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1929 EDITION**



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HANDBOOK OF LABOR STATISTICS: 1929 EDITION

Introduction

THIS is the second handbook of labor statistics to be published by the Bureau of Labor Statistics. The first handbook (Bul. No. 439), issued in 1927, sought to bring together in convenient form for reference purposes digests of the material published by the bureau prior to the year 1927. The present handbook supplements the former one by presenting similar digests of the material published by the bureau in the years 1927 and 1928.

There are necessarily repetitions of subject titles and some repetition of data but there is no repetition of articles for which no important later information is available. When a subject is one for which later information has developed than that published in the former handbook—such as cost of living—the article in the present handbook supersedes the former article. When, as in the case of wages in the iron and steel industry, no later survey has been made than that digested in the former handbook, reference to the former article is given but the material itself is not repeated. Thus, the two handbooks, used together, constitute a convenient abbreviation of practically all the published work of the Bureau of Labor Statistics of sufficiently recent date to be of present-day interest.

As explained in the introduction to the former handbook, the material presented in these handbooks represents in large part the original work of the Bureau of Labor Statistics, but this is by no means entirely the case. For instance, the Bureau of Labor Statistics does not attempt to cover certain fields of interest to labor which are already adequately covered by other official agencies. Thus, the Children's Bureau of the United States Department of Labor reports on child labor as well as on other phases of child welfare. The Women's Bureau of the same department makes comprehensive investigations of various phases of the general subject of women in industry. Since the creation of the women's and children's bureaus, the Bureau of Labor Statistics has made no special studies in the fields assigned to those bureaus. Also, other governmental agencies, outside the Department of Labor, make studies and investigations of very direct interest to labor. For example, the Bureau of Mines of the Department of Commerce regularly reports on mine accidents, and the Interstate Commerce Commission makes similar compilations of railroad accidents. The Bureau of Labor Statistics makes no attempt to do original research on these subjects. It does attempt, however, in its Monthly Labor Review to follow such of the activities of these other agencies as have a labor interest, and in the preparation of this volume it has drawn upon their work.

APPRENTICESHIP

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3

Apprenticeship in Building Construction

AN INVESTIGATION of the subject of apprenticeship in the building industry was completed by the Bureau of Labor Statistics in 1928.¹ The purpose of the study which covered 19 cities, was to determine to what extent apprenticeship is a factor in the building industry and what effect the growing agitation for a revival of the apprenticeship system is having.

The bureau limited its study to actual apprenticeship, that is, actual contract, or some equivalent obligation extending over a stipulated period of years, by which a boy is to learn and his employer is to teach one of the building crafts.

The accompanying table shows the crafts and the cities covered in the investigation, and the number of apprentices formally indentured, registered with the unions, or bound in some manner, for each city and each craft. The letter E signifies that evening-school work is provided and, theoretically at least, required. The letters PT mean that part-time school training is an integral part of the apprenticeship. The expression "part time" in all cases signifies compulsory day-school work on paid-for time.

¹ For full report see U. S. Bureau of Labor Statistics Bul. No. 459.

NUMBER OF APPRENTICES REPORTED, AND SCHOOL WORK REQUIRED IN CONNECTION WITH TRAINING, BY TRADE AND BY CITY

[E = Evening school attendance required. PT = Part-time day school attendance required and paid for]

City	As- bestos work	Brick, stone, and marble masonry	Carpentry	Electrical work	Lath- ing	Painting and deco- rating	Plastering	Plumbing	Roof- ing	Sheet- metal work	Steam fitting	Tile setting	Total
Atlanta.....		E 1 43	2				(?)	PT 12				(?)	57
Baltimore.....		150	38	22		8		PT 23		50			291
Birmingham.....		E 52	50	30		4	8	E 22		12		(?)	178
Boston.....		300	425			22	90	225		58		21	1,141
Buffalo.....		E 120	24				PT 24	PT 45		18			231
Chicago.....	E 60	E 900	PT 600	PT 650	26	PT 260	400	PT 600	26	PT 75	PT 425	45	4,067
Cleveland.....		PT 227	PT 218	PT 109	38	PT 86	61	PT 143	6	PT 75			966
Detroit.....		PT 176		PT 243	PT 12		PT 65	PT 480			PT 18	28	622
Memphis.....		23		75			12	60			27	2	204
Milwaukee.....		PT 88	PT 10	4		30	PT 46	PT 204		PT 24		17	423
Minneapolis.....		48					24					10	82
Newark, N. J.....		400	1,300	200		80	(?)	275		115			2,370
New Orleans.....				100			40	E 30					170
New York.....		E 1,600	E 1,400	E 1,600	100	E 366	577	E 94		E 300			6,127
Niagara Falls.....		E, PT 16	E, PT 25			8	E, PT 13	E 27		E 25			114
Philadelphia.....		230		210		PT 24	PT 80			E 30		40	614
Pittsburgh.....		PT 190	E 200		PT 25	12	150	PT 135		PT 60		12	904
St. Louis.....		E 180	160	150	12	90	62	E 125		E 60		16	855
Total.....	60	11 4,838	12 4,452	13 3,503	213	11 990	1,655	12 2,110	32	16 902	17 470	191	16 19,416

¹ Includes also plasterers and tile setters.

² Included under "Brick, stone, and marble masonry."

³ Includes also tile setters.

⁴ Not indented.

⁵ Including 98 not indented.

⁶ Minneapolis and St. Paul.

⁷ Includes also plasterers. Night-school students not indented.

⁸ Night-school students not indented.

⁹ Including 4,690 not indented.

¹⁰ Including 150 not indented.

¹¹ Including 2,090 not indented.

¹² Including 2,700 not indented.

¹³ Including 1,950 not indented.

¹⁴ Including 80 not indented.

¹⁵ Including 355 not indented.

¹⁶ Including 115 not indented.

¹⁷ Including 18 not indented.

¹⁸ Including 7,308 not indented.

The primary purpose of the investigation was to find out what is the present trend in producing new mechanics for the building industry, what machinery for training apprentices exists, and how it functions. Systematic school training was encountered in several localities, but the bureau did not attempt a detailed study of school work.

The apprentice problem is a local one, and the methods of meeting it vary widely not only as between cities but also as between different crafts in the same city. Even in cities where the problem is treated from the standpoint of the industry as a whole, as in Cleveland, certain crafts in the industry may be acting independently of the general plan or may be doing nothing whatever. Any attempt to generalize must be complicated with exceptions and variations. Each city covered in the bureau's survey has its own problems and its own ways of meeting them, or, perhaps, of letting them alone, and is therefore treated separately in the bulletin.

Organized Systems in Operation

WHILE apprenticeship by formal indenture between employer and boy is not widely practiced, there is coming into use a system which amounts to the same thing. That is the joint apprenticeship committee system. These committees are composed of representatives of employers and of journeymen and, in some cases, of the city school boards. Apprentices are under agreement with the committee to serve their full time and to abide by the laws of the committee, which on its part takes the responsibility of seeing that the boy has employment and proper opportunities for training throughout his apprenticeship.

Where joint committees do not operate, the union may serve the same purpose, the apprentice being in effect indentured to the local union and governed by the terms of the working agreement between the union and the employers, with the union acting as placement agent to keep the boy employed.

Apprentice training has more vitality, is more closely organized, and is affecting the building situation more definitely in those centers in which the division of vocational education of the local school board, usually acting under the Smith-Hughes law, is cooperating than in the cities in which the contractors or the unions are trying to work out the problem alone.

Apprenticeship systems designed and organized to encompass the entire building industry are found only in four cities: Cleveland, Detroit, New York City, and Niagara Falls. In none of them does the plan actually include all of the building crafts, but the organization is such that it can be expanded to cover any additional craft when the craft itself takes the necessary steps. Joint apprentice committees for individual trades are effective agents in several cities, where they operate successfully without any centralized machinery. Cleveland is the outstanding instance of successful operation under the former plan, while Chicago illustrates the method of uncorrelated craft actions.

Because the Cleveland method contains all the elements of systematic apprentice training which the bureau's investigation has found in any city visited, it will, for purposes of analysis and comparison,

be treated as a standard, deviations from which in other cities will be pointed out. As already noted, Cleveland has a system structurally so devised as to cover the building industry, but the foundation of the system is the separate crafts, each functioning through a joint committee of organized workers and organized employers. Co-operating with these committees, but not actually members of them, are the trade teachers and officials of the division of vocational education of the Cleveland public-school system. These joint apprentice committees are active working bodies, which meet regularly, monthly or oftener, and which are the controlling agency of their respective crafts in all matters pertaining to apprenticeship.

Upon action by the committee a formal indenture is made which binds employer and apprentice for the full term of apprenticeship. After the expiration of a probationary period an employer may not discharge an apprentice and a boy may not change employers without the consent of the committee after a hearing.

One of the fundamental doctrines of the system is continuous employment throughout the apprentice period, in order to keep the boy in the trade. If the contractor to whom a boy is indentured runs so short of work that he can not keep him busy, a transfer to another contractor is effected through the trade committee until such time as the original employer can resume his obligation. Responsibility for carrying the boy through his apprenticeship remains with the original employer.

All apprentices in the trades coming under the Cleveland system must attend school four hours one day a week, or one day of eight hours every other week, at the time set by the division of vocational education. While the division of vocational education is only one component element in the organized apprentice-training system in Cleveland, it enforces certain regulations which are in fact the principal cohesive factor in holding the entire scheme together.

Niagara Falls and Detroit are the only other cities covered which show the same correlation between the public schools and the industry in the training of apprentices. In each of these cities the director of vocational education is a member of each trade committee and is in effect the head of the apprentice system. The plan used in Niagara Falls is very much the same as Cleveland's, the only important difference, besides the one just mentioned, being the amount of time spent in school. First and second year boys must attend school eight hours a week—four hours in evening school on their own time and four hours Saturday morning on the employer's time; but pay for day-school work is contingent upon night-school attendance. Third and fourth year boys must attend night school four hours a week.

The system in both Cleveland and Niagara Falls depends for successful operation upon the cooperation of unions and employers and upon the active participation of the joint apprentice committees. In Detroit the trade committees are neither so active nor so interested, and formal indenture is made in only a few trades.

Apprenticeship in the building trades in Chicago depends solely on the initiative and diligence of the craft committees representing organized workers and organized employers. The school system is a receptive, not an active, agent in apprentice training. Contact between the apprentice classes and the trade is chiefly through coor-

dinators employed by the committees and through the trade teachers. Formal indenture is practiced in all cases and in most trades control and regulation of apprenticeship through joint committees are provided for in the joint working agreements and include compulsory part-time school work. In most trades uniform control is assured by the provision that only those contractors who are members of their trade associations, and hence parties to the joint agreements, may have apprentices. This is not true of carpentry, in which trade there is neither a trade agreement nor a joint apprentice committee. In the plastering trade a once active apprentice committee has become moribund and part-time school training for plasterer apprentices has been discontinued because of general lack of interest.

Under the systems thus far discussed, when a craft participates at all it does so wholly. That is to say, all the apprentices in a given trade, with possibly an occasional exception in an open shop, are included in and regulated by whatever system is followed by that trade. Only a small percentage of the contractors may be involved, but such apprenticeship as exists comes under the unified control of the organized agency.

This situation does not exist in New York City, in which an apprenticeship commission, founded and fostered by the New York Building Congress, is the medium for promoting apprenticeship in the industry. The commission is composed of representatives of the Building Congress, the Building Trades Employers' Association, and those building trades unions which are identified with it. Participation in the work of the commission on the part of the unions is determined by each local union of each craft. No craft in the city is identified with the commission plan to the extent of having all its local unions cooperating.

Structurally the New York Apprenticeship Commission is composed of apprentice committees of the component trades. Functionally the trade committees are weak and inactive, and the vital agency is not the craft organization but the superstructure representing the industry. The commission has no power and the trade committees exercise none. There is no formal indenture except in painting, no provision for continuous employment and no machinery for assuring it, and no part-time school training. The commission is the point of contact between the school system and those apprentices coming under the jurisdiction of the commission who are attending the night-school classes provided, either voluntarily or because of whatever pressure may be brought to bear upon them. Further than that, and its efforts to promote and encourage apprenticeship, the organized machinery in New York does not go.

One craft which is not a part of the apprenticeship commission has a joint apprenticeship committee composed of two representatives of the union and two of the contractors' association and exercises complete control over apprenticeship in the trade, that of sheet-metal work. Apprentices are formally indentured, continuous employment is assured, and attendance at night school four hours a week is compulsory.

The New York Apprenticeship Commission system furnished the pattern on which the Boston Building Congress built its joint apprenticeship commission in 1923. As in New York, the sheet-

metal trade remained outside and regulated its own apprentice system through its joint trade committee under its working agreement.

The Boston commission depended upon craft committees for all activities relating to apprentice regulations and control, including the enforcement of school attendance, while it undertook to secure continuity of employment and school training. Indenture was not stressed. The tendency of the craft committees, however, was to become increasingly less active and to place more and more of the burden of carrying out the program on the officers of the commission. Founded as it was on craft support, when the craft support was completely withdrawn the superstructure collapsed and the Boston Apprenticeship Commission passed out of existence four years after its establishment. Apprentice classes in the city trade school have since been discontinued for want of pupils, since no compulsion has ever been exercised.

Joint apprentice committees composed of representatives of organized employers and organized journeymen are effectively controlling apprenticeship in some trades in cities in which real apprenticeship is perhaps not followed in any other trade. The steam-fitting trade in Memphis, Tenn., is a case in point. The plumbing trade in Pittsburgh is another illustration of successful prosecution of an apprentice system by a committee composed not alone of employers and journeymen but also of materialmen and the school board.

Apprenticeship in Milwaukee is controlled by law and regulated by the apprentice department of the Wisconsin Industrial Commission. Newark, N. J., has an educational movement under the Smith-Hughes law which involves trade training but which is not actual apprenticeship in an industrial sense. It seems, nevertheless, to be working out to essentially the same ends, although it is extremely doubtful if the large number of boys reported by the various crafts as being in training both on the job and in school will complete their training and be absorbed into the industry.

Elsewhere in the field covered by the bureau nothing was found which could be considered a definite organization working toward a definite end.

Supply of Trainees

THE assertion that "boys won't go into the trades" is not verified by the investigation. On the contrary, it is quite apparent that the dearth of apprentices in the building trades is not due to a dearth of boys interested in entering those trades. The unions everywhere reported long waiting lists of applicants for apprenticeships, and joint committees agree that the problem does not lie in finding material to train.

Because of the limited opportunities for placing boys with contractors as apprentices, some unions, where they are sufficiently in control, make a practice of confining apprenticeships to the sons and other relatives of the men in the trade. This is especially true in bricklaying and plastering. It is frequently asserted that a boy has no chance to become a bricklayer unless his father is in the trade either as contractor or journeyman, and in a number of cases that is quite true. It has been true also in plumbing in some localities. The Chicago master plumbers have broken up the practice, followed there for years, of granting apprenticeships only to sons

of the men in the trade. In Pittsburgh the working agreement in the electrical trade provides that the employer shall select the apprentice one year and the union the next year, and it is tacitly understood that the union may select only sons of journeymen if it chooses to do so.

The building trades-unions in St. Louis have a very definite policy of "keeping the trade in the family" and enforce it to such an extent that one contractor declared that "a boy has as good a chance to get into West Point as into the building trades unless his father or his uncle is a building craftsman."

Apprentice Quotas

IN PRACTICAL application, union regulations governing the ratio of apprentices to journeymen prove to be far less a deterring factor in apprentice training than is commonly assumed. Where the highly developed systems prevail union regulations are apt to be abrogated entirely and the whole question of quota is handled by the joint committee on the basis of the number of apprentices the trade can support in continuous employment.

Where the method is more desultory the union quota is not an issue for the reason that relatively few contractors have any apprentices at all, and certainly have no disposition to take on more than the union agreement permits.

If union regulations were in fact responsible for restricting opportunities for apprentices, one would expect to find greater development in open-shop centers. Actually, however, it is much harder to find an apprentice in an open than in a closed shop. Only three open-shop contractors were encountered in the course of the investigation who had more apprentices than they would have been granted under union agreement.

Attitude of Contractors

THOSE most closely in touch with the situation—school authorities, members of apprenticeship committees, and contractors who are cooperating in the effort to the limit of their ability—do not hesitate to declare that the individual contractor is chiefly responsible for the shortage of apprentices and the absence of a training system. Short-sightedness, indifference, and selfishness are the charges brought against their colleagues by the contractors who are carrying the load of apprentice training for the industry.

It is conceded that the provision for continuous employment, the one element which is vitally necessary to keep the boy, is the greatest stumblingblock in the path of the contractor doing a small, or even a moderately large, business. Accordingly it is the opinion of some of the men in the industry that the problem of seasonal building will have to be met before an effective apprentice system can be evolved.

Attitude of Unions

AS A RULE trade organizations, both of employers and of journeymen, have at least an appreciation of the needs of their respective trades in regard to apprentice training, even though they may be doing nothing constructive to promote it. And while there are

exceptions, taken as a whole it is where union organization is strongest that apprentice systems function most effectively. Local unions were found here and there which definitely oppose apprenticeship, but more instances occur in which the unions are doing all that is being done to provide new mechanics. In one "closed-shop" center, on the other hand, not only strict limitations as to the number of apprentices, but dictation as to who may become apprenticed are enforced by unions strong enough to impose them upon employers. Instances of wage scales so high that few contractors can afford to pay them to learners suggest restriction by a method more indirect and probably more effective than the ratio system.

Speaking of the attitude of both contractors and unions on the question, a prominent architect of New York who was instrumental in establishing the apprenticeship commission of the New York Building Congress, said:

Recriminations flew thick and fast between the contractors and the labor men when we first tried to get together on a program, each side blaming the other for conditions. But that isn't going to solve the apprentice problem, and so far as I can see into the situation, both sides are tarred with the same stick.

Training on the Job

WHILE it is generally admitted that an apprentice is at best a financial liability for the first year, and often longer than that, it is not that phase of the problem which is objected to so much as it is the added difficulties on the job when an apprentice is taken on. The expression most frequently used by contractors is that they "can't be bothered with boys." Rapid building makes training on the job not only unprofitable but well-nigh impossible. Employers and journeymen agree that it is simply not possible to carry out any real program of teaching on the job. To this school authorities and lay opinion, equally interested but not so directly involved, add that whether possible or not, there certainly is no training on the job. The boy merely "rubs off" what he can while he is working with journeymen, and where school work is part of his training the school is expected to supply, in a few hours a week, the technical and mechanical knowledge which the job can not, or at any rate does not, provide. One authority made the unequivocal declaration that "there simply is no such thing as training apprentices on the building."

National Programs

AS ALREADY stated, apprentice problems and methods of dealing with them vary widely in different localities and crafts, and in the various crafts in the same locality. At the same time a few craft organizations have definite national programs which are of fairly wide application, notably the tile setters, the marble setters, the plumbers, the bricklayers, the electrical workers, and the sheet-metal workers.

ARBITRATION AND CONCILIATION

Work of the United States Railroad Board of Mediation

THE United States Board of Mediation was constituted under the terms of the railroad labor act of 1926, to handle cases of dispute which the carriers and employees have been unable to settle in conference. When disputes between carriers and their employees can not be settled through mediation proceedings, the law directs that the Board of Mediation shall endeavor to induce the parties to submit their controversy to arbitration. The arbitration board shall be composed of three or of six members, as the parties may determine, one-third of whom shall represent the carriers, one-third the employees, and one-third shall be neutral. If the representatives of the carriers and employees fail to name the neutral member or members of the board, it becomes the duty of the Board of Mediation to appoint such member or members.

The board began operations in July, 1926. During the two years ending June 30, 1928, the board received 363 requests for its services in the adjustment of differences concerning rates of pay, rules, or working conditions, involving 63 railroad organizations and 384 carriers. The board has disposed of 256 of the cases received, as follows:

NUMBER OF CASES DISPOSED OF, BY METHOD OF SETTLEMENT, 1926-27 AND 1927-28

Settled by—	1926-27	1927-28	Total
Mediation agreement.....	57	84	141
Arbitration agreement.....	27	14	41
Mediation withdrawal.....	15	37	52
Withdrawn voluntarily.....	9	8	17
Board action.....	3	2	5
Total.....	111	145	256

In five of the cases reported as having been disposed of during the year 1926-27 through arbitration, the agreements to arbitrate were subsequently canceled; two of these cases were later settled by mediation and three by withdrawal. Of the 107 cases remaining unsettled, 58 had been assigned for mediation and were awaiting the arrangement of mediation conferences. The remaining 49 cases had not been accepted for mediation.

In addition to the foregoing cases relating to rates of pay, rules, or working conditions, the board received during the two years applications for its services in the adjustment of 120 other cases which were, for the most part, grievances involving the interest of employees as affected by the application of rules or of discipline. Of the total of 120 grievance cases 3 have been disposed of—2 by voluntary withdrawal and 1 through mediation.

The board states that the consideration of grievance matters by the board as provided in the railroad labor act contemplates the creation of adjustment boards. Such adjustment boards have not been generally created, and the board has therefore been hampered in its efforts to render services in such cases.

Railroad Arbitration Awards, 1927 and 1928

SUMMARIES are given below of the principal awards resulting from railroad labor arbitrations held during 1927 and 1928, other than the American Express Co. case, which was settled in the early part of 1927 and was noted in the former handbook (Bul. No. 439).

Clerks and Station Employees

Boston & Maine Railroad Co.

A BOARD of arbitration consisting of Victor S. Clark appointed by the United States Board of Mediation, Benjamin Thomas, selected by the carrier, and P. J. Clair selected by the employees rendered a decision in a controversy concerning wages between the Boston & Maine Railroad Co. and the Brotherhood of Railroad Station Employees, April 25, 1927. The award was as follows:

1. Add to the rates of pay in effect on April 1, 1927, an increase of 2 cents per hour for all classes of labor coming within the scope of the agreement to arbitrate as set forth in paragraph 4 of said agreement.
2. The increase in the rates of pay herein provided for shall be effective as of April 22, 1927, and shall continue in force for one year, and thereafter until terminated upon 30 days' notice by either party to the award.

Benjamin Thomas representing the carrier filed a dissenting opinion.

Chicago & North Western Railway Co.

A WAGE dispute between the Brotherhood of Railway and Steamship Clerks, Freight Handlers, and Station Employees and the Chicago & North Western Railway Co. was settled by an award made by a board consisting of William Walliser, C. H. Westbrook, George M. Harrison, George W. Eastty, Victor S. Clark, and Ralph E. Heilman, November 4, 1927. The award was as follows:

1. Add to the rates of pay in effect October 31, 1927, an increase of 7 per cent of the existing rates for all classes of labor coming within groups 8, 9, 10, 11, 14, 83, 103, and 104 of the Interstate Commerce Commission classification.
2. Add to the rates of pay in effect October 31, 1927, an increase of 4 per cent of existing rates for all classes of labor coming within groups 31, 101, 105, and 106 of the Interstate Commerce Commission classification.
3. The increase of rates of pay herein provided for shall be effective as of November 1, 1927.
4. The sum of the increases granted the employees by this award may be distributed by a joint action and agreement of the parties to this arbitration in such manner as to bring about an adjustment of the inequalities in rates of employees covered by this award, provided, that in the event of the parties to this arbitration failing to agree as to said distribution within a period of 30 days from this award, the award shall be applied as though this paragraph were not a part thereof.

The first named two members of the board, representing the carrier, filed a dissenting opinion.

Great Northern Railway

APRIL 4, 1928, an arbitration award in a dispute between the Brotherhood of Railway and Steamship Clerks, Freight Handlers, Express and Station Employees and the Great Northern Railway Co. was made by a board consisting of John A. Cochrane, representing

the carrier, John H. Sylvester, representing the union, and John F. D. Meighen, appointed by the United States Board of Mediation. A majority of the board rendered the following decision:

This award shall be effective August 1, 1927, and the increases in rates of pay granted herein shall be added to the rates in effect July 31, 1927.

SECTION 1. Storekeepers, assistant storekeepers, chief clerks, foremen, subforemen, and other clerical supervisory forces—add 4 cents per hour, per position.

SEC. 2A. Clerks with experience of two or more years in railroad clerical work or clerical work of a similar nature in other industries, or where their cumulative experience in such clerical work is not less than two years—add 4 cents per hour, per position.

SEC. 2B. Clerks with an experience of one year and less than two years in railroad clerical work or clerical work of a similar nature in other industries, or where their cumulative experience in such clerical work is not less than one year—add 3 cents per hour, per position.

SEC. 3A. Clerks whose experience as above defined is less than one year and more than six months—add 2 cents per hour, per position.

SEC. 4. Train and engine crew callers, assistant station masters, train announcers, gatemen, and baggage and parcel room employees, other than clerks—add 4 cents per hour, per position.

(Sections 5 and 6—no increase.)

SEC. 7. Station, platform, warehouse, transfer, dock, pier, storeroom, and team-track freight handlers or truckers, and others similarly employed—add 4 cents per hour, per position.

SEC. 8. The existing differential shall be maintained between the truckers' rate, as above established in section 7, and the classes named below under A and B.

A. Sealers, scalers, and fruit and perishable inspectors.

B. Storers or stevedores, callers, or loaders, locators, and coopers.

SEC. 9. All common laborers in and about stations, storehouses, and warehouses not otherwise provided for—add 4 cents per hour, per position.

(Sections 10 and 11—no increase.)

John A. Cochran, the representative of the carrier, filed a dissenting opinion.

Illinois Central Railroad Co.

ARTHUR M. MILLARD, Phil E. Ziegler, Richard P. Dee, with William Rogers Clay as chairman, constituting a majority of a board of arbitration, rendered a decision, August 23, 1927, in regard to demands made by the Brotherhood of Steamship Clerks, Freight Handlers, Express and Station Employees, employed by the Illinois Central and Yazoo & Mississippi Valley Railroads, increasing the wage rates of the employees by 5 per cent.

G. J. Bunting and Edward C. Craig, representing the carrier, dissented from the award on the ground that an increase in the rates was not justified by the evidence.

New York Central and Grand Central Terminal

THE MEMBERS of the Brotherhood of Railway and Steamship Clerks, Freight Handlers, Express and Station Employees employed by the New York Central Railroad and Grand Central Terminal asked for an increase of wages, which was considered by an arbitration board consisting of Daniel W. Dinan, appointed by the company, William B. Wilson, appointed by the employees, and Victor S. Clark, appointed by the United States Board of Mediation. This board was created under the provisions of the railway labor act and a written agreement

of October 11, 1926. The award as made by the arbitrators March 26, 1927, is as follows:

1. Add to the rates of pay in effect March 15, 1927, an increase of 6 per cent of existing rates, for all classes of labor coming within the scope of the agreement to arbitrate as set forth in paragraph 4 of said agreement.

2. The increase in the rates of pay herein provided for shall be effective as of March 16, 1927.

3. The sum of the increases granted to the employees by this award may be distributed by joint action and agreement of the parties to this arbitration in such manner as to bring about an adjustment of the inequalities in the rates of the employees covered by this award: *Provided*, That in the event of the parties to this arbitration failing to agree as to the said distribution within a period of 90 days from the date of this award, the award shall be applied as though this paragraph was not a part thereof.

St. Louis-San Francisco Railway Co.

A BOARD of arbitration, consisting M. M. Sisson and J. L. McCormack, selected by the carrier; J. H. Sylvester and J. R. Moll, selected by the brotherhood; and John L. Kennedy and Fred L. Williams, selected by the United States Board of Mediation, rendered a decision in a controversy concerning wages between the St. Louis-San Francisco Railway Co. and other railroad companies and the Brotherhood of Railway and Steamship Clerks, Freight Handlers, Express and Station Employees, August 2, 1928, made effective the preceding day reading as follows:

SECTION 1. Storekeepers, assistant storekeepers, chief clerks, foremen, subforemen, and other clerical supervisory forces, add an increase of $3\frac{3}{4}$ cents per hour.

SEC. 2. (a) Clerks with an experience of one or more years in railroad clerical work or clerical work of a similar nature in other industries, or where their cumulative experience in such clerical work is not less than one year, add an increase of $3\frac{3}{4}$ cents per hour.

(b) Clerks with an experience of less than one year in railroad clerical work or clerical work of a similar nature in other industries or where their cumulative experience in such clerical work is less than one year who are now in the service or may hereafter enter the service are to be paid 34 cents per day less than the full established rate of pay for the position occupied.

NOTE.—After employees covered by this section have accumulated one year's experience as herein defined they shall be rated and paid the full rate of the position occupied in accordance with the provisions of section 2 (a).

SEC. 3. Telephone switchboard operators, assistant station masters, train announcers, and gatemen, other than clerks, add an increase of 1 cent per hour.

SEC. 4. Janitors, elevator operators, office and station and warehouse watchmen, and employees engaged in assorting waybills and tickets, operating appliances or machines for perforating, addressing envelopes, numbering claims and other papers, gathering and distributing mail, adjusting dictaphone cylinders, and other similar work, add an increase of 1 cent per hour.

SEC. 5. Office boys, messengers, chore boys, and other employees filling similar positions, add an increase of 1 cent per hour.

SEC. 6. Station, platform, warehouse, transfer, dock, pier, storeroom, stockroom, and team track freight handlers or truckers and other similarly employed including stockyard laborers, add an increase of $2\frac{3}{4}$ cents per hour.

SEC. 7. The following differentials shall be established and maintained between truckers and the classes named below:

(a) Sealers, scalers, and fruit and perishable inspectors, 2 cents per hour above truckers' rates as established under section 6. This not to decrease any existing higher differentials.

(b) Stowers or stevedores, callers or loaders, store helpers, pickers or locators, and coopers, 4 cents per hour above trucker's rates as established under section 6. This not to decrease any existing higher differentials.

SEC. 8. All laborers in and around stations, storehouses, and warehouses, chauffeurs, electro-mobile operators, and others similarly employed, add an increase of $2\frac{3}{4}$ cents per hour.

SEC. 9. Baggage and parcel room employees, and station helpers, add an increase of $2\frac{3}{4}$ cents per hour.

SEC. 10. Train and engine crew callers, add an increase of 2 cents per hour.

Southern Railway

AN INCREASE of $2\frac{1}{2}$ cents per hour was awarded July 14, 1927, by a board consisting of A. H. Plant, selected by the carrier and Walter C. Clephane, appointed by the United States Board of Mediation, effective July 15, 1927, in the case of a request for an increase of 6 cents per hour made by the railway clerks of the lines included in the Southern Railway System.

The third member of the board, C. R. Briceland, selected by the employees, filed a dissenting opinion from which the following extracts are taken:

The evidence as presented in the hearing of this case warrants a greater increase than that as provided for in the award. From the time the last wage adjustment was made until the time conference between the carrier and the employees was held the cost of living had advanced $5\frac{1}{2}$ per cent, while the purchasing power of the dollar had dropped from \$1.247 to \$1.193. This evidence is given in the carriers' own exhibit but is entirely disregarded, and the American standard of living is ignored.

Including the highest rates of the most experienced and skilled clerical employees, the average monthly rate is only \$121.60. Many of those so included—approximately 30 per cent—receive from \$3.11 to \$4.15 per day, and to those the award can be but a jest.

The unusual prosperity of the carrier as shown by the evidence is apparently forgotten and the employees by this award are bluntly but firmly warned that they can not participate nor have any share in the marked increased net income of the carrier although their loyalty and efficiency is neither questioned nor challenged. The award places the dividends of the carrier above the welfare and the happiness of the employees.

The award penalizes the employees for their peaceful and patient procedure, encouraging militancy, and discounts saneness.

In the light of the evidence submitted the undersigned can neither remain silent nor concur in the decisions of the majority, and therefore must dissent therefrom.

Wabash Railway Co.

AUGUST 17, 1927, a decision in the dispute between the Brotherhood of Railway and Steamship Clerks, Freight Handlers, Express and Station Employees and the Wabash Railway Co. was made by a board of arbitration consisting of S. E. Cotter, appointed by the carrier, George M. Harrison selected by the brotherhood, and Fred L. Williams, appointed by the United States Board of Mediation. The award was as follows:

This award shall be made effective as of August 16, 1927, and the increases in rates of pay granted herein shall be added to the rates in effect August 15, 1927.

SECTION 1. All clerks, etc., designated in rule 1, section 1, of the schedule effective May 1, 1924, $3\frac{1}{2}$ cents per hour.

SEC. 2. All employees in rule 1, sections 2 and 3, of the schedule effective May 1, 1924, commonly known as station employees, including such as baggage room employees, callers, watchmen, janitors, etc., 2 cents per hour.

SEC. 3. All employees in rule 1, sections 2 and 3, of the schedule effective May 1, 1924, such as messengers, chore boys, and those engaged in assorting waybills, etc., not requiring clerical ability, 2 cents per hour.

SEC. 4. Employees without previous clerical experience as a clerical worker hereafter entering the service and filling positions of clerk or machine operator shall be paid as follows: First six months \$2.35 per day, second six months \$3.19 $\frac{1}{4}$ per day, and thereafter shall be paid the established full rate of pay for the position occupied.

SEC. 5. Freight handlers as generally designated in rule 1, schedule for freight handlers, effective May 1, 1924, 2½ cents per hour.

SEC. 6. The following differentials shall be maintained between freight handlers and the classes named below:

(a) Sealers, scalers, and fruit and perishable inspectors, 3 cents per hour above the rates for truckers.

(b) Stowers, stevedores, callers, etc., 4 cents per hour above the rates for truckers.

Later a controversy arose between the parties as to the meaning and application of section 4 of the award. The board therefore reconvened November 21, 1927, stated that it was not its intention in the award to discriminate against similar employees in the employ of the carrier prior thereto, and after a hearing rewrote section 4, as follows:

Employees filling positions of clerks or machine operators who, prior to their employment by the Wabash were without previous clerical experience as a clerical worker and who shall not have served one whole year prior to the effective date of this award—to wit, August 16, 1927—shall after the end of one year's service in such position or positions be paid for future services the established full rate of pay for the position occupied; and for any unexpired portion of any said first year remaining after the going into effect of this award, shall be paid as follows: For any remaining portion of the first six months of said employment occurring after August 16, 1927, shall be paid at the rate of \$2.35 per day; for any remaining portion or whole of the second six months of their employment occurring after August 16, 1927, shall be paid at the rate of \$3.19¼ per day; and all such employees entering the service and filling such positions after August 16, 1927, shall be paid as follows: \$2.35 per day for the first six months and \$3.19¼ per day for the second six months, and thereafter the established full rate of pay for the position occupied.

S. E. Cotter, representing the carrier, declined to concur in the new decision, holding that the section as written "is plain and conclusive and not subject to interpretation, as would be clearly apparent if the majority had inserted the original section 4 in the so-called interpretation thereof, and that the board, or a majority thereof, is without authority to make an amended award establishing conditions which change or vary from the original award, as a majority of the board have attempted to do."

Engine and Train Service

Engineers and Firemen—Boston & Maine Railroad

THE Boston & Maine Railroad and its engineers and firemen submitted to a board of arbitrators, consisting of D. S. Brigham, S. H. Huff, and James Jackson, the following question:

Since July, 1900, the engineers and firemen employed on the Fitchburg-Berkshire division have been operating between Boston and Greenfield, Mass., and between Greenfield, Mass., and Troy, N. Y. The management proposes, effective November 29, 1926, to run these engineers and firemen from Boston, Mass., over the Fitchburg-Berkshire division to Troy, N. Y., a distance of 192 miles, which method of operation has been strenuously opposed by the engineers and firemen.

The decision of the board in part was as follows:

The board agreed that this question should be decided on the merits of the testimony offered and that no research of any character would be required.

In the opinion of the majority of the board, the point at issue has resolved itself to one question:

"Do the runs instituted by the management of the Boston & Maine Railroad between Boston, Mass., and Troy, N. Y., cause an excessive strain or unreasonable hardship on the engineers and firemen on those runs?"

The chairman of the board, in order to get some first-hand information, personally took the trip on the slow mail train leaving Boston at 3 a. m. and arriving at Troy at 11.40 a. m. and returned the same day on the Minute Man, the fastest express train on this line, due to leave Troy at 2.35 p. m., arriving Boston at 7.25 p. m.

The board has sat in executive session and weighed the evidence offered on this particular case, and a majority of the board renders its award in favor of the Boston & Maine Railroad, effective March 18, 1927.

Firemen—Eastern District

THE MEDIATION agreement between the Brotherhood of Locomotive Firemen and Enginemen and certain eastern railroads was signed February 5, 1927.

In the fall of 1925, a vote was taken by the union, which showed that an overwhelming majority of the members favored the inauguration of a concerted movement for an increase in wages. The matter was delayed during the spring of 1926 in order to enable the Brotherhood of Locomotive Engineers to join with them. It was then decided that each union should work separately, and the firemen made a demand on the general manager of each road for an increase in wages. In every case the demand was refused, whereupon the union requested that the roads join in authorizing the appointment of a conference committee. This was agreed to, and on January 8, 1927, representatives of the two bodies met and the firemen submitted their demands.

On January 21 the question was submitted to mediation under the provisions of the railway labor act, and on February 5 an agreement was signed by representatives of the two sides. The agreement increased the wages about $7\frac{1}{2}$ per cent.

Engineers and Firemen, Conductors, Trainmen, and Switchmen—Pere Marquette Railway

A DISPUTE between the Pere Marquette Railway Co. and its locomotive engineers and firemen, conductors, trainmen, and switchmen was ended by a somewhat lengthy decision filed January 10, 1928, by a board of arbitration consisting of Alfred J. Murphy, appointed by the United States Board of Mediation, A. L. Grandy representing the carriers, and C. S. Montooth representing the various brotherhoods interested.

The sole issue between the parties was "the determination of an effective date for the establishment of wage increases agreed to between the parties."

The facts were as follows: Twenty-one carriers operating in the same territory as the Pere Marquette had in pursuance of an award, granted their conductors, trainmen, and switchmen, a $7\frac{1}{2}$ per cent increase in wages December 1, 1926, and 19 carriers had granted their firemen the same increase February 1, 1927. The Pere Marquette, with several other carriers, was not a party to either agreement. But the Pere Marquette of its own volition, April 8, 1927, granted the same increase in wages to similar employees on its own lines, effective April 16, 1927.

The organizations representing the employees on the Pere Marquette contended that this increase should start from December 1, 1926, and February 1, 1927, respectively, the dates that the increases took effect upon the other lines, since employees working in the same

geographical district should receive a rate of increase at the same time, and common carriers operating in the same field should be subjected to the same costs of operation, and because the carrier was dilatory in dealing with their requests, closing with the statement "that a fair consideration of all the equities arising requires the retroactive payment requested."

The carrier on the other hand charged the employees with delay in dealing with its grievance, that not being a party to the arbitration of December 1, 1926, or the mediation of February 1, 1927, it should not be compelled to accept the results of those proceedings, "and that to grant the requests for back pay would be to penalize it for installing a wage increase which was not compulsory, but which it voluntarily granted."

The award of the board is that the increases made by the Pere Marquette Railway, effective as of April 16, 1927, should not be retroactive.

Engineers—Southeastern Railroads

A DECISION by a board of arbitration consisting of J. J. Pelley and W. J. Jenks representing the carriers, A. Johnston and S. H. Huff representing the Brotherhood of Locomotive Engineers, and Leslie M. Shaw and W. P. Stacey appointed by the United States Board of Mediation, handed down a decision February 4, 1928, relative to a controversy between the members of the Brotherhood of Locomotive Engineers and their employers, The Atlantic Coast Line Railroad Co., Central of Georgia Railway Co., Charleston & West Carolina Railway Co., Chesapeake & Ohio Railway Co., Clinchfield Railroad Co., Florida East Coast Railway Co., Georgia Railroad Co., Louisville & Nashville Railroad Co., Louisville, Henderson & St. Louis Railway Co., Nashville, Chattanooga & St. Louis Railway Co., Norfolk Southern Railroad Co. (steam service only), Norfolk & Western Railway Co., Richmond, Fredericksburg & Potomac Railroad Co., Winston-Salem Southbound Railway Co., and Jacksonville Terminal Co.

The men had made four demands upon the carriers as follows:

1. A request for an increase of 15 per cent in all classes of service including differentials, arbitraries and special allowances, and that the present minimum guaranty in passenger service be increased 15 per cent.
2. A request for Mallet rate for 3-cylinder steam and electric locomotives.
3. A request that there be added to the freight locomotive classification the following: Mallet engines and engines carrying Mallet rates of over 275,000 pounds on drivers, a differential of 25 cents for each additional 50,000 pounds on drivers and on other engines a differential of 25 cents for each 50,000 pounds over 350,000 pounds on drivers.
4. A request that when boosters are attached to tenders, the weight of the tender be added to the weight on drivers of locomotives and the total weight so produced shall fix the rate for the respective classes of service.

The board awarded the men an increase of 6½ per cent, disallowed the second and third demands, and spoke as follows relative to the fourth:

Fourth: With respect to the request that when boosters are attached to tenders the weight of the tender be added to the weight on drivers, it is adjudged that when a locomotive leaves a terminal with booster in condition to operate, the weight on drivers shall be determined by adding the tractive effort of the booster to the tractive effort of the locomotive, and establish new weight on drivers proportionate to the increased tractive effort.

Example: Locomotive without booster weighs 224,000 pounds on drivers, with tractive effort of 47,500 pounds. Tractive effort equals 21.2 per cent of weight on drivers. Booster adds 10,000 pounds to the tractive effort, making total tractive effort 57,500 pounds; 57,500 pounds is 21.2 per cent of 271,000 pounds, the new weight on drivers.

The representatives of the men did not sign the above award but signed a dissenting opinion.

Firemen—Southeastern Territory

C. J. Goff, W. J. Jenks, and Grafton Green as arbitrators rendered a decision June 16, 1927, in a dispute between the locomotive firemen and enginemen and certain railroads in the southeastern territory. The requests of the employees were seven in number, as follows:

1. Except as otherwise provided herein, existing rates of pay for firemen, helpers, hostlers, and outside hostler helpers shall be increased \$1 per day.

2. In freight service on steam, electric, or other power weighing 250,000 pounds and over on drivers and on Mallet engines, existing rates of pay shall be increased \$1.25 per day.

3. Gradations of locomotives, according to weights on drivers, to be extended to 550,000 pounds and over in freight service, with an additional increase of 25 cents per day to be applied for each 50,000 pounds above 250,000 pounds on drivers.

4. It is understood that the weight on all other power-driven wheels will be added to the weight on drivers of locomotives that are equipped with boosters, and the weights produced by such increased weights shall fix the rates for the respective classes of service.

5. In all passenger service, the earnings from mileage, overtime or other rules applicable, for each day service is performed shall be not less than \$6.25 for firemen.

6. Existing rates of pay, in excess of standard rates, shall be increased the same amount as proposed for the standard rates.

7. Note: All arbitrarities and special allowances to be increased proportionately.

The arbitrators decided in regard to the first and second requests "that the rates of pay of firemen engaged in all road service except passenger service shall be increased 40 cents per basic day and that the rate of pay of all other employees involved shall be increased 35 cents per basic day." In regard to the fifth request the minimum rate was placed at \$5.60. The third request was denied, the fourth, sixth, and seventh were granted.

C. J. Goff presented a dissenting opinion, arguing that the increase granted was insufficient.

Firemen—Western Railroads

THE Brotherhood of Locomotive Firemen and Enginemen made a claim for increase of wages on the managements of the various western railroads, June 25, 1926, which was denied by the carriers July 8, 1927. As both sides invoked the services of the United States Board of Mediation, mediation proceedings followed. These, however, were without result, and by agreement, August 6, 1927, both sides left the question to an arbitration board consisting of Albert Phillips and S. A. Boone, representing the brotherhood; R. V. Fletcher and John W. Higgins, representing the carriers; and Judge Haslett P. Burke and Paul A. Sinsheimer, appointed by the United States Board of Mediation.

The arbitration hearings began September 29 and ended November 11, 1927. The board agreed that a decision should be made by

December 20, met in executive session from November 28 to December 5, and then issued a statement that it was unable to agree upon an award. At the suggestion of the United States Board of Mediation, Judge Burke called the members of the arbitration board to meet December 17, and was later notified that, acting on advice from the Department of Justice, the United States Board of Mediation suggested that if a majority of the board appeared December 17, those present make an award according to the arbitration agreement. Following a protest of the chairman of the conference committee of managers of western railroads against convening the board, the arbitrators representing the railroads declined to attend the meeting. Four of the six members of the board met and rendered a decision, of which the following is a part:

Demand 1: Except as otherwise provided herein existing rates of pay for firemen, helpers, hostlers, and outside hostler helpers shall be increased \$1 per day.

On this demand the board decides that the rates of pay for firemen in road passenger service shall be increased 30 cents per day and the rates of pay of all other employees involved shall be increased 35 cents per day.

Demand 2: In freight service on steam, electric, or other power weighing 250,000 pounds and over on drivers and on Mallet engines, existing rates of pay shall be increased \$1.25 per day.

This demand the board denies, except to the extent granted in No. 1, above.

Demand 3: Gradations on locomotives, according to weights on drivers, to be extended to 550,000 pounds and over in freight service, with an additional increase of 25 cents per day to be applied for each 50,000 pounds above 250,000 pounds on drivers.

This demand the board denies.

Demand 4: The weight of all other power-driven wheels will be added to the weight on drivers of locomotives that are equipped with boosters, and the weights produced by such increased weights shall fix the rates for the respective classes of service.

This demand the board grants.

Demand 5: In all passenger service the earnings from mileage, overtime, or other rules applicable for each day service is performed shall be not less than \$6.25 for firemen.

This demand the board grants to the extent of \$5.55; otherwise denies.

Trainmen—Western Railroads

THE DECISION of the arbitrators in the dispute between the Order of Railway Conductors and Brotherhood of Railroad Trainmen and certain western railroads was given June 25, 1927. The railroads selected as arbitrators, W. J. Jackson and J. W. Higgins; the employees, E. P. Curtis and J. A. Farquharson; the United States Board of Mediation, Everett C. Brown and W. M. W. Splawn.

The new day rates requested by the men were: Conductors, \$7.75; assistant conductors and ticket collectors, \$6.84; baggagemen handling express, dynamo, and Government mail, \$7.18; baggagemen handling dynamo and Government mail, or express and Government mail, or dynamo and express, \$6.84; baggagemen handling either dynamo, express, or Government mail, \$6.50; baggagemen, \$6.16; flagmen and brakemen, \$6. For service paid local or way freight rates under schedules now in effect—conductors, \$7.74; brakemen, \$6.24. For service paid through freight rates under schedules now in effect—conductors, \$7.34; brakemen, \$5.84. Yard service—car retarder operators, \$8.44; foremen, \$7.64; helpers \$7.16; switch tenders, \$5.72.

The award was signed by all six of the arbitrators. Extracts from the award, follow:

The standard rates of pay per mile, per day, and per month for conductors, assistant conductors and ticket collectors, train baggagemen, train flagmen and brakemen, in passenger service, for conductors and brakemen in local or way freight service, for conductors and brakemen in through freight service, and for all classes of trainmen parties to this arbitration shall remain the same as established by agreement in 1924 and shall not be increased over the rates in effect on February 28, 1927.

The standard rates of pay shall be increased $7\frac{1}{2}$ per cent for yardmen who are parties to this arbitration, effective March 1, 1927. The rates of pay in yard service shall be as follows: Car retarder operators, per day, \$7.94; foremen, per day, \$7.14; helpers, per day, \$6.62; switch tenders, per day, \$5.07.

On roads where trainmen legislate for yardmasters and assistant yardmasters, the same increases will be added to the present rates as awarded to yard foremen.

Ferryboat men—California Railway Lines

A WAGE dispute between the Ferryboatmen's Union of California and various railroad lines centering at San Francisco—viz, the Atchison, Topeka & Santa Fe, Northwestern Pacific, Southern Pacific, and Western Pacific Railroad Cos., was settled by an award of a board of arbitration consisting of Charles D. Marx, W. R. K. Young, Louis Bloch, James L. Dunn, F. L. Burckhalter, and J. A. Christie, October 31, 1927, and reads as follows:

RULE 2. Passenger and car ferries and tugs towing car floats: Firemen, \$146.35 per month; deck hands, \$139.40 per month; cabin watchmen, \$139.40 per month; night watchmen, \$120 per month; matrons \$85 per month.

Fire boats: Firemen, \$97.57 per month; deck hands, \$92.94 per month.

RULE 6. Assigned crews will work on the basis of 8 hours or less on watch each day for six consecutive days.

Exceptions:

- (1) On boats with two crews, watches may be separated by an interval of time.
- (2) Extra crews may be used on any day it is found necessary to operate one or two crewed boats beyond assigned hours of regular crews.
- (3) Where three crews are used, watches may be as long as 8 hours and 40 minutes, provided the combined watches do not exceed 16 hours and no crew works over 48 hours in six consecutive days.
- (4) Where two crews are used, watches may be as long as 8 hours and 40 minutes, provided the combined watches do not exceed 16 hours and no crew works over 48 hours in six consecutive days.
- (5) On boats operating out of Vallejo Junction crews may be assigned 12 hours per day and not to exceed 48 hours per week.
- (6) On one and two crewed tugs towing car floats crews may be worked not to exceed 9 hours and 20 minutes per watch.
- (7) On 3-crewed tugs towing car floats and car ferries, except on Carquinez Straits, crews may be assigned 12 hours on watch with 24 hours off watch, provided such assigned watches average 48 hours per week within the time required to bring it about.
- (8) On fire boats crews will work 24 hours on and then 24 hours off without pay for time off.
- (9) Limit anywhere provided on length of watches does not apply in emergency or when necessary to make extra trips to handle heavy volume of traffic which can not be handled on schedule trips.
- (10) Watches on 3-crewed boats shall not begin or terminate between 1 a. m. and 6 a. m.
- (11) Employees required to operate boats to and from yard shall be paid regular run rates.
- (12) Night watchmen may be assigned on 12-hour watches four days per week.

RULE 8. The monthly salary now paid the employees covered by this agreement shall cover the present recognized straight-time assignment. All service hourage in excess of the present recognized straight-time assignment shall be paid or in addition to the monthly salary at the pro rata rate.

A dissenting opinion was filed by the last-named two arbitrators, representing the railroad.

Maintenance-of-Way Employees

Chicago & North Western Railway Co.

AN ARBITRATION award in a dispute between the maintenance-of-way employees and their employers, the Chicago & North Western Railway Co., was made by a board of arbitration, consisting of William Walliser and C. H. Westbrook appointed by the carrier, J. J. Farnan and E. E. Milliman named by the employees, and E. C. Davies and Homer B. Dibell named by the United States Board of Mediation, August 15, 1927.

The brotherhood asked a uniform rate of increase of 5 cents per hour. The carrier asked a decrease in the wages of some of the employees and asked that no change be made in others.

The employees are divided into 22 groups, the wages awarded to the various groups being as follows:

Bridge building—painter, construction, mason, and concrete foremen: Rate of \$172.50 per month unchanged.

Assistant, bridge building—painter, construction, mason, and concrete foremen: Rate of \$160 per month changed to 5 cents per hour in excess of the maximum rate paid in the gang supervised.

Carpenters and painters and leaders: Old rate, 57 cents to 69 cents per hour. Those receiving 57, 58½, and 59¾ cents increased to 58½, 60, and 61 cents, respectively. Those receiving 61¾, 62, 63, and 64¾ cents were unchanged. Those receiving 69 cents are given 58½ cents with varying differentials.

Carpenter and painter helpers: Old rates of 48½ to 67 cents per hour increased one-half cent per hour. The 67-cent rate is abolished, the one employee receiving it being given the minimum rate with a differential.

Masons and mason leaders: Old rates 59¾ to 68½ cents per hour; the minimum rate is increased to 61 cents; other rates unchanged.

Mason helpers: Old rates, 48½ and 51½ cents per hour, increased one-half cent.

Scale and bridge inspectors: Rate of 66 cets per hour unchanged.

Pile driver, ditching and hoisting engineers: Rates of \$139.08 and \$159.08 per month unchanged.

Pile-driver firemen: Rate of \$90.92 per month unchanged.

Track and section foremen and maintenance foremen: Rates \$115 to \$145 per month, increased \$5 per month.

Assistant track and section foremen and assistant maintenance foremen: Rates of 43, 45, and 49 cents per hour increased 1 cent per hour.

Extra gang foremen: Rate of \$140 per month increased \$5 per month.

Coal-chute foremen and coal-wharf and fence-gang foremen: Rate of \$110 per month unchanged.

Track and section laborers: Old rate, 38 cents per hour. New rate, 37 cents to those employed less than one year; 39 cents for one to two years' service; 41 cents for those who have served over two years.

Extra gang laborers: Rate of 38 cents per hour changed to 35 cents.

Laborers other than track and roadway, maintenance of way, and shop: Rate of 38 cents per hour unchanged.

Laborers, shops, engine houses, and power plants, coal-chute laborers: Rate of 38 cents per hour unchanged.

Common laborers, shops, engine houses, power plants, and stores: Rate of 38 cents per hour unchanged.

Lampmen: Old rates of \$47.95 to \$93.25 per month increased \$1 per month.

Pumpers: Rates of \$57.12 to \$98.88 per month unchanged.

Drawbridge tenders and assistants: Rates of \$70.92 to \$85.92 unchanged.

Crossing watchmen and flagmen: Rates of \$40 to \$135 per month unchanged except that the minimum is \$55.

Louisville & Nashville Railroad

A DISPUTE between the Louisville & Nashville Railroad and its maintenance-of-way employees was settled June 9, 1927, by a decision of three arbitrators, Col. L. L. Morton selected by the carrier, T. C. Carroll selected by the employees, and Judge Charles Kerr appointed by the United States Board of Mediation. The employees demanded an increase of 5 cents per hour. The board made the following increase, effective June 1, 1927:

B. and B. foremen and assistants, B. and B. gang foremen and section foremen, \$6 per month; B. and B. carpenters, painters, and apprentices, and engineers (except steam shovel), firemen, and labor foremen in shops, 3 cents per hour. Several other classes of employees received increases ranging from 1 to 2 cents per hour.

Col. L. L. Morton representing the carrier dissented from the findings of the majority of the board.

Shop Crafts

Chesapeake & Ohio Railway

AN ARBITRATION award was made April 14, 1928, in a dispute between the Chesapeake and Ohio System Federation No. 41, railway employees department, American Federation of Labor, and the Chesapeake & Ohio Railway Co., by a board consisting of A. O. Wharton and F. H. Knight, appointed by the employees, J. B. Parrish and C. B. Hitch, appointed by the carrier, and Thomas Walker Page and Wm. Rogers Clay, appointed by the United States Board of Mediation.

The employees had requested an upward adjustment of \$1.50 per basic day for all journeymen mechanics, their apprentices and helpers, except freight-car mechanics for whom an adjustment of \$1.66 per basic day was requested, and for coach cleaners a basic daily wage of \$4.70. The award of the majority of the board was as follows:

The request of the shop-craft employees for adjustment of existing wage rates is denied, and it is ordered that existing wage rates shall remain unchanged.

The representatives of the employees filed a dissenting opinion.

Signalmen

Louisville & Nashville Railroad

AN ARBITRATION board consisting of Perry B. Miller, L. W. Givan, and L. L. Morton handed down a decision, November 12, 1927, in a wage dispute between the Brotherhood of Railway Signalmen of America and the Louisville & Nashville Railroad. The old and the new rates for the various workers are as follows:

	Old rate	New rate
Signal construction foremen.....per month..	\$200. 61	\$215. 61
Signal maintenance foremen.....do.....	185. 20	195. 20
Assistant signal foremen.....per hour..	. 84	. 88
Leading signalmen, leading maintainers.....do.....	. 79	. 83
Signalmen, signal maintainers.....do.....	. 74	. 78
Signal linemen.....do.....	. 70	. 74
Signal groundmen.....do.....	. 64	. 66
Signal helpers.....do.....	. 49	. 52

Rates of signal laborers were increased 2 cents per hour.

Assistant signalmen and assistant maintainers start at 54 cents per hour, instead of 51 cents, as before, receiving an increase of 2 cents per hour every six months for four years.

L. L. Morton, representing the carrier filed a dissenting opinion.

Nashville, Chattanooga & St. Louis Railway

A CONTROVERSY relative to an increase in pay of signalmen on the Nashville, Chattanooga & St. Louis Railway and the Nashville Terminals was settled June 21, 1928, by a board of arbitrators consisting of H. H. Cartwright representing the carrier, L. W. Givan representing the union, and Grafton Green, selected by them and confirmed by the United States Board of Mediation.

The signalmen requested an increase of 6 cents per hour for each of the classes at the time receiving the following hourly rates: Leading signalmen and leading signal maintainers, 79 cents; signalmen and signal maintainers, 74 cents; assistant signalmen and assistant signal maintainers, starting at 51 cents and increasing 2 cents per hour each six months through four years (maximum, 65 cents); signal helpers, 49 cents; relay repairmen to be classified as leading signalmen.

The board increased the rate of signalmen and leading signalmen by 4 cents per hour and the others by 3 cents, but refused to classify relay repairmen as leading signalmen. The decision was made effective as of March 29, 1928.

Teamsters, Chauffeurs, Etc. (Express Workers)—St. Louis

A DECISION by Edwin W. Lee, J. G. Marston, and L. A. Mooney, acting as a board of arbitration in the dispute between the employees of the American Railway Express Co., connected with Local Union No. 658, International Brotherhood of Teamsters, Chauffeurs, Stablemen, and Helpers of America at St. Louis was made January 18, 1927. The questions referred to the board were—

(a) Are the employees of the American Railway Express Co. in vehicle service in the city of St. Louis, Mo., receiving rates of wages that are just and reasonable?

(b) If the board decides they are not receiving just and reasonable wages, what shall their wages be?

Answering these questions the board found as follows:

The board finds that the employees in the vehicle department are classified as follows: Chauffeurs, drivers, helpers, money deliverymen, supervisors, dispatchers, and assistant dispatchers.

The board having heard and carefully considered the evidence presented, observing:

First. The scale of wages paid for similar kinds of work in other industries in the city of St. Louis.

Second. The training and skill required.

Third. The degree of responsibility.

Fourth. The character and regularity of the employment; the board reaches the conclusion that the present rates of wages are not just and reasonable. The board hereby decides that the rate of increases set out below constitute for the positions specified a just and reasonable wage.

For each of the hereinafter-named classes, add the following amounts per month to the rates of pay in effect December 31, 1926: Chauffeurs, \$10; drivers, \$7.46; helpers, \$2.46; money deliverymen, \$7.46; supervisors, \$7.46; dispatchers \$7.46; assistant dispatchers, \$7.46.

It is understood and agreed to by both parties that any award granted by any other board of arbitration subsequent to December 16, 1926, and prior to the date of this decision involving express employees, shall not be applied to the employees affected by this decision.

The increase in wages hereby established shall be effective as of January 1, 1927, and are to be paid to all who were then in the carrier's service and remain therein or who have since come into such service and remain therein.

This decision to remain in full force and effect for a period of one year from January 1, 1927, and thereafter until 30 days' written notice shall be given by either party to the other.

Telegraphers

Baltimore & Ohio Railroad Co.

THE QUESTION of relief and vacation with pay for telegraphers on the Baltimore & Ohio Railroad was decided June 6, 1928, by a board of arbitration consisting of E. W. Scheer, representing the railroad; J. F. Miller, representing the telegraphers; and F. H. Kreismann, appointed by the Board of Mediation.

Employees requested an increase of 6 cents per hour for hourly rated employees and an increase of 10 per cent for monthly rated employees; also the establishment of a rule reading:

(a) All regular assigned employees working seven days per week will be assigned one regular day off duty every two weeks, without loss of compensation, and if such employees are required to work on their regular relief day, they will be compensated for an additional day at the rate of time and one-half.

(b) All regular assigned employees who have been in the service one year, working an assignment of 6 days per week, shall have 15 days' annual leave with pay, or in lieu thereof 15 days' additional pay.

After conducting hearings on the subject, the board denied the requests made by the telegraphers in paragraphs (a) and (b) and granted an increase in pay of about half what was asked for, as follows:

(1) The rates of pay shall be increased an amount equivalent to 3.25 cents per hour per position for hourly rated employees and 5 per cent for monthly rated employees, which shall be distributed to the various employees in such manner as may be agreed upon between the management and representatives of the employees.

In case the management of the railroad and the representatives of the employees are unable to agree on the apportionment of the increases, the items in dispute shall be referred to this board or to a subcommittee of this board, as provided in the railway labor act.

Mr. Miller, representing the telegraphers, filed a dissenting opinion.

Grand Central Terminal

AN ARBITRATION board, consisting of Daniel W. Dinan, representing the company; L. P. Clifton, representing the Railroad Telegraphers; and Walter C. Clephane appointed by the United States Board of Mediation, rendered a decision, March 9, 1928, in a dispute between the Order of Railroad Telegraphers and the Grand Central Terminal. The questions submitted to the board were two in number, as follows:

1. That the present hourly rates be increased 12 cents per hour.
2. That article 4 of the agreement (identified on the record as the agreement between the Grand Central Terminal and the Order of Railroad Telegraphers), effective as to rates of pay January 16, 1924, and as to the rules as of April 2, 1924 (which is filed herewith as a part of the record and marked "Joint Exhibit No.1"), be changed to read: "Employees will be granted 66 days off each year with pay."

The board denied the first and granted the second, Mr. Dinan voting against the award. The board recommended rewriting article 4 of the agreement to make the award consistent with the rest of the article.

Midland Valley Railroad Co. and Kansas, Oklahoma, & Gulf Railway Co.

AN ARBITRATION award dated September 27, 1928, was handed down by a board consisting of L. M. Eddy, appointed by the Order of Railroad Telegraphers; T. H. Niles, appointed by the carriers; and R. L. Williams, United States district judge, acting as chairman.

In the course of an opinion signed by a majority of the board the following statements were made:

All three of the arbitrators have agreed that the burden is on the applicants to show that the existing wages are too low and that they should be increased.

The existing rates of pay were established by the United States Railroad Labor Board in a decision issued June 1, 1921, effective July 1, 1921.

No contention is made that the cost of living is now greater than it was in 1921, when the present wages were established. * * * In addition it is in evidence that the carriers have provided means of group life insurance and group health and accident insurance, of some value to its employees.

It is further in evidence that increases in wages have been granted by other roads or carriers, but such roads are not comparable as to mileage, location, or condition. The evidence discloses as to roads in the southwestern region that are comparable in mileage, location, and condition, wages paid for the same character of work are below the present existing scale paid by the herein carriers.

We have carefully examined into the income and the earnings and the financial condition of the carriers and do not believe that it would justify an increase, but at the suggestion of the chairman of this board of arbitration the representative of the carriers has consented to an increase of 1 cent per hour to be applied to each position on the two roads involved herein, and that will be the award in this case.

The new rates of pay for employees provided by this award shall become effective September 1, 1928, and continue in force for the period of one year from such effective date, and thereafter subject to 30 days' notice by or to the carriers.

The representative of the employees filed a dissenting opinion.

Northern Pacific Railway Co.

THE RAILROAD telegraphers employed by the Northern Pacific Railway Co. requested an increase of 8 cents per hour per position, the amount of increase to be distributed as mutually agreed between the management of the railway company and a committee representing the employees, which was refused by the carrier.

An arbitration board, composed of E. E. Dildine, selected by the carrier; B. C. Lewis, selected by the employees; and Homer B. Dibell, appointed by the United States Board of Mediation, made the following award on April 22, 1927:

The board awards an increase of 3 cents per hour per position.

E. E. Dildine, representing the carrier, filed a dissenting opinion.

Washington Terminal Co

AN ARBITRATION board, consisting of F. E. Blaser, representing the Washington Terminal Co.; B. C. Lewis, representing the Railroad Telegraphers; and Leslie M. Shaw, appointed by the United States Board of Mediation, rendered a decision October 1, 1927, relative to certain demands of the telegraphers in the employ of the company. The arbitrators denied the request of the employees for an annual vacation, but granted one day of relief each two weeks without loss of pay, or overtime instead of the relief day, to all employees "filling positions necessary to the continuous operation of the carrier." The board also increased the pay of employees 2 cents per hour per position, to be apportioned as the parties might mutually agree.

Industrial Arbitration Awards, 1927 and 1928

SUMMARIES are given below of such important arbitration awards in various industries in 1927 and 1928 as have come to the attention of the bureau. (Railroad arbitration awards are covered in the preceding article.)

Bricklayers and Plasterers

ON THE 28th of January, 1927, a unanimous decision relative to a controversy between the bricklayers' and plasterers' unions was made by a board of arbitration consisting of Elihu Root, as chairman, George T. Thornton, first vice president of the bricklayers' union, and Hugh Frayne, an organizer of the American Federation of Labor, representing the plasterers' union. The decision is here given practically in full. Accompanying the decision was a long opinion by the chairman analyzing the testimony, but it was not printed as a part of the decision.

The arbitral tribunal created under the agreement entered into at Atlantic City, N. J., on October 2, 1925, between the Bricklayers, Masons, and Plasterers' International Union and the Operative Plasterers and Cement Finishers' International Association, containing the following provisions:

"The following questions shall be submitted to a tribunal created under the terms of this agreement, the decision of which shall be accepted and complied with by all parties to this agreement.

"Was the Operative Plasterers and Cement Finishers' International Association justified in considering the 1911 agreement abrogated after being notified by the Bricklayers, Masons and Plasterers' International Union that they had abrogated the two agreements governing artificial stone and the plastering of walls to receive tile, and would refer these two questions to the National Board for Jurisdictional Awards?

"After being notified by the Bricklayers, Masons, and Plasterers' International Union that the agreements governing artificial stone and the plastering of walls to receive tile were considered abrogated and no longer in effect by the Brick-

layers, Masons, and Plasterers' International Union, was the action of the Operative Plasterers and Cement Finishers' International Association in establishing locals in the cities and towns in contention in the State of Florida, justified or not?"

Has received and considered all the evidence and arguments produced by the respective parties upon the questions above stated.

Upon the first question submitted the tribunal decides:

That the Operative Plasterers and Cement Finishers' International Association was not justified in considering the 1911 agreement abrogated after being notified by the Bricklayers, Masons, and Plasterers' International Union that they had abrogated the two agreements governing artificial stone and the plastering of walls to receive tile and would refer these two questions to the National Board for Jurisdictional Awards.

Upon the second question submitted the tribunal decides:

That after being notified by the Bricklayers, Mason, and Plasterers' International Union that the agreements governing artificial stone and the plastering of walls to receive tile were considered abrogated and no longer in effect by the Bricklayers, Masons, and Plasterers' International Union, the action of the Operative Plasterers and Cement Finishers' International Association in establishing locals in the cities and towns in contention in the State of Florida was not justified.

Mailers—St. Louis

AN ARBITRATION award was rendered February 9, 1928, by a local board of arbitration consisting of Munro Roberts and Joseph P. Jud representing St. Louis Mailers' Union No. 3, W. C. Houser and M. J. Lowenstein representing the St. Louis Newspaper Publishers' Association, with Judge Henry S. Caulfield as chairman.

The wage section of the agreement between the two parties had expired November 15, 1927, with the mailers asking for an increase of \$7.08 per week for the journeymen and an increase for the apprentices. The publishers were asking for a decrease of \$3.20 a week for journeymen and a proportionate decrease for apprentices. The representatives of the two parties met and failed to settle the question and Judge Caulfield was called in, thus forming an arbitration board. After several hearings and a discussion of the questions involved, Judge Caulfield rendered an opinion with the following conclusion: "That the demand of the mailers for an increase should be denied. The reduction demanded by the publishers should also be denied."

Printers—Denver, Colo.

A DECISION of the International Joint Board of the American Newspaper Publishers' Association and the International Typographical Union, Paul H. Douglas, chairman, was recently made in a case between the Denver newspaper publishers and Typographical Union No. 49. Both parties wanted a readjustment of wages. The union asked for an increase from \$46.50 a week to \$54 for daywork and from \$49.50 to \$60 for nightwork, while the employers asked for decreases to \$42 and \$45, respectively. The union wanted a reduction of hours from 45 to 42 per week and the employers asked for an increase to 48 hours. The union asked that men who work a day and a night shift getting out a Sunday paper be paid \$2.50 in addition to the regular night scale. The employers asked that the \$1.50 rate paid for this service be removed. Finally the men asked for a weekly scale of \$66 for the lobster shift.

The board made the following award: The day scale \$48 per week and the night scale \$51.50 per week. Those working successively a day and a night shift getting out a Sunday paper to be paid \$2

in addition to the night scale. The working hours to remain at 45 hours per week. The award became effective December 1, 1926.

Printers—Omaha

AN AWARD by Dr. H. Von W. Schulte in the arbitration between Omaha Typographical Union, No. 190, and three newspapers published in Omaha was made February 17, 1927. Since September 15, 1923, the scale had been \$43.50 per week for daywork and \$46.50 for nightwork. At the expiration of the contract, September 15, 1926, the union had demanded \$50 for daywork and \$55 for nightwork, and the matter had later gone to arbitration, both sides filing extended briefs in the case. The award of the chairman was as follows: "The weekly straight-time wages exclusive of overtime, shall be \$46.50; night work, \$49.50."

Printing Pressmen—Portland, Oreg.

THE International Board of Arbitration, Paul H. Douglas, chairman, for the American Newspaper Publishers' Association and the International Printing Pressmen and Assistants' Union, sustained a decision on appeal by the Portland Web Pressmen's Union No. 17, against an award by a local arbitrator, continuing the existing wage scale for pressmen at \$7.50 for day workers and \$7.75 for night workers with \$8.25 and \$8.50 for the pressmen in charge of presses in the day and night shifts, respectively, lowering the former scale for apprentices by 25 cents a day, and providing that if during the life of the contract the cost of living in Portland changed appreciably the basic wages were to be readjusted according to whether the United States Bureau of Labor Statistics index for Portland rose or fell by a given number of points. The local union declared that an increase in wages was needed for five reasons:

(1) To provide the pressmen with an adequate standard of life; (2) to enable them to maintain the position as regards wages which they formerly enjoyed in respect to other crafts; (3) to provide differentials over certain other crafts which will be adequate to compensate the pressmen for the greater skill which, it is alleged, they must possess, and for the greater dangers of illness and accidents which, it is declared, they must endure; (4) to raise wages in Portland nearer the level of the other major Pacific coast cities; and (5) to enable the pressmen to share in what are alleged to be the considerable and indeed increasing profits of the local newspaper industry.

After considering the claim of the pressmen the chairman of the board commented in part as follows:

The evidence which has been presented has not been sufficient to lead me to believe that the decision of the local arbitrator should be overruled. When an injustice has been done the international board should feel free to overrule a local decision. But if the machinery is to function effectively both parties should be willing to abide by the local ruling, save in cases where they believe they have been wrongfully injured. In the present case the Portland pressmen receive more than a living wage and have a comfortable differential over even the majority of skilled workers. I do not feel justified, therefore, in reversing the local decision in order to raise Portland wages to an equality with those of Seattle and San Francisco, particularly so, since it is not certain whether these differentials over the rest of the country will continue permanently to endure,

Stereotypers—Buffalo, N. Y.

ON THE expiration of a 3-year agreement between Stereotypers' Local Union No. 25 and the Buffalo newspaper publishers the union demanded an increase in wages of 66 $\frac{2}{3}$ cents per day for journeymen, 75 cents for assistant foremen, \$1 for foremen and for crews who get out seven daily editions of a paper each week. The controversy was laid before Judge Philip Laing as arbitrator, December 6, 1926. After examining the newspaper plants and hearing and reading the briefs presented by each side the arbitrator delivered his written opinion on the 28th of the same month. He considered the various propositions under different heads, discussing and disposing of them separately. The only argument to which he gave much attention was the increase in the cost of living argument. Extracts from his statement on this subject follow:

In a large and growing city like this there is ever something additional to pay out, if one is to keep up with the procession. Things unknown two years ago are necessities to-day, and necessities which cost money. This statement applies to the whole family and to each member of the family. Irrespective of any changes in the cost of food, clothing, rents, or heat, I am of opinion that the ordinary man in the city of Buffalo will not be able to get through the year 1927 with the same money that he got through the year of 1923. If that statement is correct, some provision ought to be made in this controversy providing to some extent for the cost of better living which the stereotypers must meet as time goes on. I am aware that any allowance made for the reasons now under consideration must be conservative. I am also aware that extravagant people crave every new thing that comes along and call every such thing a necessity. I think, however, it is a fact that the most conservative and economical individuals must, if they keep up with the times, continually incur some additional expense for better living and better living conditions.

What additional allowance should be made to the stereotypers to meet better living conditions? The publishers make answer to this question by saying that the cost of living is not what it was a few years ago, and that that cost is now going back, and for these reasons the stereotypers are in a better position than they were three years ago when the existing scale became effective.

In the monthly bulletin issued by the United States Department of Labor in September, 1926, * * * is a table showing the average retail prices of 42 articles of food in the United States from July 15, 1913, to July 15, 1926, and the percentage each July 15, compared with July 15, 1913, the percentage for July 15, 1913, being arbitrarily fixed at 100, according to this table, the average retail prices for these 42 articles of food * * * on July 15, 1923, [were] 47.8 per cent [more than in 1913]; on July 15, 1924, 43.9 per cent; on July 15, 1925, 60.5 per cent; on July 15, 1926, 57.7 per cent. It thus appears that in 1924 the percentage was less than in 1923, but in 1925 and 1926 the percentage was quite a little more than it was in 1923. The chart contained in the same bulletin at page 153 bears out the foregoing facts.

I am of opinion, however, that during the next two or three years the stereotypers may expect to get some benefit from decreased cost of living, and that that prospect ought to be taken into consideration in connection with the allowance for increased cost of better living.

I come back to the question, "What allowance should be made to the stereotypers for the increased cost of better living?" and I add to that question the other question, "What offset should be made because of the prospect of a decrease in prices of things that make up the necessities of life?" The figures I am about to present are, in a sense, arbitrarily made, but they represent my judgment.

I am of opinion that the stereotypers should be allowed for the increased cost of better living 1 $\frac{1}{2}$ per cent per year for the last three years, making 4 $\frac{1}{2}$ per cent, and that there should be deducted from that amount 1 per cent to represent the decreased cost and prospective decreased cost of the things that make up the necessities of life. These figures mean that there should be added to the scale of wages provided for in the existing contract, excepting the foremen, 3 $\frac{1}{2}$ per cent.

I am of opinion that the foremen should get \$9.50 instead of \$9; the assistant foremen, days, now getting \$7.75, with a $3\frac{1}{2}$ per cent increase would get \$8.02; the assistant foremen, nights, now getting \$8.25, with a $3\frac{1}{2}$ per cent increase would get \$8.54; the journeymen, days, now getting \$7.50, with a $3\frac{1}{2}$ per cent increase, would get \$7.76; the journeymen, nights, now getting \$8 with a $3\frac{1}{2}$ per cent increase, would get \$8.28.

Street Railways—Chicago

AN AWARD affecting 21,000 employees of the street-railway companies of Chicago connected with Division 241 of the Amalgamated Association of Street and Electric Railway Employees of America was signed January 21, 1928, by a board consisting of Alderman Oscar F. Nelson, representing the employees, and Guy A. Richardson, representing the company. It was approved by Federal Judge James H. Wilkerson January 23, 1928, and made part of the court record, since 60 per cent of the surface lines is under the control of the Federal court.

The award continues until May 31, 1930, the agreement which by its terms was to expire May 31, 1927, but increases the wages of all employees 1 cent per hour from June 1, 1928, through May 31, 1929, and another cent from June 1, 1929, through August 31, 1930.

In addition the following provisions relative to health and accident insurance were added, similar in character to those added by arbitrators to the agreement between the members of Division 308 of the Street and Electric Railway Employees' Union and the elevated roads of Chicago, and printed in the Labor Review, November, 1926, pages 207, 208.

SEC. 2. Chicago surface lines shall pay to all members of Division 241 in the service of Chicago surface lines on February 1, 1928:

(a) Thirty-five dollars to those who were in such service on June 1, 1927, in lieu of life, sick, and accident insurance; and (b) \$12 to those who entered such service between June 1, 1927, and November 1, 1927, in lieu of life insurance.

This item of the award is made because of the practical impossibility of making insurance retroactive. Therefore, the arbitrators have computed the approximate amount of money it would have cost the Chicago surface lines in case such insurance had been in effect since June 1, 1927.

SEC. 3. For the period beginning February 1, 1928, and thereafter until and including May 31, 1930, the Chicago surface lines shall bear and pay the cost and expense of group life insurance to the amount of \$1,000 upon the life of each employee covered by this agreement who has been in the employ of the Chicago surface lines for three months, while continuing in the service of the Chicago surface lines, subject to the acceptance by the insurance company writing such insurance, of any new employee as a risk.

Chicago surface lines shall also, from February 1, 1928, and thereafter until and including May 31, 1930, bear and pay the cost and expense of a group health policy covering each employee covered by this agreement, who has been in the service of the Chicago surface lines for more than one year, for \$20 per week against becoming, while insured under said policy, wholly and continuously disabled and prevented from performing any and every duty of his or her occupation by sickness contracted or injuries sustained, provided that no indemnity shall be payable for the first seven days of incapacity nor for more than 26 weeks thereafter. Such group health policy shall not cover the following:

(1) Any period of incapacity for which the employee is not treated by a licensed practicing physician.

(2) Any period of incapacity for which the employee is entitled to indemnity or compensation under any workmen's compensation act, except to the extent of the difference between such compensation allowance and the \$20 per week provided by such health insurance.

(3) Sickness contracted or suffered or injury sustained outside of the continental limits of the United States, in North America or Canada, or in any part of either, north of the sixtieth degree of north latitude; nor sickness or injury

caused directly or indirectly by war or riot, or while participating in, or in consequence of having participated in, aeronautics; nor intentionally self-inflicted injury, while sane or insane.

Said health insurance shall continue only while the employee remains in the employ of the company.

Reasonable rules and regulations shall be promulgated by Chicago surface lines to make effective the intent and purpose of the insurance provisions of this award.

Sec. 4. During the first year in which the insurance hereby awarded is effective, the same shall be provided by policy or policies, written by reputable insurance company or companies; but at the expiration of said first year, Chicago surface lines shall have the right, if they so elect, to provide for the carrying out and performance by their own insurance department of the obligations and undertakings which will give to the employees the protection and benefits hereby awarded.

Sec. 5. In conformity with paragraph (b), section 1, of the arbitration agreement, dated July 18, 1927, which provides that cost of insurance benefits shall be considered as wages, this board of arbitration estimates the cost of health, accident, and life insurance at \$650,000 per annum, which is approximately 1½ cents per hour-wage rate per employee.

The Chicago Rapid Transit Co. signed an agreement December 14, 1927, with the members of Division 308, employees on the elevated lines, to accept this award also.

Street Railways—Mitten Management

AFTER more than 20 years of conflict an agreement was reached between the Amalgamated Association of Street and Electric Railway Employees and the Mitten Management. The Mitten Management operates at present the street-railway systems of Philadelphia and Buffalo, and, according to press reports, may take over the operation of the systems in other cities. The text of the agreement, signed March 25, 1928, is as follows:

Memorandum of Union-Management Agreement

Mitten Management reiterates its desire to deal with organized labor whenever and wherever any union organization will undertake to cooperate for increased economic efficiency and where two-thirds of the employees, by secret ballot, may so elect.

Mahon and associates, speaking for the Amalgamated Association of Street and Electric Railway Employees of America, being also desirous of cooperating in economic accomplishment and of aiding their membership to a 50-50 participation in the rewards rightfully paid to men and management, in addition to the present wages paid, have now come to an understanding with Mitten Management (Inc.) by which the following procedure will hereafter govern both parties:

The Philadelphia Rapid Transit cooperative plan of 1926 shall be made effective with the union covering such system, or departments of a system, as the union may designate, after two-thirds of such employees shall have so determined by secret ballot, it being fully understood that the right to organize is a fundamental right of labor which should not and can not be permanently abridged or denied, but it is now understood and agreed that the activities of the Amalgamated in this respect shall be restricted to properties that are to be acquired or operated by Mitten Management in the future.

So far as Philadelphia and Buffalo are concerned, conditions there are to remain as at present in so far as organization activities are concerned, it being desirable that the situation on these properties shall remain as at present in order that the standard of economic excellence of these companies now being operated by Mitten Management be the standard by which union performance in cooperating with Mitten Management on other properties shall be measured. When cooperation between the Amalgamated and Mitten Management has developed to a point where the results are equal to those obtained on these

properties, the matter of union-management agreements on these properties may be discussed and be made the basis of further agreement.

Working agreements, including standards of work and compensation, to be matter of local arrangement and ratification. Collective consideration to be upon the basis of group representation through branch, departmental, and general committees, with recourse to arbitration in case of failure of agreement. Before arbitration shall be resorted to, however, the matter under discussion shall be submitted to two representatives of the International Association and two representatives of Mitten Management for review and attempted settlement. Failing agreement one arbitrator for employee and one arbitrator for employer shall be chosen, these to select a third. If these two arbitrators are unable to agree upon the third arbitrator then the public service commission shall act as the third arbitrator.

Contract shall run during delivery of cooperative effectiveness, which is understood to mean that degree of assistance in securing the result on the property in question as secured by Mitten Management on the properties operated by them at this date. Nonperformance by either party to be settled through arbitration. Contract may be terminated by vote—secret ballot—of two-thirds of the employees represented by the organization. Operating company and union to each supply, at their own cost, their representatives on the 50-50 collective consideration committees, also each their own secretary. Operating company and union to share equally in the office and operating expenses as mutually decided. Operating company where two-thirds of the employees so vote to collect by check-off system and pay to organization such amounts as the organization may, from time to time decide. All the employees of the departments involved to be so assessed. Funeral, disability, old age, and all other benefits to be undertaken by the union, for which operating company will pay union \$1 per month, per man.

In addition to the usual results of collective consideration, it is the further object of this arrangement to secure for all interested parties, the advantages of collective effort and accomplishment. To the owners this will mean a fair return on their property; to the public an adequate and efficient system of transportation; and to employees, in addition to wages sufficient for the necessities of life, comfort, and savings, an opportunity to participate in increased earnings made possible by their increased effort and productive efficiencies. Mitten Management and Amalgamated Association are agreed that the same 50-50 participation shall be effective between "management and union" as now exists between "management and men" and the sense of this agreement is that both shall supply the same degree of cooperation and both similarly shall participate in the results secured therefrom.

Emergency Boards Appointed Under Railroad Labor Act

THE FEDERAL railroad labor act of 1926 provides that an emergency board may be established by the President if a railroad labor dispute can not be settled in accordance with the other provisions of the law and if, in the judgment of the mediation board, such dispute threatens "to interrupt interstate commerce to a degree such as to deprive any section of the country of essential transportation service." The findings of this board are not compulsory, but the act provides that after the creation of the board and for 30 days after its report has been made "no change, except by agreement, shall be made by the parties to the controversy in the conditions out of which the dispute arose."

Up to the end of 1928 this "emergency" clause had been availed of only on two occasions since the passage of the act. Both of these arose from long drawn out controversies culminating in 1928. The first concerned the Kansas City, Mexico & Orient Railroad Co. and four labor organizations; the second concerned the conductors and trainmen on the western railroads.

Orient Railroad Case

AN EMERGENCY board was appointed April 28, 1928, by the President, to investigate and report upon a dispute between the Kansas City, Mexico & Orient Railway System and its train and yard service employees, members of the Order of Railway Conductors, Brotherhood of Locomotive Engineers, Brotherhood of Locomotive Firemen and Enginemen, and Brotherhood of Railroad Trainmen. This board, composed of James R. Garfield, of Cleveland; Carl Williams, of Oklahoma City; Arthur Thatcher, of St. Louis; Davis R. Dewey, of Cambridge, Mass., and Homer B. Dibell, of Duluth, met at Wichita, Kans., May 11 to 17, 1928, heard representatives of the parties in dispute, and reported its findings the latter part of May.

The findings were, in brief, as follows:

(1) The financial condition of the Kansas City, Mexico & Orient Railway does not justify its paying at present, to its employees who are members of the four transportation labor organizations involved in the dispute, higher wage rates than the carrier has now proposed to pay, "having due regard to the maintenance of the road and the equitable compensation of employees in other branches of the service."

(2) Under existing circumstances the brotherhoods concerned in the dispute are not justified in putting their strike order into effect and should either accept the increases offered by the carrier or should arbitrate their wage controversy under the railroad labor act.

(3) The company is not warranted in declining to become a member of the southwestern board of adjustment and should forthwith become a member. Such board would take care of the eight pending grievances of individual members of the railroad brotherhoods, the determination of the merits of individual cases not coming within the province of the emergency board.

Trainmen on Western Railroads

ON SEPTEMBER 29, 1928, the President of the United States issued a proclamation creating an Emergency Board to investigate the wage dispute between 47 western railroads and their conductors and trainmen. Its membership was as follows:

James R. Garfield, of Cleveland, Ohio, Secretary of the Interior in the Roosevelt administration; Walter F. Stacy, of Raleigh, N. C., Chief Justice of the Supreme Court of North Carolina; Prof. Davis R. Dewey, of the Massachusetts Institute of Technology, Cambridge, Mass.; Chester R. Howell, of Berkeley, Calif.; and George T. Baker, of Davenport, Iowa.

The report of the board made public on October 30, suggested that the following proposals and counterproposals be submitted to the vote of the employees and that the carriers abide by the result:

1. Six and one-half per cent increase without change of rules.
2. Seven and one-half per cent increase and the elimination of the double-header and tonnage limitation rules.

Each of the above includes the continuation of existing differentials for mountain and other special service, and the addition of the requested increase to baggagemen for mail, express, and dynamo service.

3. The Washington agreement providing for an increase of $7\frac{1}{2}$ per cent on the standard rates for conductors and trainmen, and a procedure, including arbitration under the railway labor act, under which the double-header, helper district, car limit, and tonnage limit rules might be taken up by each carrier in

special cases where a carrier claimed such rules produce burdensome or objectionable conditions.

4. That whatever proposal is accepted should be made effective May 1, 1928.

According to press reports the employees affected agreed to accept the first of the above alternatives regarding wages, namely, a wage increase of $6\frac{1}{2}$ per cent without change of rules, the wage increase to be retroactive to May 1, 1928, and effective to May 1, 1929.

The dispute grew out of the refusal of the western railroads to consider the demands of their conductors and trainmen, February 27, 1927, for a $7\frac{1}{2}$ per cent increase in wages. A similar increase had been granted by the eastern railroads in 1926 and by the southeastern railroads in 1927 to the same class of employees.

On November 1, 1927, they renewed their demands for an increase in wages to become effective March 1, 1928, and in addition they demanded a change in the pick-up and drop rule. In July, 1928, conferences were held between employees and the carriers, during which the carriers asked for certain changes in the rules, among which were the elimination of the double-header rule and the rules restricting tonnage and car limits. The employees contended that the double-header rule makes for safety of the employees, while the carriers contended that it only hampers efficient and economical operation and could be eliminated without hazard to the men engaged in train and engine service.

These conferences proved fruitless and on July 19, the carriers applied to the United States Board of Mediation for its services in mediation; and, if this failed, suggested that matters in dispute be submitted to arbitration. Mediation was not successful and the employees declined to accept arbitration.

Conciliation Work of the United States Department of Labor

THE WORK of the Conciliation Service of the United States Department of Labor is, as its title indicates, that of mediation in labor disputes.

The intention of Congress in creating the Department of Labor was clearly to the end that such a mediatory policy should be the basis of the conciliation work. The language of that part of the organic act pertaining to this service simply provides that "The Secretary of Labor is authorized to act as mediator, or to appoint commissioners of conciliation in industrial disputes whenever in his judgment the interests of industrial peace may require it to be done."

In carrying out the intention of Congress it has been the general policy to respond promptly to any calls for the good offices of the representatives of the Conciliation Service from either employers, employees, or from the public affected by any industrial dispute.

In the handling of trade disputes representatives of the service cooperate freely with State or local agencies or committees. In many cases Federal commissioners assigned to a trade dispute have found local committees or agencies using their good offices in an effort to terminate the controversy. In such instances the commissioners of conciliation have cooperated with the local agencies. No

set method can be outlined to guide mediators in their work. They are constantly confronted with varying conditions and diverse views in practically every individual case. Each situation must be handled as a case peculiar to itself. It often happens that a conciliator must use different methods in handling trade disputes arising in the same industry and in the same locality in order to accomplish the desired result of bringing the disputants into conference and thereafter striving to bring about a meeting of minds that will result in a satisfactory agreement being reached.

During the fiscal year ended June 30, 1928, conciliators were assigned to 478 industrial disputes; of this number 307 were settled directly by the commissioners, 53 cases were pending at the end of the fiscal year, 57 cases were recorded as "unable to adjust," and 61 cases are carried as "unclassified." The latter designation implies that settlement was immediately effected by the parties directly interested; the commissioner arrived after agreement was reached; or the case referred for conciliation did not warrant services of representative. In some cases plants were permanently closed, or the workers had gone elsewhere, and so on. In addition to the cases arising during the time covered by this report, 13 cases coming over from previous years were also adjusted.

The following table gives a summary of the number of cases handled, and their disposition, for each of the fiscal years 1920 to 1928:

NUMBER AND DISPOSITION OF CASES HANDLED BY UNITED STATES CONCILIATION SERVICE, 1920-1928

Cases	1920	1921	1922	1923	1924	1925	1926	1927	1928
Number.....	802	457	370	534	544	559	551	545	478
Adjusted.....	596	338	266	428	346	392	377	395	307
Unable to adjust.....	96	48	41	27	62	64	61	57	57
Pending.....	9	24	31	60	67	42	43	24	53
Unclassified.....	101	47	32	19	69	61	70	69	61

CHILD LABOR

Work of the Federal Children's Bureau

THE ACT creating the United States Children's Bureau, which was passed in 1912, contains the following statement as to the scope of its work:

The said bureau shall investigate and report to said department upon all matters pertaining to the welfare of children and child life among all classes of our people, and shall especially investigate the questions of infant mortality, the birth rate, orphanage, juvenile courts, desertion, dangerous occupations, accidents and diseases of children, employment, legislation affecting children in the several States and Territories.

Under this authorization the bureau began its work with various studies of infant mortality, and of prenatal and infant care. Studies of defective, dependent and delinquent children, studies of child labor legislation in the United States and of the administration of child labor laws, of child welfare in rural communities, and of a number of miscellaneous subjects related to various aspects of the care and welfare of children followed. In 1917 the administration of the Federal child labor law was entrusted to the bureau and, until the law was finally declared unconstitutional, formed an important part of its activities.

The Federal maternity and infancy act, which was passed in 1921, authorized an annual appropriation of \$1,240,000 for a five-year period, to be used by the children's bureau in cooperation with the States in promoting the hygiene of maternity and infancy, thus at once largely increasing the bureau's activities. In 1927 the appropriation was extended for two years, with the proviso that the act itself, which was permanent legislation, should be after June 30, 1929, of no force and effect. During the year ending June 30, 1928, work was carried on under this act in 2,070 counties; 45 States and the Territory of Hawaii were cooperating with the bureau under its terms; prenatal and child health conferences were carried on in every cooperating State; and an extensive program of visits, demonstrations and consultations was carried out by means of the combined State and Federal funds.

The gainful employment of children has from the first absorbed much of the bureau's attention, and studies have been made of children in agricultural occupations in various States, children employed in seasonal industries, such as the cultivation of sugar beets, berry picking, fruit, vegetable and fish canning, and the like. Data are collected each year as to employment certificates issued to children, so that current information may be available as to the trends in child labor, as well as in regard to significant facts about the age and education of children beginning work. Studies are made of

children employed in specified industries, of laws affecting the employment of minors, of children in industrial home work, children engaged in street trades, work histories of minors attending continuation schools, and similar subjects.

Another field of activity is concerned with juvenile delinquency in various States, methods of preventing and of handling it, the kinds of courts before which children are brought, and the like. Similarly, studies are made of defective and dependent children, methods of caring for them, State and county child welfare agencies, and of child welfare legislation. Usually these studies are made at the request of the local units concerned.

The organization of the bureau is thus described in the annual report of its chief for the year ending June 30, 1927.

The Children's Bureau has seven major divisions, as follows: Maternity and infant hygiene, child hygiene, industrial, social service, statistical, editorial, and general administrative. The maternity and infant hygiene division administers the maternity and infancy act; the child hygiene division is in charge of the bureau's research in the field of child health and assists the other divisions in the preparation of reports in which child health is a factor. The social service division has for its field dependency, delinquency, and neglect of children, and the industrial division is responsible for studies relating to the employment of children, protective legislation for working children, and vocational guidance. The statistical, editorial, and general administrative divisions serve the other divisions of the bureau, the statistical division undertaking also some independent pieces of research.

Employment Certificates Granted in Various States and Cities

THE annual report of the Federal Children's Bureau for the fiscal year 1927-28 contains statistics as to the number of employment certificates issued during the calendar year 1927 to children in the District of Columbia, in 16 States, and in 69 cities in 18 other States. This is a considerable increase over 1926 in the number of States and cities reporting. Special attention was paid to the children receiving their first employment certificates during the year.

From this group of States and cities reports were received for 106,441 children 14 and 15 years of age and 47,067 children 16 and 17 years of age who obtained their first working certificates in 1927. In addition to this group 954 children in cities of less than 50,000 population were reported as receiving their first working certificates in 1927. Of the 154,462 certificates issued, 18,667 were issued to children in cities or towns where regular certificates are issued for vacation and after-school work and no separate record is kept of such certificates. Except for these, all the permits reported were for full-time regular employment.

The bureau possesses comparable data, covering a period of three years, for 10 States and for 19 cities in 10 other States and for the District of Columbia, concerning the number of first certificates issued. The following table shows for each reporting city the number of first certificates issued during 1927, and, for the cities for which the comparable data are on file, the number issued in 1926, with the relative increase or decrease, as compared with the preceding year.

NUMBER OF CHILDREN 14 AND 15 YEARS OF AGE RECEIVING REGULAR EMPLOYMENT CERTIFICATES FOR THE FIRST TIME IN 1926 AND 1927 AND PER CENT OF INCREASE OR DECREASE, AS COMPARED WITH THE PREVIOUS YEAR, IN STATES AND IN CITIES OF 50,000 POPULATION AND OVER REPORTING ¹

State and city	1926	Per cent of increase (+) or decrease (-) as compared with 1925 ¹	1927	Per cent of increase (+) or decrease (-) as compared with 1926 ¹
States reporting:				
Alabama.....	960	-4.5	700	-27.1
Birmingham.....	240	+34.1	185	-22.9
Mobile.....	89	+48.3	79	-11.2
Arkansas.....			190	
Connecticut.....	7,574	-4	6,318	-16.6
Bridgeport.....	878	+11.8	581	-33.8
Hartford.....	645	-4.6	629	-2.5
New Britain.....	391	-18.2	246	-37.1
New Haven.....	1,057	+14.0	982	-7.1
Waterbury.....	571	-9.9	478	-16.3
District of Columbia.....	220	+64.2	186	-15.5
Indiana.....	1,103	+14.2	847	-23.2
Fort Wayne.....	58	+3.6	38	-34.5
Gary.....			4	
Indianapolis.....	345	+35.7	233	-32.7
South Bend.....	88	-10.2	84	-4.5
Iowa.....			765	
Davenport.....			92	
Des Moines.....			169	
Sioux City.....			62	
Kansas.....	121	+72.9	124	+2.5
Kansas City.....	75		72	-4.0
Topeka.....	23		16	
Wichita.....	8		19	
Kentucky.....	969	+9.0	780	-19.5
Covington.....	56	-26.3	47	-16.1
Louisville.....	638	+16.6	507	-20.5
Maine.....	256	-5.9	205	-19.9
Portland.....	21		21	
Maryland.....	4,449	+7.7	3,817	-14.2
Baltimore.....	4,229	+7.1	3,567	-15.7
Minnesota.....	404		310	-23.3
Minneapolis.....	171	-12.8	123	-28.1
St. Paul.....	160	-11.1	144	-10.0
New Jersey.....	18,429	+3.4	18,081	-1.9
Jersey City.....	1,638	+2.4	1,560	-4.8
Newark.....	2,494	+11.5	2,345	-6.0
Trenton.....	906	-1.5	867	-4.3
Oklahoma.....			848	
Oregon.....	377	-8.0	352	-6.6
Vermont.....	96	+5.5	49	-49.0
Washington.....			463	
Wisconsin.....	3,018		2,599	-13.9
Milwaukee.....	2,007	-19.1	1,736	-13.5
Cities in States not reporting:				
California—				
Los Angeles.....	744		836	+12.4
Oakland.....			78	
Sacramento.....			40	
San Diego.....			147	
San Francisco.....	163	-39.0	156	-4.3
Colorado—Denver.....			209	
Delaware—Wilmington.....	252		286	+13.5
Georgia—Atlanta.....	132		52	-60.6
Illinois—				
Chicago.....	5,281	+3.0	4,186	-20.7
East St. Louis.....			123	
Peoria.....			66	
Springfield.....			135	
Louisiana—New Orleans.....	2,563	+2.3	1,743	-32.0

¹ Population according to census of 1920. Figures from State or local official sources.

² Not shown where base is less than 50 nor where figures for previous year are not available.

³ Excludes 5 reported too late for tabulation.

⁴ Number of 15-year-old children receiving certificates; law does not permit the issuance of regular certificates to children under 15.

⁵ Includes children to whom regular certificates were issued for work outside school hours, no certificates for such work being issued.

⁶ Revised figures supplied by State.

NUMBER OF CHILDREN 14 AND 15 YEARS OF AGE RECEIVING REGULAR EMPLOYMENT CERTIFICATES FOR THE FIRST TIME IN 1926 AND 1927 AND PER CENT OF INCREASE OR DECREASE, AS COMPARED WITH THE PREVIOUS YEAR, IN STATES AND IN CITIES OF 50,000 POPULATION AND OVER REPORTING—Continued

State and city	1926	Per cent of increase (+) or decrease (—) as compared with 1925	1927	Per cent of increase (+) or decrease (—) as compared with 1926
Cities in States not reporting—Continued				
Massachusetts—				
Lawrence.....			405	-----
Lowell.....			233	-----
Lynn.....			268	-----
Somerville.....			275	-----
Springfield.....			391	-----
Michigan—				
Detroit.....	4 635	+53.9	4 687	+8.2
Grand Rapids.....	4 267		4 177	—33.7
Saginaw.....			4 137	-----
Missouri—				
Kansas City.....			178	-----
St. Joseph.....			114	-----
St. Louis.....	3,407	—3.4	2,048	—39.9
Nebraska—				
Lincoln.....	5		10	-----
Omaha.....	136	—15.5	117	—14.0
New Hampshire—Manchester			7 244	-----
New York—				
Buffalo.....	2 654		2,599	—2.1
New York.....	35,484	+8.1	35,717	+7
Niagara Falls.....	252	+41.6	172	—31.7
Rochester.....	1,841	+4	1,604	—12.9
Syracuse.....	427	—4.5	375	—12.2
Yonkers.....	525	+36.7	490	—6.7
Ohio—				
Cincinnati.....			9 14	-----
Springfield.....			9 11	-----
Toledo.....			9 15	-----
Pennsylvania—				
Erie.....			267	-----
Harrisburg.....	154	+1.3	121	—21.4
Philadelphia.....	11,194	+8.2	9,932	—11.3
Pittsburgh.....	1 677	+3.1	1,381	—17.7
Scranton.....	845	—11.0	697	—17.5
Wilkes-Barre.....			924	-----
Rhode Island—Providence	4 1,633		4 1,563	—4.3
Tennessee—				
Chattanooga.....			76	-----
Knoxville.....			161	-----
Nashville.....			250	-----
Utah—Salt Lake City.....			97	-----

⁴ Number of 15-year-old children receiving certificates; law does not permit the issuance of regular certificates to children under 15.

⁵ Revised figures supplied by State.

⁷ Includes 97 regular certificates issued for "after school" work.

⁸ Number reported for year ended November 30.

⁹ Certificates issued to children under 16 adjudged incapable of profiting substantially by further instruction.

Five States and 22 cities in 8 other States, which either under the law or by administrative practice require minors 16 or 17 years of age, or both, to obtain employment certificates, supplied the bureau with reports for 1927. Most of these showed decreases in numbers of certificates issued in 1927 as compared with 1926.

Taking the figures as a whole, in those States and cities for which comparable data are available, the number of first regular certificates issued increased 5 per cent in 1926 as compared with 1925 and decreased 8 per cent in 1927 as compared with 1926.

It is generally believed that unemployment during 1927 is largely responsible for the decreases, although in periods of unemployment children who would other-

wise be kept in school are often compelled to seek employment and are sometimes able to obtain work when their parents can not do so.

In general, boys received work certificates more numerous than girls. Taking the whole group for which sex was shown, boys constituted 56 per cent of the 14 and 15 year group, and 57 per cent of the 16 and 17 year group. In a few places, girls led, but even in these they were not much more numerous than boys.

More than half of the 14 and 15 year old children entering employment in 1927 for whom reports as to school grade completed were received had finished the eighth or a higher grade—58 per cent as against 56 per cent in 1926—while 25 per cent in 1927 as compared with 28 per cent in 1926 had completed only the sixth or a lower grade.

The educational requirement of the child labor laws is probably the most influential factor in the educational attainment of children leaving school for work. Among the States reporting the grades completed by children going to work Minnesota requires completion of the eighth grade with no exceptions, and Indiana and Kansas, the eighth grade with occasional exceptions under administrative policy, for both 14 and 15 year old children. In Minnesota all children receiving work permits had completed the eighth grade, in Indiana two had received permits by court order on less than the eighth grade standard, and in Kansas 8 per cent of the certificates had been issued on exceptions to the grade requirements, all in Kansas City.

The evidence of age upon which certificates are issued is a matter of much importance. The birth certificate is the most satisfactory evidence, but though birth registration is far more generally practiced than was the case 15 years ago, it is still not possible to secure this evidence in all cases. Nevertheless, official birth certificates or baptismal records were the evidence upon which 84 per cent of the certificates reporting as to type of evidence were issued, and in some of the States and cities reported, this proof was received for between 90 and 100 per cent of the certificates issued. Where birth certificates and baptismal records were few the predominating type of evidence was the school record of age, except in Arkansas and Chattanooga where a considerable number of certificates were issued on such evidence as Bible record, passport, insurance policy, or on a physician's evidence of age with or without school records or other corroborative evidence.

Children in Street Trades

IN 1928 the Children's Bureau published the results of an investigation into the employment of children in street trades, covering eight cities: Atlanta, Ga.; Columbus, Ohio; Omaha, Nebr.; Wilkes-Barre, Pa.; Newark and Paterson, N. J.; Troy, N. Y.; and Washington, D. C. The studies in the first four cities were made in the winter and spring of 1922-23, but the cities were revisited in 1926 or 1927 to see whether the situation had changed. In the remaining cities the study was made somewhat later. Upward of 7,000 children were included in the survey; information concerning them was secured through personal interviews, through the school authorities, through juvenile court and family agency records, visits to the parents, and the like.

In each city newspaper sellers and carriers formed the largest group, child peddlers coming next; bootblacks were not numerous

except in Newark. One reason for the popularity of newspaper work was that it did not necessitate absence from school, and another was that although some of the cities had laws prohibiting children under a certain age from entering it, there never seemed much difficulty about evading this provision, so that it could be undertaken by even the youngest. One striking fact brought out in the study is that although the age at which children enter most occupations is gradually rising, no such tendency is at work in connection with newspaper selling.

In each of the cities of the survey, children of 6 and 7 sold papers (in one city, two boys of 5). From 11 to 21 per cent of the newspaper sellers were under 10 years of age.

The findings of the survey in general confirm those of earlier studies. The moral influences surrounding the work of newsboys and other street traders are discussed, as well as the effect of the irregular hours, which are sometimes very long, the physical exposure involved, the interference with proper time for sleep, the diminished energy left for school work, the separation from the normal life of the family, and the tendency to develop a taste for the excitements of street life.

While it could not be said that the boys were absolutely forced into the life by poverty, it was evident that the economic factor played a considerable part.

Newsboys, speaking generally, come from poor families, not destitute, except in rare instances, nor even so poor that they will acknowledge that they could not exist without the earnings of their children of school age, but in circumstances often so far below any reasonable standard of comfort that the temptation for the boys to earn what they can is irresistible. It is not a question of widowhood or of desertion or incapacity of fathers—almost as many newsboys as other children have fathers supporting their families—but so many fathers earn so little that without the help of mothers or of children or of both the family is always hard pressed.

The similarity between the findings of this and earlier studies indicates that conditions are not growing better with any noticeable rapidity. As a means for improving them it is suggested that newspaper selling by children should be as carefully regulated by law as other forms of child labor. The legal control of street work, it is pointed out, has difficulties peculiar to itself, and except in a few places little has been done toward working out and putting into effect adequate methods of administration and enforcement, even where the laws themselves were satisfactory.

Certain legal provisions were shown to be essential to even moderately successful control of the street-trades problem. The first of these is a specific law or regulation applying to the street worker, for school authorities and labor officials have found that most street work can not be regulated by a general child labor law, the word "employ" in the latter type of law being almost invariably construed to mean the purchasing of the services of one person by another. Satisfactory regulations included a badge system; the placing of responsibility for enforcement definitely upon a single official; and the control of the issuance of badges and the street inspections by the same agency.

Bootblacking and peddling as occupations for children, it is recommended, should be definitely prohibited, as they have many of the disadvantages of newspaper selling without any compensating advantage.

Farm Work of Children in Illinois and in Colorado

SINCE the publication of the former handbook (Bul. No. 439), two studies of the employment of children in farm work have appeared, one issued by the United States Children's Bureau (publication No. 168), dealing with conditions in Illinois, and one published by the National Child Labor Committee, describing the work of children on farms in certain sections of the western slope of Colorado.

Illinois Study

THE STUDY in Illinois by the United States Children's Bureau, covered 501 children under 16 employed on truck farms in Cook County and 737 between 7 and 16 years of age employed in general farming in Livingston, Shelby, and Marion Counties. The study of the truck farms was made in the summer of 1924 and of the general farms in the period April to July, 1923. The Cook County study was confined to the vicinity of Chicago and covered 119 farms, "26 farms within the city limits, 39 south of the city, and 54 in the northern section of the county."

Children Employed in Truck Farming

OF THE 501 children studied in Cook County, only 86, or 17.2 per cent, lived on the farms where they worked. The majority (77.8 per cent) were day laborers, coming to their work from Chicago or from towns or villages in the vicinity. Most of them were the children of industrial workers, nearly four-fifths being native born of foreign parents. In practically all cases, the parents had been in this country for 10 years or more, spoke English, and in the main were literate.

There were 404 boys and 97 girls among these child workers. More children found working in the fields were 12 years of age and under 14 than in any other age group, but those under 12 years of age constituted one-fourth (24.8 per cent) of the whole group. The age distribution was practically the same among boys and girls.

For the most part the children were employed only in the summer, although there is a certain amount of employment on truck farms throughout the year.

The work done was mainly weeding, twisting onions, cutting asparagus, pulling beets and carrots, and picking beans. None of it appeared to be beyond the children's strength, but the hours were sometimes unduly long; 20.8 per cent worked 10 or more hours and 42.6 per cent worked 8 or more hours on their last day of work. The work was apparently not allowed to interfere with school attendance, and the children made fair progress. Among those attending the Chicago schools, the percentage of retardation was less than the average for city children, and among those attending schools in smaller places the percentage of retardation was much less than was found in other studies of children engaged in farm work. Nevertheless, the work presented some undesirable features.

The problem of child labor on truck farms near Chicago is the problem of the child working away from home at an early age, working long hours, going long distances over complicated routes at hours too early in the morning and too late in the evening, to places of employment unknown to his parents, and, in some sections, with no certainty of finding work after the effort has been made. Illinois has prescribed in its child labor law the number of hours in a day and in a week that a child may work at any gainful occupation; and in order that the child up to the age of 14 years at least, may benefit from the educational facilities provided by the people, the State has decreed that he may not work for compensation during the school year. The provisions of this law have not been applied to the work of children on farms, and little thought has been given to the need for protecting child workers in agriculture from work either at too early an age or for too long hours.

Children in General Farm Work

THE MAJORITY of the 737 children studied who worked at general farming were employed on the places on which they lived, working in the fields with the older members of their families, "but 301 (about two-fifths of the child workers) assisted neighboring farmers in addition to their work at home, and 25 children (including 4 girls) worked exclusively as hired laborers." A trifle over three-fifths (62 per cent) were 12 years of age or older; 13 per cent were under 10. Most were of native American parentage.

The findings of the study are thus summarized:

Compared with truck, cotton, or tobacco farms, with beet or onion culture, or with hop growing, the general farm offers comparatively little work within the strength of girls or young children. The girls and the children under 12 years of age included in the study usually did the easier kinds of work, such as hoeing, cultivating, raking hay, and husking corn, but many of them harrowed, which is hard work, though not heavy in the sense that it requires great physical strength. Some of the boys 12 years of age and over did a great deal of field work, some of it involving the use of heavy machinery and necessitating the handling of heavy teams of horses. The majority of the children worked in the fields less than two months, but about one-sixth worked at least three months during the farm season.

The working-day was usually long for the younger as well as the older children. It was seldom less than 8 hours and more often was 9 or 10 hours. The longest working-days were reported for the spring, when plowing and other work in preparation for seeding had to be done; fully one-half the children worked 10 or more hours a day at this time. The shortest working-days were those of the harvest season, but even at that time two-thirds of the children who had worked reported a working-day of at least 8 hours.

Farm work does not interfere with the school attendance of the children in this section to the same extent as in most rural communities surveyed by the Children's Bureau, though some children lose a considerable part of their schooling on account of their work. Almost one-half of the workers for whom school records were obtained and who reported the reasons for their absences had been absent from school for farm work during the year preceding the inquiry. Usually this absence was for less than 10 days, but 71 children had lost from 1 to 5 months of school attendance because of their farm work. Much of this absence for farm work comes at the beginning or the close of the school year, when it is likely to be particularly disastrous to the child's progress in school.

Children on Colorado Farms

THE STUDY in Colorado, by the National Child Labor Committee, included sections of Mesa, Montrose, and Delta Counties, on the western slope of the State. The field work covered the period June 20 to November 20, 1924. A total of 330 families was studied, classified by tenure as 147 owner families, 103 renter, 57 contract, and 23 wage. In the families were 276 children 5 years old or younger,

838 aged 6 to 15 inclusive, and 258 aged 16 or over. Of the children from 6 to 15 inclusive, 650 did some farm work; 24 per cent of these were 9 years old or younger, and 76 per cent were from 10 to 15 inclusive.

Here, as in Illinois, it was found that the children worked long hours, the average day for all being 9.5 hours. This varied according to the status of the parents, the children of owners having an average day of 8.9 hours; those of renters, 9.6; those of wage workers, 9.2; and those of contract workers, 10.3 hours. The number of days worked during the season showed a similar variation, the average for children of owners being 39, and for children of contract workers, 62.1.

Children were employed in the cultivation of beets, hay, onions, fruit, potatoes, beans, corn, and grain. Of these, beets were more important, from the standpoint of child labor, than any other. "Nearly 45 per cent of the children worked in this crop; 45 per cent of the total time worked was in beets; and relatively more of the younger children worked in beets than in any other crop."

School Attendance and Grade Standing

THE MEDIAN number of days during which the various schools had been in session was, at the time the study closed, 46.7. Nearly three-fifths of the children had been out of school because of their work, the proportion varying according to the status of the parents.

More than nine-tenths of the contract and three-fifths of the renter, less than half of the owner, and slightly more than one-fourth of the wage children missed school for work. Nearly three-fifths of the contract children had not been in school a single day; and there were 13 renter, 10 owner, and 2 wage children that missed every day.

Of all the children, 3.4 per cent were, according to their age, ahead of their grades, not quite half were at the age of their grades, and nearly half were behind in their school work. By tenure, the percentages of the retarded were: Owners, 35; renters, 50; wage, 56; and contract, 81.

More than one-third of the retarded children were behind three years or more. The degree of retardation was lowest among owner and highest among contract children. Of the retarded children, 18 per cent of the owner, 34 per cent of the renter, 40 per cent of the wage, and 61 per cent of the contract children were behind three years or more.

Practically without exception, the contract families were Mexican or of direct Mexican descent. The poor showing which they make in all respects is partly due to their low economic status, with its accompanying lack of opportunities for advancement, and partly to the strong racial feeling in the communities in which they work.

The situation was well put by one man who said, "The Mexican is a necessary nuisance," meaning that he was necessary because the culture of beets demanded him, a nuisance because he was a Mexican. The Mexican is looked upon, spoken of, and acted toward as though he belonged to a different race or color. He is in the community upon the sufferance of the local people. He is wanted because of his work, and that only. * * *

Contract children are not expected either by their own parents or the resident people in the community to go to school until after the beets are cut. In fact the local school districts in which these families are living while working the beets are assuming practically no responsibility for the schooling of the Mexican children; they simply do not want them in their schools. Ostensibly their

reason for not wanting them is that as soon as beetles are over the families will move, and therefore to force them in would disorganize the school. This argument has some merits but its validity is weakened by a knowledge that the children are not wanted on the ground that they are Mexican.

Accidents and Accident Compensation to Employed Minors

THE SUBJECTS of industrial accidents to minors, of the extent to which such accidents are compensated, and of the effectiveness of increased compensation as a preventive of the illegal employment of minors, have received considerable attention in the larger industrial States during the past few years. From Ohio comes a study of the accidents occurring to minors under 18, from Pennsylvania a study of compensated accidents to minors, and from Wisconsin some data concerning increased compensation in cases of accidents occurring to minors who are illegally employed.

Industrial Accidents to Minors in Ohio

IN 1927 the Consumers' League of Ohio issued a study of industrial accidents to employed minors under 18 occurring in that State during the first nine months of 1926. During that time 2,763 such accidents were reported, of which 1,031 were sufficiently serious to involve some loss of time from work. Of these 533 caused disability lasting over 7 days, 27 caused permanent disability, and 3 were fatal. The number of days lost through these accidents was 36,942, the average number being 13.4 days per accident. Manufacturing industries account for much the largest group of injuries, 1,889, and for the greatest loss of time, 27,415 days.

The lack of data as to the occupational distribution of employed minors makes it difficult to calculate the relative hazard of different industries, but taking the figures of the 1920 census as to where minors are employed, their accident rate per 1,000 employed was in agriculture, 1.2; in manufacturing and mechanical industries, 49.5; in extraction of minerals, 15.1; in trade, 40.3; and in professional and clerical service, 1.6.

Machinery and handling objects seemed equally responsible for injuries, the first accounting for 618 and the second for 632 cases. Metal-working machinery made the worst showing, accounting for 366, or 59.2 per cent of the machine accidents. Textile machines came next with 72, and paper and printing machinery followed with 60 accidents. No other kind of machinery was responsible for as many as 40 accidents. The average number of days lost through machine accidents was $23\frac{1}{2}$, but there was much variation in this respect.

Although the metal-working machines show the largest group of machine accidents, the average number of days lost from accidents on machines of the metal industry is $6\frac{1}{2}$ days less than the average for all machines (although this includes 10 permanent disabilities—52.6 per cent of the total). Paper and wood-working machines, on the other hand, although the number of accidents is comparatively few, rank at the top with almost three times the average for number of days lost. Leather, clay, glass, and stone, and even food manufacturing machines, fall well above the average.

The league made a special investigation of compensable injuries to minors. Of 378 cases for which it was possible to gain information about the work certificate required for minors under 18, in 171 (45.2 per cent) no certificate was on file, and in 37 (9.8 per cent) the certificate on file authorized the minor's employment at a different job from that in which he was injured. Other illegalities were found.

Even more serious, of course, than the lack of a certificate is the employment of children at prohibited occupations. Of the 496 cases of injuries lasting over 7 days on which we had data, 37, or 7.4 per cent, were found to have occurred in occupations definitely prohibited by the child labor law.

In 14 of these cases of injury in prohibited occupations, the sufferers were operating emory or polishing or buffing wheels, in 6 cases they were running elevators, in 5 they were operating lifts or hoisting machinery, in 3 they were working during prohibited hours, in 2 they were engaged in track repairing, and the others were scattered through different occupations expressly forbidden as too hazardous for workers under 18.

An effort was made to find out how far the accident had affected the child's industrial life. Of 293 who had been injured, only 80, or 27.3 per cent, were working on the job they held at the time of the accident. Of the 97 who were on different jobs, 41 said they had changed because they wanted different work, 20 had been laid off from their former work, 26 had been incapacitated for it, and for 10 no reason was obtained.

A study of the amounts received under the workmen's compensation law leads to the conclusion that compensation for injuries to minors is inadequate. The law calls for a payment of two-thirds of the wage received at the time of the accident, but owing to the so-called "waiting period," the compensation actually received does not come up to this amount. For 414 cases in which full wage data could be obtained, it was found that the median wage at the time of the accident was \$16 a week.

Let us look closely at what happens to the child receiving the median wage of \$16 who suffers an industrial injury. Suppose he is disabled for three weeks; he receives nothing for the first week; for each of the other two weeks, his compensation is two-thirds of \$16, or \$10.66. The total compensation for the three weeks' disablement is thus \$21.32, or \$7.11 for each week of actual time lost.

A study of the actual compensation per week received by 410 children suffering from temporary disablement, all of whom had been in full-time employment, showed that the median compensation per week was \$6.64. "This is only 41 per cent of the median wage of \$16 instead of 66 $\frac{2}{3}$ per cent. The difference is, of course, due to the seven days' waiting period before compensation begins."

Two recommendations are made as to desirable changes in the law regarding compensation for children injured in industrial accidents. The minimum compensation for such children might well be raised.

The figures on compensation actually received by child workers would indicate that a real hardship falls upon the child and his family by reason of the small amount of compensation. This could be remedied in large measure by an increased minimum compensation.

The second recommendation is that when a child is injured while illegally employed, he should be entitled to double or triple compensation. Several States already have such a provision, which is especially effective in discouraging the employment of children in prohibited occupations or under illegal conditions.

Compensated Accidents to Working Children in Pennsylvania

A RATHER exhaustive and detailed analysis of compensated accidents to minors (under the age of 21) in Pennsylvania during the year 1924 was issued by the State department of labor and industry as its Special Bulletin No. 17. The report includes only accidents which were compensated in that year under the Pennsylvania law, amounting to about 40.5 per cent of the reported accidents and about one-eighth of the compensated accidents, and only those resulting in disabilities extending beyond the 10-day waiting period. Although the tabular matter in the report is extensive and covers age and sex of minors injured, extent of disability, industries in which employed, causes of the injuries, compensation paid, etc., only a brief summary of these points can be included here.

The report notes the cases of 9,197 boys and 773 girls, of whom 270 were under the age of 16 years. An indication of the severity of the accidents sustained by these children is the fact that the average time lost in cases of temporary duration was 35.2 days, as compared with an average of 42.7 days lost by adults. There were 117 death claims, 2 permanent total disability claims, 425 permanent partial disability claims, and 9,426 temporary injury claims. Accidents to these minors resulted in about the same degree of impairment as those to adults. Thus, of 68,804 compensated claims of adults during 1924, the percentages were: Death, 2.7; permanent disability, 4.2; temporary disability, 93.1; while the percentages of minors in these classes were, respectively, 1.2, 4.3, and 94.5.

Most of the minors suffered injuries to hands, arms, and fingers, comprising 55.8 per cent of the permanent disability claims and affecting 54.2 per cent of the boys and 75.4 per cent of the girls. Of the 624 cases (6.3 per cent of all cases) of blood poisoning developing, 84.9 per cent were boys, and cuts and lacerations were responsible for 43.6 per cent of these cases. Crushes and bruises and cuts and lacerations were the kinds of injury in three-fifths of all cases (63 per cent). Crushes and bruises caused 35.1 per cent of the deaths, and amputations resulted in 49.2 per cent of the permanent disabilities.

As may be expected, the largest number of minors were injured in manufacturing industries, and the next largest number in mining and quarrying, 49.3 per cent in the former and 29.1 per cent in the latter. Eighty and five-tenths per cent of the girls and 46.6 per cent of the boys were injured in the manufacturing branches of industry and 31.6 per cent of the boys were injured in mines and quarries. However, when degree of disability is considered, we find that mines and quarries caused 53 per cent of the deaths and manufacturing 29.1 per cent; that manufacturing caused 69.6 per cent of the permanent disabilities and mines and quarries caused 18.8 per cent; and that manufacturing caused 48.6 per cent of the temporary disabilities and mines and quarries caused 29.3 per cent. The percentage in each of these cases is far above the percentage in other industries. In all instances where manufacturing industries figured, metals and metal products stand highest, with 12.8 per cent of the deaths, 39.4 per cent of the permanent injuries, and 24.8 per cent of the temporary cases.

Vehicles (mostly in coal mining) caused the greatest number of accidents to boys (23.8 per cent) and machinery the greatest number

to girls (53 per cent). These figures may be compared with 21.4 per cent in the handling-objects group, in which group occurred the greatest number of accidents to adults. Vehicles were responsible for 33.3 per cent of the deaths, and falling objects for 23.1 per cent, while 63.5 per cent of the permanent disabilities were due to machinery. The temporary disabilities were largely due to vehicles (22.4 per cent), to handling objects (20.6 per cent), and to machinery (20.2 per cent).

It appears that the median average weekly wage of minors injured was \$10.56 for those 14 and 15 years of age, \$17.89 for those 16 and 17 years of age, and \$24.70 for those 18, 19, and 20 years of age. This is significant in view of the fact that compensation is payable up to 60 per cent of the average weekly wage, with a maximum of \$12 and a minimum of \$6, unless the employee was receiving less than \$6 at the time of injury, in which case an amount equal to the full wages is paid. Most of the injured (7,118, or 71.4 per cent) were in the highest age group, of whom 5,186, or 72.9 per cent, received earnings of more than \$20 a week, the compensation therefore being limited to the maximum of \$12. There being also 36.7 per cent of the age group 16 and 17 years receiving earnings of over \$20 a week, it will be seen that more than half (61.6 per cent) of the injured children received less than 60 per cent of their wages in compensation. Only 4.3 per cent received more than 60 per cent of their wages in compensation, showing that comparatively few (414, or 4.2 per cent) were, before their injury, receiving less than \$10 a week and consequently were awarded the minimum of \$6 per week, or their actual wages if less than \$6.

The average compensation awarded to minors was \$1,496.04 in death claims, \$635.58 in permanent disability claims, and \$40.04 in temporary disability claims, or an average of \$82.63 for all cases. This compares with an average of \$177.35 awarded to adults. The total compensation awarded was \$823,831, apportioned as follows: Death, \$175,037; permanent disability, \$271,392; temporary disability, \$377,402.

Compensation for Industrial Injuries to Minors in Wisconsin

IN APRIL, 1928, the Industrial Commission of Wisconsin published a discussion of the use of increased compensation in cases of industrial accidents to children illegally employed. Under the Wisconsin Law no child under 17 years of age may be employed unless the employer first has on file a labor permit authorizing his employment, issued by the commission or by some person designated by it. The State also has a list of employments which, because of their hazardous character, are prohibited to minors of different ages, irrespective of whether or not they have labor permits. If a minor of permit age suffers an industrial injury while employed without a permit, he is entitled to double compensation; if the injury occurs while he is employed in a place for which permits may not be issued, or if, whether or not of permit age, he is injured while employed in a prohibited occupation, he is entitled to treble compensation. The employer must pay the extra compensation, which in special cases may run up to approximately \$36,000, and he can not insure against this risk.

The principle of treble liability in prohibited employment cases is that the child shall receive approximately full compensatory indemnity for the loss incurred; such liability results from the individual employer's violation of laws governing the employment of children, and hence it is not an insurable liability to be distributed upon other employers.

Statistics are presented showing that since the beginning of 1923 there have been 324 cases involving increased compensation because of violations of the child labor law. In 265 cases, the minors, being under 17, were employed without a permit first having been secured, and in 59 cases the accident occurred while the minor was engaged in a prohibited occupation; in 20 of these latter cases the ages were 17 and over. In 1927 two-thirds (30) of the cases were of employment without permit, involving double liability, and the remainder (15 cases) were of employment at a prohibited occupation or employment, involving treble liability. The amount of increased compensation paid by employers varied from \$10 or less in one case to between \$3,000 and \$4,000. "The severity of accidents is capricious. One prohibited employment case cost the employer less than \$20, another case cost the employer nearly \$5,800." The number of cases, with the normal indemnity and the amount of indemnity paid for accidents occurring in illegal employment, for the last five years, are as follows:

INCREASED COMPENSATION ENDEMNITY INCURRED BY EMPLOYERS IN CASES INVOLVING VIOLATION OF CHILD LABOR LAWS, 1923 TO 1927

Year	Number of cases	Total amount of normal indemnity	Total indemnity paid
1923.....	69	\$9,782	\$29,422
1924.....	87	15,214	55,819
1925.....	57	5,806	17,402
1926.....	66	12,839	35,273
1927.....	45	11,111	27,223

COOPERATION

Development of Cooperative Stores in 1927 and 1928

WITH a few outstanding exceptions the past two years have been a period of quiet progress by the consumers' cooperative retail societies. Strikes have been the chief factor militating against these societies. The coal strike, especially, has had an adverse effect upon societies in the coal fields. Unfavorable conditions are also reported in certain textile centers. With these exceptions, the movement continues a slow stabilization and expansion.

Greater stress is being laid upon correct business practice and accounting methods in cooperative stores. All the central organizations—both educational and wholesaling—regard this as one of their chief functions. The value of this educational work and practical service toward stabilizing and assuring the solvency of cooperative stores can hardly be estimated.

One of the noteworthy developments in the attempt to raise the general level of excellence in the cooperative movement was the decision of the board of directors of the Cooperative League to issue each year a certificate of merit to those of its affiliated societies which attain a set standard of cooperative practice and business procedure. The requirements to be met are as follows:

1. That the fundamental principles of Rochdale cooperation be observed.
2. That every member society render at least semiannually a financial report to office of national or district league.
3. That every member society shall have an audit made at least once a year by an accountant acceptable to the directors of the league.
4. That every society carry on educational activities satisfactory to the directors of the league.
5. That every society in a territory where a cooperative wholesale exists shall give preference to such wholesale in its purchases.

It is planned that eventually societies will be required to meet these requirements in order to retain their membership in the league.

The established cooperative wholesales have pretty well recovered from the hard times of 1921 and 1922, and a movement toward expansion of their number has taken place.

Educational Bodies

THE YEAR 1928 was marked by the congress of the societies affiliated to the central cooperative union, The Cooperative League of the United States of America. At this congress, which was held October 29–31, at Waukegan, Ill., it was reported that the league at the end of 1927 had in affiliation 155 societies having a combined membership of 77,826. There were also 722 individual members of the league and 13 fraternal members. Excluding credit, insurance and banking organizations, these societies did a business of \$13,765 444 during the year.

There are three district educational bodies—for the Northern States, the Central States, and the Eastern States. In sections where a district league exists the local societies affiliate with the national league through the district organization, but where there is no such district organization, the local societies affiliate directly with the national league.

Northern States Cooperative League.—The territory of the league includes the States of Minnesota, North and South Dakota, Wisconsin, and Michigan.

During 1926–27 several of the newly affiliated societies failed. One of these was a promoted society in which many working people of Minneapolis had invested money. Its failure led to much adverse feeling against the society and cooperation in general, which militated against the league. In spite of this, however, it was able to report an increase from 1927 to 1928 in number of affiliated societies from 82 to 96. The membership of the affiliated societies increased from 52,828 to 54,824 and their sales from \$9,821,878 in 1926 to \$10,421,784 in 1927.

Central States Cooperative League.—This league's territory covers the States of Illinois, Indiana, and Ohio. Its way has been a most difficult one. It was organized shortly after the dissolution of the Central States Cooperative Wholesale and had to contend with the ill will engendered by that failure. Also the economic condition of the coal fields where most of the societies of the State are located has hindered its development. By 1926 only about 25 cooperative societies were left in existence in the State. Fourteen of these are members of the league; they range in size from 33 to 1,400 members and the annual business done by them ranges from \$1,600 to \$750,000.

Lack of funds and the continuance of the coal strike has prevented organization work by the league in Indiana and Ohio.

The league maintains for its members an addressograph and multi-graph service, poster service, and speakers' bureau. It has been carrying on a campaign for greater educational work by local societies and against credit trading. Some joint buying is being carried on in such staples as coffee, tea, condiments, etc., under the cooperative label.

Eastern States Cooperative League.—The Eastern States Cooperative League has for its field the States of Massachusetts, Connecticut, New York, and New Jersey. From 1927 to 1928 the number of societies affiliated to it increased from 15 to 29 societies with some 16,000 members.

The league is engaged mainly in educational work, having held a training school and several week-end conferences. It is working on a course of lectures on cooperation which it is offering to schools and colleges, and has been considering the holding of an evening cooperative training school.

Progress of Wholesale Cooperation

THE Cooperative Central Exchange, at Superior, Wis., is the wholesale society of a group of local societies in Michigan, Minnesota, and Wisconsin. It has been in operation since 1917. Always handicapped by lack of adequate capital, it has nevertheless made steady

progress. In 1926 its sales passed the million mark (\$1,048,293), and it had 74 local societies in membership. By 1927 its membership had increased to 76, and its sales rose to \$1,255,676. This wholesale's cost of operation in 1926 was 10.6 per cent of sales and in 1928 only 9.6 per cent of sales. The table below shows the development of this wholesale society which alone of the purely consumers' wholesales weathered the hard times of 1921 and 1922:

DEVELOPMENT OF COOPERATIVE CENTRAL EXCHANGE, 1917 to 1928, BY YEARS

Year	Number of member societies	Number of customer societies	Sales	Net gain	Share capital	Surplus	Net worth
1917	15	15	\$25,574	\$268	\$480		\$748
1918	25	50	132,423	2,063	4,020		6,351
1919	40	83	313,664	7,330	6,940	\$1,165	15,436
1920	48	100	409,591	6,798	10,890	4,223	21,911
1921	56	103	312,347	3,499	15,389	4,460	23,348
1922	56	112	337,567	1,183	16,292	4,704	22,280
1923	56	108	504,177	5,181	17,993	5,077	28,250
1924	60	99	613,215	5,973	21,501	5,897	33,370
1925	65	93	835,532	8,869	27,279	6,850	42,998
1926	74	99	1,048,293	11,648	37,249	8,501	57,398
1927	76	105	1,255,676	18,335	48,865	10,603	77,803
1928	84	114	1,517,813	23,894	65,733	12,565	102,193

The Grange Cooperative Wholesale, at Seattle, Wash., was organized in 1919 to serve the Grange cooperative societies in that State, and in 1922 it took over the Cooperative Foods Products Association, a consumers' organization. Some 35 of the Grange stores own stock in the wholesale. The sales of the organization in 1927 amounted to \$105,880; the net earnings for the year were \$1,785, which was applied to a previous deficit of \$5,837, leaving the deficit of \$4,052 still remaining. The course of the sales of the wholesale since 1920 are shown below:

1920	\$53,570	1924	\$246,096
1921	44,254	1925	102,677
1922	156,122	1927	105,880
1923	135,161	1928	223,290

This wholesale, serving the farmers' societies as it does, naturally handles not only consumers' goods but also farm supplies. It owns and operates a feed mill whose capacity is 100 carloads per month and buys the whole output of a soap factory to supply its customers.

One of its most important services is an accounting and auditing service for the affiliated stores.

The Kansas Union Jobbing Association is, like the Grange wholesale, an organization serving farmers' societies, in the State of Kansas. During the first nine months of 1928 the net gain on its operations was \$37,392. This was applied to wipe out a previous deficit, leaving a surplus of \$2,976 at the end of September, 1928.

The Farmers' Union State Exchange, at Omaha, Nebr., handles at wholesale nearly everything used on the farm, besides operating 10 branch retail stores and acting as purchasing agent for the federated oil associations of the State. Following heavy losses in 1920 and 1921 the wholesale has made a steady recovery. Its profits in 1926

amounted to \$34,222, in 1927 to \$49,096, and in 1928, \$37,930. The course of its business since 1920 is shown below:

	Sales		Sales
1920-----	\$2, 387, 972	1925-----	\$1, 521, 312
1921-----	1, 468, 133	1926-----	1, 512, 024
1922-----	1, 148, 133	1927-----	1, 618, 288
1923-----	1, 335, 662	1928-----	2, 146, 860
1924-----	1, 347, 605		

Among the developments of the past two years have been the calling of a conference early in 1928 to consider the formation of a cooperative wholesale for the northern Pacific Coast States and the establishment of the Eastern Cooperative Wholesale, with headquarters in New York City. The latter was the outgrowth of the scheme of collective purchasing which has been carried on for several years by the societies of the Eastern States Cooperative League. Business is reported to have begun in January, 1929.

Local Retail Cooperation

SOCIETIES of the North Central States have continued to progress during the past two years, showing an increase in membership and in sales. This district contains the largest local consumers' society in the United States, the Franklin Cooperative Creamery Association of Minneapolis, with 4,632 shareholders, and sales for 1928 amounting to \$3,410,397. Its net gain for the year was \$95,529.

This society has a male chorus and band, formed among the employees, and a baseball team. During the 1928 a motion-picture film was made, showing the processes and working of the plant, to be used in the work of the organization in familiarizing the people of the city with what it is doing.

An interesting development in this section was the formation of the Mesaba Range Cooperative Federation, by 17 stores in the iron district of Minnesota, to function as an educational body and to act as purchasing agent for them.

In certain other sections of the country the consumers' societies have not been so successful. This is especially true of the associations in the mining districts of Illinois, Ohio, and Pennsylvania.

The prolonged cessation of work at the mines in these districts has had its effect upon the cooperative societies, of which the miners are the mainstay. With no income except what was received in relief or in strike benefits the purchasing power of the members almost disappeared. The cooperative stores, which of course are dependent upon the patronage of their members, can not hope to keep on indefinitely when that patronage is gone. The result has been that a number of societies have been forced to discontinue business. Others, however, are still in operation. The Central States Cooperative League states in this connection: "The membership of 15 of our oldest and best cooperative societies is made up almost entirely of coal miners and these societies are fighting desperately to keep their cooperative enterprises, which they have so patiently and laboriously built up, from being destroyed by the curse of unemployment."

Pacific coast.—Consumers' cooperation on the southern Pacific coast has never recovered entirely from the losses sustained at the time of the failure of the Pacific Cooperative League. Individual

societies are prospering, but there is no organized cooperative movement in that section. On the northern Pacific coast, however, although many of the societies were lost as the result of the failure of the National Cooperative Association, some of the ground has been recovered, largely through the efforts of the Grange Cooperative Wholesale at Seattle, and, as stated, steps have been taken by the cooperative societies in the Astoria, Oreg., district, looking toward the formation of a central purchasing organization.

Eastern States.—No general report is available concerning the condition of the movement in the Northeastern States, but the data at hand indicate a fairly satisfactory state of things, especially among the societies affiliated to the Eastern States Cooperative League. These societies have their own auditing service. Beginning in 1925, with the joint purchase of several carloads of flour for two bakery associations which were members of the league, the pooling of purchases by the affiliated societies has been gradually extended, and, as already mentioned, a cooperative wholesale society has been started to serve them.

The conditions in the textile industry of New England have adversely affected some of the cooperative societies of the section. The manager of the United Cooperative Society of Fitchburg, Mass., reported that upon the sale and subsequent moving away of one of the textile mills of the town, the store lost some 300 of its members who had been employed in the mill but had to leave town to seek work elsewhere. Thus within a year the membership of the society dropped from 800 to about 500.

Cooperative Purchase of Gasoline and Motor Oils

DEVELOPMENT of the cooperative gasoline stations continues, mainly in the rural districts of Minnesota, Nebraska, and Illinois.

Illinois.—An article in the January 21, 1928, issue of *Agricultural Cooperation* states that in the past two years 19 farmers' cooperative oil stations have been set up in Illinois. In most cases each of these stations serves a whole county; they do not as a rule have service-pump stations but make deliveries direct to the farm by truck.

Two kinds of stock are issued—common stock of no par value, issued to farm bureau members only, ownership of which carries with it the right to vote in the organization and to participate in the distribution of patronage dividends, and preferred stock, ranging in the various organizations from \$25 to \$100, carrying the right to vote and to a dividend of from 6 to 8 per cent but no right of participation in patronage dividends.

Fourteen of these local associations have their own central purchasing organization, the Illinois Farm Supply Co., which began business April 1, 1927. It also issues common and preferred stock, like the local organizations, but adds a third class, preferred stock of \$1 par value, the whole issue of 2,500 shares being held by the Illinois Agricultural Association.

The central company is managed by a board of nine directors elected by delegates from the county organizations.

Its sales up to December 1, 1927, consisted of 261 carloads of gasoline, 138 carloads of kerosene, 37½ carloads of lubricating oils, 48,236 pounds of grease, and 2,471 gallons of denatured alcohol.

Nebraska.—In Nebraska the growth of this new phase of cooperation is being fostered by the farmers' union, and at the end of 1928 there were some 45 associations in the State. A state-wide central purchasing organization has been formed, the actual buying agent being the Farmers' Union State Exchange at Omaha. Fourteen local organizations are making all their purchases through the State association. Some of these are not members of the association, however, because they do not meet the requirement that 60 per cent of their shareholders be members of the farmers' union.

*Minnesota.*¹—Most of the 61 cooperative oil associations in operation in Minnesota are in the southern part of the State. Of these, 19 furnished membership figures, the average being 360 members per association. The paid-in share capital averages \$9,611 per association.

According to the State oil inspector's report, 43 of the associations sold 10,782,000 gallons of gasoline and 3,273,000 gallons of kerosene during 1927. These associations have had a remarkable success. Thirty-eight of them handled more than 50 per cent of the gasoline, kerosene, and distillate shipped into the towns where they were operating, and 21 handled more than 75 per cent.

In 1927 eight associations earned an average of 123 per cent on their capital stock and 40 an average of 68.2 per cent. "This showing will not be equaled in 1928 as there have been severe price wars in cooperative oil territory, but the purpose of the cooperative organizations will be attained nevertheless."

It is interesting to note that practically all of the price cuts have been in cooperative oil territory and have been brought about by competitors. The strength of the cooperative lies in the fact that the consumers get the profits regardless of the price. The cooperatives do not cut price but follow their competitors. In one case where the competition put the price of gasoline several cents below cost, the cooperative closed its doors for a few weeks until the price came back to normal. In this case there was no difficulty in getting the trade back, and they had enjoyed buying their gasoline below cost.

Development of Postal Credit Union Movement

THE credit union movement is a fast-growing one. Realizing the value of the credit union as a means of monetary assistance for members in times of stress, and shocked by revelations of the usurious rates of interest demanded by loan sharks, various trade-unions are encouraging the formation of credit unions by their locals. The Brotherhood of Railway Clerks' local lodges have been very active, and the Railway Clerk for April, 1928, states that up to the time of its issue some 41 lodges had formed credit unions. Among the earliest labor groups to adopt this form of organization were the postal employees, being encouraged in this by the service relations council of the Postal Service. The first postal credit union was formed in the Brockton (Mass.) post office in 1923, with eight charter members and "assets of less than \$20." Credit unions have developed steadily in the Postal Service since then, and Bulletin No. 8, issued by the service relations council, shows that on April 1, 1928, there were among the post-office employees 168 credit unions, with

¹ Data from Northern States Cooperative Yearbook for 1928.

19,098 members and resources of \$1,265,548. The table below, compiled from the above-mentioned report and previous bulletins of the service relations council, shows the development of these credit unions since the inception of the movement five years ago.

DEVELOPMENT OF POSTAL CREDIT UNIONS

Date	Number of societies	Number of members	Paid-in share capital	Deposits	Total loans granted	Loans outstanding
Jan. 5, 1923.....	1	8	\$20			
End of 1923.....	7	(1)	(1)	(1)	(1)	(1)
Dec. 31, 1924.....	25	(1)	(1)	(1)	(1)	(1)
Apr. 1, 1925.....	36	5,087	157,848	\$8,542	\$283,634	\$162,764
Oct. 1, 1925.....	44	7,320	250,209	7,734	590,919	257,702
Apr. 1, 1926.....	48	9,726	422,686	16,837	1,054,303	385,176
Oct. 1, 1926.....	63	11,429	530,381	32,808	1,599,465	583,309
Apr. 1, 1927.....	75	13,993	731,773	50,366	2,310,633	723,243
Oct. 1, 1927.....	83	16,257	926,857	74,678	3,183,890	981,805
Apr. 1, 1928.....	168	19,098	1,179,293	86,255	4,160,262	1,201,023

Not reported.

Development of Building and Loan Associations, 1926-27

THE REPORT of the secretary of the United States League of Local Building and Loan Associations, made to the thirty-sixth annual meeting of that body, held in Dallas, Tex., in May, 1928, contains data showing the development of these associations during 1927. Comparison with the previous year's report shows that from June 30, 1926, to June 30, 1927, the number of associations increased by 274, the membership by 670,556, and the total resources by \$844,458,644. There were 21 failures during the year, as compared with 12 the year before. These involved a loss to the stockholders estimated at \$1,013,000.

As to conditions during the year, the report states as follows:

The past year has been notably one of easy money and declining interest rates. Associations generally have experienced a keener competition for loans. Money has been pouring into the building and loan associations in greater volume than has ever been experienced heretofore, with the result that in the larger cities particularly there has accumulated a surplus of funds, which it has been a problem to keep safely and profitably employed. While the efforts of building associations have heretofore been directed toward getting investing members, they have had to readjust themselves and go after the borrowing class. This has been a new experience. In their loaning field they now find the insurance companies, the mortgage investment companies, and the various financial institutions, including the national banks, contending with them for business which in the past came to them practically without any effort. They now have to convince the borrower of the superior service which they can and do render and must demonstrate the more attractive loaning proposition which they have to offer their prospects. In other words, building and loan associations now have to employ salesmanship in disposing of their commodity—mortgage loans for home owning or home buying purposes.

The table below shows the number of associations, the total membership, and the total assets, by States.

DEVELOPMENT OF BUILDING AND LOAN ASSOCIATIONS IN THE UNITED STATES,
1926-27

State	Number of associations	Membership	Total assets	State	Number of associations	Membership	Total assets
Alabama.....	48	54,700	\$43,600,944	Nebraska.....	83	235,581	\$155,213,561
Arizona.....	6	4,400	1,942,019	Nevada.....	1	900	523,714
Arkansas.....	73	58,729	35,830,037	New Hampshire.....	28	16,444	10,397,431
California.....	191	261,232	241,796,747	New Jersey.....	1,536	1,166,980	886,167,505
Colorado.....	62	119,631	42,476,646	New Mexico.....	18	7,150	3,833,490
Connecticut.....	38	44,504	20,614,415	New York.....	313	555,242	349,533,632
Delaware.....	42	17,750	10,212,369	North Carolina.....	235	102,000	91,000,000
District of Columbia.....	22	63,768	57,191,666	North Dakota.....	19	16,800	8,859,341
Florida.....	115	28,500	40,840,280	Ohio.....	827	2,282,693	1,035,429,317
Georgia ¹	30	6,500	2,500,000	Oklahoma.....	89	184,810	116,318,814
Idaho.....	12	4,700	2,738,752	Oregon.....	40	44,700	21,913,657
Illinois.....	910	861,000	388,097,831	Pennsylvania.....	4,427	1,776,104	1,245,987,953
Indiana.....	404	404,521	274,240,104	Rhode Island.....	7	34,437	22,635,780
Iowa.....	74	53,049	43,497,008	South Carolina ¹	150	28,000	23,000,000
Kansas.....	152	194,200	117,979,508	South Dakota.....	24	7,705	5,497,015
Kentucky.....	151	141,900	85,509,918	Tennessee.....	32	14,775	9,127,109
Louisiana.....	105	190,650	174,818,227	Texas.....	143	145,380	92,632,277
Maine.....	38	29,180	19,549,005	Utah.....	24	92,921	37,251,861
Maryland ¹	1,220	330,000	210,000,000	Vermont.....	10	4,458	2,817,009
Massachusetts.....	221	497,220	478,005,147	Virginia.....	87	56,300	50,149,670
Michigan.....	78	206,774	126,799,126	Washington.....	72	208,404	101,252,277
Minnesota.....	84	80,956	32,422,622	West Virginia.....	60	60,200	36,128,266
Mississippi.....	36	21,800	15,417,900	Wisconsin.....	182	261,685	217,563,993
Missouri.....	251	229,305	159,773,547	Wyoming.....	14	26,123	13,137,453
Montana.....	30	41,500	16,337,508	Total.....	12,900	11,336,261	7,178,562,451

¹ Figures estimated.² As shown in report; items given add to 12,804.

Condition of Labor Banks, June 30, 1928

THE following data, showing the resources of the 28 labor banks on June 30, 1928, were furnished by the industrial relations section of Princeton University:

CONDITION OF LABOR BANKS AS OF JUNE 30, 1928

Name of bank, and location	Capital	Surplus and undivided profits	Deposits	Total resources	
				1927	1928
Federation Bank & Trust Co., New York.....	\$750,000	¹ \$750,000 ² 297,278	\$19,036,393	\$19,417,237	\$21,168,585
Engineers National Bank of Cleveland.....	1,000,000	359,956	16,780,115	23,788,824	20,154,680
Amalgamated Bank of New York.....	650,000	¹ 350,000 ² 85,470	9,837,679	9,396,381	11,209,688
Telegraphers' National Bank of St. Louis.....	500,000	224,303	6,755,030	7,384,032	7,718,383
Labor Cooperative National Bank of Paterson, N. J.....	300,000	¹ 150,000 ² 35,782	5,031,616	5,015,004	5,675,320
Brotherhood of Railway Clerks National Bank, Cincinnati.....	200,000	¹ 50,000 ² 43,794	4,507,582	4,768,627	5,274,641
Mt. Vernon Savings Bank, Washington, D. C.....	400,000	151,822	3,730,431	3,919,840	4,374,575
Labor National Bank of Newark.....	250,000	148,886	3,626,281	3,248,177	4,064,412
Engineers National Bank of Boston.....	500,000	¹ 50,000 ² 22,095	2,833,020	4,298,866	3,732,132
Amalgamated Trust & Savings Bank, Chicago.....	200,000	¹ 100,000 ² 42,175	3,120,408	3,449,195	3,493,885
Brotherhoods Cooperative National Bank of Spokane.....	200,000	89,097	2,687,913	3,249,073	3,195,679
Brotherhood Cooperative National Bank, Tacoma, Wash.....	200,000	45,164	2,677,757	3,163,717	3,122,879
Brotherhood Cooperative National Bank, Portland.....	200,000	70,722	2,287,024	2,921,997	2,763,149
Transportation Brotherhoods National Bank, Minneapolis.....	200,000	61,540	2,396,009	2,697,637	2,743,204

¹ Surplus.² Undivided profits.

CONDITION OF LABOR BANKS AS OF JUNE 30, 1928—Continued

Name of bank, and location	Capital	Surplus and undivided profits	Deposits	Total resources	
				1927	1928
Labor National Bank of Jersey City.....	\$200,000	\$104,320	\$2,105,277	\$2,040,548	\$2,709,095
Brotherhood National Bank of San Francisco.....	500,000	55,793	1,669,123	2,331,773	2,433,328
People's Cooperative State Bank, Hammond, Ind.....	100,000	¹ 30,000 ² 15,412	1,705,643	1,871,319	1,933,634
American Bank, Toledo.....	200,000	¹ 50,000 ² 4,241	1,203,683	998,032	1,588,567
Brotherhood Bank & Trust Co., Seattle.....	250,000	40,000	911,954	1,372,969	1,201,954
Farmers' & Workingmen's Savings Bank, Jackson, Mich.....	100,000	16,300	971,087	1,003,810	1,095,938
Nottingham Savings & Banking Co., Cleveland.....	75,000	¹ 15,000 ² 6,689	798,717	891,508	895,693
Hawkins County Bank, ³ Rogersville, Tenn.....	50,000	53,804	722,261	670,104	826,065
Labor National Bank of Great Falls, Mont.....	100,000	¹ 10,500 ² 8,786	699,892	677,376	822,178
United Labor Bank & Trust Co., Indianapolis.....	112,500	¹ 22,500 ² 11,142	658,222	1,221,227	810,144
Gary Labor Bank, Gary, Ind.....	50,000	¹ 10,000 ² 2,643	627,130	606,132	759,892
Labor Bank & Trust Co., Houston.....	100,000	¹ 3,000 ² 951	423,878	518,339	528,888
Labor National Bank of Three Forks, Mont.....	25,000	¹ 5,000 ² 5,704	192,818	209,798	228,522
Brotherhood State Bank, ⁴ Spokane.....	25,000	¹ 5,000 ² 1,745	159,891	237,431	192,563
Total (28 banks).....	7,437,500	3,606,614	98,165,834	111,368,973	114,717,673

¹ Surplus.² Undivided profits.³ Statement as of Apr. 24, 1928.⁴ Statement as of Feb. 23, 1928.

Housing Societies

THE YEAR 1928 has seen the further development or completion of several cooperative housing projects in New York City. Undoubtedly the largest of these is the cooperative community of the United Workers' Cooperative Association, with its group of apartment buildings providing living quarters for 1,185 families. The next largest project is that of the Amalgamated Clothing Workers, which has provided housing accommodations for 303 families, and has begun work on buildings which will house 192 additional families. These projects are described on pages 68 to 74.

Another colony is that of the Jewish Cooperative Homes Association, which has provided homes for some 250 families. These tenants have established a cooperative store society and are providing themselves with groceries, meats, dairy products, fruit and vegetables, drugs, and stationery, to the amount of between \$12,000 and \$15,000 per month.

A fourth group is that of the Jewish National Workers' Cooperative Homes Association, whose colony includes 125 families. Cooperative purchasing is also being done by these tenants.

The Consumers' Cooperative Services, which started a small cafeteria in downtown New York in 1920, and has since expanded its business from year to year until its business now embraces a number of cafeterias, food shops, lending libraries, and a credit union, has created a department to consider the question of cooperative housing. It is understood, however, that so far the price of land has stood in the way of immediate action.

Housing Activities of Labor Groups ²

ALTHOUGH the provision of housing accommodations for trade-unionists has thus far received comparatively little attention from labor organizations, there are a number of organizations promoted by trade-unions for financing the construction of homes by their members.

One organization has been in existence since 1920, one since 1922, one since 1924, two since 1926, one since 1927, and one was organized in 1928. Six of these building and loan associations have financed the construction of more than 400 dwellings.

So far as the bureau has been able to determine, only two unions have undertaken the actual construction of dwellings. These are the Brotherhood of Locomotive Engineers and the Amalgamated Clothing Workers.³ The operations of the former have been in the development of a town in Florida, constructing detached dwellings, mainly. Those of the latter have been in the construction of apartment buildings in the city of New York. In neither instance, however, is the purchase of dwellings confined to members of the union which has undertaken the work.

In addition to these union undertakings, a housing project in New York City is being carried on by a group of trade-unionists from a number of trades.

Having provided themselves with quarters through their organization, the tenants of these union-constructed apartment houses in New York City have gone farther and are filling their other needs cooperatively, buying milk, ice, electricity, groceries, meats, etc., collectively, and providing such other features as library, kindergarten, nursery, medical and dental care, gymnasium, playgrounds, etc., thus forming a more or less self-contained community of apartment dwellers.

Amalgamated Clothing Workers' Buildings

THE IDEA of the actual provision of dwellings for its members by the Amalgamated Clothing Workers was first broached at the 1924 convention. In 1925 a group of union members imbued with the cooperative idea formed the Amalgamated Clothing Workers Corporation for the purpose of purchasing ice and coal for the members of the Amalgamated Credit Union. The purchase of coal was in due time begun and is still being conducted.

This corporation which had been formed for the purchase of ice and coal was utilized in the housing project. Through it, purchase was made in April, 1925, of a plot of ground costing \$315,000, and this organization has directed the entire housing project. Ground was broken on Thanksgiving Day, 1926; the first two buildings were ready for occupancy November 1, 1927, the third December 1, and the fourth December 15, 1927. A celebration of the formal opening of the first five buildings was held December 25. The sixth building was ready for occupancy in March, 1928. On January 13, 1929,

² For a more detailed discussion see Bureau of Labor Statistics Bul. No. 465: Beneficial Activities of American Trade-Unions, Ch. VII.

³ The Cloth, Hat, Cap and Millinery Workers' International Union has for some time been interested in the provision of housing accommodations for its members, but so far circumstances have prevented action in this field by the union.

ground was broken for a seventh building which will house 192 families and will cost about \$1,500,000.

The union in undertaking this project was actuated by the desire to show that low-rental housing was possible if undertaken by a group. Care was taken to secure a site which would give the advantages of the suburbs while at the same time easily accessible to the downtown district.

Location of Buildings

THE GROUND acquired for the project is in the Bronx on Mosholu Parkway opposite Van Cortlandt Park. As the corporation owns two blocks of land—some 50 lots, in all—the plans were drawn so that each apartment is an outside apartment facing on a street on at least one side. There are no rear apartments, and no apartment is more than two rooms deep.

The group of buildings has parks on three sides, and those families occupying the upper floors of the apartments have a view from their windows of Van Courtlandt Park, the waters of the city reservoir, and the Palisades of the Hudson. The proximity of the parks means access to the tennis courts, ice skating, and other outdoor recreation and exercise made available by the park facilities.

The houses are so situated as to be reached by five minutes' walk from two subways. These give quick transportation to the clothing center in the downtown district where many of the tenants are employed.

Description of Apartments

As ONE of the predominant ideas was the provision of plenty of light and air, as well as play space for the children where they would be safe, the buildings are, roughly, in the form of a hollow rectangle. Only 47 per cent of the ground is occupied by the buildings; the remainder is in lawns and playground space in an inner court 556 feet long which extends the full length of the property and varies in width from 51 to 100 feet.

They are 5-story, walk-up apartments, the elevator being the only modern feature not installed. This was omitted in order to keep down maintenance and operating charges and to make low rentals possible. The building now under construction will, however, contain this feature.

The whole group of buildings contains 1,185 rooms in 303 apartments of from 2 to 7 rooms each, apartments of 3 and 4 rooms predominating. Each dining alcove is counted as a half-room, and a kitchen is counted as one room, but kitchenettes (there are only three of these in the whole block of buildings) and the bathrooms do not count as rooms. Some 14,000 square feet of floor space have been allotted for communal purposes.

There are 29 staircases in the six buildings. In most cases, in order to insure privacy, there are only two dwellings on each landing, and in no case more than three.

The rooms are large, the average size of the living rooms being 12 by 17 feet, that of the bedrooms 11 by 15 feet, and that of the kitchens 8 by 12 feet. Each apartment is equipped with gas range, refrigerator, dumb-waiter, shower bath, and electricity. All floors are of hardwood. The buildings are heated by a central oil-burning

furnace, which can, with slight changes, be converted to the use of coal. Incinerators are also installed throughout the buildings for the disposal of garbage and refuse.

Financing

CONSIDERABLE time elapsed between the time of purchase of the land and the beginning of building operations. It is pointed out, however, that the delay was beneficial, for in the interval a State housing law was passed, receiving the governor's signature May 10, 1926. This law was intended to facilitate the construction of low-rental housing, offering exemption from taxes and certain other advantages as inducements.⁴

The project was financed from the down payments of the tenant owners, by mortgages and loans from various Amalgamated subsidiaries, and from a large insurance company.

It was estimated that the 6-building group would cost about \$1,825,000—\$315,000 for land and \$1,510,000 for construction—or about \$1,500 a room and approximately 40 cents per cubic foot. This average included the rooms built for communal purposes.

Savings were possible in various ways. In the first place, the land was purchased at about \$2 per square foot. Also, lower rates were obtained on the actual building operations because of the fact that the contractors, knowing that the work was a cash job, did not add the usual amount for financing. Competition between builders, because of this cash feature and the size of the project, also was a factor in reducing costs. The loan from the insurance company was obtained at a rate of 5 instead of the 5½ per cent customary for loans of this sort. This saving is estimated at \$97,865 for the whole period of the loan (at \$5,000 per year). All of the usual recording fees, revenue stamps, etc., were waived by the authorities and by the insurance company.

But the most considerable of all sources of saving was the exemption of the buildings (not the land) from taxes, under the State housing law. The actual saving to the corporation due to this exemption amounts to approximately \$30,000 a year, or \$2.11 per room per month.

Conditions of Ownership and Management

THE PURCHASE of dwellings in these cooperative apartment houses was not confined to members of the Amalgamated Clothing Workers, but was open to any trade-unionist in New York City. Amalgamated members were, however, given preference over workers in other trades.

Each prospective tenant must pay \$500 per room, of which one-half must be paid at time of purchase. For this he receives stock in the Amalgamated Clothing Workers Corporation equal to the amount of his purchase. Thus if he buys a 3-room apartment he receives stock to the amount of \$1,500, if a 4-room apartment, stock to the amount of \$2,000, etc.; and a perpetual lease to the apartment of his choice.

⁴ For the terms of this law see Labor Review, July, 1926, p. 77.

In addition to this he has been paying "rent" of \$11 per room per month. From the amount paid in in rents each month, a certain sum is put away to pay off the mortgages, other amounts to cover expenditure for repairs, renovations, etc. It was stated at the outset that as the mortgages were paid off the rents would be reduced. Early in 1929 it was reported that as a result of the unusually favorable results of the previous year's operation, rents on the upper floors will be reduced to \$9.50 per room.

In many cases the prospective purchaser was unable to gather together the \$250 per room required as a down payment. In such cases, assistance was extended in the way of loans through the Amalgamated Bank, or the Amalgamated Clothing Workers Credit Union. The Jewish daily, *Forward*, also assisted materially by advancing an amount of \$100,000, from which loans were extended to would-be purchasers.

In order to prevent speculation, a tenant who wishes to withdraw from membership in the corporation must sell his stock back to the corporation, which will allow him its book value at the time of withdrawal. Subleasing of apartments is prohibited.

Prospective tenants must be accepted by the stockholders' membership committee before being admitted to ownership in the apartments.

The affairs of the Amalgamated Clothing Workers' Corporation are administered by a board of directors representing the tenant owners and including a representative of the State housing board.

The various activities within the buildings are managed by committees of five, elected by the tenants. There are three of these committees: The house committee, which looks after the operation and maintenance of the buildings; the business committee, whose duty it is to see to the buying of ice and milk, the running of the stores, the maintenance of the bus, etc.; and the social and educational committee, which arranges the social affairs, has supervision over the library, play rooms, etc. In order to coordinate the activities of these committees, the house committee has representatives on the other two.

Cooperative and Communal Activities

THE TENANTS have organized themselves for cooperative action along various lines. Milk, ice, and electricity are purchased collectively, and there are a grocery store, meat market, and vegetable store operated by a cooperative association of the members. Other cooperative activities include a tea room, a library, an orchestra composed of children of the tenants, and a bus which carries the children of the colony to and from school.

The land on which the fifth building stands drops 19 feet from one street to the other, and advantage has been taken of this for the construction of an auditorium seating about 500 people and having a large stage. Here movies will be shown, and lectures, plays, and entertainments of various sorts will be given. There is a kitchen nearby for the preparation of refreshments, a check room, and a rest room and lavatory for the women as well as one for the men.

There is also to be a music room, and a cooperative nursery under the care of a competent nurse. In another building there will be an indoor playground under a trained supervisor; a small outdoor playground is in course of construction.

After-school classes in Jewish history and in Yiddish are conducted for the grammar-school children of the colony under the auspices of the Workmen's Circle (to which about 80 per cent of the residents belong). This organization pays a rental for the use of the room where the classes are held and supplies the teacher.

Attitude of the Union

THESE buildings give the tenants access to housing conditions that would ordinarily (because of expense) be closed to them, at rents which they can afford to pay. Of the membership now in the buildings, about one-third have come from the lower East Side, about 35 per cent were already living in the Bronx, and the remainder have come from other parts of the city and from Brooklyn.

About one-third are members of the Amalgamated Clothing Workers, one-third are members of the International Ladies' Garment Workers' Union, and the remaining third are workers from other unions.

The union took the position that slums are not an unavoidable evil of city housing, and actuated by the desire to bring its members, so far as possible, out of the slums into light, airy, sunny dwellings, has demonstrated what collective effort can do. The step was not taken without opposition within the organization. President Hillman points out:

Our organization, like all groups of human beings, includes two types of people. On the one hand, there are those who believe that we should leave well enough alone, limit our usefulness to the spheres where everything has been tried and is certain; they fear anything new, not realizing that what is accepted to-day was new and uncertain at some earlier time. The others are impatient for new things, anxious to fly even before they have learned to walk. It is the good fortune of our organization that the great bulk of its people have steadfastly adhered to a policy of careful, if at times slow, forging ahead. Through this policy some of our dreams of yesterday are part of our actual life to-day. The soundness of this state of mind and attitude of the largest group in the organization is proved by our achievements, both the volume of them and their character. The Amalgamated has always laid stress on results as soon as it was certain of what it wanted. We have always pursued that course regardless of criticism and no matter from where it came.

United Workers' Buildings

A NUMBER of years ago a small group of workers leased one floor in a house in New York, on a cooperative basis. As the group increased, the whole house was taken over, and certain social features were added and a summer camp was started. These proved so popular that the field of activities has been broadened until to-day the United Workers' Cooperative Association is perhaps the largest and most active cooperative group in New York City.

Early in 1925 the association purchased an entire city block facing Bronx Park. Since that time additional land has been bought, until now the organization owns six blocks of land, on two of which cooperative apartments have been built.

The first group of apartment buildings contains four units surrounding a large central garden. These four units contain 339 apartments, totaling 963 rooms. The individual apartments range from two to five rooms, the majority being those of three rooms.

The second block is built in the form of an E and contains 354 apartments (1,054 rooms), while the third and fourth units will contain 494 apartments (1,450 rooms).

These are 5-story, walk-up apartments. As no wing is more than two rooms deep, this means that every room looks out either upon a street or upon the interior garden. Special care has been taken in the arrangement of the rooms so as to secure cross ventilation in every apartment. In no case do the buildings occupy as much as 50 per cent of the ground space.

The living rooms average 12 by 16 or 12 by 17 feet, and the bedrooms are 11 by 15 feet in size. Each kitchen is equipped with gas range, refrigerator, and dumb-waiter, and the bathroom with a shower.

One section of the first group of buildings contains the "bachelors' quarters," that is, single furnished rooms. Each three of these are provided with a bathroom, and there is a common kitchen for every 12 rooms.

The buildings are heated by oil from a central plant in each block. In the first building four incinerators were installed, one for each unit, the garbage being collected from the various apartments and burned here. In the second building each hall has a chute connecting directly with the incinerator, thus saving the process of collection.

Conditions of Ownership

AS ALREADY stated, each prospective tenant must pay in \$250 per room, and a monthly rent of \$14 or \$14.50 per room. Each tenant is required to be a member of the union of his trade, unless excused by insurmountable obstacles.

Unlike the ordinary cooperative procedure, the member purchaser in one of the United Workers' cooperative apartments receives no stock in the enterprise; he gets a receipt for the amount paid in and a 2-year lease to the dwelling. At the end of two years, if he is still acceptable to the other tenants, his lease is renewed; if not, he must leave, in which case his principal is returned, without interest, minus his proportional share of the cost of redecorating the apartment for a new tenant. Subleasing is not allowed; a tenant leaving for any reason before his lease expires must turn his apartment back to the association.

There is a board of 25 unpaid directors which manages the affairs of the association, and these directors also serve on various committees having to do with the community. Subcommittees are appointed by these committees from among the membership and much of the actual work of the conduct of the buildings and the various community projects is done by these subcommittees. The association encourages as many residents as possible to serve on the various subcommittees; this is done on the assumption that the more work done by the individual the greater his interest and pride in the whole project will be.

Cooperative and Communal Features

THERE are in this colony also a number of community activities. These include a kindergarten and day nursery, classes for children and adults, a young people's cooperative society, library, assembly

hall, gymnasium, health clinic, playground, and seven cooperative stores, besides the collective purchase of gas, electricity, ice, and milk.

Labor Policy

THIS group of cooperators has a well-defined labor policy. As already stated, all members must be trade-unionists, and this requirement is carried out wherever possible in the business dealings of the association, only union firms being dealt with. All the construction work on the buildings must be done by organized labor and the materials must be supplied by union firms. The association has insisted that even the common laborers employed must be union men.

The employees in the cooperative stores, restaurant, and laundry are all members of their respective unions, as are also the teachers in the kindergarten. In one instance the association has been responsible for the unionization of a formerly open-shop business. A milk dealer who desired the patronage of the colony accorded recognition to the union of his employees, upon the demand of the cooperative.

Locomotive Engineers' Project

HOUSING and land development on a large scale have been undertaken in Florida by the Brotherhood of Locomotive Engineers. The brotherhood several years ago purchased several parcels of land totaling more than 50,000 acres. Here land was cleared and the foundation of a planned city laid out, the services of a city planner being engaged for the purpose. A small town has been built there, which is surrounded by an agricultural area laid out in farms of 5 and 10 acres each. The brotherhood has erected three hotels for the accommodation of tourists and visitors and has two model farms; also, it has constructed a 9-hole golf course with clubhouse. Its total investment there is understood to aggregate some \$16,000,000.

No detailed data are available as to the methods in use in the building and sale of the houses.

Home-Finance Companies of Trade-Unions

ALTHOUGH the Brotherhood of Locomotive Engineers and the Amalgamated Clothing Workers of America are thus far the only labor organizations which have undertaken the direct task of providing homes for their members, in certain other instances labor unions are giving encouragement to home ownership by their members. This they are doing by making construction loans. There are at present eight such home-loan companies of whose existence the Bureau of Labor Statistics is aware, and the bureau has some data for seven of these.⁵ Summary data concerning these seven are shown in the table following:

⁵ The Illinois Federation Corporation (Chicago),¹ Union Building and Loan Association (Minneapolis), Federation, Savings & Loan Co., (Cleveland), American Home Builders (Cleveland), Trades-Union and Loan Association (Cincinnati),² Union Building and Loan Association (Houston), and a Florida association (name not reported).

OPERATIONS OF UNION HOME-LOAN ASSOCIATIONS

State	Number of organizations	Number reporting	Number of share holders	Paid-in share capital	Surplus and undivided profits	Number of homes financed	
						Last year	Since organization
Florida.....	1	1	(¹)	(¹)	(¹)	18	(¹)
Illinois.....	1	1	(¹)	\$800,000	\$12,000	(¹)	40
Minnesota.....	2	1	1,100	211,000	713	31	150
Ohio.....	3	3	² 2,461	1,432,410	4,800	³ 15	² 220
Texas.....	1	1	571	23,755	340	13	13
Total.....	8	7	⁴ 4,132	⁵ 2,467,165	⁶ 17,853	⁴ 77	⁶ 423

¹ Not reported.² 2 associations only.³ 1 association only.⁴ 4 associations only.⁵ 6 associations only.⁶ 5 associations only.

Reasons Why Workers Borrow

AN ANALYSIS was made by the Women's Educational and Industrial Union of Boston⁶ of 4,000 loans made by the credit unions of Massachusetts. The study was undertaken "in order to discover something of the financial backgrounds [of the borrowers], their family responsibilities, and the crisis in life for which they are forced to borrow."

The eight credit unions making the loans had 13,700 members, the majority of whom had belonged to their respective organizations three years or more.

Of the 4,000 borrowers, 3,048 were men and 952 were women; 1,543 were single and 2,457 were married. The great majority were American born, largely of Irish, English, and Russian-Jewish stock.

Most of the men who borrowed were between 25 and 40 years old. They were at the prime of life when their family responsibilities were heaviest but when their earning power should have been greatest. The women fell into two divisions: The younger ones under 25 who might in a short time leave their jobs to marry, and the older ones, also in the prime of life, who found it necessary to borrow for their dependents and to make provision for themselves in old age. In one credit union composed of civil-service employees, who have long tenure of service, there were more older men borrowing than anywhere else.

The occupations of the men fell into four main classifications: The skilled artisans, the clerical workers, firemen, and the unskilled laborers. The largest single group was that of the firemen. In both municipal credit unions they formed the majority of borrowers. Men in the skilled trades formed one-third, clerical workers one-fifth, and unskilled laborers one-thirteenth of the total number of borrowers. There were in the two general credit unions a number of men who had independent businesses—small stores and shops of various kinds—and many of the artisans were self-employed, particularly the tailors and painters. There was a noticeable lack of professional men among those who were granted loans, even in the general credit unions to which they have access. This may be accounted for in three ways: They do not know any thing about credit unions, they

⁶ For a detailed report of this study see Labor Review, July, 1927, pp. 7-16.

have no need to use them, or they are too proud to do so. The last reason is perhaps the most important, for it was found that many men in comfortable circumstances had an idea that credit unions were semicharitable institutions and therefore reserved for the use of the "poor working men."

Forty-five per cent of the women in the sample group were employed as telephone operators and 29 per cent as clerical workers. The group in professional pursuits, mainly school-teachers and nurses, is small, but three times greater in proportion than among the men studied. There was also a group of women who had embarked on enterprises of their own and needed help to tide them over dull periods. Housewives, whose cherished ambitions may be new sideboards or rugs, also belong to credit unions. Although they have no earnings, most of them save enough out of their housekeeping allowances to pay up their loans, and there were almost no cases of the husband's having to pay a defaulted loan.

The weekly earnings of the borrowers, by sex, are shown in the table below:

TABLE 1.—WEEKLY EARNINGS OF BORROWERS FROM SIX CREDIT UNIONS, BY SEX

Classified weekly earnings	Number earning each classified amount					
	Men		Women		Both sexes	
	Number	Per cent	Number	Per cent	Number	Per cent
\$20 or under.....	11	0.4	276	30.8	287	8.2
\$21 to \$25.....	70	2.7	290	32.3	360	10.3
\$26 to \$30.....	314	12.1	129	14.4	443	12.7
\$31 to \$35.....	444	17.1	33	3.7	477	13.6
\$36 to \$40.....	631	24.2	19	2.1	650	18.6
\$41 to \$45.....	479	18.4	10	1.1	489	14.0
\$46 to \$50.....	262	10.1	4	.4	266	7.6
\$51 to \$55.....	84	3.2	1	.1	85	2.4
\$56 to \$60.....	115	4.4	2	.2	117	3.3
\$61 to \$65.....	34	1.3	1	.1	35	1.0
\$66 to \$70.....	27	1.0	—	—	27	.8
\$71 to \$75.....	53	2.0	1	.1	54	1.5
Over \$75.....	52	2.0	—	—	52	1.5
Housewives.....	—	—	131	14.6	131	3.7
No data.....	27	1.0	—	—	27	.8
Total.....	2,603	100.0	897	100.0	3,500	100.0

Modal earnings only (piecework) were available for two credit unions. In these, those of skilled men lay between \$35 and \$40, of unskilled men between \$25 and \$30, and of women between \$20 and \$22.50.

Of 1,702 male borrowers, 483, or 28 per cent, owned some property, as did also 80, or 21 per cent of the 298 female applicants.

Eighty-five per cent had dependents whom they were supporting.

Purposes and Amounts of Loans

THE PURPOSES for which people borrow reveal dramatically the crises which come into their lives and the need of the average worker for some source of credit at such times. These purposes are shown in Table 2.

TABLE 2.—PURPOSES FOR WHICH LOANS WERE GRANTED

Purpose of loan	Loans granted for each purpose to—					
	Men		Women		Both sexes	
	Number	Per cent	Number	Per cent	Number	Per cent
Medical.....	577	18.9	352	37.0	929	23.2
Coal.....	540	17.7	78	8.2	618	15.5
Family expenses.....	389	12.8	62	6.5	451	11.3
Various bills.....	296	9.7	26	2.7	322	8.1
Clothing.....	152	5.0	189	19.9	341	8.5
Taxes.....	168	5.5	40	4.2	208	5.2
Insurance.....	45	1.5	12	1.3	57	1.4
Furniture.....	71	2.3	19	2.0	90	2.3
House repairs and payments.....	263	8.6	39	4.1	302	7.6
Investment.....	262	8.6	61	6.4	323	8.1
Education.....	47	1.5	12	1.3	59	1.5
Vacation.....	33	1.1	24	2.5	57	1.4
Automobiles.....	39	1.3			39	1.0
Radios.....	3	.1			3	.1
Renewals.....	56	1.8	5	.5	61	1.5
To pay notes.....	19	.6			19	.5
Death.....	20	.7			20	.5
All other.....	60	2.0	33	3.5	93	2.3
No data.....	8	.3			8	.2
Total.....	3, C48	100.0	952	100.0	4, 000	100.0

The most common reason for borrowing is to meet expenses incurred during illness—18.9 per cent in the case of the men, and 37 per cent for the women. The term “medical” also includes dental bills, of which there were a great number. In one credit union 47 per cent of the women and 20 per cent of the men listed under “medical” borrowed specifically to pay dentists’ bills. Even though the reason given may not always have been the real reason, yet these numerous loans to maintain health would appear to be one of the best arguments for health insurance. Although no effort is made to appeal for sympathy, for those who pass on the application are members of their own group who know what their needs are, the circumstances are sometimes pitiful. One girl of 22 had borrowed, and repaid over a period of several years, nearly \$600 for surgical and hospital care for her crippled brother. In other cases, the birth of children necessitated borrowing, for, in addition to the medical care, household expenses increased during the mother’s absence from her tasks. Although many of the men were entitled to sick benefits from various sources, they found the sums paid inadequate, and were forced to borrow if they were out of work for any length of time. Education in preventive medicine is very directly related to credit-union borrowing, for many loans were granted “to have my boy’s teeth straightened” or tonsils removed.

Coal was the need second in importance for which borrowing was necessary. Many men could not raise the money needed to meet their coal bills, and the coal merchants were not so willing to extend credit as is often supposed. It is costly and unsatisfactory to buy coal in small quantities, and one man remarked that he would rather pay 6 per cent interest than be dunned all winter. Taxes and insurance, like coal, must be paid for at stated times, and so again men must borrow.

“Family expenses” may mean anything from a new kitchen stove, around which so much of the family life in these homes revolves, to new tires for the Ford. One man, when asked what he meant by family expense, grinned as he recited, “The butcher, the baker, the candlestick maker.” He went on to explain that he had been

laid off for several weeks and that although the income had stopped the bills piled up and the rent came due.

The reason "various bills" indicates a kind of despair. A man may have a number of bills outstanding which he can not pay, and for which he is constantly being dunned—he may even have his wages attached—and so he groups them and borrows the entire amount, preferring to pay the credit union in weekly installments. People whose margins are so small find it impossible to escape situations like these, for no matter how carefully they plan, emergencies will arise.

Clothing did not play such an important part for the men as it did for the women, and when the men did borrow it was usually to buy clothing for their families, not for themselves.

Loans for medical expenses, coal, family expenses, "various bills," and clothing formed four-fifths of the total number of loans granted. They were made to satisfy current and emergency needs—to enable the borrowers to keep their heads above water. There was, however, a second group of loans which were made for progressive purposes. These loans comprised only one-fifth of the total number granted, but even this was an increase over former years, and thus a hopeful sign.

Paying for their homes, improving, and repairing them were among the most important purposes of this second group. Many people were buying their homes through cooperative banks (building and loan associations) and would need to borrow occasionally to make their payments. The same was true of interest payments on mortgages privately held. Often a man needed several hundred dollars to complete the down payment on a house he wanted to buy. Such loans do not mean improvidence, but that because of illness or some other cause these persons were forced to use the money they had planned to set aside. After they had acquired their homes, they wished to keep them in good condition and improve them. Many loans were granted to put in furnaces, bathrooms, and other modern equipment. One man had borrowed each year for five years, first to buy additional property, then to build a garage. The next year he added a sun porch, then repaired the roof, and finally bought an oil burner. His loans never exceeded \$250, and were always promptly repaid. His willingness to carry this continuous burden of debt for the benefit of his family entitled him to the help the credit union could give.

"Investment" as used here covers loans to small business men who needed help to tide them over a dull period or to expand when their business seemed to warrant it. Many of the shopkeepers also borrowed in order to make cash payments on stock when they could buy it more cheaply that way. The most extensive borrowing for investment occurred in the two general credit unions to which these small business men could belong. However, some money was loaned to buy securities, as at the telephone workers' credit union, whose members borrowed in order to buy company stock.

Vacations, automobiles, and radios came in for their small shares, but to borrow for such purposes a man must have a very good record and indorsers. However, because radios and automobiles are sold so largely on the installment plan, there was not a large demand for loans of this kind.

Education formed but a small part of the total loans made. Five per cent of the men and 1 per cent of the women borrowed to improve their own education or to provide it for others. One man earning \$40 a week paid his daughter's college tuition, and another—a Jewish immigrant—borrowed to send his son to the Harvard School of Business Administration. Younger men borrowed to take technical training which would help them advance in their work. The women borrowed chiefly for their own education.

The amounts loaned differed with the policies of the credit unions, with the records and characters of the applicants, and with the purposes for which they needed the loans, as is shown in Table 3. The last named was probably the most important factor, and, since four-fifths of the borrowing was to satisfy current and emergency needs, men rarely borrowed more than was absolutely necessary. Most of the loans ranged between \$51 and \$100, with the latter figure the most common. Those who borrowed for home payment and investment were granted larger sums, also those whose need for other purposes was urgent, but even these rarely borrowed more than \$500.

TABLE 3.—SIZE OF LOANS TO BORROWERS FROM SIX CREDIT UNIONS

Amount of loan	Number of loans of specified amounts to—			Amount of loan	Number of loans of specified amounts to—		
	Men	Women	Total		Men	Women	Total
\$50 and under.....	179	134	313	\$401 to \$450.....	13	6	19
\$51 to \$100.....	778	364	1,142	\$451 to \$500.....	86	29	115
\$101 to \$150.....	348	98	446	\$501 to \$600.....	17	4	21
\$151 to \$200.....	647	145	792	\$601 to \$700.....	21	1	22
\$201 to \$250.....	193	22	215	Over \$700.....	36	10	46
\$251 to \$300.....	219	70	289	Total.....	2,603	897	3,500
\$301 to \$350.....	17	5	22				
\$351 to \$400.....	49	9	58				

Often a member's account is not touched for several years, but the members know that if any emergency arises they can demand and receive help. On the other hand, many members in the organizations studied borrowed continuously; as soon as one loan was paid up they applied for others. In one credit union where a record was kept of the number of times members had been granted loans, it was found that 390 out of 600 had borrowed once a year or oftener since joining. One man had borrowed sixteen times during nine years. It would seem at first to be a habit—a rather bad one too—but the loans meant a college education for his son, a new roof on his house, and medical attention for his wife. Some one will say that he should have accumulated the money before he spent it and saved the interest. The only answer to that is that on \$35 a week it does not seem to be within the power of human nature to save without some pressure, and the fact that he owed the credit union supplied that pressure. It is not the accepted way of saving, but it is better than not saving at all.

Agricultural Cooperative Associations in the United States

THE United States Bureau of Agricultural Economics estimates that there are nearly 69,000 agricultural organizations in the United States, of which about 5,000 are educational associations (fairs, exhibits, etc.), 6,000 are productive associations, 5,065 are credit associations, 2,049 are mutual insurance companies, 40,000 are farmers' telephone, light, and power companies, and 10,803 are marketing and purchasing associations. The membership of the marketing and purchasing associations alone is estimated at 2,700,000, and their annual business at \$2,400,000,000. About 50 per cent of the associations are engaged also in the purchase of farm supplies.

The Secretary of Agriculture in his report for 1928 sums up the condition of the farmers' cooperative movement as follows:

Cooperative organization among the farmers of the United States, as is well known, has developed greatly in recent years. Naturally its progress has not been uniform. Setbacks as well as advances have been recorded. But there remains a remarkable net gain, the value of which can not be estimated wholly in terms of business done, membership gained, or savings effected. It includes also such important, if not easily measurable, results as a widespread realization among farmers that success in agriculture requires efficient selling as well as efficient production. Hereafter this realization will play an increasing part in the adjustment of output to market requirements, which must play a large part in any rational program for the solution of the surplus problem.

Agricultural cooperation is sometimes charged with responsibilities that do not belong to it. When markets are depressed by overproduction it is difficult even for the most efficient cooperative organization to obtain satisfactory prices. This difficulty is sometimes considered evidence that cooperation does not work. But such an attitude is unjustified. Cooperation can not correct all the basic difficulties of agriculture and is not designed to do so. It may influence the volume of production. But the control of conditions such as exist in the California dried-fruit industry and in the marketing of potatoes this year does not fall directly within the sphere of cooperative responsibilities. The remedy for the surplus problem will necessarily transcend the powers of the cooperative associations. For the present our cooperative organizations must be judged as marketing concerns operating sometimes under favorable, and sometimes under unfavorable, conditions. Cooperative marketing aims to give the farmer an efficient and economical marketing system, while at the same time promoting the adjustment of production to market needs. It emphasizes quality output, and is perhaps the chief influence in the standardization, handling, packing, and processing of farm commodities. It sometimes favorably modifies the purchasing practices of commercial agencies. These and similar activities are the true standards by which cooperative marketing should be judged.

Cooperative Camps

THERE are a number of cooperative vacation camps. One of these, the Unity Cooperative Camp, is situated in the White Mountain region near Wingdale, N. Y., where the association owns some 245 acres. The camp now has, it is reported,⁷ a dining hall seating 1,200 persons, a general store, comfort stations with hot and cold showers, a casino, and a board walk. During the summer of 1928 more than 4,600 workers visited the camp.

Among the features was a series of lectures, discussions, and entertainments of an educational character, a daily bulletin, and a weekly paper. The entertainments include musical programs and dramatics.

⁷ The Cooperative Pyramid Builder, July, 1923.

A cooperative league formed in the Marquette district of Michigan has been especially active along recreational lines, having arranged a summer festival in 1926 and another in 1928 and having been instrumental in the launching of a summer resort association. This latter association will be restricted to societies only, no individual members will be accepted. Land on the shore of one of the numerous lakes has been purchased, containing 13 acres and a shore line of half a mile, which will be used for recreational purposes.

Other vacation resorts, owned on a collective basis by trade-union and workers' groups, are described on page 668.

Federal Trade Commission Report on Cooperative Marketing

ONE OF THE events in the agricultural cooperative movement during the past year was the publication of the results of a study made by the Federal Trade Commission in response to a Senate resolution.

The report took up in turn large-scale organizations handling specified commodities and showed that some of these were playing no mean part in the distribution of the product, in some cases handling as much as 70 or 75 per cent of the total product of the State.

One of the questions which the commission was directed to study was whether and to what extent cooperative organizations are hindered by the interference of private distributors. It found that on the whole, independent buyers and dealers were fair, their opposition being merely that of keen competition. In some instances, however, "rivalry has gone too far, resulting in the using of unfair tactics to injure cooperative associations."

Of 3,994 cooperative associations from which reports on this point were received, more than 68 per cent reported no interference or opposition, 20 per cent reported that the annoyances were trivial, "mere competition," and "nothing to complain about." About 12 per cent stated that the interference experienced by them was sufficient to cause them concern and sometimes embarrassment; of those making such reports, some 70 per cent were engaged in the marketing of livestock, grain, or dairy products.

Some of the unfair methods resorted to were unfair price competition, manipulation of grades of quality in order to induce members to violate their contracts, circulation of reports to injure the reputation of the association, boycotts to keep the association from buying supplies, etc.

The most serious hindrance to the success of the associations, in the opinion of the commission, is that arising from internal dissension in the organization itself.

Value of Cooperative Organization

CERTAIN outstanding organizations are cited as proof that "a cooperative organization can operate at as low expense per unit as can noncooperative distributors, provided it has sufficient volume and provided that the managers keep close watch upon unit expenses at all points and promptly check all tendencies toward waste." Other

necessary factors are qualities of leadership, knowledge of market conditions, adequate capital, and ability to keep going until the organization has overcome the initial handicap of lack of experience.

This section of the report concludes in part as follows:

In formulating any opinion or drawing any conclusions as to the relative merits of the cooperative-marketing system as compared with other types of marketers and distributors of farm products it must be remembered that the results obtained in the comparative studies in this report are colored by the varying conditions and circumstances under which the organizations may have operated. The studies as presented show that in some instances the economic benefits accruing to the producer are greater through cooperative marketing than through other types of distributors and vice versa. These results might be used as argument both for and against the application of the cooperative principle as applied to the marketing of farm products. The report as a whole, however, no doubt presents a true cross-section picture of the economic advantages of the cooperative-marketing movement in its present state of development in this country as compared with other types marketing farm products. * * *

In some cases the distributive process may be so efficiently effected that gains from cooperative effort may be insignificant; in others the entrance of cooperative-marketing organizations may awaken a slumbering trade resistance and create a competitive situation which in the final analysis shows very little or no advantage for the cooperative-marketing association over other types of distributors, the creation and maintenance of such a condition, however, being due to the existence of the cooperative. * * *

The study indicates, from the experience of those cooperative associations that have been operating over a period of years, that it is possible through the application of the cooperative principle to the marketing of some farm products to operate as economically and make as good or better return to producers for their product by this method as through the older-established types of marketing. The relative merits of the cooperative principle in the marketing of every farm product as compared with other types of distributors is not yet definitely determined because of the fact that it is largely in its infancy in the handling of some products.

With reference to the entire movement it might be said that producers are endeavoring to develop a system of marketing whereby they can improve their economic condition by securing a better return for their product. This inquiry seems to indicate that the progress made and the degree of success attained in handling of any commodity seems to have been largely in proportion to the length of time the principle has been in actual practice, together with the support received from the producers themselves. The reason for this seems to be that it takes time to educate producers as to the value and benefits of cooperation and to develop an efficient marketing organization. A cooperative organization, like any other type of business if it is to succeed in competition with others, must be efficiently managed and operated and also must have the support of a sufficient number of producers supplying a sufficient volume of business to enable it to operate economically.

Use of Contracts in Cooperative Marketing

IN THE agricultural branch of the cooperative movement, the use of a contract between member and association, to insure a continuous and sufficient supply of business to the association, has been widespread. Such contracts generally bind the member of the cooperative marketing association to deliver to it all of his crops of the sort handled by the association, and may also provide for damages in case of non-performance. These contracts have been tested in a great number of the State courts and have there been almost universally upheld. The provisions whose constitutionality has been most often questioned have been those providing for damages and specific performance of the contract, and exempting agricultural marketing associations from the charge of restraint of trade.

Not until 1928, however, did such a contract come to the United States Supreme Court for decision. The case came up from the Court of Appeals of Kentucky, the constitutionality of two sections of the State act being questioned. The first of these provided that it should be a misdemeanor for anyone knowingly to induce breach of contract with a cooperative marketing association, and the second declared that warehousemen who knowingly permitted or encouraged the violation of such a contract should be liable to the association for \$500 as well as fees and costs.

It appeared that Mike Kielman joined the cooperative association and signed its contract, binding himself to deliver to it all tobacco raised by him. Notwithstanding, he delivered 2,000 pounds of his crop to the Liberty Warehouse Co. Before the warehouse company could dispose of it, the association notified the company of the circumstances, requested it not to sell the tobacco, and called attention to the penalties prescribed in the law. The company ignored this warning and proceeded to sell the produce at auction, whereupon the cooperative association brought suit, in which it was sustained by the lower court and by the court of appeals, the association being awarded judgment for \$500 and \$100 attorneys' fees.

As to the company's contention in regard to sections 26 and 27 that they abridged the company's privileges as a citizen, conflicted with the fourteenth amendment, deprived it of property without due process of law, and denied it equal protection of the laws, the Supreme Court pointed out that a corporation does not possess the same rights as a citizen. It denied that mere authorization by the State of the formation of marketing associations impaired any right of a warehouse company. "This also is true of the declaration that such associations shall not be deemed monopolies, combinations, or conspiracies in restraint of trade, and that contracts with members shall not be illegal. The State may declare its own policy as to such matters."

The court declared that the company had no substantial basis upon which to invoke the equal protection clause, since the act did not prescribe any more rigorous penalties for warehousemen than for other offenders. As to the company's contention that the act abridges the company's right to do business with anyone who seeks its services, the court said:

Undoubtedly the statute does prohibit and penalize action not theretofore so restricted and to that extent interferes with freedom. But this is done to protect certain contracts which the legislature deemed of great importance to the public and peculiarly subject to invasion. We need not determine whether the liberty protected by the Constitution includes the right to induce a breach of contract between others for the aggrandizement of the intermeddler—to violate the nice sense of right which honorable traders ought to observe.

The court pointed out that similar statutes have been enacted in 42 States and by Congress, and that, with a single exception, no court has condemned any essential feature of such an act, and concluded as follows:

The opinion generally accepted—and upon reasonable grounds we think—is that the cooperative-marketing statutes promote the common interest. The provisions for protecting the fundamental contracts against interference by outsiders are essential to the plan. This court has recognized as permissible some discrimination intended to encourage agriculture. [Cases cited.] And in

many cases it has affirmed the general power of the States so to legislate as to meet a definitely threatened evil. [Cases cited.] Viewing all the circumstances, it is impossible for us to say that the Legislature of Kentucky could not treat marketing contracts between the association and its members as of a separate class, provide against probable interference therewith, and to that extent limit the sometime action of warehousemen.

The liberty of contract guaranteed by the Constitution is freedom from arbitrary restraint—not immunity from reasonable regulation to safeguard the public interest. The question is whether the restrictions of the statute have reasonable relation to a proper purpose. [Citing cases.] A provision for a penalty to be received by the aggrieved party as punishment for the violation of a statute does not invalidate it. [Citing cases.]

The decision of the lower court was affirmed. (*Liberty Warehouse Co. v. Burley Tobacco Growers' Cooperative Marketing Association*, 48 Supreme Court 291.)

New Trend in Contracts

THERE has been a question, however, whether taking such cases to court has not resulted in the association's losing, in the ill will so engendered, more than it gained by the verdict of the court. In this connection a new trend in such contracts recently pointed out by Mr. Robin Hood, editor of the *Cooperative Marketing Journal*, in a report submitted to the National Association of Marketing Officials, is of interest. He sees a tendency toward the liberalization of marketing contracts. Grain associations are abandoning compulsory seasonal settlements for optional immediate settlements. Other associations have included in the contracts the right of the member to withdraw from the association. The longest step toward liberalization has been taken by the cotton associations.

"They have abandoned law courts and threats of legal compulsion as a means of getting deliveries from members, and have adopted contracts that set forth services fitted to the credit needs and settlement preferences of their members.

"During the past year numerous associations have incorporated a clause in their contracts by which members are given the right to withdraw and cancel their marketing contracts by giving notice in advance. Most of the cotton associations, several wheat pools, one tobacco cooperative, and a number of scattered organizations have been added to the list of those from whom members may withdraw, while a number of the older associations have operated with a withdrawal clause prior to the present year.

"The withdrawal clause has been a mooted question in cooperative circles. Its disadvantage lies in the fact that a year of adversity may result in such a number of withdrawals as to endanger an association's existence. There are plenty of legal and financial reasons why an organization should deny its members the right of withdrawal if it wants to, but when considered from the standpoint of members' morale, most cooperative officials are inclined to the view that there is only one satisfactory way to handle the dissatisfied member, and that is to let him out as quick as he will get out—even to encourage him to get out.

"The thing I like best about the optional settlement and withdrawal provisions is that they eliminate every semblance of compulsion and make cooperation less a legal affair and more a mutual service affair.

In other words, they emphasize the spirit of cooperation and make its success dependent more directly upon rendering a service year in and year out. The withdrawal right checks back responsibility squarely and promptly to the executives. Their service must be satisfactory or a heavy withdrawal will undermine their standing and compel their retirement. I believe the liberal features of the new contracts place greater demands upon cooperative executives for business efficiency and releases demands upon them for political strategy."

Development in Consumers' Cooperation in Foreign Countries

THE YEARS 1927 and 1928 were comparatively uneventful, in the main, as far as the cooperative movement in foreign countries is concerned. Nearly everywhere definite progress is reported and the movement has quite generally recovered from the difficult postwar years, though inadequacies of share capital are still evident.

The year 1927 was marked by the holding of the Twelfth International Cooperative Congress, at which 28 countries were represented. This congress emphasized the necessity for the accumulation of resources within the movement to the end of making it independent of private capital; urged closer relations between the consumers' and agricultural branches of the movement; and the establishment of cooperative banks. The next congress will be held in Vienna in 1930.

A few of the events of the past two years in certain countries are shown below:

Canada.—The past two years have seen several new developments in cooperation in Canada. Following the cooperative congress of 1927, steps were taken toward the formation of cooperative wholesale societies in Saskatchewan, Alberta, and Manitoba. The Manitoba Cooperative Wholesale Society was formed and began business in twine, flour, coal, oil, gasoline, cement, salt, barbed wire, lumber, and clothing, in February, 1928. It is confining its operations for the present to the purchase of car-lot quantities for member societies.

The Alberta Cooperative Wholesale Association has just gone into operation, commencing business in January, 1929.

The question of a national cooperative wholesale for Canada was taken up at the 1928 cooperative congress, and after a good deal of discussion a resolution was adopted stating it to be the sense of the convention that the time has arrived for the establishment of a national Canadian cooperative wholesale society. Since the wisdom and practicability of a central wholesale at this time was doubted by a considerable portion of the delegates because of the sparse development of societies in Canada and the long railroad hauls necessary in transporting goods from wholesale to local societies, a supplementary resolution was adopted calling for the appointment of a committee on wholesale cooperation to investigate the practicability (1) of one wholesale society for the whole of Canada; (2) one society for the three prairie Provinces; (3) separate provincial wholesale societies, with a central buying agency centrally owned; (4) development of

group buying by district societies, and placing the same through a national or provincial wholesale society; (5) the best and most economical means of promoting trade with the wholesale societies of Great Britain.

The International Cooperative Alliance has recently made a grant of £500 (\$2,433) to the Cooperative Union of Canada, to be used for the furtherance of cooperation in Canada.

Great Britain.—Considerable progress was made in Great Britain in 1927, the latest year for which data are available. The consumers' societies gained 391,000 new members, and despite falling prices a gain of nearly \$70,000,000 was recorded in the volume of sales. Some of the individual societies are enormous, the London society alone having 177,339 members and two others having more than 100,000 members each. (Retail consumers' societies in the United States average fewer than 300 members each.)

In 1927 the cooperative laundries of Manchester and district united to form the largest cooperative laundry in the world.

The members of consumers' cooperative societies now form from 45 to 50 per cent of the population in Scotland and in Great Britain from 40 to 45 per cent.

Italy.—When the Fascist régime came into power in Italy, the old Italian cooperative movement with its 20,000 societies (1921) was suppressed and its place was taken by a Fascist movement, part of and directed by the State. A national body, called the Ente Nazionale Cooperativo, was set up to act as the central organization of the four thousand and odd Fascist cooperative societies. The International Cooperative Alliance, however (as it had previously in the case of Russia, when the movement there was taken over by the Soviet Government), refused to recognize this new movement. Italy's place on the council of the alliance is still held by the secretary of the former Italian Cooperative League.

In 1928, however, the Fascist movement succeeded in obtaining recognition by the Hungarian movement, which addressed a letter to the alliance asking for the readmission of Italy to the alliance. So far, this request has not been acceded to.

A national cooperative exposition was held in Italy on the occasion of a visit by Albert Thomas of the International Labor Office, at which, it is claimed, 8,849 societies with some 2,000,000 members were represented.

At the opening of this exposition, Mussolini is reported to have emphasized the Fascist character of cooperation in Italy and to have concluded:

This principle being accepted, it goes without saying that the residue and wreckage of the former régime must be eliminated without pity. It is thus that Italian cooperative societies, under the invincible protection of the lash of the lictors, will constitute a force for the members, for the Government, and for the country.

Russia.—More than 6,000,000 new members joined the consumers' cooperative movement in Russia during the year ending October 1, 1928. A report from the Russian Central Union of Consumers' Societies (Centrosyus), dated January 1, 1929, states that the Soviet cooperatives have already become the most important factor in the supply of commodities to the consumer. More than 53 per cent of the whole retail business of the country is done by these societies, and their wholesale society does approximately one-third of the wholesale

business of the country. The wholesale and retail sales of the consumers' societies during the past two years were as follows:

	1926-27 ^a	1927-28 ^a
Retail-----	\$2, 747, 964, 000	\$3, 653, 660, 000
Wholesale-----	2, 474, 196, 800	3, 835, 313, 800

Some 424,000 workers are employed in cooperative distribution, besides about 110,000 employed in the manufacturing and industrial enterprises owned by the movement.

Much educational and propaganda work is done by the cooperative societies, and the sale of cooperative literature in Russia far exceeds that in any other country. In this connection extensive use is made of motion pictures. The report states that 700 portable motion-picture machines are owned by the movement and the purchase of 700 more is planned for next year, in addition to 80 stationary machines. Plans are also being made to purchase 750 radios with loud speakers, for use in rural districts.

Spain.—Spain is a backward country from the cooperative point of view, having only some 250 consumers' societies, with about 80,000 members. There are several central organizations, however, each with a small group of societies. Early in 1928 representatives of these central organizations met in Madrid and formed the National Federation of Spanish Cooperative Societies. It will unite societies of various types, not confining its membership solely to consumers' societies. One of its principles is that it "will not engage in political or religious activities"; it will represent the affiliated organizations before the governmental authorities, establish friendly relations with the movement in other countries, and will apply for membership in the International Cooperative Alliance.

^a Conversions on basis of rouble = 51.46 cents.

COST OF LIVING

Trend of Cost of Living in the United States

COST OF LIVING data are secured from 32 cities in the United States by the United States Bureau of Labor Statistics in June and December of each year. The changes in the cost of living in the 32 cities and in the United States as a whole as shown by the index numbers compiled from such data, are published immediately in pamphlet form and afterwards in the succeeding issue of the Labor Review.

The original price information used in compiling the cost-of-living figures is secured from merchants and other dealers in each of the 32 cities. The prices of food and of fuel and light (which include coal, wood, gas, electricity, and kerosene) are furnished the bureau by correspondence in accordance with previous arrangements made with establishments through personal visits of the bureau's agents. In each city food prices are secured from 15 to 30 merchants and dealers and fuel and light prices from 10 to 15 firms, including public utilities. All other data are secured by representatives of the bureau, who visit the various merchants, dealers, and agents and secure the figures in person. Four quotations are secured in each city (except in Greater New York, where five are obtained) on each of a large number of articles of clothing, furniture, and miscellaneous items. Rental figures are secured from 400 to 2,300 houses and apartments in each city, according to its population.

The average price of each article and item is weighted according to its importance in the average family budget.

The various groups forming the components of the cost of living are then weighted according to their relative importance. These "weights" are derived from the comprehensive cost-of-living and budgetary survey made by the bureau in 1918-19. This survey covered 12,096 families in 92 localities. The results of this 1918-19 survey were published in detail in Bulletin No. 357. Tables showing the sources and amounts of family incomes for one year, by income groups, as determined by this survey, are given in the former handbook (Bul. No. 439). It is extremely desirable that a new budget survey should be made, as there probably have been important changes in the character of family expenditures since 1918-19; but the very heavy expense involved has thus far prevented the bureau from undertaking this task.

Changes for Country as a Whole, 1913 to 1928

As **ALREADY** noted, the bureau's studies of changes in cost of living cover 32 cities. In the case of 19 of these cities the studies began in December, 1914, and for the 13 other cities, in December, 1917.

From the figures for these 32 cities a combined index number has been computed, and this combination is assumed to be fairly representative for the United States as a whole. It should be noted that

this index number for the United States has been based on the year 1913, inasmuch as that year has been used as the basis for many of the bureau's index numbers. To bridge the gap between 1913 and December, 1914, use has been made of the data regarding retail prices of certain articles and the wholesale prices of other articles. As the price changes during this period were relatively small, the results are believed to be substantially accurate.

Table 1 gives the index numbers for changes in the cost of living for the United States as a whole, for all of the periods for which surveys are made by the bureau.

TABLE 1.—INDEX NUMBERS OF COST OF LIVING IN THE UNITED STATES FROM 1913 TO DECEMBER, 1928

Month and year	Food	Clothing	Rent	Fuel-and light	House furnish- ing goods	Miscel- laneous	All items
1913 average.....	100.0	100.0	100.0	100.0	100.0	100.0	100.0
December, 1914.....	105.0	101.0	100.0	101.0	104.0	103.0	103.0
December, 1915.....	105.0	104.7	101.5	101.0	110.6	107.4	105.1
December, 1916.....	126.0	120.0	102.3	108.4	127.8	113.3	118.3
December, 1917.....	157.0	149.1	100.1	124.1	150.6	140.5	142.4
December, 1918.....	187.0	205.3	109.2	147.9	213.6	165.8	174.4
June, 1919.....	184.0	214.5	114.2	145.6	225.1	173.2	177.3
December, 1919.....	197.0	268.7	125.3	156.8	263.5	190.2	199.3
June, 1920.....	219.0	287.5	134.9	171.9	292.7	201.4	216.5
December, 1920.....	178.0	258.5	151.1	194.9	285.4	208.2	200.4
May, 1921.....	144.7	222.6	159.0	181.6	247.7	208.8	180.4
September, 1921.....	153.1	192.1	160.0	180.9	224.7	207.8	177.3
December, 1921.....	149.9	184.4	161.4	181.1	218.0	206.8	174.3
March, 1922.....	138.7	175.5	160.9	175.8	206.2	203.3	166.9
June, 1922.....	140.7	172.3	160.9	174.2	202.9	201.5	166.4
September, 1922.....	139.7	171.3	161.1	183.6	202.9	201.1	166.3
December, 1922.....	146.6	171.5	161.9	186.4	208.2	200.5	169.5
March, 1923.....	141.9	174.4	162.4	186.2	217.6	200.3	168.8
June, 1923.....	144.3	174.9	163.4	180.6	222.2	200.3	169.7
September, 1923.....	149.3	176.5	164.4	181.3	222.4	201.1	172.1
December, 1923.....	150.3	176.3	166.5	184.0	222.4	201.7	173.2
March, 1924.....	143.7	175.8	167.0	182.2	221.3	201.1	170.4
June, 1924.....	142.4	174.2	168.0	177.3	216.0	201.1	169.1
September, 1924.....	146.8	172.3	168.0	179.1	214.9	201.1	170.6
December, 1924.....	151.5	171.3	168.2	180.5	216.0	201.7	172.5
June, 1925.....	155.0	170.6	167.4	176.5	214.3	202.7	173.5
December, 1925.....	165.5	169.4	167.1	186.9	214.3	203.5	177.9
June, 1926.....	159.7	168.2	165.4	180.7	210.4	203.3	174.8
December, 1926.....	161.8	166.7	164.2	188.3	207.7	203.9	175.6
June, 1927.....	158.5	164.9	162.1	180.8	205.2	204.5	173.4
December, 1927.....	155.9	162.9	160.2	183.2	204.6	205.1	172.0
June, 1928.....	152.6	162.6	157.6	177.2	201.1	205.5	170.0
December, 1928.....	155.8	161.9	155.9	181.3	199.7	207.1	171.3

Changes in Individual Cities

TABLE 2 shows index numbers for changes in the cost of living as a whole (i. e., all items combined), for 19 cities, from December, 1914, to December, 1928. The figures are given for December of each year up to 1919, and thereafter semiannually. The index numbers are computed on December, 1914, as the base or 100.

TABLE 2.—INDEX NUMBERS OF COST OF LIVING IN 19 CITIES FROM DECEMBER, 1914, TO DECEMBER, 1928

Month and year	Balti- more, Md.	Boston, Mass.	Buffa- lo, N. Y.	Chica- go, Ill.	Cleve- land, Ohio	Detroit, Mich.	Hous- ton, Tex.	Jack- sonville, Fla.	Los Angeles, Calif.	Mobile, Ala.
December, 1914	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0
December, 1915	98.6	101.6	103.5	103.0	101.4	103.5	99.7	101.3	98.1	99.6
December, 1916	118.5	115.7	124.4	119.5	119.1	122.3	116.4	114.7	107.7	113.8
December, 1917	151.3	138.1	151.1	141.8	142.9	149.9	144.9	141.6	128.9	143.2
December, 1918	184.7	170.6	180.9	172.2	171.4	178.0	175.7	171.5	158.0	171.4
June, 1919	184.0	172.8	184.2	174.5	177.2	184.4	180.2	177.5	165.1	176.6
December, 1919	198.4	192.3	202.7	200.6	198.2	207.9	201.7	201.5	185.3	194.5
June, 1920	214.3	210.7	221.5	214.6	220.3	236.0	212.2	216.5	201.7	207.0
December, 1920	196.8	197.4	201.7	193.3	207.3	218.6	204.0	206.2	196.7	193.3
May, 1921	177.4	174.4	180.3	178.4	187.5	193.3	179.7	185.8	178.7	170.8
December, 1921	173.2	170.2	176.8	172.3	178.8	182.4	173.6	175.1	176.4	163.6
June, 1922	167.6	159.6	168.6	165.0	168.9	175.3	165.9	165.7	172.5	155.3
December, 1922	170.9	165.1	173.9	168.0	172.9	178.2	168.4	167.8	174.5	158.8
June, 1923	172.0	163.5	174.1	169.6	177.1	181.7	167.2	167.7	175.1	158.6
December, 1923	174.8	169.4	178.6	183.7	179.6	184.7	170.6	171.9	178.8	162.6
June, 1924	171.9	163.2	173.9	172.6	175.9	182.8	165.0	167.3	175.1	158.0
December, 1924	174.8	167.3	177.8	175.3	178.1	182.2	170.5	170.4	175.4	163.9
June, 1925	177.3	165.8	179.7	177.1	180.4	184.5	171.1	170.9	176.9	163.9
December, 1925	181.2	174.7	184.8	180.6	182.7	187.8	174.3	181.7	177.4	168.5
June, 1926	178.4	169.4	182.8	177.8	181.9	184.7	169.2	181.8	171.2	166.2
December, 1926	178.6	171.9	183.6	179.0	181.5	184.1	170.6	181.3	172.2	168.1
June, 1927	175.3	168.1	179.8	177.1	180.2	182.7	164.3	175.7	171.5	165.2
December, 1927	174.5	169.5	180.2	174.3	179.0	179.0	167.9	173.0	170.6	165.5
June, 1928	173.7	164.8	178.7	171.5	176.3	176.4	164.1	168.3	167.4	163.6
December, 1928	173.9	168.2	179.6	173.1	175.4	177.4	166.4	169.1	171.0	165.7

Month and year	New York, N. Y.	Nor- folk, Va.	Phila- del- phia, Pa.	Port- land, Me.	Port- land, Oreg.	San Fran- cisco, and Oak- land, Calif.	Savan- nah, Ga.	Seattle Wash.	Wash- ington, D. C.
December, 1914	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0
December, 1915	102.0	100.6	101.2	99.6	96.9	98.3	99.8	99.0	101.0
December, 1916	114.9	114.7	114.7	113.8	106.1	108.3	114.6	107.4	114.6
December, 1917	144.7	145.2	143.8	138.0	131.2	128.6	142.5	131.1	147.3
December, 1918	177.3	180.7	173.9	172.2	164.2	157.8	175.0	169.9	173.8
June, 1919	179.2	187.1	176.2	174.3	169.2	165.6	179.8	176.9	171.2
December, 1919	203.8	207.0	196.5	191.6	183.7	187.8	198.7	197.7	187.6
June, 1920	219.2	222.2	213.5	207.6	200.4	196.0	209.4	210.5	201.3
December, 1920	201.4	209.0	200.7	193.1	180.3	185.1	198.7	194.1	187.8
May, 1921	181.7	188.1	179.8	172.1	162.2	166.7	177.6	180.2	167.1
December, 1921	179.3	179.2	174.3	169.6	158.3	163.6	166.2	171.5	163.0
June, 1922	170.7	169.5	168.2	159.7	152.1	156.8	156.8	167.0	157.6
December, 1922	174.2	169.9	170.7	164.1	156.1	158.8	159.2	166.7	159.5
June, 1923	172.6	171.1	172.1	163.3	154.6	157.6	157.9	166.4	160.9
December, 1923	177.3	172.4	174.7	166.9	157.8	162.1	158.2	168.5	163.2
June, 1924	172.5	168.4	171.5	162.4	152.8	157.3	154.8	166.7	159.2
December, 1924	176.5	172.1	176.1	166.0	155.8	160.1	156.3	167.8	163.1
June, 1925	175.8	171.9	177.6	165.3	155.8	162.2	157.9	170.5	164.0
December, 1925	183.2	176.4	182.6	170.3	156.9	164.7	162.9	171.7	167.3
June, 1926	178.6	173.1	180.6	167.3	154.6	160.7	160.6	169.4	165.5
December, 1926	180.0	174.6	182.3	169.2	155.1	161.7	160.5	169.1	166.0
June, 1927	177.8	173.9	178.0	166.8	153.7	160.5	158.3	169.4	160.5
December, 1927	179.1	173.4	178.3	167.0	152.8	160.7	158.1	166.9	160.8
June, 1928	174.4	171.5	175.3	163.8	150.5	158.8	156.6	165.8	159.7
December, 1928	176.3	174.1	174.5	166.6	152.4	161.7	159.1	167.1	160.2

¹ For April, 1919.² For November, 1919.

Table 3 gives similar information for the 13 cities for which reports were begun in December, 1917, this date, therefore, being used as the base, or 100, in computing the index numbers.

TABLE 3.—INDEX NUMBERS OF COST OF LIVING IN 13 CITIES FROM DECEMBER, 1917, TO DECEMBER, 1928

Month and year	Atlanta, Ga.	Birmingham, Ala.	Cincinnati, Ohio	Denver, Colo.	Indianapolis, Ind.	Kansas City, Mo.	Memphis, Tenn.
December, 1917.....	100.0	100.0	100.0	100.0	100.0	100.0	100.0
December, 1918.....	119.7	117.0	117.3	120.7	119.1	119.6	118.3
June, 1919.....	123.3	119.8	121.1	125.3	121.1	120.6	123.3
December, 1919.....	137.9	134.3	135.2	138.2	136.5	138.2	135.2
June, 1920.....	146.7	141.9	147.1	150.3	150.2	151.0	146.4
December, 1920.....	138.5	133.3	134.7	138.7	137.6	139.5	139.3
May, 1921.....	125.2	122.1	121.7	126.9	123.9	127.3	126.7
December, 1921.....	118.7	116.2	115.3	124.5	119.3	122.5	123.2
June, 1922.....	113.7	110.7	112.7	118.8	116.4	115.0	118.2
December, 1922.....	115.1	113.2	113.8	121.6	118.8	116.2	118.6
June, 1923.....	114.2	113.6	115.5	119.9	119.4	115.3	119.9
December, 1923.....	116.0	116.0	117.7	122.1	120.6	117.2	121.0
June, 1924.....	113.6	113.1	116.3	117.8	119.3	114.3	118.2
December, 1924.....	114.9	116.8	117.6	120.2	121.4	115.3	120.4
June, 1925.....	116.2	116.9	122.1	121.1	121.5	116.3	120.5
December, 1925.....	119.0	119.2	123.0	122.5	124.2	118.0	122.0
June, 1926.....	117.3	117.5	122.6	119.7	121.9	116.6	119.9
December, 1926.....	117.4	117.8	123.8	120.4	122.3	115.2	119.9
June, 1927.....	116.2	114.8	123.3	118.4	121.4	114.0	118.1
December, 1927.....	114.3	115.7	121.3	116.6	119.2	111.9	117.3
June, 1928.....	113.9	113.7	121.0	114.9	118.2	111.2	116.4
December, 1928.....	115.6	114.2	121.2	116.3	118.5	111.3	117.5

Month and year	Minneapolis, Minn.	New Orleans, La.	Pittsburgh, Pa.	Richmond, Va.	St. Louis, Mo.	Scranton, Pa.
December, 1917.....	100.0	100.0	100.0	100.0	100.0	100.0
December, 1918.....	115.8	117.9	119.8	117.9	116.7	121.9
June, 1919.....	118.8	120.7	121.8	120.6	117.9	125.0
December, 1919.....	132.7	133.9	136.2	132.0	134.2	137.1
June, 1920.....	143.4	141.9	149.1	143.8	148.9	151.5
December, 1920.....	135.7	136.7	139.3	133.3	135.4	139.1
May, 1921.....	123.7	123.8	127.7	120.2	123.1	128.2
December, 1921.....	120.7	122.7	122.8	118.3	118.5	126.3
June, 1922.....	117.3	118.9	117.8	113.2	115.1	120.9
December, 1922.....	118.0	118.6	120.1	114.4	117.0	122.4
June, 1923.....	117.4	117.7	121.3	114.9	117.7	122.4
December, 1923.....	118.8	120.2	122.9	117.1	120.6	125.8
June, 1924.....	116.2	116.8	122.4	113.5	118.8	122.4
December, 1924.....	117.3	120.6	124.9	116.5	120.7	125.8
June, 1925.....	117.6	120.2	126.0	116.7	122.4	127.0
December, 1925.....	120.3	122.7	128.5	120.8	125.0	132.0
June, 1926.....	119.6	120.1	126.2	119.7	124.1	129.0
December, 1926.....	118.2	121.7	127.2	119.3	124.5	129.8
June, 1927.....	117.2	120.3	125.4	117.4	123.2	128.2
December, 1927.....	115.4	119.9	124.8	116.4	121.4	128.5
June, 1928.....	115.8	118.2	122.3	115.3	119.9	126.9
December, 1928.....	115.2	119.5	124.4	115.7	120.4	127.8

Cost of Living in the United States and in Foreign Countries

THE TREND of cost of living in the United States and in various foreign countries since 1913 is shown by the index numbers in the following tables, in so far as data are available from official sources for the several countries. Only those countries are presented for which the index numbers include all or most of the items usually combined under the term "Cost of living." Details for the items of food, clothing, fuel and light, and rent in most of the countries were published in the Labor Review for February, 1929.

Caution should be observed in the use of these figures, since not only are there differences in the base periods and in the number and kind of articles included and the number of markets represented, but also there are radical differences of method in the construction of the index numbers. Moreover, monetary inflations in certain countries seriously affect, of course, the index numbers.

INDEX NUMBERS OF COST OF LIVING IN THE UNITED STATES AND IN FOREIGN COUNTRIES, 1913 TO DECEMBER, 1928

Country	United States	Canada	Belgium	Czecho-slovakia	Denmark	Finland	France	Germany	Ireland	Italy
Number of localities	32	60	50	Prague	200	21	Paris	71	200	Milan
Commodities included	Food, clothing, fuel and light, rent, house furnishings, etc.	Food, clothing, fuel and light, rent, sundries	Food, clothing, fuel and light, rent, sundries	Food, clothing, fuel and light, rent, sundries	Food, clothing, fuel and light, rent, taxes, etc.	Food, clothing, fuel, rent, taxes, etc.	Food, clothing, fuel and light, rent, sundries	Food, clothing, fuel and light, rent, sundries	Food, clothing, fuel and light, rent, sundries	Food, clothing, fuel and light, rent, sundries
Computing agency	Bureau of Labor Statistics	Department of Labor	Ministry of Labor and Industry	Office of Statistics	Department of Statistics	Central Statistical Office	Commission for Study of Cost of Living	Federal Statistical Bureau	Department of Industry and Commerce	Municipal Administration
Base period	1913	1913	1921	July, 1914	July, 1914	January-June, 1914	January-June, 1914	1913-14	July, 1914	January-June, 1914
Year and month										
1913	100	100								
1914	103	103		100	100	100	100	100	100	100
1915	105	107			116					114
1916	118	124			136					146
1917	142	143			155					197
1918	174	162			182					285
1919	199	176			211		228			327
1920	200	190			262		341			462
1921	174	161	100		237	1172	307			541
1922	170	157	90		199	1157	302		185	501
1923	173	159	109	690	204	1147	334	142	180	494
1924			125	692	214	1170				527
Dec	173	156	137	707		1217	377	135	193	573
1925			133	721	219	1212				611
Dec	178	160	143	703		1197	421	141	188	649
1926						1183				654
Jan			139	707	194	1186		140	188	665
Feb			140	699		1175		139		661
Mar		159	137	687		1172	451	138		647
Apr			140	685		1163		140	180	642
May			147	692		1159		140		652
June	175	157	155	693		1175	485	141		650
July			174	718	184	1183		142	182	649
Aug			182	723		1213		143		652
Sept		156	179	723		1203	539	142		647
Oct			188	726		1197		142	189	672
Nov			196	734		1193		144		657
Dec	176	157	199	735		1197	545	144		657
1927						1207				
Jan		158	202	741	181	1187		145	182	655
Feb		157	204	740		1189		145		667
Mar		157	200	738		1183	524	145		663
Apr		155	199	740	178	1173		146	171	651
May		155	197	750		1166		147		612
June	173	155	210	755		1184	525	148		586
July		155	204	747	176	1203		150	171	548
Aug		155	201	733		1237		147		543
Sept		155	204	730		1230	507	147		537
Oct		156	207	727	176	1237		150	175	536
Nov		156	207	729		1251		151		536
Dec	172	157	207	734		1243	498	151		531
1928										
Jan		157	209	734	176	1216		151	177	532
Feb		156	206	732		1206		151		533
Mar		156	203	730		1214	507	151		531
Apr		156	204	734	176	1212		151	170	531
May		155	202	736		1207		151		526
June	170	155	204	734		1219	519	151		530
July		155	205	746	176	1236		153	173	526
Aug		157	206	754		1258		154		522
Sept		157	209	749		1249	519	152		526
Oct		158	212	726	172	1254		152	176	528
Nov		158	217	721		1262		152		534
Dec	171	158	216	725		1260	531	153		538

1 December.

2 January-June.

3 April-June.

4 July.

5 October, 1913; January, April, and June, 1914.

6 Quarter ending with month.

INDEX NUMBERS OF COST OF LIVING IN THE UNITED STATES AND IN FOREIGN COUNTRIES, 1913 TO DECEMBER, 1928—Continued

Country	Netherlands	Norway	Poland	Sweden	Switzerland	United Kingdom	South Africa	India	Australia	New Zealand
Number of localities	The Hague	30	Warsaw	49	33	630	9	Bombay	30	25
Commodities included	All commodities	Food, clothing, fuel, light, and rent, sundries	Food, clothing, fuel, light, and rent, sundries	Food, clothing, fuel, light, and rent, sundries	Food, clothing, fuel, light, and rent	Food, clothing, fuel, light, and rent, sundries	Food, fuel, light, rent, sundries	Food, clothing, fuel, light, and rent	Food, groceries, rent	Food, clothing, fuel, light, and rent, sundries
Computing agency	Municipal administration	Central Statistical Office	Central Statistical Office	Board of Social Welfare	Federal Labor Office	Ministry of Labor	Office of Census and Statistics	Labor Office	Bureau of Census and Statistics	Census and Statistics Office
Base period	1921	July, 1914	January, 1914	July, 1914	June, 1914	July, 1914	1914	July, 1914	1911	July, 1914
1913.....									108	
1914.....		⁷ 100	100	² 100	² 100	² 100	100	² 100	111	² 100
1915.....		⁷ 117				² 125	105		126	107
1916.....		⁷ 146		¹ 139		² 148	112		130	116
1917.....		⁷ 190				² 180	122		129	129
1918.....		⁷ 253		² 219	204	² 203	131	154	134	143
1919.....		⁷ 275		² 257	222	² 208	145	175	148	157
1920.....		⁷ 302		² 270	224	² 252	179	183	175	178
1921.....	100	⁷ 302		² 236	200	² 219	162	173	167	177
1922.....	¹ 83	⁷ 255		² 190	164	² 184	135	164	156	160
1923.....	¹ 82	⁷ 239		² 174	164	² 169	131	154	168	158
1924.....				² 171	169	² 170	153	157	166	160
Dec.....	84	267				181	133	160	⁶ 165	
1925.....					168			155	170	162
Dec.....	82	236		² 176	167	177	131	155	⁶ 172	⁶ 164
1926.....					162				176	163
Jan.....			121	174	166	175	131	155		
Feb.....			114		164	173	131	154		162
Mar.....	80	227	111		163	172	131	155	⁶ 175	
Apr.....			95	173	162	168	131	153		
May.....			87		162	167	132	153		163
June.....	82	221	98		162	168	131	155	⁶ 180	
July.....			102	172	162	170	130	157		
Aug.....			104		161	170	130	155		163
Sept.....	79	221	109		161	172	130	155	⁶ 176	
Oct.....			111	171	161	174	131	155		
Nov.....			114		161	179	131	154		163
Dec.....	80	216	115		161	179	129	156	⁶ 174	162
1927.....					160				174	
Jan.....		213	117	171	160	175	130	156		
Feb.....		211	117		160	172	130	155		162
Mar.....	80	208	116		159	171	131	155	⁶ 174	
Apr.....		206	118	170	158	165	131	153		
May.....		205	119		160	164	132	152		162
June.....	80	204	119		160	163	132	154	⁶ 172	
July.....		206	115	169	160	166	132	156		
Aug.....		205	116		160	164	131	157		161
Sept.....	80	199	117		161	165	131	154	⁶ 175	
Oct.....		199	119	172	161	167	132	151		
Nov.....		198	122		162	169	132	150		161
Dec.....	82	197	121		162	169	132	151	⁶ 177	
1928.....										
Jan.....		197	120	171	161	168	132	154		
Feb.....		197	118		161	166	131	148		161
Mar.....	83	196	119		160	164	132	145	⁶ 175	
Apr.....		196	121	171	160	164	133	144		
May.....		196	121		160	164	133	147		162
June.....	82	195	122		161	165	132	146	⁶ 175	
July.....		196	123	173	161	165	131	147		
Aug.....		195	122		161	165	131	146		161
Sept.....	81	187	122		161	165	131	145		
Oct.....		186	123	172	162	166	131	146		
Nov.....		185	125		162	167	131	147		162
Dec.....	80	184	125		162	168	131	148		

¹ December.² July.⁶ Quarter ending with month.⁷ June.

Use of Cost-of-Living Figures in Wage Adjustments

A STUDY of the use of cost-of-living figures in wage adjustments was published by the United States Bureau of Labor Statistics in 1925 (Bul. No. 369). The following abstract from that bulletin shows the widespread use of cost-of-living figures in wage adjustments, not only during the war but also during the subsequent years:

The cost of living has entered as a factor into practically every award made by Government arbitration boards. It also has been considered by State and municipal agencies, and by State arbitration boards, and has been the controlling factor in the fixing of wages by minimum wage boards in 13 States and the District of Columbia. In the last 10 years it has entered into practically every industrial case which was voluntarily arbitrated. During the war, plans involving the use of cost-of-living figures were adopted by a great many private employers, and while some of these have been abandoned others are still in effect. Since the war many other firms have adopted definite plans for the payment of wages, all of which provide for the consideration of figures showing changes in the cost of living. * * *

Altogether, the number of employees affected directly by specific wage adjustments is very great; those industries alone where the approximate number is known employ over five and one-half million workers. It should also be borne in mind that in many instances an even greater number of employees is affected indirectly, for often other employers engaged in the same character of work voluntarily make changes in wages to conform to those fixed by an adjustment agency or granted by other employers. Therefore practically all labor has been affected either directly or indirectly by adjustments which were based in some measure upon the cost of living.

Since the beginning of 1924, the date of the preparation of Bulletin No. 369, the bureau has made no survey of the subject, but enough information is at hand to show that the use of cost-of-living data in wage adjustments by governmental boards, arbitration boards, and private contract has continued to the present time. The past two or three years, however, have been years of relatively few wage controversies of sufficient intensity to bring them to the attention of the public.

The following represent, therefore, only such examples of the recent use of cost-of-living figures in wage adjustments as have come to the attention of the bureau without special inquiry or research.

Railroad Arbitrations under the Federal Act of 1926

DURING its life of six years from 1920 to 1926, the Railroad Labor Board used the cost-of-living indexes of the Bureau of Labor Statistics in all its wage decisions, the law providing that it should consider, among other factors, "the relation between wages and the cost of living."

The mediation and arbitration boards established under the railway labor act of 1926 have no definite rules of procedure established by law, but a review of the hearings and awards in the numerous arbitration cases held under the act shows that data regarding changes in the cost of living have been given constant consideration by the parties concerned. The awards so made have involved more than 200,000 men. In a great many other instances, also, voluntary settlements were made between the men and the carriers on the basis of awards made by such boards.

Colorado Industrial Commission

THE INDUSTRIAL relations act of Colorado, effective August 1, 1915, which created the Colorado Industrial Commission, requires employers and employees to give 30 days' notice of an intended change affecting wages and hours; gives the commission power to mediate and investigate and hold hearings on controversies or demands; and prohibits any change or stoppage of work during the 30-day period, or while the commission is holding its hearings or investigation. The findings of the commission become final if the parties accept the commission as arbitrator; otherwise they are merely recommendatory.

Up to December 1, 1924, the commission had handled 1,157 controversies, involving approximately 150,000 workers.¹ In the findings of the commission various factors were recognized, but changes in the cost of living seem to have been of most importance. The former chairman of the commission, Hiram E. Hiltz, has stated that "all wage changes are based primarily on the cost of living."²

Minimum Wage Boards

PRIOR to the decisions of the United States Supreme Court adversely affecting the constitutionality of mandatory minimum wage laws for women, such laws were in operation in 13 States and the District of Columbia. Most of the minimum wage commissions or boards connected therewith formulated budgets which were considered equivalent to a minimum cost of living for the workers concerned or applied to budgets already accepted the per cent of change in the cost of living.³ In 1919 at a joint conference of representatives of the California, Oregon, and Washington commissions, it was recommended that the figures of the United States Bureau of Labor Statistics should be used by the wage conferences in all States.⁴

While the decisions of the United States Supreme Court have no doubt affected the operation of mandatory wage laws as regards women, they are apparently unaffected as regards minors. Under the Massachusetts law, which is nonmandatory, wage boards have continued to adopt budgets and to revise previous budgets after the consideration of the changes in the cost of living.⁵ At the close of 1926 wage boards had been called in Massachusetts for 21 occupational groups, employing probably 85,000 females.⁶

State and Municipal Agencies

OF THE various State and municipal agencies which used cost-of-living figures in the adjustment of salaries during or immediately after the war, at least one—St. Paul, Minn.—made this principle a permanent feature. For the other jurisdictions the bureau has no recent information.

Cost-of-living figures were first used in St. Paul in the adjustment of wages in 1918. In October, 1922, a plan was approved by the

¹ See *Journal of Political Economy*, October, 1927.

² U. S. Bureau of Labor Statistics Bul. No. 369, p. 132.

³ *Idem*, pp. 156-158.

⁴ *Idem*, p. 158.

⁵ Massachusetts. Department of Labor and Industries. Annual reports, 1925, pp. 26, 27, and 1926, pp. 28, 29.

⁶ National Industrial Conference Board. *Minimum Wage Legislation in Massachusetts*. New York, 1927, p. 197.

city council whereby all city employees, with the exception of teachers, were grouped into three services—graded, ungraded, and common labor—and standard basic salaries established for the different grades under these classifications, which have been adjusted annually since that time according to the change in the cost of living, as determined by the United Bureau of Labor Statistics.⁷ The number of employees subject to these periodic wage adjustments was approximately 2,330 in 1925.⁸

Agreements Between Employers and Employees

MANY collective agreements between employers and their employees provide for arbitration in case a new agreement can not be negotiated at the expiration of the old one, and in the resulting arbitrations cost-of-living figures play an important part. Others provide specifically for revision of the agreed wage rates to meet any important change in the cost of living, and accurate and authoritative current statistics of changes in cost of living are therefore necessary. An agreement of the latter type is that between the International Ladies' Garment Workers' union and employers of Cleveland, Ohio, of January 1, 1924.

Industrial Arbitration Boards

ARBITRATION as a means of settling disputes is frequently resorted to in all types of industries, and in almost every arbitration case cost of living is necessarily one of the important factors which must be considered. A large number of these cases, however, probably do not come to the attention of the Bureau of Labor Statistics.

In certain industries, such as printing and electrical construction, permanent arbitration machinery on a national scale has been voluntarily established. Cases which can not be adjusted by the parties are ordered to local boards of arbitration and, failing adjustment there, to a national board. Local arbitration boards have also been established in other industries, such as the building industry in San Francisco, the cloth hat and cap industry in New York and Chicago, the clothing industry in Baltimore, Chicago, Cleveland, and Rochester, and in the silk ribbon, fancy leather goods, shirt, and boys' waist industries in New York. In practically all cases voluntarily referred to arbitration the cost of living is considered as a factor, though one of varying weight. In the decisions of some of the arbitration boards the cost of living has had controlling influence, and some decisions have been based entirely upon this ground.

Street-railway industry.—The principle of arbitration in wage disputes has long been accepted in the street-railway industry, and cost of living has been prominent in the findings of the arbitrators. Recent cases in which data on the changes in the cost of living have figured prominently include those between the following companies and their employees: Worcester Consolidated Street Railway Co., Boston Elevated Railway Co., Shreveport (La.) Railways Co., United Electric Railways Co. (Providence, R. I.), Northern Ohio Traction & Light Co., street railway companies of East St. Louis, Alton, Granite, etc., traction companies of San Francisco and Oakland, and the Connecticut Co.

⁷ Letter from St. Paul Civil Service Bureau. Dec. 27, 1927.

⁸ St. Paul. Civil Service Bureau, Twelfth Annual Report, 1925.

Printing trades.—The printing trades, especially in the newspaper branch, rival the street-railway industry in their adoption of arbitration, and in nearly all cases of arbitration the cost of living holds an important place. Quite generally, the Bureau of Labor Statistics cost-of-living data are used, not only by the parties concerned but by the arbitration board itself. In the arbitration case between the Washington Newspaper Publishers' Association and Typographical Union No. 101, the figures of the bureau were stated to be "undoubtedly the best statistics available."

Individual Companies

IN 1921-22 the Bureau of Labor Statistics sent out questionnaires to 7,000 employers, asking them if they used cost-of-living figures in the adjustment of wages of their employees. Of the 2,311 replies received, 1,370, or about 60 per cent, stated that they did make use of such figures when making wage changes, something over 1,500,000 employees being affected. In some cases the employers computed their own cost-of-living data, but in most cases use was made of the figures compiled by existing agencies such as the United States Bureau of Labor Statistics. Details regarding these plans are given in Bulletin No. 369.

The bureau has not been able to keep in touch with these establishments to determine to what extent these plants have continued to use cost-of-living figures. There is no reason to suppose that the practice is not still a common one, and this is indicated by recent correspondence received by the bureau.

Employers' Association

THE National Industrial Conference Board, an association of a large number of important employers' organizations, issues a monthly index of cost of living primarily for the use of its own members. This index number is based partly upon original investigations by the board, but for retail food prices, the largest item in the workers' budget, it uses the data of the United States Bureau of Labor Statistics, and also depends upon the bureau for the weighting system used in compiling cost-of-living index numbers. The board is therefore much interested in the accuracy of the weighting system, and in a recent communication to the bureau expresses the hope that the bureau will be able to make a new budgetary study for this purpose.

Cost of Medical Service

A STUDY of the cost of medical service was made by the Bureau of Labor Statistics from information secured in the first week of April, 1928, from its personnel of 117 persons, other than the commissioner, assistant commissioner, and agents in the field. One hundred and fourteen satisfactory schedules were secured.

The term "cost of medical service," as used in this study, covers all direct expenditures for health purposes, including the care of the teeth and eyes, medicines, hospital and nursing charges, surgical appliances, etc., as well as the services of physicians and surgeons.

The principal points developed from the study are as follows:

The average annual expenditures per employee for medical services were \$98.92 for the group earning less than \$2,000 per year; \$146.13 for the salary group \$2,000 to \$3,000; and \$190.63 for the salary group \$3,000 and over. The average medical costs for all salary groups was \$122.72, the average salary being \$1,992.63. Expressed in terms of percentages, medical costs represented 6.2 per cent of salary in the lower salary group; 6.3 per cent in the middle group; and 5.5 per cent in the upper group.

Medical costs, reduced to an annual basis, were in excess of \$500 in a number of instances. Nineteen persons spent over 10 per cent of their salaries for medical care, the costs ranging from 10.4 to 33.9 per cent.

Because of the large number of unmarried employees in the bureau, the average number of persons per schedule (i. e., the reporting employees and their dependents) was only 1.9, the average ranging from 1.8 persons in the lowest salary group to 2.2 in the upper group. Thus the average per capita expenditures for medical services were \$54.96 for the lowest salary group, \$69.59 for the middle group, \$86.65 for the upper group, and \$64.59 for all three groups combined.

The study did not show, of course, the exact sums which on the average, should be spent for medical services. Many employees, particularly those with the lower salaries and those with the larger families, neglect or postpone such medical treatment as is not absolutely imperative. This was shown in numerous statements made by employees replying to the present questionnaire. On the whole, however, it may be assumed that the members of the group earning \$3,000 and over were expending approximately enough for all the major requirements of health, without being in a position to spend wastefully for services of this nature. It is probable, therefore, that the average per capita expenditure in this group represents the average minimum amount per individual necessary for the maintenance of health. The average per capita expenditure of the group is \$86.65. On this basis the average annual cost of adequate medical services would be approximately \$350 for a family of four and approximately \$430 for a family of five.

The cost of medical service to employees of the Bureau of Labor Statistics is considerably reduced by reason of the fact that the Department of Labor maintains a free dispensary service open to all employees of the department. Visits to the dispensary average about 10 per year per employee and thus represent an average money saving of at least \$20 a year.

The summarized statistical findings of the study are shown in Table 1.

TABLE 1.—AVERAGE ANNUAL MEDICAL EXPENSES OF 114 GOVERNMENT EMPLOYEES, CLASSIFIED ACCORDING TO SALARY

Salary class	Number of employees reporting	Number of persons covered	Average number of persons covered per schedule	Average salary	Annual medical expenses		
					Average per employee	Per cent of salary	Average per capita
\$3,000 and over.....	9	20	2.2	\$3,466.67	\$190.63	5.5	\$86.65
\$2,000 and under \$3,000.....	40	85	2.1	2,316.00	146.13	6.3	69.59
Under \$2,000.....	65	115	1.8	1,589.54	98.92	6.2	54.96
Total.....	114	220	1.9	1,992.63	122.72	6.2	64.59

As noted above, the medical costs covered by this study include only direct costs. Indirect costs—such as loss of salary from illness and convalescence—are not included. Nor are funeral expenses included. As regards loss of salary, the regulations of the Department of Labor permit of a maximum *sick* leave of 30 days within any one calendar year, proper certification by a physician being required. As a maximum of 30 days of *annual* leave within a calendar year may also be allowed under the departmental regulations, an employee suffering a severe illness may be paid, at the most, for a period of 60 days without service during a calendar year. Beyond this period the salary ceases. Neither sick leave nor annual leave is cumulative.

Furthermore, it should be noted that the medical costs reported in this inquiry were in many, and probably most, cases less than the actual amounts spent. Most of the employees replying had not kept complete records of all medical expenditures—especially for family medicines usually bought for cash—and as a result there was an evident tendency to understate the totals.

The results of the present study can not of course be accepted as conclusive for other than the personnel of the particular bureau to which they relate. On the other hand, the fact that the personnel of the Bureau of Labor Statistics has such a wide range of duties (from messengers to expert statisticians) and of salaries (from \$1,020 to \$4,400 per year) indicates that the results may be regarded as fairly representative of the other classes of salary and wage earners of similar income groups.

Individual Reports

THE DETAILED data for each of the 114 schedules obtained are given in Table 2. The schedules used requested information back to January 1, 1927, in the case of normal medical services, and to January 1, 1926, in the case of special medical services. This was done in order to cover the more extended cases of illness. In tabulating the schedules, however, all data were reduced to an annual basis, and the cost figures here presented represent in all cases average annual expenditures.

In the schedule and in the following tabulation distinction is made between "normal services" and "special services." By "normal services" is meant the ordinary and more or less routine services of

the dentist, oculist, and family physician. By "special services" is meant those incident to the more serious illnesses requiring expenditures for surgeons, hospital, nursing, etc. Such a distinction is necessarily rather rough but permits of useful comparisons.

TABLE 2.—NORMAL AND SPECIAL MEDICAL EXPENSES OF 114 GOVERNMENT EMPLOYEES AND PER CENT OF SALARY THUS SPENT, BY SALARY GROUPS

Salary classification and employees' number	Number of persons covered	Salary	Average annual expenditures for—					
			Normal medical services		Special medical services		Total	
			Amount	Per cent of salary	Amount	Per cent of salary	Amount	Per cent of salary
\$3,000 and over:								
Employee No. 1.....	3	\$3,000.00	\$84.00	2.8	\$33.33	1.1	\$117.33	3.9
Employee No. 2.....	3	3,100.00	28.80	.9	105.78	3.4	134.58	4.3
Employee No. 3.....	2	4,400.00	244.80	5.6	210.67	4.8	455.47	10.4
Employee No. 4.....	1	3,000.00	40.00	1.3	—	—	40.00	1.3
Employee No. 5.....	2	3,000.00	11.20	.4	6.67	.2	17.87	.6
Employee No. 6.....	2	3,300.00	56.36	1.7	171.84	5.2	228.20	6.9
Employee No. 7.....	1	4,000.00	20.00	.5	33.33	.8	53.33	1.3
Employee No. 8.....	4	4,400.00	154.40	3.5	400.89	9.1	555.29	12.6
Employee No. 9.....	2	3,000.00	113.60	3.8	—	—	113.60	3.8
Total.....	20	—	753.16	—	962.51	—	1,715.67	—
Average.....	2.2	\$3,466.67	\$3.68	2.4	106.95	3.1	190.63	5.5
\$2,000 and under \$3,000:								
Employee No. 10.....	1	2,900.00	275.20	9.5	96.44	3.3	371.64	12.8
Employee No. 11.....	6	2,600.00	65.60	2.5	—	—	65.60	2.5
Employee No. 12.....	3	2,100.00	88.00	4.2	14.44	.7	102.44	4.9
Employee No. 13.....	1	2,000.00	113.40	5.7	—	—	113.40	5.7
Employee No. 14.....	6	2,600.00	131.20	5.0	1.89	.03	132.09	5.1
Employee No. 15.....	1	2,600.00	81.20	3.1	19.56	.8	100.76	3.9
Employee No. 16.....	1	2,000.00	28.00	1.4	167.78	8.4	195.78	9.8
Employee No. 17.....	1	2,000.00	3.20	.2	—	—	3.20	.2
Employee No. 18.....	2	2,400.00	87.20	3.6	—	—	87.20	3.6
Employee No. 19.....	1	2,600.00	85.60	3.3	—	—	85.60	3.3
Employee No. 20.....	1	2,300.00	1.60	.1	—	—	1.60	.1
Employee No. 21.....	1	2,200.00	1.60	.1	—	—	1.60	.1
Employee No. 22.....	3	2,600.00	185.20	7.1	195.33	7.5	380.53	14.6
Employee No. 23.....	1	2,000.00	78.80	3.9	—	—	78.80	3.9
Employee No. 24.....	2	2,200.00	70.40	3.2	60.00	2.7	130.40	5.9
Employee No. 25.....	2	2,200.00	112.80	5.1	4.44	.2	117.24	5.3
Employee No. 26.....	1	2,040.00	39.20	1.9	121.78	6.0	160.98	7.9
Employee No. 27.....	4	2,600.00	171.00	6.6	—	—	171.00	6.6
Employee No. 28.....	4	2,600.00	114.66	4.4	22.00	.8	136.66	5.3
Employee No. 29.....	1	2,300.00	—	—	—	—	—	—
Employee No. 30.....	1	2,300.00	55.20	2.4	11.56	.5	66.76	2.9
Employee No. 31.....	2	2,500.00	189.60	7.6	309.33	12.4	498.93	20.0
Employee No. 32.....	5	2,100.00	81.04	3.9	46.67	2.2	127.71	6.1
Employee No. 33.....	2	2,800.00	140.32	5.0	136.54	4.9	276.86	9.9
Employee No. 34.....	1	2,100.00	52.80	2.5	4.44	.2	57.24	2.7
Employee No. 35.....	4	2,100.00	453.88	21.6	355.56	16.9	809.44	38.5
Employee No. 36.....	1	2,000.00	88.00	4.4	—	—	88.00	4.4
Employee No. 37.....	2	2,000.00	56.00	2.8	—	—	56.00	2.8
Employee No. 38.....	2	2,000.00	64.00	3.2	8.89	.4	72.89	3.6
Employee No. 39.....	5	2,200.00	32.00	1.5	—	—	32.00	1.5
Employee No. 40.....	1	2,100.00	80.00	3.8	28.80	1.3	108.80	5.1
Employee No. 41.....	3	2,300.00	64.80	2.8	—	—	64.80	2.8
Employee No. 42.....	1	2,400.00	48.80	2.0	108.00	4.5	156.80	6.5
Employee No. 43.....	1	2,600.00	24.80	1.0	218.67	8.4	243.47	9.4
Employee No. 44.....	1	2,600.00	225.60	8.7	—	—	225.60	8.7
Employee No. 45.....	4	2,000.00	284.00	14.2	3.11	.2	287.11	14.4
Employee No. 46.....	2	2,600.00	35.08	1.4	4.89	.2	39.97	1.5
Employee No. 47.....	1	2,600.00	31.20	1.2	14.22	.5	45.42	1.7
Employee No. 48.....	2	2,200.00	71.60	3.3	22.22	1.0	93.82	4.3
Employee No. 49.....	1	2,300.00	25.60	1.1	33.33	1.4	58.93	2.6
Total.....	85	—	3,836.18	—	2,008.98	—	5,845.16	—
Average.....	2.1	\$2,316.00	\$45.90	4.1	50.23	2.2	96.13	6.3

TABLE 2.—NORMAL AND SPECIAL MEDICAL EXPENSES OF 114 GOVERNMENT EMPLOYEES AND PER CENT OF SALARY THUS SPENT, BY SALARY GROUPS—Contd

Salary classification and employees' number	Number of persons covered	Salary	Average annual expenditures for—					
			Normal medical services		Special medical services		Total	
			Amount	Per cent of salary	Amount	Per cent of salary	Amount	Per cent of salary
Under \$2,000:								
Employee No. 50	1	\$1,620.00	\$40.00	2.5	\$88.89	5.5	\$128.89	8.0
Employee No. 51	2	1,620.00	17.00	1.1			17.00	1.1
Employee No. 52	2	1,320.00	47.60	3.6	5.33	.4	52.93	4.0
Employee No. 53	1	1,680.00	41.60	2.5	123.11	7.3	164.71	9.8
Employee No. 54	2	1,920.00	48.00	2.5	20.00	1.0	68.00	3.5
Employee No. 55	4	1,680.00						
Employee No. 56	1	1,440.00	106.80	7.4	29.33	2.0	136.13	9.5
Employee No. 57	1	1,320.00	58.40	4.4			58.40	4.4
Employee No. 58	1	1,860.00	40.60	2.2	13.33	.7	53.93	2.9
Employee No. 59	1	1,860.00	12.23	.7			12.23	.7
Employee No. 60	1	1,860.00	40.40	2.2	64.44	3.5	104.84	5.6
Employee No. 61	1	1,320.00	156.00	11.3			156.00	11.3
Employee No. 62	1	1,440.00	20.00	1.4	88.89	6.2	108.89	7.6
Employee No. 63	3	1,740.00	72.20	4.1	13.33	.8	85.53	4.9
Employee No. 64	2	1,740.00	171.20	9.8			171.20	9.8
Employee No. 65	1	1,320.00	55.20	4.2			55.20	4.2
Employee No. 66	1	1,800.00	49.00	2.8			49.00	2.8
Employee No. 67	1	1,800.00	24.80	1.4			24.80	1.4
Employee No. 68	2	1,140.00	44.00	3.9	24.00	2.1	68.00	6.0
Employee No. 69	1	1,320.00	112.00	8.5	17.78	1.3	329.78	9.8
Employee No. 70	1	1,320.00	7.20	.5			7.20	.5
Employee No. 71	1	1,680.00	88.16	5.2	377.44	22.5	465.60	27.7
Employee No. 72	1	1,860.00	73.00	4.0	226.67	12.2	300.27	16.1
Employee No. 73	7	1,500.00	158.40	10.6			158.40	10.6
Employee No. 74	2	1,140.00	36.00	3.2			36.00	3.2
Employee No. 75	1	1,800.00	84.20	4.7			84.20	4.7
Employee No. 76	1	1,920.00	144.00	7.5	16.44	.9	160.44	8.4
Employee No. 77	6	1,620.00	29.60	1.8	39.11	2.4	68.71	4.2
Employee No. 78	1	1,380.00	2.40	.2	23.11	1.7	25.51	1.8
Employee No. 79	3	1,860.00	196.00	10.5	24.44	1.3	220.44	11.9
Employee No. 80	1	1,680.00	75.60	4.5	16.59	1.0	92.49	5.5
Employee No. 81	5	1,620.00	45.60	2.8			45.60	2.8
Employee No. 82	1	1,620.00	38.40	2.4	26.67	1.6	65.07	4.0
Employee No. 83	1	1,860.00	75.20	4.0			75.20	4.0
Employee No. 84	4	1,920.00	28.00	1.5	220.00	11.5	248.00	12.9
Employee No. 85	2	1,320.00	12.00	.9	22.22	1.7	34.22	2.6
Employee No. 86	5	1,620.00	87.20	5.4	151.11	9.3	238.31	14.7
Employee No. 87	1	1,920.00	108.00	5.6	2.22	.1	110.22	5.7
Employee No. 88	1	1,620.00	20.00	1.2			20.00	1.2
Employee No. 89	1	1,740.00	28.28	1.6	15.56	.9	43.84	2.5
Employee No. 90	1	1,320.00	56.00	4.2			56.00	4.2
Employee No. 91	1	1,740.00						
Employee No. 92	1	1,740.00						
Employee No. 93	2	1,560.00	64.00	4.1			64.00	4.1
Employee No. 94	1	1,680.00	16.80	1.0	160.00	9.5	176.80	10.5
Employee No. 95	4	1,680.00	64.00	3.8			64.00	3.8
Employee No. 96	1	1,500.00	28.00	1.9			28.00	1.9
Employee No. 97	3	1,800.00	71.20	3.8	150.67	8.1	221.87	11.9
Employee No. 98	2	1,620.00	2.80	.2	12.00	.7	14.80	.9
Employee No. 99	1	1,740.00	10.12	.6	4.89	.3	15.01	.9
Employee No. 100	1	1,380.00	15.20	1.1	22.22	1.6	37.42	2.7
Employee No. 101	1	1,380.00	28.00	2.0			28.00	2.0
Employee No. 102	1	1,320.00	2.40	.2			2.40	.2
Employee No. 103	1	1,320.00						
Employee No. 104	2	1,500.00	85.60	5.7	26.67	1.8	112.27	7.5
Employee No. 105	1	1,560.00	119.84	7.7	33.33	2.1	153.17	9.8
Employee No. 106	1	1,620.00	54.80	3.4	147.56	9.1	202.36	12.5
Employee No. 107	1	1,680.00	80.80	4.8	33.33	2.0	114.13	6.8
Employee No. 108	3	1,500.00	41.60	2.8	2.22	.1	43.82	2.9
Employee No. 109	5	1,380.00	102.80	7.4			102.80	7.4
Employee No. 110	1	1,020.00						
Employee No. 111	1	1,140.00	116.00	10.2			116.00	10.2
Employee No. 112	1	1,680.00	9.20	.5	13.33	.8	22.53	1.3
Employee No. 113	1	1,620.00	18.40	1.1	39.11	2.4	57.51	3.6
Employee No. 114	1	1,920.00	50.40	2.6	600.04	31.3	650.44	33.9
Total	115		3,534.03		2,895.71		6,429.71	
Average	1.8	1,589.54	54.37	3.4	44.55	2.8	98.42	6.2
Grand total	220		8,123.38		5,867.20		13,990.58	
Average	1.9	1,992.63	71.26	3.6	51.47	2.6	122.72	6.2

Cost of Medical Care, Hospitalization, and Funerals

MUCH INTEREST is being manifested at the present time in the problem which the wage earner is obliged to meet when confronted with serious sickness either of himself or of members of his family, the belief seeming to be quite general that the costs of medical and hospital care and even funeral expenses are excessive and present an unfair burden on the person of average means. In consequence of this belief studies have been made as to the ability of patients to pay for medical care, the cost of hospitalization, and funeral expenses.

Ability to Pay for Medical Care

A REPORT presented at the annual meeting of the American Hospital Association in San Francisco in August, 1928, reported in *Modern Hospital*, October, 1928, describes the methods in use in five clinics which have devoted special attention to the basis for determining the ability of the patient to pay for medical care and the best methods to be followed by the out-patient clinics in fixing a fair rate of payment.

In the Lakeside Hospital, Cleveland, the applicant for treatment is interviewed as to his income, the size of his family, and his responsibilities, and from these data the margin available for medical care is computed after comparison of the income or expenditures with a standard budget, which is adjusted to cover single persons and families of different sizes, and is based on a budget for families of small income compiled by the associated charities of the city and a study of the rents reported by 100 patients accepted for clinic care. Allowance is made for the age of children, two sets of figures covering different age groups being given. Other conditions which would affect the ability of the patient to pay are also taken into consideration, such as number of dependents other than children, rent standards, educational standards, debts, previous illnesses, and degree of thrift and competence shown in managing the income. These determine whether the larger or the smaller budget or a modification of either will be used in determining the patient's financial classification.

In the Michael Reese Hospital, Chicago the economic eligibility of patients applying for medical care is estimated from data secured as to the occupation, wages, and regularity of employment of the head of the household, the earnings of other members of the family and their contribution to the household budget, and other possible sources of income, such as membership in a lodge or insurance company from which they can obtain benefit. After the income and the responsibilities are determined, taking into consideration all these varying factors, the results are compared with budgets estimated for a normal self-supporting family, a single self-supporting woman, and a single self-supporting man. These budgets are based on the minimum financial requirements of families in their respective groupings, the amount of the budget being fixed at \$87.70 per month for a man and wife; \$97.88 when there is a child aged 3; \$115.87, with a girl aged 5 and a boy aged 3; and \$142.23 with a girl aged 12, one aged 5, and a boy aged 3. There are three grades for admission to the

clinic—A, with an admission fee of \$50; B, \$25; and C, free—and patients are classified as A, B, and C according to their conformity to budget figures and are required to pay the corresponding admitting fee or are admitted without charge. The budgets were based on a study of the expenditures of reliable families maintaining a standard of living conforming to that adopted as representative by the committee. The budget allowed a family a minimum of medical service and no provision for special needs.

In the Cornell Clinic, three principles guide in determining the eligibility of applicants—the resources of the patient, including the extent to which he could draw on the family for his personal medical needs; his responsibilities; and the usual cost, at private rates, of the kind of medical care required in the individual case.

Patients considered eligible for treatment are single individuals with incomes from \$1,100 to \$1,800; families of two members with incomes from \$1,600 to \$2,200; of three members with incomes of \$1,850 to \$2,500; of four members with incomes of \$2,050 to \$2,750; and of five members with incomes of \$2,200 to \$3,000.

The Boston Dispensary, in determining eligibility for clinic treatment, uses an income schedule for single persons and families ranging from man and wife only to families with seven children, and in addition, the following facts are taken into consideration: Unemployment, length of illness, previous cost to patient, and the probable duration of the disability and the cost of treatment.

In the Harper Hospital, Detroit, information is secured as to the type and probable duration of illness, the occupation, wages, and length of employment of each member of the family, and income from roomers, boarders, and children, savings, insurance, and lodge. Automobile ownership, rent, payments on home, and debts are also considered. The income and responsibilities are considered in relation to minimum standard budgets varying from \$81.27 for a man and his wife to \$129.92 for a family of five. The clinic has a system of admission fees amounting to 25 cents, 50 cents, and \$1, or no fee at all is charged.

Cost of Hospitalization

OF THE 120,000,000 people in the United States it is estimated that 10,000,000 pass through the hospitals each year, so that the average citizen may expect to visit the hospital once in 12 years; if he is the head of a family he may expect to have a hospital bill for some one of the family on an average every three years. The average hospital cost, including the physician's fee and special nurse, it is estimated, is \$300, so that the allowance for sickness in the annual budget would be only \$100 a year.

In order to ascertain whether costs are actually too high, figures were secured from a number of large hospitals as to the operating costs and the charges to the patients in 1913 and 1926.⁹ Costs were obtained from four hospitals in Chicago, all of which do a large amount of free work, while none of them receive grants from the municipality, State, or Government, and in all of them the executives are paid adequate salaries. In 1913 the average per capita cost per day in these four hospitals was \$2.83, which had risen in 1926 to \$6.65, an

⁹ Modern Hospital, June, 1928: Correct Those Wrong Ideas, by John A. McNamara.

increase of 135 per cent. One of these hospitals charged \$2 per day for its ward beds in 1913 and \$4 in 1926, an increase of 100 per cent, and the charge for private rooms had increased from a range of \$4 to \$8 per day in 1913 to a range of \$6 to \$10 in 1926, or only 33 per cent. The average increase for both types of service amounted, therefore, to only 66 per cent as compared with an increase of 135 per cent in the cost of operating the four hospitals. The average length of stay per patient had been reduced, moreover, from 15 days in 1913 to 12 days in 1926, with the result that a patient using the highest-priced room in 1913 would have paid \$120 for his 15-day stay, while in 1926 a patient using the same room at \$10 a day would have paid exactly the same amount, \$120, for a stay of 12 days. These figures do not include charges for special treatments, but investigation has shown that these special services do not add on an average more than \$50 to the hospital bill. Summing up these figures, the writer says:

Costs have increased 135 per cent; charges have increased a maximum of \$50 or approximately 42 per cent due to special charges; patients have been returned to society three days earlier than previously, thereby causing an economic saving to industry of approximately \$15 represented by the average earning power per man. If this can be logically deducted from the increased cost, the increase is but 29 per cent.

A further study of costs in seven hospitals in different parts of Pennsylvania confirmed the results of the Chicago study.

In the Modern Hospital, June, 1928 (pp. 61, 62), an account is given of the plans of a hospital in Grand Rapids, Mich., for standardizing and reducing costs. Laboratory and X-ray work are playing an increasingly important part in the diagnosis of disease, and since all these facilities are available in a hospital, physicians frequently have their patients go to a hospital for a short time for observation and examination. As the amount of laboratory and other work varies with the case, it is impossible to determine beforehand the cost to the patient, and this uncertainty undoubtedly keeps many patients from availing themselves of this service. To meet this situation, therefore, the board of trustees of the hospital established a flat rate of \$25 for a two days' stay if the patient is in a ward and \$35 if he occupies a private room, this rate covering all services in connection with the diagnosis asked for by the physician. The desirability of making the benefits of hospitalization in maternity cases available to a larger number has also been recognized by the management, and flat rates covering all expenses during the average 10-day stay in the hospital for this class of cases have been fixed for ward patients and those in semiprivate or private rooms.

Funeral Costs

A SURVEY of funeral costs and the burial industry, financed by the Metropolitan Life Insurance Co., was made by an independent committee representative of various social and religious interests and the industry itself.¹⁰ The study covered actual funeral expenditures among various income groups, including the funeral bills secured from 2,830 decedents' estates in four large cities; those for 8,828

¹⁰ Advisory Committee on Burial Survey. *The Reasons for Present-day Funeral Costs*, by John C. Gebhart. New York [1928?].

holders of industrial policies from various sections of the United States; 3,123 claims for burial expenses filed with the United States Veterans' Bureau; and the bills filed by 319 widows applying for pensions to the New York Board of Child Welfare.

In a summary of the results of the survey it is shown that excessive funeral expenditures entail the most suffering in families of limited means who have minor children to support. The excessive expenditures may be accounted for partly by the desire on the part of the family for an elaborate funeral, either as a token of respect and affection for the departed or to comply with the demands made by the conventions or the social and religious traditions of the group, and partly by the disorganization and waste in the industry itself, the number of undertakers having increased roughly 25 times as fast as the volume of business.

The expenses of the industrial policyholders group may be considered a fair index of funeral expenses of wage-earning families in various parts of the country. While the figures given are averages and do not show the range of expenditures, these averages are sufficiently high to indicate the excessive amounts spent for this purpose. In general, charges were highest in the East, lowest in the South, with the Midwest and Central States (with one exception) falling between these extremes. Thus the average for New Jersey, the highest was \$484, and for North Carolina, the lowest, \$194. In Ohio, the highest of the States in the Middle West, the average expenditure was \$415. In general, expenditures were considerably higher in the cities than in the rural districts.

From the records of 319 widows in New York now receiving pensions for the support of their children, grouped by nationality, it was found that the average funeral expenditure among the Irish was \$452, which consumed 44 per cent of the net assets; among the Italians the average bill was \$421, absorbing 50 per cent of the net assets; while among the Jews, owing to their simpler funeral customs, the average bill was only \$247. For the industrial policyholders in New York City the average expenditure was \$432.

Living Expenses of Farmers

A STUDY of the living expenses of 2,886 farm families in selected localities of 11 States was made by the United States Department of Agriculture and published in its Bulletin No. 1466. The data were gathered by means of personal visits, the period of study ranging from 1922 to 1924. Typical farm homes within the localities chosen were visited, the selection of households of any one size or level of living being avoided.

Average living expenses per family in the different States represented in the investigation varied as follows: Connecticut, \$1,559; Massachusetts, \$1,948; New Hampshire, \$1,839; Vermont, \$1,553; Alabama, \$1,615; Kentucky, \$1,493; South Carolina, \$1,482; Iowa, \$1,669; Kansas, \$1,492; Missouri, \$1,897; and Ohio, \$1,541.

The average annual living expenses, per family, of all families included in the study were found to be \$1,598. This figure included food, house rent, and fuel furnished by the farm for family living

purposes, valued at conservative prices. The average size of the family was 4.4 persons. More than two-fifths of the general average of \$1,598 was covered by goods furnished by the farm. The value of food furnished by the farm was almost twice the value of house rent and fuel furnished.

The various items included in the \$1,598 were found to be apportioned as follows:

	Amount	Per cent
Food.....	\$659	41. 2
Clothing.....	235	14. 7
House rent.....	200	12. 5
Furniture and equipment.....	40	2. 5
Operation goods.....	213	13. 3
Maintenance of health.....	61	3. 8
Life and health insurance.....	41	2. 6
Advancement.....	105	6. 6
Personal goods.....	41	2. 6
Unclassified.....	3	. 2
Total.....	1, 598	100. 0

Husbands and wives had about the same expenses for clothing per year, \$59 each. Daughters of the age groups over 24 years, 19 to 24 years, 15 to 18 years, and 12 to 14 years generally are clothed at a higher average cost than are sons of corresponding age groups. The average cost of clothing for both sons and daughters over 24 years, 19 to 24 years, and 15 to 18 years is considerably above the averages for male and female heads of families. Relatively, the average costs for sons of these age groups are 1.26, 1.54, and 1.24 times as high as the average costs for male heads of families. Similarly, the average costs for daughters are 1.42, 1.67, and 1.36 times as high as the average costs for female heads of families.

In the groups of expenditures directly concerned with health, the average amount spent on life and health insurance was \$40.80 per family, more than half of the families reporting no expenditure for this item. The expenditure for the maintenance of health—that is, for medicines and the services of doctors or nurses, or for hospital care—averaged \$61.60 per family, or 3.8 per cent of all expenditures. The average was highest in the North Central States, \$72.10 per family; in the New England States the cost averaged \$61.30, and in the Southern States, \$48.50.

Three hundred and three families, or more than one-tenth of the families studied, reported no expenditures for the maintenance of health. The average expenditure for this purpose does not represent, therefore, the extent of serious or minor sickness prevailing in the families studied; while many families reported that no money was spent for medicines, or for doctors', dentists', or nurses' services, a number reported extremely heavy expenditures for major operations or for doctors' or nurses' care either at home or in a hospital.

The average length of the workday (excluding Sundays) of the farm operator was found to be 11.3 hours and of the home-maker 11.4 hours, not including time spent at meals and in reading or resting. Little or no relation was found between the average length of the workday and the average value of goods used in a year.

Formal schooling of both the operator and the home maker was found to be significantly related to expenses for family living purposes. This relation appears to be slightly more noticeable with home

makers than with operators. The average number of years the operator has been a farm owner is closely associated with expenses. Mortgage indebtedness on the farm considered generally, however, seems to have no bearing on the expenses.

Income and Living Standards of Unskilled Laborers in Chicago¹¹

OF THE 467 families of able-bodied unskilled laborers covered by a survey in Chicago under the auspices of the local community research committee of the University of Chicago, the Chicago Council of Social Agencies, and several large employers of labor, only slightly over 50 per cent were able to maintain a standard equivalent to the budget (1925 revision) proposed for the use of the charitable organizations of that city.

This budget had been carefully adapted to varying family circumstances; for example, the food cost (1924 prices) for a man at hard muscular work in a family where bread is bought is estimated at \$14.30 per month and for a woman under the same conditions at \$11.30 per month. Additional allowances are provided when members of the family need special diets. An increased estimate for clothing is considered necessary when the man's work "involves unusual exposure." A reduction of 10 to 25 per cent is made in the clothing costs for younger children when wearing apparel is handed down to them.

As the line of demarcation between "unskilled" and "semiskilled" was found to be hazy, both classes were included in the survey. The earnings in both groups ranged from about \$800 to \$2,200 per annum, the majority being under \$1,500. A comparison of the earnings of the chief breadwinner and the estimates of the budget showed that in over two-thirds of the families such earnings were not sufficient for a standard of living equivalent to that contemplated in the Chicago budget. The group of wage earners covered, the investigators point out, was unusually well situated, having had regular employment throughout the year 1924, and most of them had been with their employers for several years.

Of the 467 families, 355 had other sources of income, which included earnings of wives and children, returns from keeping lodgers and boarders, property income, benefits, gifts from relatives and friends, and "borrowed money." The fact that in 108 families the mothers felt necessary to work and their jobs were especially arduous, undoubtedly meant "a lowering of the standard of living in those families and the consequent sacrifice of the welfare of the dependent children." Also the boarders and roomers in 100 families and the consequent overcrowding contributed to lower the standard of both physical and moral well-being in such families.

During 1924, 134 of these families had to avail themselves of the free services which the social agencies provide. As these services are rendered principally by medical agencies, the importance of such aid to both these families and the community as a whole can readily be

¹¹ Houghteling, Leila: *The Income and Standard of Living of Unskilled Laborers in Chicago*. Chicago, 1927.

seen. Without this assistance the general standard of living would drop "to an extremely low level."

The number and per cent of the families having dependent children were as follows

Number of dependent children: ¹²	Number of families	Per cent of total
None ¹³ -----	2	0.4
1-----	77	16.5
2-----	112	24.0
3-----	103	22.0
4-----	79	16.9
5-----	41	8.8
6-----	34	7.3
7 or more-----	19	4.1
Total-----	467	100.0

Changes in Consumption of Certain Articles of Diet

Meat

DATA published by the Bureau of Animal Industry of the United States Department of Agriculture on the per capita consumption of meat, by kinds, from 1900 to 1927, show certain changes in the American habits of meat consumption. This is brought out in the following table, which gives the average per capita meat consumption, by kind, for the 5-year periods, 1900 to 1904, 1915 to 1919, and 1923 to 1927:

AVERAGE ANNUAL PER CAPITA CONSUMPTION OF DRESSED MEATS IN THE UNITED STATES, BY SELECTED 5-YEAR PERIODS

Kind of meat	1900-1904	1915-1919	1923-1927
	<i>Pounds</i>	<i>Pounds</i>	<i>Pounds</i>
Beef-----	70.98	58.92	61.26
Veal-----	4.32	6.24	8.04
Lamb and mutton-----	6.94	5.50	5.30
Pork (excluding lard)-----	61.52	55.70	70.24
Total-----	143.76	126.54	144.84

¹ Includes 0.18 pound goat meat.

Comparing the earliest period with the latest, it is evident that there was no important increase in the per capita consumption of meat, the average being 143.76 pounds in the earliest period as compared with 144.84 in the latest period. There was, however, a decline in per capita beef consumption from 70.98 to 61.26 pounds and a counterbalancing increase in pork consumption from 61.52 to 70.24 pounds. The consumption of veal increased notably—from 4.32 pounds per capita to 8.04 pounds. The per capita consumption of lamb and mutton, however, decreased from 6.94 to 5.30 pounds. The data for the 5-year period 1915 to 1919 are of significance only as showing the great decline in domestic meat consumption during the war period.

¹² No age limit was set, and 40 children of 16 years or over were included because they were not contributing to the family exchequer. Also includes 35 children who contributed very small amounts.

¹³ The children in these families are dependent nieces and nephews and therefore were not in this table classified with the other dependent children.

Pork.—Investigations by the United States Department of Agriculture continue to show the popularity of pork in the American diet. This country, though possessing only about 6 per cent of the population of the world, has contained in recent years about 20 per cent of the world's swine.

An increasing control of hog cholera, swine parasites, and other loss factors has made the production of swine a much safer enterprise than formerly. A report issued by the Bureau of Animal Industry of that department shows an increase of more than 2,200,000 hogs slaughtered under Federal inspection during 1926-27 as compared with the previous year. The total number of federally inspected hogs slaughtered exceeded 42,500,000 out of a total of approximately 70,000,000 food animals.

The large and efficient production of pork in the country has made it possible for this food to reach the market at comparatively low prices. Its economy, combined with high food value, department officials believe, helps to explain the very liberal use of pork products in the American diet.

Milk

PER CAPITA consumption of milk and cream in the United States continues to increase, according to the Bureau of Agricultural Economics of the United States Department of Agriculture,¹⁴ which places per capita consumption at 55.3 gallons for 1926, as against 54.75 gallons in 1925 and 43 gallons in 1920.

The figures are based upon a survey of 373 cities with a total population of about 39,000,000, supplemented by reports from many of the large milk distributors and from cooperative milk producers' associations. Increased consumption was reported from each of these sources, although a few firms reported a slight decrease.

Total consumption of milk and cream in 1926 is placed at 56,417,000,000 pounds, against 54,325,776,000 pounds in 1925. Practically all the large cities in the country show increased per capita consumption of milk and cream, the large dealers reporting an increase in sales of about 8.5 per cent over sales in 1925.

The report shows the daily per capita consumption of milk and cream on farms was 1.47 pints in 1926, and in cities the consumption was 0.967 pint per capita. Daily per capita consumption of milk and cream in cities in 1925 was 0.951 pint.

The following shows the average daily per capita consumption of milk and cream by State groups in 1925 and 1926.

	1925 (pints)	1926 (pints)
11 Atlantic States and District of Columbia..	1. 0504	0. 9889
12 Central States.....	. 9388	1. 0389
14 Southern States.....	. 6184	. 6113
11 Western States.....	1. 0114	. 9767
United States.....	. 9510	. 9670

¹⁴ Press release of Bureau of Agricultural Economics of U. S. Department of Agriculture, dated May 4, 1927.

The annual per capita consumption of milk and cream in the United States since 1920 has been as follows:

	Gallons
1920.....	43. 0
1921.....	49. 0
1922.....	50. 0
1923.....	53. 0
1924.....	54. 75
1925.....	54. 75
1926.....	55. 3

The survey was made in cooperation with municipal boards of health of the cities, State officials, cooperative associations, and the National Dairy Council.

Bread and Flour

THAT BREAD is ranked third among the most important foods, being surpassed only by meats and vegetables, and followed by milk, was disclosed by a survey made in Philadelphia, Wilkes-Barre, and Sunbury, Pa., by the Pennsylvania Bureau of Markets, the Pennsylvania Bakers' Association, the Philadelphia Bakers' Club, and the United States Bureau of Agricultural Economics. Sixty per cent of the housewives interviewed in the three cities were of the opinion that no change had taken place in the amount of bread consumed per family during the past two years; 30 per cent reported an increase in their per family consumption of from $12\frac{1}{2}$ to 25 per cent, and 10 per cent reported a similar decrease. Little or no seasonal variation was reported. White bread was given a preference and is reported to constitute 90 per cent of the entire bread consumption. The proportion of white bread eaten is highest among the poor classes; while the well to do are consuming a relatively larger proportion of whole wheat and graham bread. The per capita consumption of all bread in the three cities is slightly more than $2\frac{1}{4}$ loaves per week. Five per cent of the bread used in Sunbury, about 7 per cent in Philadelphia, and about 33 per cent of that used in Wilkes-Barre is baked at home. Approximately one-half the housewives in Philadelphia, three-fourths in Wilkes-Barre, and practically all in Sunbury bake pies and cakes at home.

Philadelphia, Wilkes-Barre, and Sunbury were selected for the survey as they represent three distinct types of economic and social communities. The chief industry of Sunbury is railroading, and the majority of the inhabitants are native-born Americans. The principal industry of Wilkes-Barre is, of course, anthracite coal mining, and a large part of the population is of foreign birth. In Philadelphia the textile industry is probably the greatest employer of labor but the city may be classed as a general industrial and commercial city. The population is predominantly American, although some parts of the city are inhabited by large numbers of foreign born.

Changes in Cost of the Canadian Family Budget, 1921 to 1928 ¹⁵

THE COST per week, in specified months from 1921 to 1928, of the family budget in terms of average retail prices of certain classes of commodities in 60 Canadian cities, is shown in the following table:

COST PER WEEK OF FAMILY BUDGET IN CANADA IN SPECIFIED MONTHS, 1921
TO 1928 ^a

Year and month	All foods	Starch, laundry	Fuel and lighting	Rent (¼ month)	Total
1921: January.....	\$14.48	\$0.049	\$4.17	\$6.60	\$25.30
July.....	10.96	.044	3.70	6.83	21.53
1922: January.....	11.03	.042	3.53	6.92	21.52
July.....	10.27	.040	3.41	6.95	20.67
1923: January.....	10.52	.040	3.61	6.96	21.13
July.....	10.17	.040	3.48	6.97	20.65
1924: January.....	10.78	.041	3.49	6.92	21.23
July.....	9.91	.041	3.37	6.98	20.30
1925: January.....	10.77	.041	3.37	6.91	21.09
July.....	10.49	.041	3.28	6.89	20.70
1926: January.....	11.63	.041	3.43	6.86	21.96
July.....	11.07	.042	3.32	6.87	21.30
1927: January.....	11.37	.041	3.33	6.85	21.59
July.....	10.92	.041	3.28	6.86	21.10
1928: January.....	11.19	.041	3.28	6.89	21.41
July.....	10.80	.041	3.26	6.91	21.01
August.....	11.08	.041	3.26	6.93	21.31
September.....	11.15	.041	3.27	6.93	21.38
October.....	11.28	.041	3.26	6.95	21.52
November.....	11.28	.041	3.26	6.94	21.52

^a This budget is intended to show the changes in the cost of items included, not to show the minimum cost for an average family.

¹⁵ Canada. Department of Labor. Labor Gazette, February and August to November, 1928.

ECONOMIC CHANGES

39142°—29—9

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Economic Changes

VARIOUS studies have been made to determine the extent and character of the great economic changes which have taken place in recent years and are still taking place, and which have seriously affected the employment, the living conditions, and the living standards of the working people of this and other countries. Summaries of a few of the recent studies of this character are given below.

Indexes of the Economic Progress of the United States, 1922 to 1928

SEVERAL of the major economic indexes for the United States for the past seven fiscal years are contained in the following table taken from the annual report of the Secretary of Commerce for the fiscal year ending June 30, 1928:

INDEX NUMBERS OF ECONOMIC PROGRESS

[Based upon calendar years 1923-1925=100]

Item	Year ended June 30—						
	1922	1923	1924	1925	1926	1927	1928
Volume of business (quantities not value):							
Manufacturing production.....	75	98	97	99	107	108	106
Mineral production.....	69	93	101	93	99	114	103
Forest products, production.....	80	95	100	99	103	93	93
Freight, railroad, ¹ ton-miles.....	79	96	97	98	105	111	104
Electric-power production.....	72	88	95	102	116	129	138
Building contracts let, square feet.....	74	91	93	95	122	108	116
Value of sales:							
Department stores.....	85	94	99	100	104	106	107
5-and-10-cent stores.....	69	81	93	104	118	131	144
Mail-order houses.....	67	85	94	102	114	116	123
Wholesale trade.....	85	97	99	99	101	96	94

¹ Revenue freight.

The Secretary of Commerce comments upon these figures as follows:

It will be seen that of the 10 indicators presented only 4 show an average for 1927-28 lower than for the preceding fiscal year. The general index of manufacturing production, perhaps the most comprehensive measure of business conditions, averaged 2 per cent lower than the year before and 1 per cent lower than in 1926. It was, however, higher than in any fiscal year before 1926. The relatively slight degree to which industrial activity had been temporarily cut down is indicated by the fact that the index of production of manufactured goods in November, at the lowest point reached, was only 2 per cent below the average for the three years 1923 to 1925. By January, 1928, the index had already been restored to its normal and progressing level, output being 9 per cent greater than in November. Indeed, the first half of the calendar year 1928, taken as a whole, showed greater production in our factories than any corresponding period theretofore.

Mineral production in 1926-27 was abnormally great, partly because of the demand for coal, caused by the British mining strike, and partly by reason of an unduly rapid expansion of petroleum output which was generally considered contrary to the public interest. The falling off in aggregate mineral production during the fiscal year just closed was therefore entirely to be expected; output,

nevertheless, remained greater than in any year before 1926-27. The decline in railway traffic last year was in considerable part due to this smaller movement of coal.

The indexes of electric-power production, of building construction, and of the sales of department stores, chain stores, and mail-order houses all showed increases in the last fiscal year as compared with that preceding and most of them were the highest ever recorded.

Growth of Manufactures in the United States, 1899 to 1925

INDUSTRIAL production in the United States increased 175 per cent during the 26-year period 1899 to 1925, according to a recent monograph of the United States Bureau of the Census.¹ The population increase during this time was 54 per cent. Primary horsepower installed increased over 250 per cent and the average number of wage earners employed, 80 per cent.

Table 1 gives the percentages of growth in different industries by 5-year census periods, and for the 24-year period, 1899 to 1923, as measured by physical volume of production, average number of wage earners, and primary horsepower. It is stated that these three factors are the only ones which can be "made to serve effectively in the measurement of general industrial expansion," since the information on these points is expressed in physical terms and is not directly affected by changes in the value of money. The data for 1925 were not available when the main part of the report was prepared, hence they were presented separately.

TABLE 1.—GROWTH OF MANUFACTURES, 1899 TO 1923, BY INDUSTRIAL GROUPS •

Industrial group	Per cent of change					24-year period, 1899-1923
	Intercensal period					
	1899-1904	1904-1909	1909-1914	1914-1919	1919-1923	
All groups:						
Physical volume of production	+22.2	+30.3	+6.4	+26.1	+22.0	+160.7
Average number of wage earners	+16.0	+21.0	+6.4	+29.3	-2.5	+88.2
Primary horsepower	+33.6	+38.5	+20.1	+31.5	+12.8	+229.6
Iron and steel and their products:						
Physical volume of production	+19.9	+45.4	-5.6	+40.6	+31.2	+203.7
Average number of wage earners	+16.6	+18.2	+3.4	+49.4	-3.6	+105.1
Primary horsepower	+62.0	+37.1	+21.4	+46.0	+10.7	+308.8
Nonferrous metals and their products:						
Physical volume of production	+41.7	+36.2	+7.1	+54.1	+25.7	+300.3
Average number of wage earners	+23.0	+25.7	+5.0	+29.5	-3.2	+103.5
Primary horsepower	+35.5	+59.2	+24.2	+71.9	+23.2	+467.5
Chemicals and allied products:						
Physical volume of production	+42.1	+37.1	+20.2	+41.4	+25.1	+314.2
Average number of wage earners	+15.7	+17.6	+12.1	+42.5	-5.0	+106.4
Primary horsepower	+58.3	+40.6	+43.1	+39.2	+32.5	+487.6
Stone, clay, and glass products:						
Physical volume of production	+17.2	+32.2	+8.8	-11.9	+55.6	+131.2
Average number of wage earners	+23.1	+20.1	-2.4	-10.7	+16.6	+50.3
Primary horsepower	+52.1	+60.0	+20.2	+5.3	+21.6	+274.3
Lumber and its remanufactures:						
Physical volume of production	-2.3	+32.0	-19.4	-9.6	+10.1	+3.5
Average number of wage earners	+9.3	+24.2	-8.6	+7	+8.5	+35.5
Primary horsepower	+4.9	+46.5	-2.0	+7.3	-2.2	+58.1

• The figures in this table are given for the purpose of showing growth of manufactures as a whole and by groups, as indicated by different means of measurement. The three sets of data for individual groups should not be used as an indication of changes in output per worker, because in some cases the group index is based upon data for industries which are not entirely representative of the group as a whole, whereas the figures for wage earners and horsepower are totals for the entire group. This is particularly true of the lumber group and to a less degree of food products and paper and printing.

¹ United States. Department of Commerce. Bureau of the Census. Census Monograph VIII: The Growth of Manufactures, 1899 to 1923. A Study of Indexes of Increase in the Volume of Manufactured Products, by Edmund E. Day and Woodlief Thomas. Washington, 1923.

TABLE 1.—GROWTH OF MANUFACTURES, 1899 TO 1923, BY INDUSTRIAL GROUPS—Con.

Industrial group	Per cent of change					
	Intercensal period					24-year period 1899-1923
	1899- 1904	1904- 1909	1909- 1914	1914- 1919	1919- 1923	
Paper and printing:						
Physical volume of production.....	+41.8	+34.5	+25.4	+14.3	+37.1	+274.6
Average number of wage earners.....	+17.7	+18.3	+8.9	+12.6	+4.9	+79.1
Primary horsepower.....	+43.2	+28.0	+22.6	+14.5	+16.9	+200.7
Textiles and their products:						
Physical volume of production.....	+18.5	+27.8	+5.3	+3.3	+22.9	+102.5
Average number of wage earners.....	+13.1	+24.3	+4.3	+6.9	+6.7	+67.1
Primary horsepower.....	+25.0	+31.1	+20.3	+19.0	+16.4	+173.0
Leather and its finished products:						
Physical volume of production.....	+16.8	+7.6	-3	+14.4	+5.6	+51.3
Average number of wage earners.....	+6.4	+17.1	-9	+13.8	-1.2	+33.8
Primary horsepower.....	+27.4	+38.1	+13.1	+22.4	+8.0	+163.0
Food and kindred products:						
Physical volume of production.....	+22.8	+14.9	+8.0	+23.8	+11.6	+110.6
Average number of wage earners.....	+17.3	+16.2	+20.6	+38.0	-8.2	+108.2
Primary horsepower.....	+18.8	+22.8	+15.6	+28.9	+3.0	+123.9
Liquors and beverages:						
Physical volume of production.....	+32.5	+15.3	+18.3	-56.9	-----	-----
Average number of wage earners.....	+24.0	+13.9	+13.3	-37.1	-42.5	-42.2
Primary horsepower.....	+36.6	+28.4	+17.8	-21.0	-40.1	-2.3
Tobacco manufactures:						
Physical volume of production.....	+24.8	+15.2	+14.7	+30.9	+9.8	+137.1
Average number of wage earners.....	+20.3	+4.6	+7.2	-12.2	-5.6	+11.9
Primary horsepower.....	+10.4	+15.9	+22.5	+24.2	+3	+95.2
Vehicles for land transportation and railroad repair shops:						
Physical volume of production.....	+86.4	+90.0	+130.8	+177.8	+99.5	+4,434.0
Average number of wage earners.....	+22.4	+31.9	+24.0	+60.8	+8.2	+248.3
Primary horsepower.....	+44.6	+81.8	+42.3	+63.7	+40.4	+759.2
Miscellaneous products:						
Average number of wage earners.....	+25.2	+18.0	+21.5	+109.5	-30.4	+154.5
Primary horsepower.....	+74.3	+39.7	+51.9	+80.6	+10.3	+636.5

The principal points brought out by the figures compiled for the individual industries are summed up as follows in the report:

The net resultant for the entire period 1919-1923 was substantial growth for industry as a whole, characterized by almost amazing increases in automobiles and related industries—rubber tires and petroleum refining—by the largest output of building materials since before the war, and by moderate increases in the production of iron and steel, nonferrous metals, textiles, and paper. With the exception of shipbuilding and liquors and beverages, which decreased under the influence of special circumstances, leather, food products, and tobacco showed the smallest increases for the period.

When the growth of manufactures by industrial groups for the 24-year period from 1899 to 1923, taken as a whole, is considered, it is evident that the expansion of industries manufacturing vehicles for land transportation stands at the top of the list, with the miscellaneous group second, and chemicals and metals next. The increase for paper and printing follows in order. Tobacco (as measured by increases in physical output, although not in wage earners or horsepower), food products, and stone, clay, and glass products are close to the center of the list. Textiles and leather stand fairly close together, well below the average for all industries. Growth of the lumber industry has been very small, and liquors and beverages have shown net decreases since the beginning of the century.

Viewing these figures as a whole, a number of conclusions may be drawn regarding relative rates of growth in different lines of manufacture since 1899. The phenomenal increase in the output of automobiles is a fact too commonly recognized to call for further comment. The high increase in the output of miscellaneous products reflects in part the exceptionally rapid expansion of production of such articles as phonographs, photographic equipment and supplies, rubber products, and electrical appliances and machinery. The fact that the metals and chemicals groups stand well above the average for all groups combined bespeaks the increasing industrialization of modern economic life. Products most closely related to the consumer—food and tobacco on the one hand and

clothing and footwear on the other—show increases which vary widely but in general are clearly well above the rate of increase of population, which for this 24-year period was nearly 50 per cent.

The growth of manufactures by geographic divisions for the census periods from 1899 to 1923, and for the 24-year period as a whole, is shown in Table 2. It was not feasible to compute index numbers of the physical volume of production by States or by larger geographic divisions. Therefore, the changes in industrial production in the different geographic divisions is indicated by percentage increases or decreases in average number of wage earners employed and in primary horsepower installed and by the combination of these two sets of percentages. While it was recognized that changes in the number of wage earners and in installed horsepower "do not accurately represent changes in the physical volume of production, they do serve to show relative rates of expansion or contraction of production among broad groups of manufacturing enterprise."

TABLE 2.—GROWTH OF MANUFACTURES, 1899 TO 1923, BY GEOGRAPHIC DIVISIONS

Geographic division	Per cent of change					24-year period, 1899-1923
	Intercensal period					
	1899-1904	1904-1909	1909-1914	1914-1919	1919-1923	
United States:						
Wage earners and horsepower combined	+20.2	+25.1	+9.7	+29.8	+1.1	+116.5
Average number of wage earners	+16.0	+21.0	+6.4	+29.3	-2.5	+88.2
Primary horsepower	+33.6	+38.5	+20.1	+31.5	+12.8	+229.6
New England:						
Wage earners and horsepower combined	+12.4	+19.7	+6.3	+19.2	-3.0	+65.5
Average number of wage earners	+10.4	+17.1	+3.5	+18.5	-6.9	+47.7
Primary horsepower	+18.6	+27.7	+15.1	+21.5	+9.9	+132.8
Middle Atlantic:						
Wage earners and horsepower combined	+21.9	+20.1	+10.1	+23.3	-1.4	+95.9
Average number of wage earners	+17.6	+17.0	+6.7	+21.9	-5.9	+68.4
Primary horsepower	+35.6	+30.0	+21.1	+27.4	+13.3	+208.2
East North Central:						
Wage earners and horsepower combined	+17.9	+27.6	+14.0	+42.6	+4.1	+154.8
Average number of wage earners	+14.1	+23.6	+11.0	+42.6	-1	+123.1
Primary horsepower	+29.9	+40.4	+23.7	+42.7	+17.9	+279.8
West North Central:						
Wage earners and horsepower combined	+19.2	+25.9	+4.4	+30.4	-1.7	+100.8
Average number of wage earners	+17.4	+19.8	+1.9	+30.9	-5.0	+78.4
Primary horsepower	+24.6	+46.2	+12.4	+28.7	+8.7	+186.3
South Atlantic:						
Wage earners and horsepower combined	+20.8	+32.2	+8.2	+20.2	+5.3	+118.8
Average number of wage earners	+14.0	+26.9	+3.4	+19.3	+2.9	+83.5
Primary horsepower	+43.5	+50.0	+24.2	+22.9	+12.9	+270.8
East South Central:						
Wage earners and horsepower combined	+30.0	+22.8	+3.6	+24.0	+6.1	+117.5
Average number of wage earners	+24.8	+18.3	+1.0	+24.5	+6.9	+98.6
Primary horsepower	+46.8	+37.5	+11.7	+22.3	+3.6	+185.6
West South Central:						
Wage earners and horsepower combined	+29.7	+46.1	+5.3	+31.5	-2.2	+156.3
Average number of wage earners	+26.5	+42.6	+3.6	+34.6	-5.4	+138.0
Primary horsepower	+39.8	+57.2	+10.6	+22.8	+8.0	+222.3
Mountain:						
Wage earners and horsepower combined	+34.6	+48.3	+9.3	+38.1	+2.2	+208.0
Average number of wage earners	+18.6	+42.9	+7.5	+34.6	-1.6	+141.5
Primary horsepower	+96.6	+65.7	+14.8	+49.2	+14.5	+539.0
Pacific:						
Wage earners and horsepower combined	+41.1	+39.8	+16.5	+78.4	-.04	+409.7
Average number of wage earners	+33.2	+29.9	+10.5	+84.8	-2.7	+243.7
Primary horsepower	+67.6	+74.3	+36.5	+60.6	+8.4	+594.0

NOTE.—The percentages shown for wage earners and horsepower combined are weighted geometric averages of the individual percentages for wage earners and for horsepower, with wage earners weighted 3 and horsepower 1.

Table 3 shows for the different geographic divisions their relative positions as to volume of production in the 5-year census periods, 1899 to 1923:

TABLE 3.—RANK OF GEOGRAPHIC DIVISIONS ACCORDING TO WEIGHTED AVERAGE OF INCREASES IN NUMBER OF WAGE EARNERS AND IN PRIMARY HORSEPOWER, FOR CENSUS PERIODS 1899 TO 1923

Geographic division	1899-1904	1904-1909	1909-1914	1914-1919	1919-1923	Total rank score
Pacific.....	1	3	1	1	5	11
Mountain.....	2	1	4	3	4	14
East North Central.....	8	5	2	2	3	20
West South Central.....	4	2	7	4	8	25
South Atlantic.....	6	4	5	8	2	25
East South Central.....	3	7	9	6	1	26
Middle Atlantic.....	5	8	3	7	6	29
West North Central.....	7	6	8	5	7	33
New England.....	9	9	6	9	9	42

The following paragraphs from the report summarize the changes in manufacturing development in the different sections of the country from 1899 to 1923:

Certain features of the rank lists are striking. One is the rise of the East North Central division from a relatively low position in the first intercensal period to near the top of the list in the period from 1909 to 1923. The rather radical changes in ranking in the latest period, 1919-1923, are especially notable. The Pacific and Mountain divisions which in earlier years were consistently near the top in rate of growth were moved down to the middle of the list, while the East South Central and South Atlantic divisions which were near the bottom from 1909 to 1919 rose to first and second places. The tendency of the New England, West North Central, and Middle Atlantic divisions to occupy positions toward the foot of the rank list is also to be noted; two of these are old established manufacturing sections which passed through their stages of rapid expansion several decades ago, and the third is largely dominated by agricultural States, most of which have had little manufacturing development.

The changes in the years since 1899 may be effectively summarized by considering the combined increases in the average number of wage earners and primary horsepower for the full 24-year period 1899-1923. * * * Despite certain irregularities from one intercensal period to another, it is clear that the most rapid growth of manufacture has been in the Pacific, the Mountain, the West South Central, and the East North Central divisions. The South Atlantic and East South Central divisions, owing to rapid growth between 1919 and 1923, also show, for the full 24-year period, slightly larger increases than the average for the country as a whole. Expansion in the West North Central, Middle Atlantic, and New England States has been below the nation-wide average. New England has shown by far the smallest increase for the full 24-year period and also ranked lowest in rate of increase in every intercensal period shown except one.

Figures obtained in the 1925 biennial census of manufactures showed that the quantity of goods manufactured increased 5.3 per cent from 1923 to 1925 and the amount of primary horsepower installed increased 8.2 per cent. The number of wage earners employed, however, decreased 4.4 per cent. The report comments that "the increases in quantity of goods produced and in horsepower, in contrast to the further decrease in number of wage earners, indicate a continuation of the tendency, noted in earlier periods, particularly between 1919 and 1923, toward greater use of machinery in production and illustrate the limitations of employment statistics as a measure of industrial growth."

By industries and major industrial groups, the most rapid expansion between 1923 and 1925 occurred in the production of motor vehicles and allied products—

rubber tires and gasoline. The large building activity of 1925 was reflected in the increased output of building materials, especially cement. The printing industry continued to expand, and growth was also shown in the canning and preserving, ice cream, and cigarette industries. Two comparatively new industries which increased considerably in the two years were those manufacturing radio apparatus and rayon. The manufacture of engines and of machine tools also showed some increase. There were decreases, however, during the period in most of the textile industries (silk being the most notable exception), in meat packing and flour milling, in the manufacture of leather and its products, in the railway-equipment industries, and in the production of musical instruments.

By geographic divisions and States, the East South Central and the South Atlantic States appeared to have had the largest expansion between 1923 and 1925, with development of the Pacific Coast and East North Central States continuing at a more rapid rate than that for the country as a whole. Growth was smallest in the New England and Middle Atlantic States, and the Mountain States showed relatively less expansion than in any previous period.

Migration of United States Industry

THE GEOGRAPHICAL shifting in American industry from 1904 to 1925 is analyzed in an article by Sidney G. Koon in the *Iron Age* (New York) of January 5, 1928. The article is based on the reports of the United States Bureau of the Census, the reports of the American Iron and Steel Institute, and the compilations on iron and steel production in the *Iron Age*.

Shift of the Center of Manufacturing

DISREGARDING separate districts and taking into consideration "the movement of the center of activity of the country as a whole," calculations based on the 1904 United States Census of Manufactures showed the center of such manufacture to be approximately 91 miles to the eastward and almost 19 miles to the northward of Columbus, Ohio.

The shift of the manufacturing center from 1904 to 1925 was as follows:

Year	Miles east of Columbus	Miles north of Columbus
1904.....	91	19
1909.....	74	16
1914.....	71	17
1919.....	23	18
1921.....	34	13
1923.....	17	13
1925.....	3½	8

Production of Rolled Iron and Steel

IN STUDYING rolled iron and steel production in the United States from 1911 to the present a well-defined movement into Indiana, Michigan, and Ohio, as a group, is shown. This movement is from both the East and the West but not from the South, which also shows a steady expansion in production.

In 1911 and 1914 Pennsylvania's output was approximately 49½ per cent of the country's total. The percentage of this State is now under 39. In the meantime Indiana's proportion of the total output has advanced from 6 to 13 per cent and Ohio's has risen from 18 to approximately 22 per cent. As a consequence, even though the percentage in Illinois has experienced a decline comparable with that in Pennsylvania, Ohio, Indiana, and Illinois as a group in 1926 produced 42 per cent of the total output of the United States, while in 1911 their combined contribution was only 34 per cent.

The territory south of the Ohio River, exclusive of the two Virginias, shows a rise from less than 3 per cent of the total in 1911 to nearly 5 per cent of the total in 1926. The expansion in the Birmingham district was a very important factor in this increase in the South's share in production.

The Manufacturing Movement in General

IN THE course of the study special attention was given to that section of the United States west of New England, east of the Missouri River, and north of the Ohio River, which includes 11 States, constituting "the most intensive large manufacturing area in the country." While these States cover only $18\frac{1}{2}$ per cent of the Nation's territory "they contain 49 per cent of its inhabitants and produce 67 per cent of its manufactured products."

In 1904, 1909, and 1914 the "Empire group" (New York, New Jersey, and Pennsylvania) contained 34 per cent of the total wage earners in the country; in 1919 and 1921, approximately 32 per cent; and in 1923 and 1925 some 30 per cent. In the same period the proportion of wage earners in Ohio and Michigan increased from 10 per cent in 1904 and 1909 to approximately 14 per cent in 1923 and 1925.

From 1904 to 1914, inclusive, Indiana and Illinois together had 10 per cent of the total employment, which percentage in recent years has risen to $10\frac{3}{4}$.

Missouri, Iowa, Minnesota, and Wisconsin as a group held for years practically the same proportion of the total wage earners of the country— $7\frac{1}{4}$ per cent.

Without taking into consideration New England, the South, and the Far West, the Ohio-Michigan group was found to have gained in industrial expansion at the expense mainly of the Empire group.

"This study does not show, in the same way as with the rolling-mill study, a movement from both west and east into the middle section. It does show, however, that that middle section is growing faster than the sections surrounding it and to the (relative) loss of some of them."

Study of 68 Cities

A STUDY of the changing volume of production in 68 principal manufacturing cities in six sections of the country showed in certain respects results similar to those yielded by the preceding analyses.

There has been a slight falling off in the territory covered by New York, New Jersey, and eastern Pennsylvania, in which 14 of these cities are located. There has been a slight falling off in the section around Chicago, including 11 cities, in that area from Louisville and Kansas City on the south up to Minneapolis on the north. There has been a decided gain, as shown by the other studies in the area comprised by Michigan, Ohio, and western Pennsylvania, represented by 10 cities.

New England's proportion has declined steadily, as shown by records of its 11 cities. The South has shown a moderate gain, represented by figures from 10 cities, while the Far West and the Southwest have shown a consistent gain, considerably exceeding that of the South. This western area, which contains 12 of the cities, has almost reached the New England percentage of the total, although in 1914 it was only six-tenths as great as New England.

The movement recorded in the foregoing paragraphs may probably be attributed to the enormous growth of the automobile industry. The chief seat of that industry and also of its principal auxiliary

services of supply is located in the Michigan-Ohio-Indiana group. "And it is precisely into that area that we have found industry going from contiguous areas on either side." Attention is called in the article under review to the industrial recession in these three States in 1921 and to the correspondingly heavy decline in the same year in automobile production. "Only 41 per cent as many cars were produced in 1921 as in 1923, whereas for manufacturing as a whole the ratio was 72 per cent." The "tie-up" between the automobile industry "and the relative movement of manufacturing activity into the area dominated by that industry is striking."

Changing Importance of Various Industries in the United States and Other Countries

THE MARKED change which has taken place since pre-war times in the relative industrial importance of European countries, on the one hand, and of America, Japan, India, Australia, and other Pacific countries, on the other, is analyzed in a document (C. E. I. No. 19) prepared by the League of Nations for the use of the International Economic Conference held in May, 1927. This change "has affected the equilibrium of the whole commerce of the world." Industries have increased in importance in certain countries and fallen in magnitude in others, and this rise and fall of importance has also had an appreciable effect upon the condition of the wage earners in the industries.

Thus there has been almost a world-wide depression in the ship-building industry, varying only in degree in the different countries. In the United States, where the increase of capacity was greatest in this industry, the production has diminished the most. Germany, however, has been able to regain some of the ground lost in that country. The electrical engineering, silk, and artificial silk industries, however, have shown an almost universal expansion, and the production of sugar is about 40 per cent higher than before the war. "In many countries the industries producing for the local markets are more prosperous than those dependent on exports."

Changes in Output and Trade

THE REPORT points out that conditions which obtain in various parts of the globe are widely different. In North America, Japan, China, India, Australia, and South Africa, and in a lesser degree in certain South American countries, industry has made substantial progress since 1914. European countries, however, are still suffering from the effects of war. Industry, especially in Europe, is hampered by a "maldistribution of fixed capital" and surplus plant acquired for various reasons:

- (1) The necessity on the part of belligerents of increasing output of war-time essentials during the war and on the part of neutrals of supplying their own wants for goods not obtainable from other countries;

- (2) The development of new tariff-protected industries in countries pursuing a "policy of industrial nationalism";

- (3) Extension of plant to provide occupation for the increasing working population in certain of the more prolific nations;

- (4) "Finally, inflation produces a change in the relative strength of the demand for different commodities and services which does not

continue to operate, once stable currency conditions have been restored."

These causes have also worked in combination. Thus—

The development of shipbuilding yards in certain countries, though mainly a necessity of war, was not unaffected by ideas of economic nationalism. The threatened oversupply of sugar is due at once to the development of the cane industry in America and Asia, and of the beet industry in neutral Europe and to the restoration of the beet crop since the war in other European countries toward its pre-war level by means of protective import duties. Similarly, the dye industry which was created during the war in France, England, Italy, and elsewhere is now supported by protective duties or other forms of Government assistance.

The cotton textile industry of China, Japan, British India, and Brazil has increased enormously, while that of Europe has remained stationary. Before the war Germany produced about four-fifths of the world supply of coal-tar dyes; in 1924 her output had fallen to less than half of the world production. The production of coal in Great Britain has fallen to less than 91 per cent of the pre-war output and that of Poland to less than 81 per cent. In the electro-technical industry world production is nearly double the pre-war figure; the share of the United States has risen from one-third to nearly a half; production has also increased greatly in France, Italy, and Great Britain; but Germany's share in the world output has fallen from about one-third to less than one-fourth.

As regards the mill consumption of raw cotton, that of Japan and the United States together is nearly 2,000,000 bales more than before the war and that of Europe nearly the same amount less. The report points out, however, that "while the United Kingdom has been particularly affected by the development in the Far East and central European countries, not only by irregularity of trade resulting from currency instability but also by tariff barriers, and to some extent in certain districts by the reduced purchasing power of the masses, the fact must not be overlooked that both for piece goods and for hosiery, cotton has to some extent been replaced by artificial silk. Cotton conditions must in no sense be taken as representative of the textile industry as a whole." The most serious falling off in the woolen-goods industry has occurred in Russia. In the production of chemicals the share of the United States has risen from about a third of the world output to nearly one-half, while that of Germany has fallen from one-fourth to about one-sixth.

France has become the greatest exporter in the world of the products of the heavy-metals industry, Australia the largest importer of electrical goods, and Italy the largest exporter of artificial silk. The "essential characteristic of the world trade in raw silk is the great expansion of American demand and nearly equivalent growth of Japanese exports." In 1925 the United States consumed over 60 per cent of the world silk production and 78 per cent of this came from Japan.

Causes of Shifting Trade

THE CAUSES of these shifts of trade the report analyzes as follows: (1) The general impoverishment of European countries immediately after the war reduced the margin of income left after satisfying primary requirements, and the demand was for immediately consumable goods, resulting in prosperity for the industries producing these. The currency inflation also aided in the demand for goods

immediately consumable. The report states that "with stable monetary conditions and the regrowth of confidence, it may well be that the demand for the products of those industries mainly producing goods not intended for immediate consumption will greatly increase."

(2) The war reinforced the tendency to treat raw materials in the country of production instead of shipping them to Europe for treatment and importing them later as finished goods.

(3) Recent scientific discoveries have in some cases changed the type of raw materials used and hence the location of the industry.

(4) The development outside of Europe of industries competing with those of that continent is inevitable.

(5) The demand for certain products (such as coal, pig iron, etc.) has fallen off because of competition of an alternative article (hydro-electric power, scrap iron, etc.) at a lower price.

(6) Tariffs are higher and "security is reduced and trade hampered" by the frequency with which rates are modified, by the short terms of commercial treaties, and by discriminatory customs classifications, etc.

(7) Trade is hampered by restrictions on the passage of business representatives from one country to another; by restrictions on the rights of foreigners to establish businesses in other countries, etc.

(8) The tendency is to develop industry in countries with surplus population and low economic and wage conditions.

(9) Fluctuations in prices and cost of production due to unstable monetary conditions have "constituted the worst form of trade barriers."

Of these various causes which have been considered, some are no longer operative though their effects may live after them, while others are still vital. The danger of great immediate additions to equipment in industries where plant is already excessive is slight; the will to save is being revived and the supply of capital grows steadily; the number of countries in which currency stabilization has not yet been achieved is now relatively restricted, though among that number are certain States of world economic importance. On the other hand, the deep-laying economic tendencies—the growth of industries in countries with important supplies of raw materials, the substitution of one commodity for another, etc., continue in being and are only within restricted limits subject to direction. The causes resulting from Government action, the control of the free movement of goods or persons, etc., are of course always operative and always possible of deliberate modification.

Moreover, the tendencies considered, as was stated at the beginning of this section, have affected certain countries much more adversely than others. At the particular stage which has now been reached, the industrialization of Asia, Oceania, etc., is directly competitive with several of the major European industries—more especially the British—and has brought about a serious reduction in demand. Asiatic countries are tending to trade more inter se, more with the United States of America, more with Oceania and less with Europe.

Partly owing to monetary factors, partly owing to the degree of industrial specialization, largely in the case of the United Kingdom to the particular reactions of the drop in the Asiatic demand, that country and Germany have been particularly adversely affected by the postwar economic forces, while Belgium, France, and Italy have countered them with a considerable measure of success.

The establishment of new industries in certain European countries (coal-tar dyes, various textiles, superphosphates, etc.), generally with some form of government protection, has reduced the selling power of the older producers and lessened the trade in these commodities, both absolutely and relatively to production.

The growth in the demand for certain products such, for instance, as paper and pulp has benefited the countries from which they are mainly derived. But all countries have suffered by the instability of currencies, of prices, of tariffs, and from the irregularity of the demand for goods which this instability has entailed.

Various proposals have been put forward for meeting these conditions, such as the conclusion of long-term commercial treaties,

horizontal combination between the same industries all over the world and vertical "rationalization" within each industry by standardization and classification of products and raw materials, marketing agreements, international stabilization of production, reorganization of the industries so as to eliminate inefficient factories, an adequate intelligence service, etc.

Changes in Standards of Living

STANDARDS of living are not, in their entirety, measurable in statistical form. However, many factors contributing to the increased material welfare of the people are measurable numerically, and some of the leading measures are presented in the following table taken from the annual report of the Secretary of Commerce for the fiscal year ending June 30, 1928.

INDICATORS OF MATERIAL PROGRESS

Item	1914	1919	1921	1927
Human factors:				
Population (thousands).....	97,928	105,003	108,445	118,623
Number of families (thousands).....	¹ 22,401	¹ 24,028	¹ 24,816	¹ 27,146
Students in elementary and secondary schools (thousands).....			² 23,359	² 27,259
Students in high schools (thousands).....			² 2,413	² 4,053
Students in colleges (thousands).....			² 598	² 1,037
Financial factors:				
Savings deposits, all banks (thousand dollars).....	8,712,000	13,040,000	16,501,000	26,091,000
Building and loan associations—				
Assets (thousand dollars).....	1,358,000	2,127,000	2,891,000	³ 7,200,000
Members (thousands).....	3,104	4,289	5,810	³ 11,500
Life insurance—				
Ordinary in force, value (thousand dollars).....	⁴ 18,349,000		² 35,092,000	³ 64,457,000
Ordinary in force, number of policies (thousands).....	⁴ 9,890		² 16,695	³ 25,501
Industrial in force, value (thousand dollars).....	⁴ 4,435,000		² 7,100,000	³ 14,035,000
Industrial in force, number of policies (thousands).....	⁴ 33,142		² 49,805	³ 76,404
Check payments—				
140 cities, excluding New York (thousand dollars).....		211,175,000	191,941,000	282,345,000
New York City (thousand dollars).....		244,119,000	207,095,000	391,558,000
Production:				
Agriculture (general index number of output).....		100		115
Value of crops (million dollars).....	7,268	16,561	7,750	³ 9,266
Value of livestock products (million dollars).....	4,249	8,275	5,589	³ 7,300
Mining (general index number of output).....		100		138
Coal, bituminous (thousand short tons).....	422,704	465,860	415,922	519,804
Manufacturing (general index number of output).....		100		130
Pig iron (thousand tons).....	23,050	30,582	16,544	36,232
Steel ingots and castings (thousand long tons).....	22,824	33,695	19,224	43,398
Copper, smelter (tons).....	699,242	751,572	287,250	968,657
Lumber, 10 leading varieties (million feet).....	25,230	24,834	21,147	27,993
Buildings (36 States)—				
Residential (thousand dollars).....		929,580	961,668	2,489,592
Commercial (thousand dollars).....		466,584	381,636	897,172
Industrial (thousand dollars).....		600,612	202,716	475,614
Bathtubs (shipments).....		415,496	498,117	1,101,000
Automobiles—				
Passenger (number).....	543,679	1,657,652	1,453,111	2,939,191
Trucks (number).....	25,375	275,943	143,712	455,194
Washing machines in use (thousands).....	44	999	1,888	5,631
Electric refrigerators, sales (thousands).....	(⁵)	(⁵)	(⁵)	365
Radios, sales (thousands).....			(⁵)	1,800
Vacuum cleaners in use (thousands).....	122	1,696	3,196	8,498
Aeroplanes and parts (thousand dollars).....	790	14,373	7,431	20,784
Power:				
In public utility plants (million kilowatt-hours).....		38,921	40,975	80,205
In factories (thousand horsepower).....	22,264	29,298		⁶ 35,773
Developed water power (thousand horsepower).....	5,790	7,590	8,050	12,296
Transportation:				
Railroads—Class I—				
Revenue freight carried (million ton-miles).....	⁷ 284,924	364,293	306,840	429,044
Passengers carried 1 mile (millions).....	⁷ 34,567	46,358	37,313	33,655
Automobile registration—				
Trucks (thousands).....			980	2,897
Passenger cars (thousands).....	{ 1,711	{ 7,565	{ 9,483	{ 20,230
Telephones in use (thousands).....	10,046	12,668	13,875	18,523

¹ Approximate.³ Year 1926.⁵ Insignificant.⁷ Fiscal year 1914.² Year 1920.⁴ Year 1915.⁶ Year 1925.

Migration of Population to and from Farms

THE BUREAU of Agricultural Economics of the United States Department of Agriculture issued in 1927 a report entitled "Analysis of Migration of Population To and From Farms." The study was conducted in the summers of 1926 and 1927 by means of circular letters and covered 2,745 farm operators who migrated from farms to city, town, or village and 1,167 persons who left city, town, or village for the farm.

Migration from Farms

THE 2,745 former farm operators were scattered through every State in the Union, and included 2,307 farm owners and 438 tenants, hired men being excluded. It is not claimed that this particular sample of farmers is typical of all those who have given up farming, but "there seems no reason to disregard or even to minimize the facts revealed in this investigation as types of causes and conditions playing a part in the general recent movement of farmers off the land."

Of the reasons given for leaving the farm, 37.8 per cent were of an economic character, as, for example, high prices, high taxes, and not being able to make ends meet. The next most prevalent set of reasons (25.2 per cent) included physical disability, old age, and inability to obtain enough help to carry on the farm and household work; 12 per cent of the owners' reasons and 5.6 per cent of the tenants' reasons were the lack of opportunity for schooling their children; 1.8 per cent left the farm to allow a son or son-in-law to occupy it; 2.5 per cent (76 owners and 3 tenants) had obtained a competency which permitted them to "lead an easier life" and to obtain those things which "the family has long craved but has not had opportunity to obtain."

The new occupations of these former farmers covered a wide range: 25.3 per cent were working at day labor or at trades, etc.; others were salesmen (6.9 per cent), public servants (6 per cent), merchants or grocers (4.9 per cent), employees of garages or service stations (2.6 per cent), teachers, preachers, etc. (2.2 per cent), dealers in feed, coal, etc. (2.1 per cent), and real estate agents (1.1 per cent); other occupations accounting for 25.6 per cent, while 23.3 per cent reported no present occupation.

Not all of those leaving their farms disposed of them, and 22 per cent reported that 70 per cent or more of their present income was derived from farms they still owned, 9.3 per cent were receiving from 50 to 59 per cent of their income from their farms, and 7.8 per cent were receiving from 20 to 29 per cent.

Migration to Farms

CIRCULAR letters were sent to 10,000 persons who had recently moved from cities, towns, or villages to farms but only 1,167 replies were received. Every State, with the exception of Arizona, Delaware, and New Mexico, was represented in the replies.

The purpose of the inquiry was to throw some light upon the character of the constant stream of migration from urban areas to farming communities. The outstanding reasons given by migrants who became farm owners and tenants were "health," "better living

conditions," "better place to bring up children," and "love of nature and country life." The reasons given by those who became hired men included the high cost of living in cities and better opportunity for making money on farms, although some of them were influenced by the same motives that actuated those who became farm owners and tenants. Many of the migrants had tired of city life and others (6.6 per cent) wanted to live more independently.

The total number of those included in this part of the study who became owners of farms was 776; whereas 344 became tenants, and 47, hired men. Out of 1,166 persons who answered the question as to their previous experience on farms, only 155 had never worked on farms. More than one-third of those reporting previous farm experience had owned farms and one-third had been tenants.

The majority of the migrants said that they liked farming better than city work and considered it a good occupation; 54.3 per cent of a total of 1,098 reported that they made a better living on the farm than they had in the city. Of the farm owners, 47.4 per cent reported a better living on the farm; of the tenants, 66.9 per cent; and of the hired men, 73.3 per cent. The incomes of 6.3 per cent were about the same as in the city, 4.3 per cent had not been on the farm long enough to answer this question, and 2.1 per cent reported that the farms were not yet on a good paying basis but they expected to make them pay. About 3 per cent were not dependent upon the farms for a living.

Estimated Income of the People of the United States

THE NATIONAL Bureau of Economic Research (Inc.) issued, in 1927, a statement of the estimated "current income" of the people of the United States, by years, from 1922 to 1926, inclusive, thus supplementing its earlier estimates for the years 1909 to 1921.

Subject to the reservations made below, these figures indicate that the total current income of the people of the United States in 1926 was approximately \$90,000,000,000, or 40 per cent higher than in 1921, and that the per capita income in 1926 was approximately \$770, or 33 per cent greater than in 1921. These increases between 1921 and 1926, moreover, must have represented real increases in income, as prices were not higher in 1926 than they were in 1921.

In using these estimates the National Bureau of Economic Research makes the following cautionary statements regarding the possibility of error in the figures for the years 1921 to 1926:

The income estimates for the years 1909 to 1921, already published by the National Bureau, are composed of several thousand separate items and are arrived at by means of complicated and laborious computations. Because of the limited number of workers available for this study and the amount of work involved, it has proved impracticable to complete the estimates until a considerable period has elapsed after the publication by the United States Bureau of Internal Revenue of the volume entitled "Statistics of Income," and this volume does not appear until many months after the income tax schedules are filed.

The necessary result has been that the careful income estimates of the National Bureau have appeared several years late, and it is this retardation which has given rise to the demand for current estimates.

The preliminary figures which are here presented for years since 1921 are based upon a limited number of indicators consisting of such items as wage rates, numbers of employees, dividend and interest payments, and volume of trade. For the years 1922, 1923, and 1924, the income tax reports are available and the figures in those have been utilized as fully as possible. It is by no means

certain that these indices constitute reliable gauges of the variations in income. It is possible, therefore, that the figures presented for the year 1926 may be as much as 10 per cent in error, but the probabilities are that the error is not as great as that. The chances of error increase with the distance from the year 1921. All users of the figures here presented should keep in mind the necessary shortcomings of preliminary estimates of this type.

Total Current Income

THE estimates of current income for each of the years 1909 to 1926 are given in Table 1, the second column showing the estimated actual money income and the third column showing the computed purchasing value of such income in terms of the 1913 dollar. The estimated amounts in terms of the purchasing power of 1913 were obtained by dividing the current income figures by index numbers representing the average prices of goods purchased by consumers—in other words, they represent the total amount of direct or consumption goods which the people could have purchased for their entire current income if they had spent it all for such commodities or services. The term “current income” is defined “the excess of cash receipts over business expenses, plus the money value of income received in the form of commodities.” It is estimated by adding (1) wages, salaries, and pensions, (2) profits withdrawn from business, (3) dividends, interest, and rent received by individuals, (4) the rental value of homes occupied by their owners, (5) interest upon the sums invested in household furnishings, clothing, and the like, and (6) the value of commodities which families produce for their own consumption. Attention is called to the fact that the term “current income” as thus interpreted “does not include the savings of business enterprises. It may well be, therefore, that the figures for total income would run materially higher throughout.”

TABLE 1.—TOTAL CURRENT INCOME OF PEOPLE OF THE UNITED STATES, 1909-1926

Year	Current dollars	1913 dollars	Year	Current dollars	1913 dollars
1909.....	27,100,000,000	28,200,000,000	1918.....	56,000,000,000	35,500,000,000
1910.....	28,400,000,000	29,100,000,000	1919.....	67,254,000,000	37,600,000,000
1911.....	29,000,000,000	29,300,000,000	1920.....	74,158,000,000	36,300,000,000
1912.....	30,600,000,000	30,800,000,000	1921.....	62,736,000,000	36,200,000,000
1913.....	32,000,000,000	32,000,000,000	1922.....	¹ 65,567,000,000	¹ 40,400,000,000
1914.....	31,600,000,000	31,300,000,000	1923.....	¹ 76,769,000,000	¹ 46,900,000,000
1915.....	32,700,000,000	32,000,000,000	1924.....	¹ 79,365,000,000	¹ 48,400,000,000
1916.....	39,200,000,000	35,500,000,000	1925.....	¹ 86,461,000,000	¹ 51,100,000,000
1917.....	48,500,000,000	37,300,000,000	1926.....	¹ 89,682,000,000	¹ 52,900,000,000

¹ Preliminary estimate.

Per Capita Income

TABLE 2 reduces the total income figures to a per capita basis. In commenting on this table the statement of the National Bureau of Economic Research says:

The figures become much more significant when they are reduced to a per capita basis. It appears that, in 1926, the average inhabitant of the United States had an income of \$770, or one-third more than in 1921. When this per capita income is expressed in dollars having the purchasing power which they possessed in 1913, we find that the increase has been about 36 per cent. It appears, then, that from the economic point of view the condition of the average inhabitant has been improving at a rate of about 7 per cent per annum.

The startling nature of this change is indicated by the fact that the annual increase since 1921 has been as great as the entire increase during the 12 years from 1909 to 1921. The fact should be noted, however, that the difference in slope is partially accounted for by the fact that 1921 was a year of depression, while 1926 has been one of unusual prosperity. A fairer comparison may be made by dividing the entire period into two parts—1909 to 1917 and 1917 to 1926.

During the first period of eight years the per capita income, in terms of 1913 dollars, increased 15 per cent, while during the last nine years it increased 26 per cent. If the preliminary estimates are correct, there has, then, been a sharp upward turn in the trend of economic welfare in the United States.

TABLE 2.—ESTIMATED CURRENT INCOME PER CAPITA

Year	Current dollars	1913 dollars	Year	Current dollars	1913 dollars
1909.....	299	312	1918.....	537	340
1910.....	307	315	1919.....	640	358
1911.....	309	312	1920.....	697	341
1912.....	321	323	1921.....	579	334
1913.....	329	329	1922.....	1 507	1 369
1914.....	320	316	1923.....	1 689	1 421
1915.....	326	319	1924.....	1 700	1 426
1916.....	385	349	1925.....	1 752	1 445
1917.....	470	361	1926.....	1 770	1 455

¹ Preliminary estimate.

Income per Person Gainfully Employed

TABLE 3 reduces the total income data to the basis of income per person gainfully employed. It is estimated that in 1926 there were some 44,600,000 inhabitants of the United States "gainfully employed" as the term is employed by the United States Bureau of the Census—i. e., employers, employees, and those working on their own account. Housewives and women and children helping the head of the family on the home farm are not included.

Commenting on this table, the statement says:

For every person gainfully occupied in 1926 there appears to have been an income of slightly over \$2,000. When reduced to terms of 1913 purchasing power, we find that the average person working for a money income received about one-quarter more for his services than he obtained in 1917, and about 44 per cent more than he could have secured in 1909. The indications are, then, that despite the constantly growing population and the relatively inelastic nature of the supply of natural resources, new inventions and greater skill and organization are still enabling the average inhabitant to progress steadily upward on the scale of economic welfare.

TABLE 3.—INCOME PER PERSON GAINFULLY OCCUPIED

Year	Current dollars	1913 dollars	Year	Current dollars	1913 dollars
1909.....	791	823	1918.....	1,386	879
1910.....	809	829	1919.....	1,669	934
1911.....	812	821	1920.....	1,851	907
1912.....	841	850	1921.....	1,537	887
1913.....	864	864	1922.....	1 1,586	1 979
1914.....	836	828	1923.....	1 1,821	1 1,113
1915.....	861	843	1924.....	1 1,840	1 1,121
1916.....	1,014	919	1925.....	1 1,971	1 1,165
1917.....	1,232	947	1926.....	1 2,010	1 1,186

¹ Preliminary estimate.

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EMPLOYMENT STATISTICS

Present Status of Employment Statistics in the United States and Foreign Countries

WITH the growing intensity of interest in the problems of unemployment there has naturally developed a great demand for basic statistics regarding the number of the unemployed. What is wanted, first of all, is a knowledge of just how many people are out of work, and this information, unfortunately, is not yet available for the United States as a whole.

To obtain this information at all accurately requires a canvass or census of the population, and such an undertaking is so difficult and costly that it is rarely attempted in any country and never has it been attempted at frequent intervals.

In the absence of complete census surveys other sources have to be relied on for information regarding the number of persons out of work. The best of these other sources is undoubtedly the records developed under national unemployment insurance systems such as exist in Great Britain and Germany. To the extent that such systems are comprehensive in their coverage, the number of persons in receipt of unemployment insurance benefits measures with fair accuracy the number of idle workers. As a matter of fact, however, none of the systems existing is completely comprehensive, i. e., none of them covers all groups of workers and none of them pays benefits indefinitely. Moreover, no such insurance system is in operation in any part of the United States.

Details regarding the scope and character of employment statistics in the United States and various foreign countries are given below:

Statistics for the United States

Unemployment Surveys

Enumeration of the unemployed by canvass.—No nation-wide enumeration of the unemployed has been undertaken recently in this country. At three of the United States censuses of population (1880, 1890, 1900) efforts were made to carry out such an enumeration as part of the regular canvass, but these experiments have not been repeated in recent years, partly because of the expense involved and partly because of lack of confidence in the results on the part even of those who planned and organized the investigation. Local enumerations of this character have been made occasionally, as, for instance, the canvas made by the municipal authorities of Baltimore City in 1928 (see p. 168) and the surveys made by the United States Bureau of Labor Statistics in 1915 (Bul. No. 172), by the department of economics of Ohio State University, covering the City of Columbus, for the years 1921 to 1925 (Bul. No. 409), and by the Metropolitan Life Insurance Co. In the studies made by the Metropolitan Life Insurance Co. the families of industrial policy-holders of the company were canvassed, first in New York and later in certain other cities,

on the assumption (which appears to have been correct) that they constituted representative portions of the wage-earning population in the cities studied. In the two studies made by the United States Bureau of Labor Statistics in New York City in 1915 a complete canvass was made of the population of representative city blocks. The police department of New York City cooperated in the first of these by making a count of the unemployed among the homeless who were found in various temporary lodgings on one night in January, 1915. In the more recent Columbus study a complete canvass was made of carefully selected sections of the city.

Registration of the unemployed.—Another method of obtaining data on unemployment has been the voluntary registration of unemployed persons. Such registration has been attempted in several cities, but nowhere has experience proved the method one to be recommended. Without a compelling motive for persons out of work to register, and without adequate means of preventing fraudulent registration if the incentive is expectation of relief, data so obtained are certain to be grossly inaccurate.

The unemployment statistics of Great Britain, although derived from actual registration of the unemployed, are of quite different quality. They are obtained through the administration of the law that provides compulsory unemployment insurance in most of the divisions of industry. In that case the insurance benefit provides the incentive for registration; and the labor exchange machinery, established to prevent the fraudulent receipt of benefits, largely excludes from the count persons who are not actually unemployed. In the United States, of course, no such data are available, because employment exchanges lack the kind of machinery for registration upon which such figures depend.

Estimates of numbers of unemployed.—Serious attempts to determine the number of unemployed persons have sometimes been made by responsible authorities from estimates collected at large from social workers, clergymen, poor-relief administrators, employers, labor leaders, and others. As an example, the two special inquiries made by the United States Employment Service in 1921 through its correspondents in numerous cities of the United States may be cited.

Data gathered in this way have a certain significance and value, particularly when no other method is possible, but the results must necessarily be of only limited accuracy.

The Employment Service of the United States Department of Labor publishes each month, in addition to the monthly report of activities of State and municipal employment services, an industrial employment information bulletin in which industrial conditions in different localities are summed up so as to give a picture of the employment situation throughout the entire country. For the purposes of this report the country is divided into nine districts with a director in charge of each zone. These directors establish contacts within their districts with chambers of commerce, labor union officials, employment offices, industrial leaders, business men and other sources of information and transmit their report each month to the United States Employment Service. In the bulletin the industrial conditions in the principal industrial centers and the principal industries are reported upon by each director for his particular district

and there is a general summary showing the industrial employment situation in the country as a whole.

Trade-union statistics.—Unemployment statistics obtained from trade-union sources are monthly or sometimes quarterly figures, commonly reported by the secretaries of various local unions, and usually expressed in the form of "percentage of members unemployed." In this country New York and Massachusetts are the only States which have had extended experience with trade-union reports of unemployment. In both New York and Massachusetts their collection was discontinued soon after the current collection of employment statistics from representative manufacturing establishments was begun. In Massachusetts, the monthly publication of such statistics was resumed in 1927 by the State department of labor for the building trades, but not for other organized trades. These monthly statistics are very complete, and, in presentation, are analyzed by trades, cities, and causes of unemployment.

During the fall of 1927 the American Federation of Labor undertook the collection of data regarding unemployment covering the membership of the constituent unions. The results are published in the form of "percentage of membership unemployed." The data are given separately for the larger cities and also separately for building trades and other trades. The basic figures regarding total membership reporting are not published.

For industries and for communities where labor is strongly organized, trade-union statistics regarding unemployment are representative. A weakness is, of course, that many trades—particularly unskilled laborers and clerical workers—are not well organized. Another weakness is the difficulty of getting prompt and accurate reports from the various local unions. In the past this latter difficulty has been a serious one and has caused the results in many cases to be of dubious value.

Statistics of Employment Offices

WHILE the statistical methods followed in the compilation of employment office statistics in the different States and localities are not uniform and are, therefore, not always strictly comparable, practically all public employment offices in the States are now cooperating with the United States Employment Service which assembles and publishes monthly statistics of their operations. There are numerous other agencies concerned in the placement of workers, such as large employing corporations which have their own employment bureaus, the local branches of the trade-unions, bureaus which deal only with professional workers, and private employment agencies dealing with all kinds of labor, the number and variety of these agencies making it practically impossible to secure returns from any large proportion of them at any given time.

In addition to the practical difficulties in coordinating the reports from such a wide variety of agencies the incompleteness of the returns must also be taken into consideration. The number of persons who are out of work and who are seeking employment varies from day to day and such persons can be located only when they apply to some agency for assistance in securing work. It is probable, however, that a large proportion of the people who really desire work if they can

get just what they want never apply to any employment agency and, on the other hand, many persons who register at an employment agency are not unemployed but are simply trying to get another or a better job; there is also the question of duplication, since many persons when seeking a job register at several agencies. It is evident therefore, that the chief value of the returns from these bureaus as an index of unemployment lies in the trend shown by their figures, giving, as they do, a fairly trustworthy basis for an estimate of the extent of unemployment and adding to the value of the figures when they are correlated with the statistics of employment secured from the pay rolls of a large number of industries.

The Federal Employment Service publishes a monthly report of the activities of State and municipal employment services which cooperate with it. There are 41 States and the District of Columbia which report on the number of requests for help wanted, and the number of persons registered, referred, and placed in employment in one or more principal cities of the State each month. The registrants in these offices are largely unskilled or semiskilled workers. The probable inadequacy of these figures as a source of unemployment data is shown by the fact that the total number of persons registered during a recent month was 208,742 and that during that month there were 173,688 calls for help from employers, 169,517 workers were referred to positions, and 146,266 workers were placed in employment. In spite of the comparatively small number of workers covered, however, these figures do show to a certain extent the demand for labor and the supply of workers and thus reflect the activity of business and the intensity of changes in opportunities for employment.

Employment Statistics from Pay Rolls

[EVERY pay roll contains at least some mark of identification of each employee of the concern, and the wages received by him within a specified pay period. It is a timely and accurate record, available in almost every industrial organization of appreciable size. The required figures of total number employed and total wages paid can be transcribed to a report form with very little effort and with comparatively small chance of clerical error. It is practicable, therefore, to obtain these data at frequent intervals and by means of inquiries sent through the mail.

In some instances the bureaus now collecting pay-roll statistics obtain only the number of persons employed. More frequently both the number of employees and the total amount of wages shown on the pay roll are recorded, and the statistics are thus commonly referred to as statistics of employment and earnings. The figures for total earnings are valuable as a check on those showing the number employed. They are valuable also for what they show directly concerning purchasing power, and when divided by the total number of persons at work they give average earnings per employee, a figure which is worth obtaining for rough indication of changes in the rate of wages.

Development of pay-roll employment statistics.—Although the current publication of employment figures from pay rolls is a development of the last 13 years only, statistics of this sort are not new. The United States Bureau of the Census has obtained statistics of the numbers

employed monthly in manufacturing establishments for the years in which the national census of manufactures have been taken—every five years from 1899 to 1919, and subsequently every two years. In Massachusetts, in 1886, the office which was then known as the Bureau of Statistics of Labor inaugurated an annual census of manufactures, in which similar monthly employment figures were collected. This State census of manufactures has been continued each year since, thus giving Massachusetts the longest record of employment fluctuation which is anywhere available. Monthly employment figures were also gathered in an annual census of manufactures in New Jersey from 1893 to 1918. In Ohio monthly figures for employment in manufacturing industries were assembled each year from 1892 to 1906, and since 1914 a comprehensive canvass of employment and wages by months has been made annually, covering agriculture, construction, service, trade, transportation, and public utilities, as well as manufacturing.¹ In all of these records, however, the monthly data for each year were compiled after the completion of the calendar year to which they referred, and were tabulated and made public only after an interval ranging from several months to a year or more.

The earliest current collection of such data in this country was made by the New York State Department of Labor. The reporting establishments were selected to represent the manufacturing industry as a whole. The first data were collected in June, 1915, but during the first year employers were requested to furnish figures for both the current month and the corresponding month in the preceding year; thus, in effect, the New York series of pay-roll statistics for manufacturing industries dates from June, 1914.

The United States Bureau of Labor Statistics began to collect pay-roll statistics shortly after the New York bureau, but confined itself to fewer industries. Beginning with October, 1915, reports were obtained from employers in four industries—boots and shoes, cotton, cotton finishing, and hosiery and underwear. The list was extended, however, so that by the end of 1916, 13 manufacturing industries had been included. Several of these series were carried back to December, 1914. In July, 1922, the scope of the inquiry was enlarged to include 42 manufacturing industries, and additional industries have been added since, so that the latest published report (December, 1928) covers 54 leading manufacturing industries. In July, 1928, the Bureau of Labor Statistics began to enlarge further the scope of its employment survey to include other important fields of industry. The August, 1928, report included the trend of employment and earnings in wholesale and retail trade establishments; the September, 1928, report began the current publication of employment data for public utilities; the October report included for the first time figures relative to anthracite and bituminous coal mining; the November, 1928, report added data on hotel employment and metalliferous mining. All these industries will be carried currently hereafter. The number of reporting establishments, especially in these fields in which the bureau has recently started its survey, will be constantly increased until the desired proportion of employees in the several industries has been secured.

¹ While these later data have been collected and tabulated annually, they have been published only for the years 1914, 1915, and 1923. The U. S. Women's Bureau, however, is now making a study of employment fluctuations as it has affected woman workers in Ohio industries, and this report will contain full series of Ohio data since 1914 for the more important industries.

Number and activities of existing agencies.—The accompanying table gives a list of the Federal and State agencies in the United States which publish current monthly pay-roll statistics, and indicates the general scope and character of the information collected. It shows that pay-roll statistics are now being collected from month to month in the United States by 2 Federal bureaus and by 10 State bureaus.

In addition, employment statistics are being collected by some of the Federal reserve banks and privately by a number of employers' associations.

The United States Bureau of Labor Statistics covers the widest field. In December, 1928, its current figures covered 21,494 establishments in the following industrial groups: Manufacturing industries (54), wholesale trade, retail trade, public utilities, anthracite mining, bituminous coal mining, metalliferous mining, and hotels. These establishments in December had 4,209,264 employees whose combined earnings in one week were \$114,453,170.

The reports received from 11,752 establishments in the 54 manufacturing industries in December, 1928, covered 3,245,412 employees. These employees represent one-half of the employees in these manufacturing industries and nearly 40 per cent of the employees in all manufacturing industries in the United States. In collecting these figures the Bureau of Labor Statistics cooperates with the State labor departments in seven States, thus avoiding duplication of work.

The Federal bureau's figures are now published in a special section of the Labor Review, which is also issued as an advance pamphlet, news releases being sent out earlier as data are available. The data for the 54 manufacturing industries are given for the main industrial groups and their subdivisions, and a recapitulation by the nine geographical divisions used by the United States Census Bureau is also given. The data for the nonmanufacturing industries and public utilities are published by geographic divisions only. It has not yet proved feasible for the Federal bureau to publish the data for each State, or for Federal reserve districts, which, it has been suggested, would make the data directly useful to the 12 Federal reserve banks. All the cooperating State bureaus, however, now publish their own data currently for local use.

Summary figures for the railroads furnished by the Interstate Commerce Commission, are included in the monthly report issued by the Bureau of Labor Statistics, but they are for earlier dates than the manufacturing statistics. The Department of Agriculture has continued experiments begun by the Wisconsin Industrial Commission on the difficult problem of collecting employment figures for farms, but the statistics are not yet currently available. Data on employment in wholesale and retail trade are being obtained by certain State bureaus, including Wisconsin and Illinois, and by the Federal Reserve Bank of Philadelphia, as well as the United States Bureau of Labor Statistics.

Despite encouraging progress, the great majority of States have no information regarding employment within their own boundaries, although manufacturing plants therein may contribute to the data collected by the United States Bureau of Labor Statistics for the country as a whole.

FEDERAL AND STATE AGENCIES WHICH PUBLISH CURRENT MONTHLY PAY-ROLL
STATISTICS OF EMPLOYMENT

Agency	Industries covered
Federal bureaus:	
U. S. Bureau of Labor Statistics.....	Manufacturing, mining, public utilities, trade, and hotels. Railroads.
Interstate Commerce Commission	
State bureaus:	
California. Department of Industrial Relations...	Manufacturing; water, light, and power.
Illinois. Department of Labor.....	Manufacturing; coal mining; public utilities, including street railways; construction; trade; hotels.
Iowa. Bureau of Labor.....	Manufacturing, trade.
Maryland. Commissioner of Labor and Statistics.	Manufacturing, trade, public utilities.
Massachusetts. Department of Labor.....	Manufacturing.
New York. Department of Labor.....	Manufacturing; water, light, and power.
Oklahoma. Department of Labor.....	Manufacturing, mining, oil, public utilities.
Pennsylvania. Department of Labor and Industry.	Manufacturing, construction.
Wisconsin. Industrial Commission.....	Manufacturing, mining, quarrying, transportation, hotels and restaurants, construction, trade, logging, agriculture, certain professional services.
New Jersey. Department of Labor..	Manufacturing.

Statistics for Foreign Countries

EXAMINATION of European publications shows that 19 countries publish current unemployment statistics in some form. This section of the present article summarizes the unemployment statistics of these 19 European countries and of Canada.

Unemployment surveys.—General surveys of the unemployed have been made occasionally by certain countries and communities. Two of the most recent have been by the Swedish Government and by the city of Amsterdam. The Swedish investigation was made in 1927, and a summary of the report was published in the Monthly Labor Review for November, 1928. The Amsterdam study was made in 1926, a summary of the report being published in the Monthly Labor Review for June, 1928.

Unemployment insurance reports.—Many of the statistical reports on unemployment published abroad are collected by groups organized primarily to administer financial assistance to the unemployed or to aid them in securing work. By carrying unemployment insurance, which may be maintained by contributions of either wage earners alone, or with the financial help of the Government or employer, or both, workers obtain weekly allowances when unemployed, in lieu of wages. These insurance systems provide financially for a large percentage of unemployed persons in certain countries and on the basis of the number of applications for and payments of benefit a statistical record is developed. Sixteen of the twenty countries here considered have unemployment insurance systems; 6 nations have compulsory systems that are State administered; 10 have union-administered plans that are either subsidized and supervised by the State or administered entirely under local union rulings. Sweden expends considerable sums annually for unemployment relief but maintains no insurance system.

Existing insurance systems provide primarily for industrial workers, both manual and nonmanual, and persons employed in transportation and mining who earn less than a stated sum. Exclusion of agricultural and forestry workers, domestic servants, and casual labors from participation is general. Only a limited number of

countries allow benefit to agricultural workers and domestic servants; the British law covers the casual laborer. To enjoy benefits the wage earner insured under a national law must have attained a minimum age. This minimum is lowest in Italy (15 years). In certain European countries social legislation provides pensions for aged workers, the pensionable age varying between ages 60 and 65 according to the law of the country. When an unemployed beneficiary under the insurance system becomes eligible for a pension he ceases to draw insurance benefit and is no longer counted as unemployed.

Statistics based on insurance returns, reported by the majority of countries, show total number of persons registered as unemployed on insurance books. It is understood that this live register of unemployed includes persons serving waiting time before they become eligible for benefit payment but excludes those persons who have been dropped from registers for any reason. Belgium and Switzerland tabulate totally and partially unemployed persons separately; Great Britain reports temporary and complete stoppages. A second group of countries (Czechoslovakia, Finland, Germany, and Hungary) publishes totals showing only those persons in receipt of benefit. German figures are grouped by type of benefit and period of unemployment of recipients. Czechoslovakia publishes a monthly index of total unemployment reported under the insurance system, January, 1921, being used as the base, or 100, while Hungary shows a percentage of unemployment based on the relationship of total unemployed recorded under the insurance system to the total membership of the unions providing insurance.

In most instances figures are published monthly. Recapitulations and additional data are prepared quarterly, semiannually, or annually. Totals shown represent either volume of unemployment on a given date, or an average for a specified period.

Public employment exchange records.—With few exceptions State statistical offices show records of unemployment based on returns furnished by public employment exchanges. Registration of persons seeking work through such exchanges is voluntary except in Italy where it was made compulsory in March, 1928. Voluntary registration in employment exchanges is augmented, in countries where unemployment insurance is compulsory, by automatic registration with exchanges of all applicants for benefit under the insurance law. This double registration is facilitated where insurance branches are housed in labor exchanges. In countries where insurance is privately administered and voluntary not all insured unemployed are necessarily included in labor exchange records. In many countries the free labor exchange, open to all classes of labor, competes with privately run exchanges, for which no records are available.

Basic tables covering employment exchange returns show applications for work and help and number of unsatisfied applications at the end of a given period. This method is general. In addition detailed tables show number of applicants, (1) by geographical areas and (2) by industries, classified according to sex, occupation, or even by degrees of skill. Reports are usually published weekly or monthly.

Figures showing average number of vacancies per 100 applications or number of applications per 100 vacancies are not unusual. The ratio of applications to vacancies over long periods of time reflects business conditions. In times of business expansion the number of

applications per 100 vacancies decreases sharply. In depression the increase in applications per 100 vacancies is likewise marked.

Trade-union statistics.—Many unions report unemployment on the basis of insurance records. In Canada and Sweden, where there are no general insurance systems in force, trade-union statistics are collected irrespective of whether or not members are insured. These records cover large percentages of union membership and are important sources of unemployment statistics in these two countries. Canadian unions exclude from reports on unemployment in unions persons who are employed on work outside their trade and persons not working owing to illness.

Employers' reports.—Monthly employers' reports, showing number of persons on the pay roll (volume of employment), indicate trend of unemployment. But it may not be assumed that all persons dropped from pay rolls are out of work, as the figures cover only certain trades and workers may have found work in other trades. Seven countries show volume of employment covering from 200,000 to 1,500,000 employees in selected industries.

Other specialized statistics that have a bearing on unemployment are those on employment of agricultural workers and seamen in Sweden and in relief work in several other countries.

Employment Statistics Compiled by the Bureau of Labor Statistics

AS EXPLAINED in the preceding article the Bureau of Labor Statistics has compiled, for a number of years, monthly data regarding the volume of employment in manufacturing industries. Beginning in the latter part of 1928, this work was extended to cover other industries—mines, public utilities, etc.—but the reports for these added industries cover too short a period to justify their presentation in this Handbook. The following presentation is limited, therefore, to the employment statistics for manufacturing industries.

Trend of Employment in Manufacturing Industries

THE United States Bureau of Labor Statistics' indexes of employment and pay-roll totals in manufacturing industries are based on monthly returns from approximately 12,000 establishments in 54 of the principal manufacturing industries of the United States. These 54 industries normally employ about 77 per cent of the wage earners in all manufacturing industries of the United States; the 12,000 reporting establishments normally employ over 3,250,000 wage earners or more than 50 per cent of the total number employed in the 54 selected industries, and nearly 40 per cent of the employees in all manufacturing industries.

Trend of Employment in 1928

THE GENERAL trend of employment in manufacturing industries in 1928, month by month, followed the general trend of employment in 1927, but while 1927 kept on a fairly high level for the first three months

and then fell off quite consistently throughout the remainder of the year, 1928 followed an opposite course. The net change in employment from January to December in 1927 was -4.8 per cent, while the net change in the same period of 1928 was +4.3 per cent. The variation in the indexes for January was -5.9 per cent for 1928. Beginning in March, the magnitude of the variations decreased consistently until in September, 1928, the variation was -0.8 only and in October had become +0.6; in December, 1928, the index of employment was 3.1 per cent higher than in December, 1927.

Employment in 1927 reached its highest level in March and was at its lowest point in December, while in 1928 the highest level was attained in October and the lowest in January. Pay-roll totals each month except May followed the same general trend as employment, although the variations, both increases and decreases, usually were greater in pay-roll totals than in number employed; in May a slight decrease in employment was accompanied by a slight increase in pay-roll total.

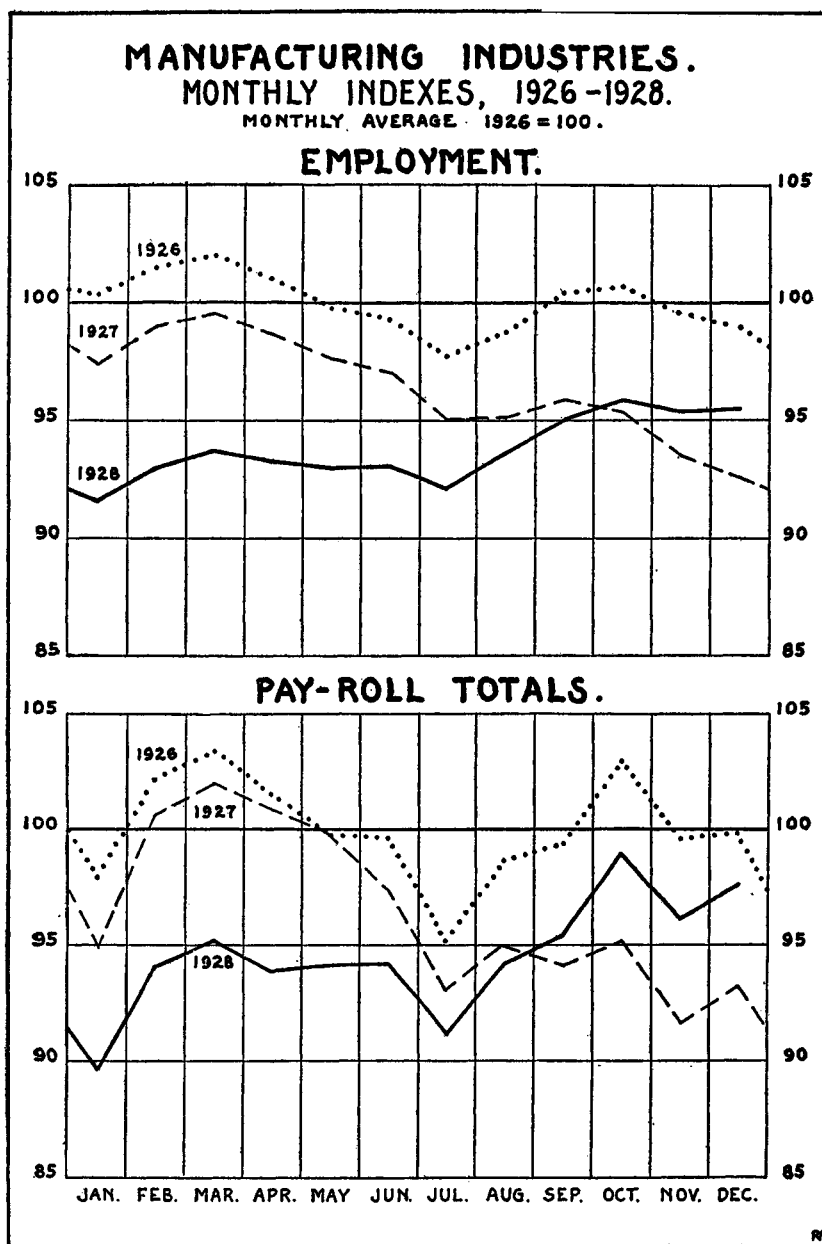
On the whole, although the levels of employment may and do vary considerably, the seasonal trend of employment is much the same from year to year. This fact is illustrated by Table 1 and Chart 1. In each of the last three years there was a pronounced recovery in February from the regular January depression, caused by inventories and repairs, and a smaller increase in March; from April to July the curve was downward, but from July the course curved sharply upward to and including October both in 1926 and 1928, while in 1927, after slight increases in August and September, the downward course which continued to the end of the year began in October; beginning with November, the curve of employment in 1926 also fell off to a marked degree, but 1928 showed much greater stability by curving downward only one-half of 1 per cent in November and actually moving slightly upward in December.

Table 1 shows by months the general index of employment in manufacturing industries and the general index of pay-roll totals from January, 1923, to December, 1928:

TABLE 1.—GENERAL INDEXES OF EMPLOYMENT AND PAY-ROLL TOTALS IN MANUFACTURING INDUSTRIES, JANUARY, 1923, TO DECEMBER, 1928
[Monthly average, 1926=100]

Month	Employment						Pay-roll totals					
	1923	1924	1925	1926	1927	1928	1923	1924	1925	1926	1927	1928
January.....	106.6	103.8	97.9	100.4	97.3	91.6	95.8	98.6	93.9	98.0	94.9	89.6
February.....	108.4	105.1	99.7	101.5	99.0	93.0	99.4	103.8	99.3	102.2	100.6	93.9
March.....	110.8	104.9	100.4	102.0	99.5	93.7	104.7	103.3	100.8	103.4	102.0	95.2
April.....	110.8	102.8	100.2	101.0	98.6	93.3	105.7	101.1	98.3	101.5	100.8	93.8
May.....	110.8	98.8	98.9	99.8	97.6	93.0	109.4	96.5	98.5	99.8	99.8	94.1
June.....	110.9	95.6	98.0	99.3	97.0	93.1	109.3	90.8	95.7	99.7	97.4	94.2
July.....	109.2	92.3	97.2	97.7	95.0	92.2	104.3	84.3	93.5	95.2	93.0	91.2
August.....	108.5	92.5	97.8	98.7	95.1	93.6	103.7	87.2	95.4	98.7	95.0	94.2
September.....	108.6	94.3	98.9	100.3	95.8	95.0	104.4	89.8	94.4	99.3	94.1	95.4
October.....	108.1	95.6	100.4	100.7	95.3	95.9	106.8	92.4	100.4	102.9	95.2	99.0
November.....	107.4	95.5	100.7	99.5	93.5	95.4	105.4	91.4	100.4	99.6	91.6	96.1
December.....	105.4	97.3	100.8	98.9	92.6	95.5	103.2	95.7	101.6	99.8	93.2	97.7
Average..	108.8	98.2	99.2	100.0	96.4	93.8	104.3	94.6	97.7	100.0	96.5	94.5

Chart 1, made from the index numbers of Table 1 shows clearly the *trend* of employment and pay-roll totals during the period January, 1926, to December, 1928.



Employment by Industries, 1927 and 1928

IN TABLE 2 are shown for the years 1927 and 1928 the general index, the group indexes, and the indexes for each of the 54 component industries.

The weights used in combining the various relatives for individual industries into the 12 group indexes and the final general index are representative of the importance of the several industries.

TABLE 2.—INDEXES OF EMPLOYMENT AND PAY-ROLL TOTALS IN MANUFACTURING INDUSTRIES—1927 AND 1928

[Monthly average, 1926=100]

Industry	Employment		Pay-roll totals	
	1927	1928	1927	1928
General index	96.4	93.8	96.5	94.5
Food and kindred products	99.4	98.4	100.0	99.8
Slaughtering and meat packing.....	99.5	99.5	99.9	101.0
Confectionery.....	96.5	93.0	97.9	93.3
Ice cream.....	94.0	92.4	93.4	93.1
Flour.....	99.3	100.0	99.4	102.1
Baking.....	101.4	100.9	102.2	101.6
Sugar refining, cane.....	98.8	91.1	98.8	94.9
Textiles and their products	101.3	96.3	103.0	95.6
Cotton goods.....	105.0	95.2	108.5	91.7
Hosiery and knit goods.....	99.0	94.7	102.2	97.3
Silk goods.....	98.4	96.9	99.2	100.2
Woolen and worsted goods.....	99.7	95.0	100.6	94.4
Carpets and rugs.....	102.5	101.0	104.1	95.9
Dyeing and finishing textiles.....	108.7	92.5	102.8	101.0
Clothing, men's.....	97.8	92.2	97.3	89.0
Shirts and collars.....	95.0	92.2	96.3	89.9
Clothing, women's.....	105.4	105.4	107.4	105.2
Millinery and lace goods.....	95.6	93.5	96.8	92.7
Iron and steel and their products	93.2	91.5	91.9	92.8
Iron and steel.....	92.9	90.9	91.4	92.7
Cast-iron pipe.....	89.8	80.1	88.1	75.9
Structural ironwork.....	94.9	95.0	95.0	97.9
Foundry and machine-shop products.....	93.8	92.3	92.4	92.8
Hardware.....	92.2	88.9	90.9	88.4
Machine tools.....	92.8	100.8	92.2	107.5
Steam fittings and steam and hot-water heating apparatus.....	92.5	82.2	91.9	81.9
Stoves.....	91.2	87.6	90.4	84.7
Lumber and its products	91.9	87.8	93.1	88.8
Lumber, sawmills.....	91.0	86.7	92.4	88.0
Lumber, millwork.....	89.2	85.5	89.2	85.6
Furniture.....	96.1	92.5	98.2	93.2
Leather and its products	97.9	92.8	97.4	89.7
Leather.....	98.4	95.4	97.2	93.7
Boots and shoes.....	97.7	91.9	97.6	88.0
Paper and printing	100.1	99.2	101.2	101.5
Paper and pulp.....	97.5	94.4	96.6	94.9
Paper boxes.....	96.8	94.0	99.0	99.4
Printing, book and job.....	100.3	99.2	102.1	101.6
Printing, newspapers.....	103.4	105.2	104.6	107.4
Chemicals and allied products	96.6	93.4	99.1	95.9
Chemicals.....	100.0	99.3	103.7	103.3
Fertilizers.....	91.2	95.4	94.0	97.1
Petroleum refining.....	94.6	84.8	95.6	87.2
Stone, clay, and glass products	94.5	89.7	94.2	89.6
Cement.....	95.8	87.7	96.5	88.3
Brick, tile, and terra cotta.....	94.3	84.9	94.1	82.8
Pottery.....	94.5	95.3	94.2	93.4
Glass.....	94.2	92.9	93.4	94.3
Metal products, other than iron and steel	92.9	92.8	91.6	96.1
Stamped and enameled ware.....	88.9	88.8	90.6	90.4
Brass, bronze, and copper products.....	94.5	94.4	92.0	98.0
Tobacco products	98.1	96.0	97.1	93.5
Chewing and smoking tobacco and snuff.....	97.7	95.2	97.7	94.1
Cigars and cigarettes.....	98.1	96.0	97.0	93.4
Vehicles for land transportation	90.8	95.8	91.6	95.3
Automobiles.....	91.2	111.3	90.3	114.4
Carriages and wagons.....	78.7	76.7	83.6	82.1
Car building and repairing, electric-railroad.....	100.9	94.9	101.1	96.2
Car building and repairing, steam-railroad.....	90.3	83.5	92.3	85.4
Miscellaneous industries	99.5	91.6	100.9	91.9
Agricultural implements.....	91.9	106.8	92.2	111.8
Electrical machinery, apparatus, and supplies.....	95.1	93.9	95.7	95.9
Pianos and organs.....	90.4	77.1	87.4	74.3
Rubber boots and shoes.....	103.3	101.1	107.7	101.0
Automobile tires.....	97.3	103.3	98.2	105.7
Shipbuilding.....	104.8	82.8	105.8	83.0

Proportion of Time Worked and Force Employed

THE Bureau of Labor Statistics has collected data as to operating time in factories, in connection with employment statistics, since July, 1922. The earliest published report, made in January, 1923, was based on returns from about 3,000 establishments and showed 81 per cent of the establishments operating on a full-time schedule, 17 per cent on a part-time schedule, and 2 per cent idle. The December, 1928, report, based on returns from over 9,000 establishments or three times as many as in the first report, showed 85 per cent operating on a full-time schedule, 15 per cent on a part-time schedule, and 1 per cent idle.

The first tabulation of the *average* per cent of full time worked by the operating establishments was in March, 1924, when the average for 5,000 establishments stood at 94 per cent. During the last 5 months of 1928 the average stood at either 97 or 98, from 9,000 to 9,500 establishments having been concerned in the reports for these months.

Since March, 1924, the *average* per cent of normal full force employed by operating establishments has also been computed and published. Starting with 82 in March, 1924, for 5,000 establishments, the average fell to 75 in July, 1924. The highest average appearing was 90, reached in both September and October, 1928. During the last two months of 1928, however, the average fell to 89.

While no direct comparison of these averages is made between months, the monthly computations are very largely made on reports from identical plants, the number varying from month to month, so that with such a large number of establishments it is likely the monthly returns are quite fairly comparable.

These reports are made for each of the 54 industries separately, and for the same industries combined in 12 groups.

These data as to time worked and force employed form an important addition to the regular presentation of statistics of employment and pay-roll totals and aid in their interpretation.

Employment by Geographic Divisions

THE GENERAL trend of employment and the fluctuations from month to month, differ widely between the several geographic divisions of the United States. To illustrate these differences a chart is presented showing for each of the nine divisions the course of employment during the years 1927 and 1928. The chart is based on index numbers computed for each division, using the monthly average for 1926 as 100. These index numbers are presented in Table 3.

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TABLE 3.—INDEXES OF EMPLOYMENT IN MANUFACTURING INDUSTRIES IN EACH GEOGRAPHIC DIVISION IN 1927 AND 1928, BY MONTHS

[Monthly average, 1926=100]

Month and year	Geographic division								
	New England	Middle Atlantic	East North Central	West North Central	South Atlantic	East South Central	West South Central	Mountain	Pacific
1927									
January	98.6	96.8	93.1	96.3	100.6	94.9	97.9	97.5	94.1
February	99.8	97.8	97.4	96.8	102.1	95.9	98.6	94.2	94.3
March	99.4	97.8	99.0	96.6	102.9	95.4	97.4	93.0	97.0
April	98.0	96.1	99.1	96.5	103.1	94.7	96.3	94.3	98.2
May	96.8	94.6	98.9	97.3	101.5	93.3	94.8	97.3	99.9
June	95.3	94.0	97.7	99.5	100.9	93.0	94.9	96.0	101.7
July	94.0	92.5	94.4	98.6	99.8	91.2	93.1	100.7	100.7
August	93.4	92.5	95.7	98.9	99.3	92.4	93.9	99.3	101.0
September	95.5	93.6	94.5	98.9	101.8	92.6	95.3	98.2	101.0
October	95.2	93.4	93.8	98.2	101.5	93.2	93.6	96.6	100.3
November	93.8	91.8	90.7	94.9	100.8	91.9	92.2	97.5	97.7
December	92.0	90.6	91.5	93.3	99.9	92.0	90.8	93.4	94.6
1928									
January	91.4	88.7	93.3	92.6	98.2	90.9	89.2	88.5	90.4
February	92.1	89.2	97.8	95.5	98.5	92.0	89.4	89.2	91.1
March	90.9	89.4	100.1	96.0	100.0	91.8	89.6	90.0	93.8
April	89.4	88.4	100.4	95.5	98.4	92.0	89.3	91.2	97.1
May	86.8	88.2	102.4	96.2	96.6	90.4	88.8	94.1	98.6
June	85.8	88.3	102.7	98.7	96.5	90.0	89.0	97.2	99.3
July	85.8	87.4	102.1	97.4	94.2	86.8	90.0	97.9	97.8
August	86.0	87.9	105.8	97.2	96.8	89.9	90.9	97.0	96.7
September	88.0	89.4	107.5	97.1	98.2	90.8	92.1	97.6	101.5
October	90.7	91.0	107.5	97.6	98.7	90.3	91.9	98.0	100.4
November	91.3	91.1	104.1	95.9	99.7	91.3	92.3	97.0	97.9
December	91.6	91.1	104.2	96.1	99.0	91.3	90.2	95.3	95.5

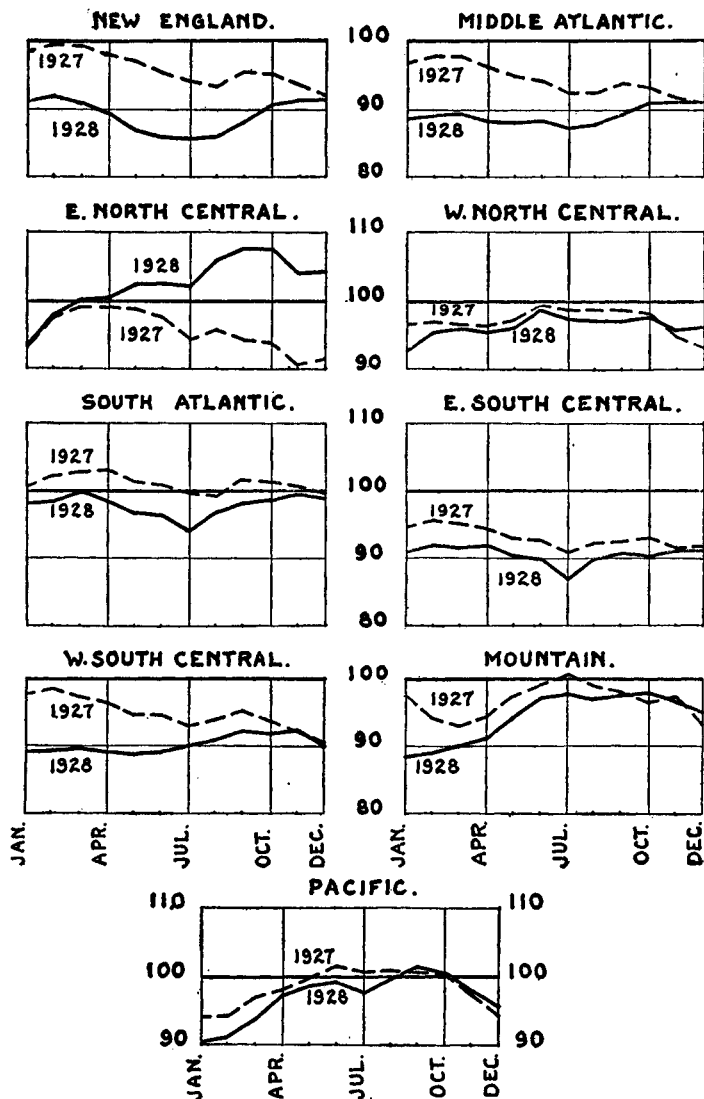
Industries Covered

THE 54 industries surveyed by the Bureau of Labor Statistics include very nearly all of the most important manufacturing industries of the United States. The industries included are the old-established industries, and a large part of the reporting establishments are likewise old-established ones.

In this connection, however, it should be borne in mind that a new industry is not of necessity maintained entirely as a separate and distinct affair. Invariably when a new industry or product comes into prominence old-established concerns, engaged in turning out a kindred article—either near or remote—the value or sale of which may be affected by the newer production, are likely to turn over a part of their plant to the making of the new product. This may be a experimental plan only, although not infrequently the policy of the concern may be changed, at least in part, by the success of the new industry; for example, phonograph cabinets are made to a considerable extent by furniture manufacturers; rayon goods are reported as a product of cotton goods, silk goods, and hosiery and knit goods plants; and a large amount of radio equipment is turned out by establishments classified under electrical machinery, apparatus and supplies, and still largely engaged in such production. Thus it is clear that while the 54 industries selected by the bureau for these employment statistics are per se old-established industries it must not be inferred that the indexes of employment are altogether unaffected by the influence of the spectacular newer industries of to-day.

As this study is designed primarily to show conditions in the more important manufacturing lines in the United States as a whole, some industries of considerable weight to their respective local communi-

TREND OF EMPLOYMENT. **GEOGRAPHIC DIVISIONS.** (1926 = 100)



ties may, in the aggregate of employment, fall too far below the total which warrants giving them a place in this compilation.

The magnitude of the bureau's report on "Employment in selected manufacturing industries" is shown in Table 4, in which the data for December, 1928, are presented, to illustrate the distribution of establishments, employees, and pay-roll totals among the various industries and classified groups of industries, with a recapitulation by geographic divisions:

TABLE 4.—EMPLOYMENT AND PAY-ROLL TOTALS, BY INDUSTRIES AND GEOGRAPHIC DIVISIONS

Industry	Estab-lish-ments	Number on pay-roll (one week) December, 1928	Amount of pay-roll (one week) December, 1928
Food and kindred products.....	1,627	228,233	\$5,899,419
Slaughtering and meat packing.....	194	90,483	2,412,507
Confectionery.....	294	35,718	663,023
Ice cream.....	274	9,962	339,389
Flour.....	327	15,929	417,295
Baking.....	523	65,586	1,743,165
Sugar refining, cane.....	15	10,555	324,132
Textiles and their products.....	2,105	618,347	12,326,513
Cotton goods.....	473	220,044	3,559,051
Hosiery and knit goods.....	338	93,748	1,807,814
Silk goods.....	280	64,684	1,387,943
Woolen and worsted goods.....	188	64,951	1,486,376
Carpets and rugs.....	31	25,082	655,972
Dyeing and finishing textiles.....	107	23,526	859,851
Clothing, men's.....	301	60,944	1,438,645
Shirts and collars.....	120	22,830	369,798
Clothing, women's.....	197	22,489	529,446
Millinery and lace goods.....	70	10,049	231,752
Iron and steel and their products.....	1,799	681,733	20,968,695
Iron and steel.....	202	273,810	8,679,099
Cast-iron pipe.....	38	11,265	267,335
Structural ironwork.....	165	27,354	824,596
Foundry and machine-shop products.....	960	250,084	7,647,979
Hardware.....	70	32,279	848,973
Machine tools.....	145	36,739	1,259,334
Steam fittings and steam and hot-water heating apparatus.....	109	30,545	882,614
Stoves.....	111	19,657	558,765
Lumber and its products.....	1,331	230,401	5,119,048
Lumber, sawmills.....	626	133,731	2,748,166
Lumber, millwork.....	317	32,703	790,383
Furniture.....	388	63,967	1,580,499
Leather and its products.....	364	118,109	2,583,203
Leather.....	132	26,129	654,197
Boots and shoes.....	232	91,980	1,929,006
Paper and printing.....	1,120	198,522	6,703,651
Paper and pulp.....	211	55,762	1,529,399
Paper boxes.....	182	20,144	462,167
Printing, book and job.....	314	44,839	1,587,503
Printing, newspapers.....	413	77,777	3,124,582
Chemicals and allied products.....	347	92,905	2,753,561
Chemicals.....	144	37,639	1,057,493
Fertilizers.....	147	9,131	177,063
Petroleum refining.....	56	46,135	1,519,005
Stone, clay, and glass products.....	921	121,399	3,169,223
Cement.....	104	23,599	675,876
Brick, tile, and terra cotta.....	566	38,247	962,983
Pottery.....	123	20,825	509,771
Glass.....	128	38,728	1,020,593
Metal products, other than iron and steel.....	218	52,012	1,458,067
Stamped and enameled ware.....	73	19,882	495,072
Brass, bronze, and copper products.....	145	32,130	962,995
Tobacco products.....	246	64,101	1,111,548
Chewing and smoking tobacco and snuff.....	30	8,943	143,547
Cigars and cigarettes.....	216	55,158	968,001

TABLE 4.—EMPLOYMENT AND PAY-ROLL TOTALS, BY INDUSTRIES AND GEOGRAPHIC DIVISIONS—Continued

Industry	Estab- lish- ments	Number on pay-roll (one week) December, 1928	Amount of pay-roll (one week) December, 1928
Vehicles for land transportation	1,268	557,498	\$17,815,473
Automobiles.....	207	393,759	12,827,553
Carriages and wagons.....	51	1,475	32,879
Car building and repairing, electric-railroad.....	393	25,317	796,512
Car building and repairing, steam-railroad.....	557	136,939	4,158,524
Miscellaneous industries	466	282,160	8,430,611
Agricultural implements.....	80	28,939	874,724
Electric machinery, apparatus, and supplies.....	180	140,686	4,210,803
Pianos and organs.....	73	9,870	311,231
Rubber boots and shoes.....	12	18,870	466,083
Automobile tires.....	39	52,851	1,628,240
Shipbuilding.....	82	30,944	939,530
All industries	11,752	3,245,412	88,339,215

RECAPITULATION BY GEOGRAPHIC DIVISIONS

GEOGRAPHIC DIVISION			
New England ¹	1,442	400,409	\$10,126,319
Middle Atlantic ²	2,759	801,124	24,954,298
East North Central ³	2,953	1,116,880	33,755,199
West North Central ⁴	1,040	163,545	4,092,809
South Atlantic ⁵	1,493	336,107	6,648,474
East South Central ⁶	607	120,766	2,368,027
West South Central ⁷	495	86,642	1,937,069
Mountain ⁸	207	31,002	859,522
Pacific ⁹	756	128,937	3,597,498
All divisions	11,752	3,245,412	88,339,215

¹ Connecticut, Maine, Massachusetts, New Hampshire, Rhode Island, Vermont.² New Jersey, New York, Pennsylvania.³ Illinois, Indiana, Michigan, Ohio, Wisconsin.⁴ Iowa, Kansas, Minnesota, Missouri, Nebraska, North Dakota, South Dakota.⁵ Delaware, District of Columbia, Florida, Georgia, Maryland, North Carolina, South Carolina, Virginia, West Virginia.⁶ Alabama, Kentucky, Mississippi, Tennessee.⁷ Arkansas, Louisiana, Oklahoma, Texas.⁸ Arizona, Colorado, Idaho, Montana, New Mexico, Nevada, Utah, Wyoming.⁹ California, Oregon, Washington.

Method of Computing Employment Index Numbers

THE BASIC material for these indexes is obtained from reports furnished by manufacturers in every State of the Union, the great majority of the reports coming direct to the bureau, although seven States collect employment data for their own use and furnish the bureau with the data in detail for each establishment.

Questionnaires are mailed to each establishment on the 15th of each month requesting information as to the pay-roll period ending nearest the 15th day of the month. The questionnaire asks for an enumeration of the concern's principal products, the date of the ending of the pay roll, the period covered (one week, two weeks, half-month, month), the amount of the pay roll, and the total number of persons who worked any part of the period. Also, for verification purposes, a request is made for the reason for any marked increase or decrease in total pay roll or number of employees, and for a statement showing current operating time, and any change made in rates of wages.

Each report is inspected upon its arrival, and if the pay-roll total is for a period longer than one week the equivalent pay roll for one week

is computed. Where necessary, reports are returned to the senders for correction or amendment.

The bureau's aim has been to secure in each industry a sufficiently large number of reporting establishments to guarantee for each report approximately 40 per cent of the employees in the industry in each State, as recorded by the Census of Manufactures. The consummation of this design brings the geographical distribution of employees in the several industries reported to an equitable basis.

In selecting establishments to represent each industry great care has been exercised to secure in each geographic division a proportionate number of concerns with large, small, and medium numbers of employees, and if there are two or more branches of an industry, the same care has been exercised to maintain the ratio of representation from each branch.

The number of employees and the pay-roll total for each establishment are entered on a separate record card which has space for the 12 months of each of three years. From these record cards totals for each industry are made of the employees and the pay-roll amounts in all establishments for both the current month and the month immediately preceding. Percentages of change between the totals for the two months are then computed, and with the per cent of change the link chain index for each industry for the current month is built up from the index of the previous month. The index for each of the 12 classified groups of industries and for all industries combined is reached by weighting the relatives for each industry according to the importance of the industry.

Percentages of change in the separate industries and groups between a current month and the same month of the previous year are arrived at by comparing the monthly indexes of the two years.

Changes in per capita earnings are computed and tabulated by industries, comparisons being made between the current month and the preceding month and between the current month and the corresponding month of the previous year; wage changes also are brought together and tabulated by industries.

From the current operating time reported, and the normal working time which we have on file, the per cent of full-time operation is computed for each concern, together with an average of these percentages for each industry, for each group, and for all industries combined; percentages of normal full force are computed on the same plan.

The monthly reports are presented with the industries arranged in 12 groups: Food; textiles; iron and steel; lumber; leather; paper; chemicals; stone, clay, and glass; metal, other than iron and steel; tobacco; vehicles; and miscellaneous industries. Index numbers for each industry are computed monthly, and from these relatives group indexes are constructed, as well as a general index, which is a weighted average of relatives for the 54 separate industries.

Trend of Employment on Steam Railroads

MONTHLY statistics as to the employment on Class I railroads—that is, all roads having operating revenues of \$1,000,000 or over—are published by the Interstate Commerce Commission and presented in summarized form in the Labor Review. Table 1 and

the accompanying chart show the movement of employment for all classes of employees over the year 1928, in comparison with the two preceding years, the year 1926 being taken as a base or 100. Table 2 gives these data, by principal occupational groups and by months, for the year 1928. In these tabulations the data for the occupational group reported by the Interstate Commerce Commission as "executives, officials, and staff assistants" are omitted.

TABLE 1.—INDEX OF EMPLOYMENT ON CLASS I STEAM RAILROADS IN THE UNITED STATES, JANUARY, 1923 TO 1928

[Monthly average 1926=100.0]

Month	1923	1924	1925	1926	1927	1928
January.....	98.3	96.9	95.6	95.8	95.5	89.3
February.....	98.6	97.0	95.4	96.0	95.3	89.0
March.....	100.5	97.4	95.2	96.7	95.8	89.9
April.....	102.0	98.9	96.6	98.9	97.4	91.7
May.....	105.0	99.2	97.8	100.2	99.4	94.5
June.....	107.1	98.0	98.6	101.6	100.9	95.9
July.....	108.2	98.1	99.4	102.9	101.0	95.6
August.....	109.4	99.0	99.7	102.7	99.5	95.7
September.....	107.8	99.7	99.9	102.8	99.1	95.3
October.....	107.3	100.8	100.7	103.4	98.9	95.3
November.....	105.2	99.0	99.1	101.2	95.7	92.9
December.....	99.4	96.0	97.1	98.2	91.9	89.7
Average.....	104.1	98.3	97.9	100.0	97.5	92.9

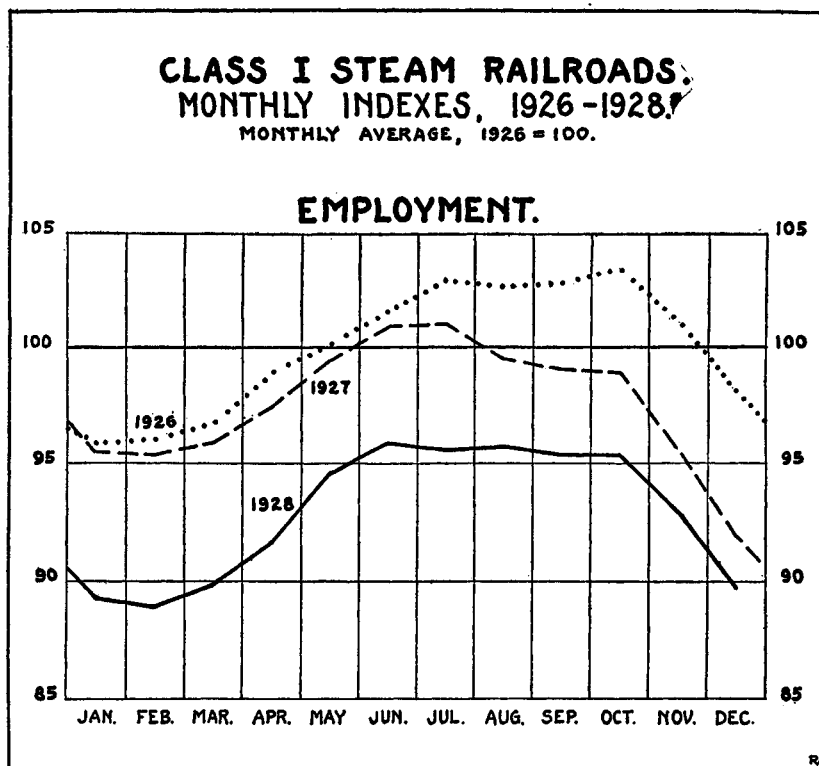


TABLE 2.—EMPLOYMENT ON CLASS I STEAM RAILROADS IN THE UNITED STATES, BY MONTHS, 1923

[From monthly reports of Interstate Commerce Commission, as data for only the more important occupations are shown separately, the group totals are not the sum of the items under the respective groups]

Occupation	Number of employees at middle of month											
	January	February	March	April	May	June	July	August	September	October	November	December
Professional, clerical, and general	272,741	271,818	271,582	270,957	271,169	271,403	272,216	271,959	271,510	271,639	270,693	268,972
Clerks.....	156,743	155,933	155,740	155,333	155,456	155,101	155,707	155,528	155,676	155,876	154,975	153,455
Stenographers and typists.....	24,790	24,699	24,741	24,659	24,655	24,758	24,644	24,663	24,588	24,617	24,673	24,621
Maintenance of way and structures	332,969	329,452	344,062	398,649	434,304	456,296	452,732	452,338	438,817	428,802	393,552	350,412
Laborers, extra gang and work train.....	38,390	38,277	44,272	58,557	74,063	82,351	81,820	80,445	74,849	69,543	57,615	45,563
Laborers, track and roadway section.....	171,153	168,998	170,687	203,898	228,096	237,899	234,519	234,461	227,883	222,863	202,393	177,235
Maintenance of equipment and stores	468,198	466,490	466,612	461,876	461,986	464,037	457,943	456,807	456,192	459,512	459,415	456,344
Carmen.....	99,667	99,018	99,905	99,220	99,663	100,967	99,266	99,453	100,056	101,313	100,880	99,530
Machinists.....	56,800	56,906	56,714	56,251	56,169	56,022	55,214	55,119	54,902	55,255	55,153	54,896
Skilled trades helpers.....	102,514	101,747	101,843	101,030	101,072	101,858	100,602	100,221	100,131	100,844	101,175	100,432
Laborers (shops, engine houses, power plants, and stores).....	39,764	39,320	39,151	38,159	37,966	37,919	38,118	37,361	37,352	37,700	37,626	37,369
Common laborers (shops, engine houses, power plants, and stores).....	52,905	53,241	52,978	52,303	52,784	53,191	52,024	52,536	51,981	52,450	52,449	52,338
Transportation, other than train, engine and yard	194,697	195,612	196,547	195,574	196,593	198,204	198,806	198,643	200,432	201,641	197,899	194,953
Station agents.....	30,125	30,045	29,978	29,941	29,914	29,897	29,904	29,868	29,779	29,729	29,663	29,541
Telegraphers, telephoners, and towermen.....	23,746	23,475	23,378	23,328	23,310	23,400	23,462	23,449	23,461	23,472	23,235	23,066
Truckers (stations, warehouses, and platforms).....	32,068	33,195	34,343	33,707	33,878	33,995	33,652	33,851	35,424	36,920	35,773	34,432
Crossing and bridge flagmen and gatemen.....	21,477	21,455	21,347	21,314	21,368	21,394	21,400	21,284	21,132	20,995	20,852	20,860
Transportation (yardmasters, switch tenders, and hostlers)	22,520	22,444	22,375	22,135	22,151	22,030	22,122	22,053	22,072	22,100	21,861	21,834
Transportation, train and engine	306,133	305,884	306,270	302,618	306,621	306,892	308,002	312,105	316,967	323,902	320,188	312,523
Road conductors.....	34,636	34,353	34,778	34,436	34,945	35,169	35,472	35,676	36,260	36,661	35,990	35,202
Road brakemen and flagmen.....	69,409	68,511	69,205	68,601	69,396	69,504	70,060	70,645	72,081	73,157	71,648	69,753
Yard brakemen and yard helpers.....	50,779	51,306	51,656	50,269	50,862	50,880	50,433	51,297	51,994	53,797	54,120	52,782
Road engineers and motormen.....	41,405	40,946	41,346	40,840	41,276	41,380	41,768	42,268	42,860	43,595	42,794	41,660
Road firemen and helpers.....	42,689	41,967	42,152	41,745	42,042	42,271	42,336	42,884	43,522	44,056	43,506	42,659
Total number of employees	1,597,258	1,591,401	1,609,448	1,641,809	1,692,824	1,718,862	1,711,823	1,713,905	1,705,990	1,707,596	1,663,608	1,605,033

State Employment Records

THE States listed below compile current statistics of volume of employment and total pay rolls from establishments within their respective jurisdictions. The industries covered vary to some extent among the several States. Also, the methods of presenting the data vary, although the usual practice is to show the changes (expressed in percentages or in index numbers) during the month preceding and during the year preceding. These reports, in so far as they are received by the Bureau of Labor Statistics, are published in the Labor Review each month, in summarized form. The following table, compiled from the State reports, shows the general character of these reports and the changes in employment and pay roll reported in the latter part of 1928 as compared with the corresponding periods of 1927.

PER CENT OF CHANGES IN EMPLOYMENT AND PAY ROLLS IN SPECIFIED STATES

Monthly period

State, and industry group	Percent of change, November to December, 1928		State, and industry group	Per cent of change, November to December, 1928	
	Employment	Pay roll		Employment	Pay roll
Iowa ¹			Maryland—Continued		
Food and kindred products...	+5.4	-----	Machinery (not including transportation equipment)...	+1.8	+8.5
Textiles.....	0.0	-----	Musical instruments.....	-3.0	+3.3
Iron and steel works.....	+4.4	-----	Transportation equipment.....	+3.0	+10.3
Lumber products.....	-1.7	-----	Car building and repairing.....	-3.0	-2.1
Leather products.....	+1.1	-----	Miscellaneous.....	+6.0	+1.4
Paper products, printing and publishing.....	+1.7	-----			
Patent medicines, chemicals, and compounds.....	-3.2	-----	All industries.....	-3.0	+1.6
Stone and clay products.....	-9.3	-----			
Tobacco and cigars.....	0.0	-----			
Railway car shops.....	-15.7	-----			
Various industries.....	+4.7	-----			
All industries.....	-4.0	-----			
Maryland ¹			New Jersey ¹		
Food products.....	+1.8	+2.4	Food and kindred products...	+14.3	+9.3
Textiles.....	+1.2	+3.2	Textiles and their products...	+1.7	+1.0
Iron and steel and their products.....	+4.3	+15.0	Iron and steel and their products.....	+1.6	+1.1
Lumber and its products.....	-3.0	+2.5	Lumber and its products.....	+2.3	+3.4
Leather and its products.....	-5.5	+12.7	Leather and its products.....	-2.8	-3.2
Rubber tires.....	-15.6	-33.9	Tobacco products.....	-1.5	-2.7
Paper and printing.....	-2.0	+1.8	Paper and printing.....	+3.7	+7.0
Chemicals and allied products.....	-1.1	+5.9	Chemicals and allied products.....	+5.0	+2.2
Stone, clay, and glass products.....	+6.0	+7.1	Stone, clay, and glass products.....	-8.0	-2.4
Metal products, other than iron and steel.....	+6.0	+2.0	Metal products other than iron and steel.....	+2.9	+1.9
Tobacco products.....	-9.5	+1.8	Vehicles for land transportation.....	+9.6	+8.7
			Miscellaneous.....	+1.2	-8.0
			All industries.....	+2.3	+1.6

¹ Annual figures not available.

PER CENT OF CHANGES IN EMPLOYMENT AND PAY ROLLS IN SPECIFIED STATES—Continued

Yearly period

State, and industry group	Percent of change, November, 1927, to November, 1928		State, and industry group	Employment— index numbers (1919-1923=100)	
	Employ- ment	Pay roll		Decem- ber, 1927	Decem- ber, 1928
California			Massachusetts—Contd.		
Stone, clay, and glass products.....	-2.2	-4.4	Paper and wood pulp.....	93.0	92.2
Metals, machinery, and conveyances.....	+11.6	+13.1	Printing and publishing.....	105.3	109.1
Wood manufactures.....	-4.9	-6.8	Rubber footwear.....	107.2	101.3
Leather and rubber goods.....	+31.7	+23.6	Rubber goods, tires, and tubes.....	99.2	82.6
Chemicals, oils, paints, etc.....	+25.1	+27.2	Silk goods.....	113.6	102.3
Printing and paper goods.....	-8	-1.2	Textile machinery and parts.....	66.3	50.1
Textiles.....	-4.9	+4.4	Woolen and worsted goods.....	88.1	82.2
Clothing, millinery, and laundering.....	-1.1	-1.1	All industries.....	83.0	78.9
Foods, beverages, and tobacco.....	+4.9	-7	Per cent of change, November, 1927, to November, 1928		
Water, light, and power.....	-6.4	-6.9	Employ- ment	Pay roll	
Miscellaneous.....	-7.2	-13.4	New York		
All industries.....	+5.8	+5.9	Stone, clay, and glass.....	+0.3	+2.4
Employment— index numbers (1922=100)			Metals and machinery.....	+3.4	+10.2
Novem- ber, 1927		Novem- ber, 1928	Wood manufactures.....	-7.5	-4.9
Illinois			Furs, leather, and rubber goods.....	+6	-1.0
Stone, clay, and glass.....	96.3	119.7	Chemicals oils, paints, etc.....	-2.2	-1
Metals, machinery, and conveyances.....	97.1	111.6	Paper.....	-9	-9
Wood products.....	89.5	79.3	Printing and paper goods.....	-5	+8
Furs and leather goods.....	111.1	100.5	Textiles.....	-3.1	-3.1
Chemicals, oils, and paints.....	113.9	122.5	Clothing and millinery.....	-3.1	-3.6
Printing and paper goods.....	120.4	117.8	Food and tobacco.....	(?)	+7
Textiles.....	113.8	102.6	Water, light, and power.....	-7.6	-3.4
Clothing and millinery.....	64.7	57.8	All industries.....	-1	+2.9
Food, beverages, and tobacco.....	93.6	91.6	Per cent of change, December, 1927, to December, 1928		
All manufacturing industries.....	91.8	96.4	Oklahoma		
Trade, wholesale and retail.....	78.6	70.5	Cottonseed-oil mills.....	-17.1	-17.6
Public utilities.....	136.3	139.2	Food production:		
Coal mining.....	65.4	60.9	Bakeries.....	+18.9	+23.1
Building and contracting.....	122.2	140.7	Confections.....	-64.2	-67.0
All industries.....	99.1	102.5	Creameries and dairies.....	-1.2	+7.2
Employment— index numbers (1919-1923=100)			Flour mills.....	+37.6	+36.4
Decem- ber, 1927		Decem- ber, 1928	Ice and ice cream.....	+28.4	+219.3
Massachusetts			Meat and poultry.....	+7.5	+3.1
Boots and shoes.....	62.8	64.4	Lead and zinc:		
Bread and other bakery products.....	98.7	104.1	Mines and mills.....	-11.2	-16.9
Cars and general shop construction and repairs, steam railroads.....	74.8	70.2	Smelters.....	+1.3	-4.4
Clothing, men's and women's.....	96.0	92.1	Metals and machinery:		
Confectionery.....	100.7	87.6	Auto repairs, etc.....	+245.4	+80.7
Cotton goods.....	67.4	57.5	Machine shops and foundries.....	+33.0	+27.9
Dyeing and finishing textiles.....	103.5	105.9	Tank construction and erection.....	+35.0	+48.2
Electrical machinery, apparatus, and supplies.....	107.3	104.2	Oil industry:		
Foundry and machine-shop products.....	64.8	68.1	Producing and gasoline manufacture.....	+26.9	+30.6
Furniture.....	111.2	109.4	Refineries.....	-1	+9.8
Hosiery and knit goods.....	87.6	71.5	Printing: Job work.....	+17.7	+44.5
Jewelry.....	106.1	108.3	Public utilities:		
Leather, tanned, curried, and finished.....	88.6	75.8	Steam-railway shops.....	-12.0	-8.4
			Street railways.....	+24.8	+10.8
			Water, light, and power.....	+217.3	+279.6
			Stone, clay, and glass:		
			Brick and tile.....	+54.7	-64.5
			Cement and plaster.....	+22.4	+27.5
			Crushed stone.....	+22.3	+39.7
			Glass manufacture.....	+12.1	+18.1

* Also publishes monthly per cent of change in employment and pay roll.

* Less than 0.05 per cent change.

PER CENT OF CHANGES IN EMPLOYMENT AND PAY ROLLS IN SPECIFIED STATES—Continued

Yearly period—Continued

State, and industry group	Per cent of change, December, 1927, to December, 1928		State, and industry group	Per cent of change, November, 1927, to November, 1928.	
	Employment	Pay roll		Employment	Pay roll
Oklahoma—Continued			Wisconsin		
Textiles and cleaning:			<i>Manual</i>		
Textile manufacture.....	+28.7	+22.2	Logging.....	+26.1	-13.2
Laundries, etc.....	+44.6	+43.1	Mining.....	-39.0	-44.7
Woodworking:			Stone crushing and quarrying.....	-26.3	-40.2
Sawmills.....	+438.8	+498.6	Manufacturing:		
Millwork, etc.....	+18.3	+30.4	Stone and allied industries.....	-9.7	-8.3
All industries.....	+22.3	+31.0	Metal.....	+16.2	+33.1
	Employment— index numbers (1923-1915=100)		Wood.....	+2.7	-2.0
	Decem- ber, 1927	Decem- ber, 1928	Rubber.....	+7.7	-3.8
Pennsylvania			Leather.....	-4.3	-7.2
Metal products.....	80.3	86.7	Paper.....	-2	+1.8
Transportation equipment.....	82.7	67.5	Textiles.....	-12.1	-11.9
Textile products.....	102.6	98.8	Foods.....	+2.9	+5.3
Foods and tobacco.....	91.6	95.5	Light and power.....	+8.9	+22.3
Stone, clay, and glass products.....	85.4	81.5	Printing and publishing.....	+8.5	+1
Lumber products.....	82.1	76.5	Laundrying, cleaning, and dyeing.....	+2.5	+9
Chemical products.....	95.2	98.1	Chemical (including soap, glue, and explosives).....	-20.6	-18.7
Leather and rubber products.....	100.7	95.4	All manufacturing.....	+5.2	+11.3
Paper and printing.....	90.1	92.6	Construction:		
All industries.....	87.7	88.3	Building.....	-14.8	-7.9
	Pay roll		Highway.....	-4.6	+3.7
Metal products.....	80.7	93.0	Railroad.....	+12.6	+9.0
Transportation equipment.....	84.2	67.7	Marine dredging, sewer digging.....	-37.3	-23.5
Textile products.....	113.4	108.8	Communication:		
Foods and tobacco.....	94.6	99.2	Steam railways.....	-7.1	+4.9
Stone, clay, and glass products.....	78.7	80.2	Electric railways.....	-8.9	-7.3
Lumber products.....	82.5	81.3	Express, telephone, and telegraph.....	+11.8	+13.5
Chemical products.....	103.1	105.4	Wholesale trade.....	+9.0	+2.8
Leather and rubber products.....	103.7	98.2	Hotels and restaurants.....	+3.1	
Paper and printing.....	109.8	105.9	<i>Nonmanual</i>		
All industries.....	89.6	92.8	Manufacturing, mines and quarries.....	-6	+2.3
			Construction.....	-7.7	-5.8
			Communication.....	+7.5	+7.1
			Wholesale trade.....	+11.9	+7.8
			Retail trade—sales force only.....	-6.3	-8.7
			Miscellaneous professional services.....	+5.1	+6.8
			Hotels and restaurants.....	-12.1	

Unemployment of Organized Building-Trades Workers in Massachusetts, April, 1927, to December, 1928

THE extent of unemployment of organized building-trades workers in Massachusetts from April 1, 1927, to December 3, 1928, by cause and by occupation, is shown in the accompanying tables. The figures have been compiled from press releases issued by the Massachusetts Department of Labor and Industries, which began publishing the data monthly as of April 1, 1927.

TABLE 1.—PER CENT OF ORGANIZED BUILDING-TRADES WORKERS UNEMPLOYED ON SPECIFIED DATES, BY CAUSE, APRIL, 1927, TO DECEMBER, 1928

Date	Cause of unemployment					
	Lack of work or materials	Strike or lockout	Sickness, accident, or old age	Unfavorable weather	Other reasons	All causes
1927:						
Apr. 1.....	24.7	0.1	1.7	0.3	0.6	27.4
May 2.....	17.8	.1	1.8	.1	(¹)	19.9
June 1.....	15.6	.9	1.7	.3	(¹)	18.4
July 1.....	15.3	.3	1.4	.2	(¹)	17.2
Aug. 1.....	12.4	.1	1.9	.2	(¹)	14.7
Sept. 1.....	12.8	.1	1.7	.6	(¹)	15.3
Oct. 3.....	11.4	.3	1.7	.1	(¹)	13.5
Nov. 1.....	12.0	.1	1.5	.1	(¹)	13.7
Dec. 1.....	16.2	(¹)	2.0	.6	.3	19.1
1928:						
Jan. 3.....	20.8	.8	2.1	3.4	.2	27.3
Feb. 1.....	27.4	.1	1.7	.2	(¹)	20.4
Mar. 1.....	28.9	.2	1.7	3.4	(¹)	34.1
Apr. 2.....	26.9	.2	1.7	.1	(¹)	28.9
May 1.....	22.2	.2	1.4	.1	.2	24.1
June 1.....	16.9	4.0	1.6	.3	.1	22.9
July 2.....	12.8	.1	1.4	.2	-----	14.6
Aug. 1.....	11.3	.2	1.5	.1	.1	13.2
Sept. 4.....	14.1	.1	1.6	(¹)	(¹)	15.8
Oct. 1.....	15.3	(¹)	1.8	.1	(¹)	17.2
Nov. 1.....	17.8	.1	1.9	.1	.2	20.1
Dec. 3.....	21.6	(¹)	1.9	.2	(¹)	23.7

¹ Less than one-tenth of 1 per cent.

TABLE 2.—PER CENT OF ORGANIZED BUILDING-TRADES WORKERS UNEMPLOYED ON SPECIFIED DATES, BY OCCUPATION, APRIL, 1927, TO DECEMBER, 1928

Date	Brick-layers, masons, and plasterers	Carpenters	Electrical workers	Iron carriers and building laborers	Lathers	Painters, decorators, and paper hangers	Plumbers, gas fitters, and steam fitters	Sheet-metal workers	Other occupations	All occupations
1927:										
Apr. 1.....	30.2	27.7	16.1	30.5	22.0	23.7	31.5	18.3	26.5	27.4
May 2.....	15.8	16.8	11.4	31.7	19.4	17.7	26.9	11.6	19.7	19.9
June 1.....	16.6	15.4	12.5	28.1	13.8	16.9	27.8	16.9	14.5	18.4
July 1.....	12.2	13.5	12.5	27.7	10.5	24.4	21.3	19.6	13.0	17.2
Aug. 1.....	10.8	15.1	15.4	16.8	8.6	13.2	15.2	19.5	14.0	14.7
Sept. 1.....	11.6	17.3	13.0	19.1	11.8	12.3	10.8	5.2	13.0	15.3
Oct. 3.....	10.0	12.2	9.0	19.9	6.3	20.9	6.0	4.2	13.7	13.5
Nov. 1.....	9.5	12.7	6.8	20.9	7.8	21.9	5.9	4.1	11.3	13.7
Dec. 1.....	15.4	15.7	10.8	35.3	16.9	30.7	11.0	6.2	5.7	19.1
1928:										
Jan. 3.....	23.1	25.8	15.7	37.6	24.4	42.4	17.1	15.9	17.1	27.2
Feb. 1.....	31.8	27.4	20.3	33.5	27.6	46.9	21.6	12.3	20.0	29.4
Mar. 1.....	35.0	31.6	22.5	38.1	26.6	48.6	30.7	12.7	28.1	34.1
Apr. 2.....	29.4	24.4	24.5	34.9	24.7	36.4	37.5	16.5	20.4	28.9
May 1.....	17.9	20.8	17.9	38.5	17.7	23.0	30.6	15.3	17.3	24.1
June 1.....	17.1	20.0	12.7	35.1	14.3	17.7	29.0	10.2	30.9	22.9
July 2.....	9.2	17.1	7.0	8.3	11.9	21.4	23.8	8.7	8.6	14.6
Aug. 1.....	11.0	16.8	5.0	10.9	13.1	14.1	16.3	5.5	3.3	13.2
Sept. 4.....	11.9	16.8	9.8	20.7	15.8	18.0	13.1	10.1	7.2	15.8
Oct. 1.....	14.1	16.8	6.1	30.2	18.4	17.4	8.1	7.8	10.0	17.2
Nov. 1.....	16.8	17.6	8.9	37.7	18.8	20.9	8.3	7.3	16.0	20.1
Dec. 3.....	23.0	22.8	10.2	32.6	18.6	27.6	11.2	10.7	28.3	23.7

Trend of Employment in Boot and Shoe and Cotton Goods Manufacturing

IN ADDITION to the regular monthly reports on trend of employment in various industries, the Bureau of Labor Statistics made, during 1928, special reports on employment and pay rolls in the boot and shoe industry and in cotton goods mills. In both of these industries there have been interesting geographical shifts in production, and the purpose of these special reports was to study these geographical changes.

Boot and Shoe Industry

THE TREND of employment and pay-roll totals from January, 1923, to August, 1928, in the three principal boot-making districts of the United States—New England, Middle Atlantic, and North Central—is shown in the accompanying table and chart.

INDEXES OF EMPLOYMENT AND PAY-ROLL TOTALS IN BOOT AND SHOE FACTORIES, BY DISTRICTS

[Monthly average, 1923=100]

New England States: Connecticut, Maine, Massachusetts, New Hampshire, Rhode Island, and Vermont

Month	Employment						Pay-roll totals					
	1923	1924	1925	1926	1927	1928	1923	1924	1925	1926	1927	1928
January.....	106.9	96.1	89.5	79.2	79.3	68.9	107.5	99.3	84.4	71.1	68.2	58.9
February.....	109.2	97.2	91.7	85.2	80.5	72.1	110.9	102.9	89.6	79.9	76.0	68.0
March.....	107.3	96.4	90.9	84.4	80.8	72.6	108.1	102.4	88.5	84.1	76.3	68.2
April.....	102.9	91.0	84.0	77.9	75.6	67.4	99.7	87.9	76.0	69.9	68.0	54.4
May.....	99.8	86.3	80.5	77.0	72.2	64.8	96.3	82.7	71.5	69.3	64.9	50.0
June.....	90.9	75.2	70.9	75.0	68.5	60.3	84.7	69.6	61.8	60.3	59.5	47.9
July.....	94.3	78.5	78.0	79.3	74.6	68.6	90.6	73.5	72.9	74.8	69.6	58.2
August.....	100.5	85.4	85.3	84.3	78.6	73.2	104.9	87.2	85.1	85.1	79.3	68.8
September.....	100.5	88.1	86.2	85.7	78.1	-----	103.7	92.2	80.2	84.1	76.1	-----
October.....	98.2	88.0	86.2	85.4	75.8	-----	97.0	90.7	81.7	81.0	65.5	-----
November.....	97.9	85.0	82.1	83.1	70.7	-----	101.2	76.6	70.6	73.6	56.8	-----
December.....	91.4	82.4	74.9	76.5	62.6	-----	93.5	72.8	63.0	63.9	47.5	-----
Average.....	100.0	87.6	83.4	81.1	74.8	168.5	100.0	86.5	77.1	75.5	67.3	159.3

Middle Atlantic States: New Jersey, New York, and Pennsylvania

Month	1923	1924	1925	1926	1927	1928	1923	1924	1925	1926	1927	1928
January.....	97.9	96.8	94.4	97.8	94.7	94.0	99.1	95.8	96.7	103.7	102.8	95.0
February.....	98.5	96.6	96.6	97.4	94.7	94.8	98.1	97.3	109.8	105.7	106.0	104.1
March.....	99.8	98.0	97.9	95.3	95.4	93.7	102.6	97.1	112.0	100.4	105.0	98.8
April.....	98.2	94.3	95.6	91.6	93.0	91.3	99.3	91.6	104.8	93.6	101.4	90.1
May.....	100.1	90.1	94.9	89.5	93.6	87.6	102.8	89.2	106.6	80.8	98.8	84.8
June.....	101.8	86.4	93.6	88.9	94.6	91.1	107.4	86.9	106.4	94.4	105.9	97.4
July.....	102.4	86.2	94.2	91.9	96.9	94.1	105.8	89.5	107.1	101.7	108.9	102.5
August.....	103.7	90.3	96.3	93.8	99.0	93.7	103.8	96.3	113.3	103.7	113.1	104.3
September.....	101.3	91.2	100.4	94.0	99.8	-----	99.6	101.8	107.4	106.2	112.6	-----
October.....	99.4	91.6	99.0	94.7	97.6	-----	95.4	100.1	102.4	107.6	106.0	-----
November.....	98.7	90.1	94.6	93.9	93.2	-----	87.4	86.1	94.2	100.7	92.2	-----
December.....	98.3	92.9	98.2	94.7	93.3	-----	98.8	104.1	104.5	104.4	96.1	-----
Average.....	100.0	92.0	96.3	93.6	95.5	192.5	100.0	94.7	106.3	100.2	104.1	197.1

¹ Average for 8 months.

EMPLOYMENT STATISTICS

INDEXES OF EMPLOYMENT AND PAY-ROLL TOTALS IN BOOT AND SHOE
FACTORIES, BY DISTRICTS—Continued

*North Central States: Illinois, Indiana, Iowa, Michigan, Minnesota, Missouri,
Ohio, and Wisconsin*

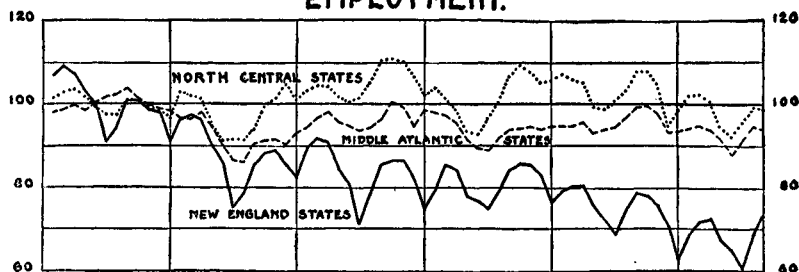
Month	Employment						Pay-roll totals					
	1923	1924	1925	1926	1927	1928	1923	1924	1925	1926	1927	1928
January.....	101.7	102.7	103.2	103.9	107.2	102.2	102.4	98.0	93.4	96.7	01.2	97.0
February.....	102.7	102.1	104.5	101.4	106.2	102.5	103.6	96.8	98.2	98.2	108.4	95.8
March.....	103.5	101.5	104.2	98.5	105.1	100.5	108.8	92.5	98.8	90.2	101.4	94.4
April.....	102.0	94.8	101.9	93.5	99.0	94.8	105.7	85.2	94.1	82.0	94.5	76.7
May.....	99.7	91.2	100.3	92.6	98.5	92.4	99.7	79.4	94.3	84.0	94.0	76.0
June.....	97.5	91.8	101.6	96.6	100.8	95.7	98.8	83.1	93.8	91.6	96.5	84.7
July.....	97.5	91.5	105.1	100.5	103.4	99.0	90.7	78.7	97.7	98.7	103.1	94.4
August.....	100.8	94.1	110.8	106.8	107.9	98.9	97.3	92.3	109.9	108.0	111.5	96.9
September.....	100.5	99.4	111.3	109.6	107.7	-----	98.8	98.2	104.3	104.7	106.8	-----
October.....	99.4	101.7	110.3	107.8	105.0	-----	101.5	98.6	105.3	104.7	101.1	-----
November.....	98.3	104.9	106.8	105.2	95.0	-----	98.0	96.3	95.5	96.5	78.9	-----
December.....	96.8	101.1	102.4	105.9	98.5	-----	96.3	94.5	93.2	97.6	89.1	-----
Average..	100.0	98.1	105.2	101.9	102.9	198.3	100.0	91.1	98.2	96.1	98.9	189.5

¹ Average for 8 months.

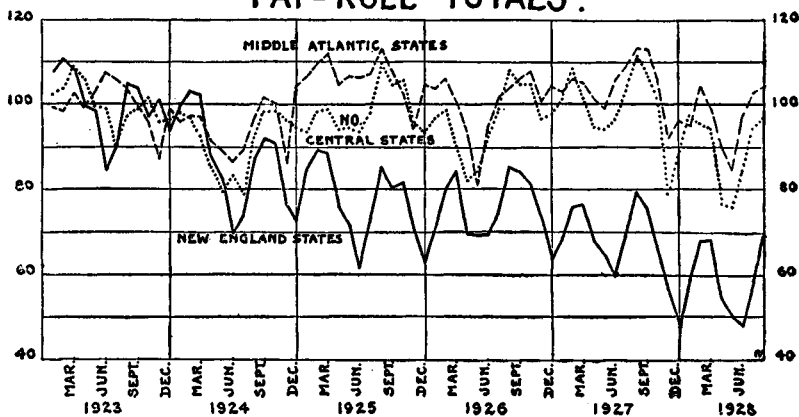
TREND OF EMPLOYMENT & PAY-ROLL TOTALS IN BOOT & SHOE FACTORIES BY DISTRICTS.

MONTHLY AVERAGE 1923=100.

EMPLOYMENT.



PAY-ROLL TOTALS.



The information collected is presented in the form of index numbers which show relatively the movement of employment and pay-roll totals from month to month—January, 1923, to August, 1928. In computing these index numbers the monthly average for 1923 is used

as a base, or 100. The data for 68 months are linked together by means of a chain index, the per cent of change from one month to the succeeding month being obtained by comparing reports from identical establishments for the two months. The number of establishments reporting has varied from month to month, and the average number in 1928 is greater than in 1923, but even in the earlier year so large a number of employees was represented in each district as to render the information representative of the industry as a whole in the respective districts.

In August, 1928, the representation from each district was as follows: New England, 107 establishments, 29,979 employees, and \$721,437 weekly pay-roll total; Middle Atlantic, 27 establishments, 23,029 employees, and \$617,498 weekly pay-roll total; North Central, 59 establishments, 30,273 employees, and \$666,068 weekly pay-roll total. The range of employment has been greatest in New England States, the index standing at 109.2 in February, 1923, at 60.3 in June, 1928, and 73.2 in August, 1928; in the Middle Atlantic States the index of employment stood at 103.7 in August, 1923, at 86.2 in July, 1924, and 93.7 in August, 1928; and in the North Central States the index of employment stood at 91.2 in May, 1924, at 107.9 in August, 1927, and 98.9 in August, 1928.

The average indexes of employment for the first eight months of 1928 and for the first eight months of 1927 are:

Geographic division	1927	1928
New England.....	76.3	68.5
Middle Atlantic.....	95.2	92.5
North Central.....	103.5	98.3

Cotton-Goods Mills

THE ACCOMPANYING table and chart show the trend of employment and pay rolls in the three principal cotton manufacturing districts of the United States—New England, Middle Atlantic, and Southern—from January, 1923, to September, 1928.

The information collected is presented in the form of index numbers which show relatively the movement of employment and pay-roll totals, from month to month, from January, 1923, to September, 1928. In computing these index numbers the monthly average for 1923 is used as the base, or 100. The data for 69 months are linked together by means of a chain index, the per cent of change from month to month being obtained by comparing reports from identical establishments for each two consecutive months. The number of establishments reporting has varied from month to month, and the average number in 1928 is considerably greater than in 1923, but even in the earlier year so large a number of employees was represented in each district as to render the information representative of the industry as a whole in the respective districts.

In September, 1928, the representation from each district was as follows: New England, 102 establishments, 64,344 employees, and \$1,219,617 pay-roll total; Middle Atlantic, 25 establishments, 11,250 employees, and \$239,011 pay-roll total; Southern, 323 establishments, 122,246 employees, and \$1,535,029 pay-roll total.

The range of employment has been greatest in the Middle Atlantic States, the index standing at 118.4 for February, 1923, and at 38.6

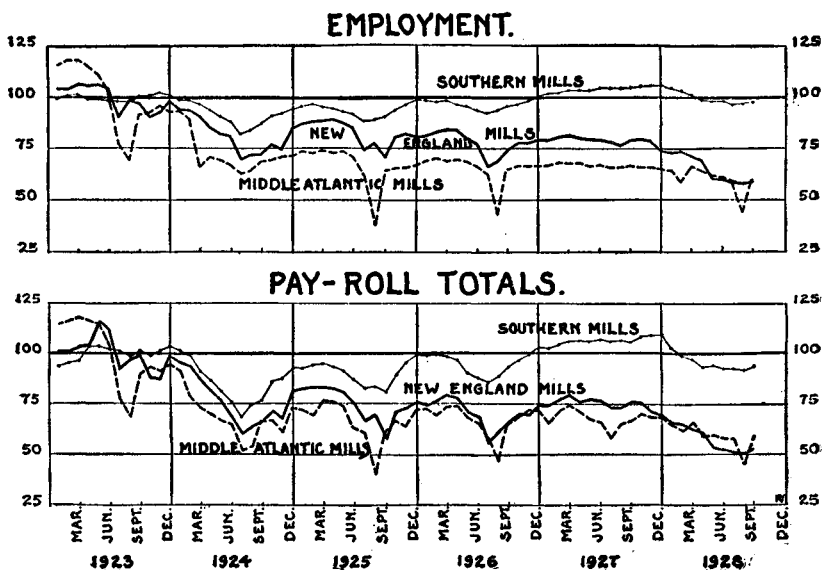
for August, 1925; for September, 1928, the index is 59.9. The New England States' employment index has ranged from 106.7 for March, 1923, to 58.3 for August, 1928. The Southern States' employment index has ranged from 106 for December, 1927, to 82.1 for July, 1924; for September, 1928, the index is 97.5.

The monthly average index for 1927 was *slightly* higher than the average index for 1926 in both the New England and Middle Atlantic districts, while in the Southern States the 1927 average was *considerably* higher than in 1926.

The average monthly indexes in the New England and Middle Atlantic geographic divisions were considerably lower in each year from 1924 to 1927, inclusive, than in 1923, while in the Southern States the average, although lower in 1924, 1925, and 1926, than in 1923, was 4.1 higher in 1927 than in the base year.

TREND OF EMPLOYMENT & PAY-ROLL TOTALS IN COTTON-GOODS MILLS.

MONTHLY AVERAGE 1923 = 100.



Comparative employment conditions in the three districts are further exemplified by the following tabular statement, which shows the average monthly index for each district for the first 9 months of each year, 1923 to 1928, inclusive. This statement shows that, while average monthly employment in the New England States was 36 per cent lower in the first 9 months of 1928 than in the same period of 1923 and 41 per cent lower in the Middle Atlantic States, there was no change in the Southern States in 1928 as compared with 1923.

District	Average index of employment for first 9 months of—					
	1923	1924	1925	1926	1927	1928
New England.....	102.0	82.5	83.2	77.6	79.4	65.1
Middle Atlantic.....	102.1	72.6	67.1	64.9	67.1	60.1
Southern.....	99.6	91.5	93.1	95.9	103.6	99.6

TABLE 9.—INDEXES OF EMPLOYMENT AND PAY-ROLL TOTALS IN COTTON-GOODS MILLS, BY DISTRICTS

[Monthly average, 1923=100]

New England States: Connecticut, Maine, Massachusetts, New Hampshire, Rhode Island, and Vermont

Month	Employment						Pay-roll totals					
	1923	1924	1925	1926	1927	1928	1923	1924	1925	1926	1927	1928
January.....	104.5	94.8	87.0	81.3	79.1	73.4	100.7	95.8	82.3	74.9	74.2	65.1
February.....	104.3	94.1	88.1	82.8	80.9	74.0	100.4	94.0	83.2	76.7	77.3	65.0
March.....	106.7	91.1	88.7	84.1	81.1	71.8	103.1	87.2	83.1	78.9	78.6	62.3
April.....	105.8	85.9	89.2	84.0	80.3	69.7	104.4	81.5	82.7	77.4	76.6	60.2
May.....	106.1	82.2	87.5	80.3	79.9	61.1	116.2	76.2	80.5	70.8	77.0	53.5
June.....	104.6	80.8	85.2	77.4	79.6	60.2	111.3	68.9	75.1	68.8	76.1	52.3
July.....	90.2	70.1	74.6	66.5	78.4	58.8	92.9	59.9	66.7	55.8	73.7	51.1
August.....	98.6	71.6	77.5	68.4	76.8	58.3	96.6	63.0	69.4	60.1	73.4	50.3
September.....	97.3	72.0	70.8	74.0	78.9	58.9	99.1	66.1	58.4	66.1	75.7	52.3
October.....	91.1	76.6	80.4	77.7	79.6	-----	88.0	70.6	71.8	69.9	75.7	-----
November.....	92.7	74.9	82.1	77.5	78.5	-----	87.5	68.0	72.8	69.7	71.4	-----
December.....	98.3	85.0	80.5	79.2	74.6	-----	99.6	81.9	75.2	74.1	69.5	-----
Average..	100.0	81.6	82.6	77.8	79.0	165.1	100.0	76.1	75.1	70.3	74.9	156.9

Middle Atlantic States: New Jersey, New York, and Pennsylvania

January.....	115.9	94.1	73.3	68.6	67.0	64.5	114.8	91.3	71.5	72.2	66.0	64.1
February.....	118.4	89.7	72.9	70.0	68.0	58.5	116.1	79.0	69.2	69.3	71.6	61.2
March.....	118.2	66.8	74.1	69.2	67.7	66.9	118.0	72.9	76.1	73.1	74.2	65.4
April.....	115.0	70.9	73.0	69.6	68.2	64.0	117.2	69.6	75.6	73.5	71.2	58.6
May.....	110.8	69.7	73.4	68.9	66.5	61.6	114.9	67.0	73.5	68.0	67.4	59.4
June.....	103.5	67.2	71.1	66.8	67.2	60.9	104.6	64.6	63.1	65.1	65.9	57.7
July.....	76.5	63.1	62.5	62.6	66.3	59.8	76.8	52.0	60.1	58.0	58.7	57.6
August.....	69.1	63.9	38.6	43.4	66.1	44.4	68.5	53.3	40.9	46.8	64.6	45.2
September.....	91.8	68.2	64.6	64.8	66.6	59.9	90.0	66.6	60.1	65.8	66.5	58.9
October.....	92.3	69.3	65.4	66.7	66.1	-----	93.3	66.8	66.7	68.6	70.0	-----
November.....	95.5	70.7	65.5	66.5	66.0	-----	91.6	60.5	63.7	71.7	68.5	-----
December.....	92.9	71.6	67.3	66.7	65.0	-----	94.2	72.9	71.9	71.5	68.4	-----
Average..	100.0	72.1	66.8	65.3	66.7	160.1	100.0	68.0	66.0	67.0	67.8	158.7

Southern States: Delaware, Florida, Georgia, Maryland, North Carolina, South Carolina, Virginia, West Virginia, Alabama, Kentucky, Mississippi, Tennessee, Arkansas, Louisiana, Oklahoma, and Texas

January.....	99.4	99.6	96.0	98.9	101.5	104.7	93.8	101.3	92.9	99.3	102.2	102.7
February.....	100.7	99.8	97.1	97.9	102.3	103.2	95.5	99.9	94.4	99.8	104.4	99.8
March.....	101.2	97.3	95.4	98.7	103.3	101.4	96.4	91.5	94.8	98.4	105.6	97.4
April.....	99.7	94.2	95.2	96.8	103.6	99.3	103.3	87.2	93.4	96.7	106.1	93.4
May.....	99.4	91.1	93.5	95.5	103.4	98.7	103.3	80.8	91.5	90.7	105.6	94.5
June.....	93.8	88.0	92.4	93.8	104.3	98.3	102.2	75.7	87.0	87.9	106.7	92.6
July.....	98.6	82.1	88.6	92.5	104.6	96.5	100.8	68.6	82.9	85.6	105.7	92.4
August.....	98.2	84.2	89.4	93.6	104.8	97.0	99.1	74.0	83.1	88.8	106.3	92.0
September.....	100.1	87.1	90.1	95.4	104.6	97.5	101.0	76.5	80.3	93.2	106.0	94.2
October.....	100.4	90.9	94.2	96.8	105.0	-----	99.6	85.6	89.7	96.6	108.3	-----
November.....	102.3	92.6	96.8	98.7	105.9	-----	101.7	87.5	95.3	99.2	108.7	-----
December.....	101.0	94.7	99.4	100.2	106.0	-----	103.8	93.1	99.6	102.6	109.0	-----
Average..	100.0	91.8	94.0	96.6	104.1	199.6	100.0	85.1	90.4	94.9	106.2	195.4

¹Average for 9 months.

Unemployment in the United States in 1928: Report of Secretary of Labor

IN RESPONSE to a Senate resolution the Secretary of Labor on March 24, 1928, transmitted to the Senate a report regarding the unemployment situation in the United States. The report explained that complete information was not available as regards the total

number of persons out of work, and that no accurate information of this character could be obtained except by a very comprehensive census. From existing data, however, the Commissioner of Labor Statistics estimated that between 1925 and January, 1928, there was a shrinkage of 1,874,050 in the number of employed wage and salary workers. No attempt was made to estimate the number of unemployed in the base year, 1925, but it was pointed out that 1925 was a year in which there was no noticeable unemployment question.

The report of the Secretary included a statistical report on the unemployment situation, prepared by the United States Commissioner of Labor Statistics. Extracts from this report follow:

Report of Commissioner of Labor Statistics

ON MARCH 6, 1928, the United States Senate passed Resolution 147, which contains the following language:

Resolved, That the Secretary of Labor is hereby directed (1) to investigate and compute the extent of unemployment and part-time employment in the United States and make report thereon to the Senate, and together therewith to report the methods and devices whereby the investigation and computation shall have been made; (2) to investigate the method whereby frequent periodic report of the number of unemployed and part-time employed in the United States and permanent statistics thereof may hereafter be had and made available, and make report thereon to the Senate.

Responding to the requirements of the first part of the resolution quoted, the best estimate that can be made from all sources of information available at this time is that the shrinkage in the volume of wage earners, including manufacturing, transportation, mining, agriculture, trade, clerical, and domestic groups, figuring on a basis of those employed in 1925, is revealed to be 7.43 per cent. Applying this percentage to the total number of employees as of 1925 gives a shrinkage between the average of 1925 and January, 1928, of 1,874,050 persons.

The method of calculation employed in arriving at this figure is as follows: First, the census of 1925 is taken as a base, because the census of 1920 represents a boom year, and while there was a tremendous slump between that and the census of 1923, nevertheless between these periods there had been a recovery and the year 1923 brought an up-swing, which from the present point of view may be considered by some at least an incipient boom. Employment dropped again in 1924, advanced slightly in 1925, a little more in 1926, and dropped again through 1927. The year 1925 may therefore be accepted as an average recent year from which to take measurement, and it is herein made the base from which employment shrinkage has been computed. In making 1925 the base or 100, it is understood that whatever there may have been of unemployment in that year is ignored, and it is assumed that those who were let out of industry between 1923 and 1924 had by 1925 readjusted themselves. It may be said that 1925 was a year in which there was no noticeable unemployment question. It is also used as a base because it was a year in which the Census of Manufactures was taken.

The foundation of the estimate here submitted is the known figures for 1925 for (1) manufacturing wage earners, and (2) railroad employees. These, with the estimates as of January, 1928, are as follows:

Industry	Employed in 1925	Estimated employed January, 1928	Estimated shrinkage
Manufacturing.....	8,383,781	7,739,907	643,874
Railroads.....	1,752,589	1,643,356	109,233
Total.....	10,136,370	9,383,263	* 753,107

¹ December, 1927.² Decrease of 7.43 per cent.

No figures are available for the groups—agriculture, mining, clerical workers, domestic service and trade—and it can only be assumed that they have been affected in like degree.

The change in manufacturing employment is determined from the change in the Bureau of Labor Statistics' index of employment in manufacturing industries. The railroad figures are exact for Class I railroads, omitting general and division officials. The number of employees in 1925 is estimated from the population census taken as of January, 1920, as recast in the July, 1923, issue of the Monthly Labor Review, and from the percentage of change in employment as known for manufacturing and railroads.

The number of employees in 1925 used in this calculation—that is, persons working for wages or salaries for others—is estimated at 25,222,742. This figure does not include any person operating his own business or profession. The calculated number of employees as of January, 1928, upon the same basis, was 23,348,692, leaving a shrinkage between the two periods as indicated above of 1,874,050.

The figures of percentage of change in employment show a great variation in geographical districts, which the Bureau of Labor Statistics interprets to mean that unemployment is not universal nor in all places or industries is it acute, but that it is spotted by geographical sections and by industries, and that in actual numbers it is not more than one-third of the magnitude of the labor depression of 1921, which caused a shrinkage in the number on the pay roll according to the estimates of this bureau of 5,735,000, from the peak of 1920 to July, 1921.

The spottedness of the unemployment situation is brought out by a list showing the percentage of change in employment between a given month in 1928 and the same month in 1927, except in the case of Wisconsin where December is used. These ranges in percentage are shown in the following table:

YEARLY CHANGES IN EMPLOYMENT

State	Period	Per cent of change in employ- ment
U. S. Bureau of Labor Statistics.....	January, 1927-January, 1928.....	-5.8
Oklahoma.....	February, 1927-February, 1928.....	-19.7
Wisconsin (factory workers).....	December, 1926-December, 1927.....	-3.9
Illinois.....	February, 1927-February, 1928.....	-6.5
California.....	January, 1927-January, 1928.....	-7.8
New York.....	do.....	-5.8
Maryland.....	do.....	-7.8
Massachusetts.....	February, 1927-February, 1928.....	-9.7

As further indication of such spottedness, the employment report from the State of California indicates that the average of employment in all industries carried was 7.8 per cent lower in January, 1928, than in January, 1927. The details show the same spotted conditions there that have been noted elsewhere. For instance, canning and packing of fish has dropped off 67.8 per cent while other food products showed an increase of 19.3 per cent. Men's clothing dropped 11.3 per cent while millinery advanced 11.6 per cent. Iron foundries and machine shops fell off 16.6 per cent while glass advanced 18.7 per cent. Sugar fell off 21.6 per cent while agricultural implements advanced 30.1 per cent.

Part-Time Employment

IN THE pamphlet on Employment in Selected Manufacturing Industries for January, 1928, percentage figures were given as to the number of establishments operating full time or part time and establishments idle. Such figures were based on the reports of establishments, without taking into consideration the size of the several establishments.

These percentage figures have since been recomputed and weighted by the number of employees. In other words, due weight has been given to the size of the establishment in computing the average per cent.

Reports on percentage of full-time employment were received from but 9,095 of the 10,772 establishments reporting other facts to the bureau in the pay period ending nearest January 15, 1928. Of these 78.8 per cent were working full time, 20.2 per cent were working part time and 1.1 per cent were working overtime.

Of the total number of employees reported, 1,876,367 employees (78.7 per cent) were working in establishments operating full time; 482,354 employees (20.2 per cent) were employed in establishments working part time; and 25,598 employees (1.1 per cent) were employed in establishments working above normal full time.

In the establishments reporting part time operation, the weighted time worked by the 482,354 employees was 80.7 per cent of full time. The weighted average per cent of time worked by the 25,598 employees in those plants operating in excess of normal full time was 111.3 per cent of full time.

The following table shows a classification of the employees by groups, according to per cent of normal full time worked.

NUMBER AND PER CENT OF EMPLOYEES IN ESTABLISHMENTS WORKING EACH SPECIFIED PER CENT OF REGULAR FULL WORKING TIME

Per cent of employment	Persons in group		Per cent of employment	Persons in group	
	Number	Per cent		Number	Per cent
Over 100 per cent (overtime).....	25,598	1.1	73 per cent.....	33,534	1.4
100 per cent (regular full time).....	1,876,367	78.7	72 to 61 per cent.....	37,102	1.5
99 to 93 per cent.....	56,291	2.4	60 per cent.....	23,371	1.0
92 per cent.....	88,956	3.7	59 to 51 per cent.....	10,692	.4
91 per cent.....	31,697	1.3	50 per cent.....	12,744	.5
90 to 84 per cent.....	31,742	1.3	49 to 25 per cent.....	6,731	.3
83 per cent.....	47,509	2.0	24 to 9 per cent.....	428	1.0
82 per cent.....	54,833	2.3			
81 to 74 per cent.....	46,724	2.0	Total.....	2,384,319	100.0

¹ Less than one-tenth of 1 per cent.

This tabulation shows that 79.8 per cent of all employees were in establishments that worked full time or over and that 87.2 per cent of all employees were in establishments that worked more than 90 per cent of full time, while less than 1 per cent of the employees were in establishments working half time or less.

In the great majority of establishments six days constitute a full week. In some departments of the iron and steel industry continuous operation is obligatory, and in a few instances seven days constitute a full week, although usually employees are granted relief at various stated intervals, such as one day in seven, fourteen, nineteen, etc., as the case may be. Five and one-half days make a full week in a few establishments and five days in some others.

Employees working less than their regular full time may be roughly grouped as follows:

Idle over one-half day and under one day, 1.3 per cent.

Idle one day, 5.3 per cent.

Idle over one day and including one and one-half days, 3.4 per cent.

Idle over one and one-half days and under three days, 2.9 per cent.

Idle three days or more, 0.8 per cent.

In addition to the 9,095 establishments in operation that reported their per cent of full-time employment, 108 establishments definitely reported that they had recently become temporarily idle. These establishments were smaller than the average and several of them were in their slack season. When last operating they employed 14,126 persons. Thus, about six-tenths of 1 per cent of manufacturing industry employees became temporarily idle because of recent shutdown of plants in which employed.

In this statement of part-time employment the bureau confines its report strictly to the data in hand and does not apply the percentage obtained therefrom to manufacturing industries as a whole, for the reason that there is no information at hand upon which to base an opinion as to whether the same percentage found to exist in the establishments reporting to this bureau, which are admittedly larger than the average establishment, could fairly be applied to manufacturing industries as a whole. There is no material available upon which to base an opinion as to whether averages from the selected industries now reporting to the Bureau of Labor Statistics should be applied to clerical and domestic labor, or to any of those classes which are not covered in these reports.

It may not be out of place here to call attention to the fact that unemployment as it at present exists is composed of two entirely different elements, first, those who are temporarily out of work at their regular occupation and in their regular industry and, second, those who have been displaced by the changes in industrial and commercial methods—or as one might say, the suspended and the displaced. What proportion of those at present entirely idle applies to each one of these classes it is impossible to tell. The man who has been entirely displaced by a new method of doing work or a new machine must seek new contacts, it may be change his occupation and his industry entirely. In other words, in one class a man is waiting for his old job with reasonable assurance that the plant which is now idle will resume operation and he will be restored to his employment. In the other class the job is gone. The work formerly done by human energy is now performed by mechanical devices.

The chances are that not only in the establishment from which he was dropped but in all other similar establishments he will face the same situation—that he must start anew. It is not unreasonable, as has been estimated by a writer in the *Annalist*, that one-half of the employment shrinkage shown in this report is due to new machines and new mechanical devices. All that is definitely known is that taking it for all in all the total displaced labor is largely of the unskilled type. The conveyor, the motor hoist truck, changes in placement of machines so that the process is continuous and the material goes from machine to machine by the force of gravity, are schemes that have displaced much labor, and this labor is mostly unskilled and common labor.

Survey of Unemployment in Baltimore, February, 1928

A SURVEY of the volume of unemployment in the city of Baltimore was made in February, 1928, by the Commissioner of Labor and Statistics of Maryland. Extracts from this report are given below:

A study and survey of the facts obtained show that in Baltimore City there are at the present time [February, 1928] approximately 15,500 unemployed persons who usually are engaged in some gainful occupation. These figures are based on information secured by a house-to-house canvass conducted by the members of the city police force, through the courtesy of their commissioner, upon the request of the commissioner of labor and statistics.

While this total number is smaller than any of the various and scattered estimates of the amount of unemployment in Baltimore, several factors must be taken into consideration before arriving at a conclusion of its general effect. In making the canvass, consideration was given only to those who usually work for wages or on their own account in some business and who are now entirely without gainful employment of any kind. No effort was made to secure information for the apparently large number of persons who are employed for only part time. This is a separate and distinct study in itself and must be approached, we believe, from a different angle and by a different method. In addition, every precaution was made to eliminate those men and women who either could not or would not work if employment were available for them. To have included either or both of these groups would have clouded our problem, and would, perhaps, have greatly increased our figures.

Thus, then, if we may legitimately assume that the number of those usually engaged in gainful occupations in Baltimore City has increased at the same rate as the estimated population, we find approximately 4 per cent of these men and women, who can work and who want to work, unable to secure employment at the present time. Of the 15,473 persons found unemployed, by far the larger group, 13,468 in fact, is composed of men. Only 2,005 women, of whom 1,279 are white and 726 are colored, are included. More than 10,000 of these unemployed are white.

While more than 25 per cent of these men and women have worked in connection with the various manufacturing industries, the individual industry in which the survey shows unemployment to be the

most severe is building. Here alone we find about one-sixth of the total number of persons. The textile industry, involving mostly clothing, is the most outstanding of the manufacturing industries, with food products and iron and steel competing for second place.

In considering the regular occupations of those unemployed, we find that the largest single group is composed of unskilled labor. The second largest number are found in the semiskilled operatives and factory workers, but of the individual building and hand trades carpenters lead in actual numbers.

The individual reports submitted by the police department indicate that, through the unemployment of these 15,473 men and women, almost 13,000 of an approximate number of 175,000 families are involved, and that at least 64,000 individuals are either directly or indirectly affected, a situation the seriousness of which is not to be minimized.

The existence of a group of almost 15,500 totally unemployed persons who are usually gainfully employed in a city of Baltimore's size is in itself a serious problem. The situation in this city, however, has become acute in that a large proportion of these individuals have been without employment for relatively long periods of time. Generally speaking, the findings show periods of unemployment, not in days or weeks as we might have reasonably expected, but rather in months. According to the results of the survey, less than 2,000 of the total number have been without employment of any kind for less than one month and almost two-thirds have been unemployed for periods varying between one and five months.

The total number of families in which one or more cases of unemployment were found, was 12,739; number of private families, 12,217; number of boarding houses, 289; number of lodging houses, 170; number of unclassified families, 63. The total number of persons included in the 12,739 families was 64,306. The total number of persons who usually are engaged in gainful occupations in these 12,739 families, was 29,099.

NUMBER OF REGULARLY ENGAGED PERSONS IN BALTIMORE WHOLLY UNEMPLOYED, CLASSIFIED BY SEX, COLOR, AND REGULAR OCCUPATION

Regular occupation	Males			Females			Total unemployed
	White	Colored	Total	White	Colored	Total	
Apprentices in building and hand trades.....	132	22	154	-----	-----	-----	154
Blacksmiths.....	39	1	40	-----	-----	-----	40
Boilermakers.....	56	-----	56	-----	-----	-----	56
Brick and stone masons.....	209	9	218	-----	-----	-----	218
Building industry.....	135	5	140	-----	-----	-----	140
Other industries.....	5	-----	5	-----	-----	-----	5
Contractors.....	69	4	73	-----	-----	-----	73
Carpenters.....	852	24	876	-----	-----	-----	876
Building industry.....	588	17	605	-----	-----	-----	605
Other industries.....	59	1	60	-----	-----	-----	60
Contractors.....	205	6	211	-----	-----	-----	211
Electricians.....	131	-----	131	-----	-----	-----	131
Building industry.....	25	-----	25	-----	-----	-----	25
Other industries.....	24	-----	24	-----	-----	-----	24
Contractors.....	82	-----	82	-----	-----	-----	82
Engineers (stationary) and cranemen.....	101	5	106	-----	-----	-----	106
Building industry.....	19	1	20	-----	-----	-----	20
Other industries.....	37	-----	37	-----	-----	-----	37
Contractors.....	45	4	49	-----	-----	-----	49
Factory workers (not otherwise classified).....	926	671	1,597	117	13	130	1,727
Food and kindred products.....	122	93	215	33	3	36	251
Textiles and their products.....	47	17	64	11	2	13	77
Iron and steel, not including machinery.....	165	87	252	22	1	23	275

NUMBER OF REGULARLY ENGAGED PERSONS IN BALTIMORE WHOLLY UNEMPLOYED, CLASSIFIED BY SEX, COLOR, AND REGULAR OCCUPATION—Continued

Regular occupation	Males			Females			Total unemployed
	White	Colored	Total	White	Colored	Total	
Factory workers (not otherwise classified)—Con.							
Lumber and allied products	70	56	126	1	—	1	127
Leather and its manufactures	11	7	18	3	—	3	21
Rubber products	4	—	4	—	—	—	4
Paper and printing	12	7	19	1	—	1	20
Chemicals and allied products	47	111	158	7	—	7	165
Stone, clay, and glass products	37	81	118	—	1	1	119
Metal and metal products, other than iron and steel	42	42	84	2	—	2	86
Tobacco manufactures	4	2	6	3	—	3	9
Machinery, not including transportation equipment	95	35	130	1	—	1	131
Musical instruments	4	—	4	—	—	—	4
Transportation equipment	69	28	97	—	—	—	97
Railroad repair shops	20	5	25	—	—	—	25
Other industries	177	100	277	33	6	39	316
Firemen (not locomotive or fire department)	67	22	89	—	—	—	89
Laborers (not otherwise classified)	1,501	2,594	4,095	—	—	—	4,095
Building industry	204	882	1,086	—	—	—	1,086
Other laborers	1,297	1,712	3,009	—	—	—	3,009
Machinists	237	3	240	—	—	—	240
Mechanics (not otherwise classified)	89	9	98	—	—	—	98
Painters	451	33	484	—	—	—	484
Building industry	229	7	236	—	—	—	236
Other industries	22	12	34	—	—	—	34
Contractors	200	14	214	—	—	—	214
Paper hangers	78	8	86	—	—	—	86
Building industry	16	2	18	—	—	—	18
Contractors	62	6	68	—	—	—	68
Plasterers and cement finishers	145	16	161	—	—	—	161
Building industry	84	9	93	—	—	—	93
Contractors	61	7	68	—	—	—	68
Plumbers, gas fitters, and steam fitters	305	7	312	—	—	—	312
Building industry	71	—	71	—	—	—	71
Other industries	48	—	48	—	—	—	48
Contractors	186	7	193	—	—	—	193
Semiskilled operatives (not otherwise classified)	934	68	1,002	341	36	377	1,379
Food and kindred products	135	16	151	36	2	38	189
Textiles and their products	222	22	244	186	22	208	452
Iron and steel and their products (not including machinery)	135	8	143	23	—	23	166
Lumber and allied products	76	1	77	10	—	10	87
Lumber and its manufactures	27	3	30	4	—	4	34
Rubber products	4	—	4	1	—	1	5
Paper and printing	118	1	119	18	—	18	137
Chemicals and allied products	9	2	11	1	—	1	12
Stone, clay and glass products	33	5	38	2	2	4	42
Metal and metal products, other than iron and steel	32	1	33	1	—	1	34
Tobacco manufactures	19	—	19	37	6	43	62
Machinery, not including transportation equipment	13	—	13	—	—	—	13
Musical instruments	6	—	6	—	—	—	6
Transportation equipment	33	2	35	—	—	—	35
Railroad repair shops	6	—	6	—	—	—	6
Other industries	66	7	73	22	4	26	99
Other manufacturing and mechanical occupations	618	29	647	61	15	76	723
Total, manufacturing and mechanical	6,871	3,521	10,392	519	64	583	10,975
Water transportation ¹	136	173	209	—	—	—	209
Sailors and deck hands	111	14	125	—	—	—	125
Stevedores	7	59	66	—	—	—	66
Others	18	—	18	—	—	—	18
Road and street transportation	506	289	795	1	—	1	796
Chauffeurs	426	239	665	1	—	1	666
Draymen, teamsters	73	47	120	—	—	—	120
Others	7	3	10	—	—	—	10
Railroad transportation	82	4	86	—	—	—	86
Brakemen	35	—	35	—	—	—	35
Others	47	4	51	—	—	—	51
Express, post, telegraph and telephone	15	1	16	36	—	36	52
Telephone operators	4	1	5	36	—	36	41
Others	11	—	12	—	—	—	12
Total, public utilities	739	367	1,106	37	—	37	1,143

¹ Including 89 occupants of two seamen's lodging houses who may or may not be usual residents of Baltimore.

NUMBER OF REGULARLY ENGAGED PERSONS IN BALTIMORE WHOLLY UNEMPLOYED, CLASSIFIED BY SEX, COLOR, AND REGULAR OCCUPATION—Continued

Regular occupation	Males			Females			Total unemployed
	White	Colored	Total	White	Colored	Total	
Retail dealers.....	44	6	50				50
Salesmen.....	484	13	497	229	4	233	730
Others.....	81	4	85	30	2	32	117
Total, trade.....	609	23	632	259	6	265	897
Public service (policemen and firemen).....	9		9				9
Professional service.....	59	5	64	23	1	24	88
Servants.....	25	112	137	50	578	628	765
Other domestic and personal service.....	150	247	397	69	71	140	537
Total, domestic and personal service.....	175	359	534	119	649	768	1,302
Bookkeepers, cashiers, accountants.....	51	1	52	37	1	38	90
Clerks (office).....	240	3	243	110	1	111	354
Stenographers and typists.....	11	1	12	112	2	114	126
Other clerical occupations.....	157	16	173	27		27	200
Total, clerical occupations.....	459	21	480	286	4	290	770
Clerks, unclassified ²	96		66	14		14	89
Other occupations.....	165	20	185	22	2	24	200
Total, other occupations.....	231	20	251	36	2	38	289
All occupations.....	9,152	4,316	13,468	1,279	726	2,005	15,473

² Unclassified as to whether sales or office clerks.

The statement below classifies the unemployed according to the length of time during which they have been entirely without employment of any kind:

Less than 1 month.....	1,981
1 month and under 2 months.....	2,373
2 and under 3 months.....	3,041
3 and under 4 months.....	2,643
4 and under 5 months.....	1,657
5 and under 6 months.....	901
6 and under 7 months.....	1,229
7 and under 8 months.....	275
8 and under 9 months.....	320
9 and under 10 months.....	122
10 and under 11 months.....	46
11 and under 12 months.....	26
12 months and over.....	778
Time not reported.....	81
Total.....	15,473

Employment Conditions in New York State, 1928

IN RESPONSE to a request from the Governor of New York the State industrial commissioner submitted on February 14, 1928, a report on employment conditions in New York State and New York City,² including statistics of factory employment, returns from building departments in various cities, records of the State employment service, and private welfare agencies, and other data secured from reliable sources from various cities.

² New York. Department of Labor. Report to Hon. Alfred E. Smith, Governor of the State of New York, on unemployment conditions in New York State, by James A. Hamilton, industrial commissioner, February, 1928. Albany, 1928.

The report states that "the evidence at hand indicates an extensive amount of unemployment and that serious distress has been caused."

Factory Employment

APPROXIMATELY 500,000 employees, or from 35 to 40 per cent of all the factory workers in New York State, are included in the monthly reports made to the State department of labor. These reports show that "since the spring of 1926 the general level of factory employment has declined, and in December, 1927, the index of such employment was below that of December, 1921. In January, 1928, there was a further decrease of 2 per cent, bringing the index below that of January, 1921."

Falling Off of Building Activities

THE returns on the issuance of building permits in 23 cities of New York State indicated a decline in 1927 of 13 per cent in the estimated cost of such building work as compared with the previous year.

Employment Conditions in New York City

ACCORDING to detailed reports of the employment service of the New York State Department of Labor for its Manhattan, Brooklyn, and Bronx offices and the Harlem office for negroes, the combined registration for adults and juveniles for December, 1927, was 13.6 per cent below the registrations for the corresponding period in 1926, while the adult registrations alone were 23.2 per cent less in December, 1927. The decrease in placements of both adults and juveniles was even more striking, being in December, 1927, 36.6 per cent below the December, 1926, record.

The decline in registrants may be explained by the fact that in times of serious unemployment men flock into the office and when they hear jobs are not available turn away without registering. When there is a fair condition of the market with some jobs available a larger proportion of the men who call make formal registration. The largest percentage of registrants is obtained when many jobs are open since the workmen become eager to move on to better positions. In addition, space in one of the offices is limited and when it becomes congested many turn away immediately, thus reducing still further the number registering.

Of 30 voluntary employment agencies making returns, 22 reported a larger number of applicants for work in December, 1927, than in the corresponding period in 1926, and 8 reported fewer applicants in December, 1927. For the whole group of reporting voluntary agencies the placements in December, 1927, were 5,547, or 638 more than in December, 1926.

Of the 15 family service agencies reporting, 13 together had 23,330 active cases in December, 1927, or 1,950 in excess of December, 1926. With one exception the 10 seamen's agencies stated that they had increased calls for service in December, 1927.

Of the four agencies concerned with homeless men, three together served 2,922 persons in December, 1927, or 423 more than in December of the previous year. The fourth agency had very many more applicants in December, 1927, than in December, 1926, but the number of those served in the later period was less because of the dearth of jobs, which necessitated the men's remaining in the institution for a longer period.

Admission to the municipal lodging house numbered 17,220 in December, 1927, or 7,053 above the December, 1926, record.

Situation in Other Cities

AMONG the cities for which estimates as to the number of unemployed are given in the report are the following:

	Population	Unemployed
Buffalo.....	538, 016	35, 000 to 40, 000
Rochester.....	316, 786	10, 000
Syracuse.....	182, 003	5, 000 to 7, 000

Stability of Employment in Various Industries

DURING recent months the Bureau of Labor Statistics has been carrying on a series of studies for leading industries to determine the degree of regularity of employment and to ascertain whether there has been any improvement in this respect during the past several years. The industries for which results have so far been published are: The iron and steel industry, the men's clothing industry, the automobile industry, and railroad transportation.

In the case of the railroads, the basic data are derived from the reports of the railroad companies to the Interstate Commerce Commission. In the case of the manufacturing industries, the basic data are from the monthly reports on employment furnished the Bureau of Labor Statistics by various manufacturing establishments. It is, of course, highly desirable that the data should be by occupations and not merely by establishments. Such occupational separation is available for the railroads, but, unfortunately, is not available for the manufacturing establishments.

In considering the results of these studies, it is important to bear in mind that regularity of employment is an entirely different matter from volume of employment. Thus, the total number of employees in a plant may steadily decline from year to year with improving productive efficiency, while within each year the fluctuations in the number of employees, whether due to seasonal or other causes, may progressively diminish, with the result that the employees, though fewer in number, may have more steady work.

Also, it is to be noted that the periods covered are not identical for the industries here studied, the statistical work having been done at various dates, and the results are here presented just as they were originally published.

Index of Employment Stability

THE METHOD of measuring employment stability used in these studies is that of the relationship of average monthly employment during the year to the number of employees in the month of maximum employment. Thus, if during 1927 a particular establishment or occupation had a monthly average of 90 employees and the maximum number in any month was 100, then the stability of employment may be fairly said to be 90 per cent. In other words, if the 100 men needed to fill the positions at the busiest season had no other opportunity for work, then each man would have an opportunity of 90

per cent of full-time employment. Of course, this is rarely quite true but it is often substantially true; and, in any case, the method offers, a fairly accurate measure of the degree in which a particular establishment has attained a condition of stable employment. On the other hand, failure of an establishment to obtain a good level of stability in one or all occupations must not necessarily be attributed to faulty management. Many factors over which the management has little or no control may affect the stability of employment. Nevertheless, an employment stability of or very near to 100 per cent is the desirable goal.

The method of measuring employment stability just described has been used in this study because it is simple and clear. Somewhat more accurate measures of a mathematical character could be employed, but what they gain in accuracy is more than overbalanced by complexity in computation and explanation.

Stability of Employment in the Iron and Steel Industry

THE PERCENTAGE of full-time employment, computed as described above, has been worked out for 32 iron and steel plants for each of the years 1923 to 1927 and for the 12-month period ending August, 1928, the results being presented in the accompanying table. These 32 plants represent all reporting plants with sufficiently large personnel to make yearly comparisons of value. Collectively they employ about 40 per cent of all wage earners in the industry. The plants are arranged in the table in descending order according to the favorableness of their showing in 1928.

Examination of the employment indexes for the several plants listed in Table 1 shows some very interesting facts:

1. For the 32 plants as a whole regularity of employment showed a marked improvement over the years covered. Thus, the average per cent of full-time employment rose from 88 and a fraction in 1923 and 1924 to 91.2 in 1925 and has ranged around 94 during the past three years.

Still more striking as measuring the improved conditions of employment are the figures at the bottom of the table, showing the great increase in the number of plants with high records of employment regularity during the period of almost six years. Thus in 1923 only 6.7 per cent of all the plants showed an average of 95 per cent full-time employment, whereas by 1928 this percentage had increased to 53.2. Also, in 1923 more than half the plant averages were less than 90 per cent of full-time employment. In 1927 less than one-tenth were below 90.

2. For several individual plants the showing is extraordinarily favorable. Thus for the 12 months ending August, 1928, plants 1 and 2 had a record of more than 98 per cent stability.

Other plants, with not quite so good a record in 1928, showed a strikingly consistent improvement over the 6-year period. Thus in plant 14, the per cent of full-time employment rose from 83.2 in 1923 to 96.2 in 1928 in an almost unbroken line.

Also, it should be noted that six plants (2, 3, 4, 18, 25, and 26) had the excellent record of more than 90 per cent full-time employment for each of the years studied.

TABLE 1.—PER CENT OF FULL-TIME EMPLOYMENT IN THE IRON AND STEEL INDUSTRY

Plant No.	1923	1924	1925	1926	1927	12 months ending August, 1928
1.....	92.4	82.9	93.1	95.2	89.5	98.3
2.....		97.9	96.8	96.9	93.9	98.1
3.....	91.7	93.6	95.3	95.4	96.5	97.8
4.....	91.8	93.4	94.9	97.2	93.4	97.2
5.....	89.5	79.6	88.3	91.9	97.7	96.9
6.....	86.5	90.1	89.4	92.0	94.4	96.7
7.....		87.9	82.3	94.6	95.6	96.6
8.....	89.6	81.3	94.4	94.6	96.5	96.5
9.....	85.4	88.1	82.8	89.8	91.9	96.5
10.....	91.6	81.4	97.0	95.8	97.9	96.4
11.....	83.9	95.0	96.5	95.5	90.1	96.4
12.....	89.5	84.2	90.1	94.7	87.4	96.4
13.....	84.9	93.6	96.8	91.9	93.5	96.3
14.....	83.2	89.3	88.3	96.6	92.4	96.2
15.....	94.8	96.5	96.2	96.3	89.0	95.7
16.....	87.6	88.6	78.6	91.2	90.3	95.4
17.....	81.7	84.2	92.3	94.3	93.3	95.3
18.....	91.1	93.7	95.0	96.1	96.1	94.9
19.....	88.6	88.5	93.7	96.9	94.9	94.5
20.....	88.6	92.0	95.3	97.5	93.9	94.4
21.....	82.0	92.7	90.0	98.6	96.0	93.0
22.....	94.0	83.3	92.6	93.7	93.8	92.7
23.....	82.7	80.4	81.3	90.1	83.1	92.3
24.....	83.5	89.6	92.3	94.8	95.6	91.9
25.....	94.7	90.0	94.8	96.8	96.0	91.8
26.....	96.1	93.0	98.0	97.5	94.1	91.7
27.....	90.0	80.9	87.8	94.9	91.3	91.5
28.....	91.1	80.2	86.2	90.1	94.5	91.3
29.....	94.5	83.4	90.9	93.1	92.5	90.2
30.....	91.6	92.2	92.1	95.3	95.7	89.8
31.....	95.4	84.2	91.7	89.8	92.9	88.1
32.....	73.1	83.5	84.5	90.0	91.5	83.0
Average.....	88.9	88.3	91.2	94.3	93.6	94.2
Highest.....	96.1	98.0	98.0	98.6	97.9	98.3
Lowest.....	73.1	79.6	78.6	89.8	87.4	83.0
Per cent of plants with employment stability of—						
95 per cent and over.....	6.7	12.5	28.1	46.9	31.2	53.2
90 to 94.9 per cent.....	40.0	28.1	40.7	46.9	59.4	37.5
85 to 89.9 per cent.....	30.0	21.9	15.6	6.2	9.4	6.2
80 to 84.9 per cent.....	20.0	34.4	12.5			3.1
Under 80 per cent.....	3.3	3.1	3.1			

Stability of Employment in the Men's Clothing Industry

THE PERCENTAGES of full-time employment, computed as described above, have been worked out for 64 men's clothing establishments for each of the years 1923 to 1927 and for the 12-month period ending October, 1928, the results being presented in the accompanying table.

These 64 establishments represent all establishments engaged in making men's outer clothing for which data are available. Specialized products—such as caps, overalls, etc.—have been omitted, in order that those included might be fairly comparable as regards working conditions and as regards market influences.

The establishments are arranged in the table in descending order according to the favorableness of their showing in 1928.

A few of the interesting facts developed by an examination of the employment indexes in the table are cited below:

1. Judged by the averages, stability of employment in the men's clothing industry is bad and conditions have shown no improvement in the six years covered by the table. Thus the average stability for the plants reporting was only 87.9 per cent in 1923 and in no subsequent year was the percentage ever that high. Also, as shown by the last section of the table, this continuous low average over the 6-year period was the resultant of an increasing number of plants with improving records and a corresponding increase in the number of plants with records which were growing worse. Thus in 1923 the per cent of plants with employment stability rates of 95 per cent or over, was only 10.9 per cent as against 28.1 and 15.6 per cent in 1927 and 1928, respectively. On the other hand, the number of plants with stability rates of less than 80 per cent also increased from 15.6 per cent in 1923 to 21.9 in 1927 and to 23.4 in 1928.

2. While the general conditions of employment stability in the industry were bad and did not improve over the 6-year period, a number of establishments nevertheless had excellent records. Thus establishments 4 and 6 had an average of more than 96 per cent of full-time employment for each of the six years, and several establishments show averages of more than 98 per cent in individual years.

TABLE 2.—PER CENT OF FULL-TIME EMPLOYMENT IN THE MEN'S CLOTHING INDUSTRY

Plant No.	Location	1923	1924	1925	1926	1927	12 months ending October, 1928
1	Cleveland, Ohio.....	92.5	88.9	93.8	81.6	96.8	98.6
2	Boston, Mass.....	61.9	96.3	93.0	96.5	96.4	98.5
3	Chicago, Ill.....	93.7	86.6	89.8	88.1	96.1	98.3
4	New York, N. Y.....	97.9	96.6	97.4	97.3	97.9	97.7
5	Rochester, N. Y.....	86.0	96.2	91.2	96.8	95.6	97.5
6	Boston, Mass.....	97.1	97.1	97.1	97.2	98.0	97.2
7	(1).....	92.1	97.2	97.8	97.8	98.4	96.3
8	(1).....	69.1	74.3	77.2	83.3	76.0	96.0
9	(1).....	81.4	90.0	82.7	81.4	76.5	95.7
10	(1).....	94.7	92.6	88.2	90.2	93.3	95.5
11	(1).....	93.2	86.1	93.3	93.2	96.1	94.8
12	Boston, Mass.....	84.8	89.0	99.0	92.7	95.8	94.8
13	Rochester, N. Y.....	89.2	92.1	95.8	95.6	96.5	94.7
14	Boston, Mass.....	94.9	88.1	89.7	94.3	91.7	94.4
15	(1).....	96.3	95.1	95.7	93.3	96.3	93.4
16	(1).....	78.2	75.9	86.5	82.7	90.0	93.0
17	New York, N. Y.....	93.2	94.9	93.8	92.7	89.2	93.0
18	Chicago, Ill.....	89.7	79.9	89.4	93.7	94.9	92.6
19	Rochester, N. Y.....	95.0	91.9	92.6	96.4	93.8	92.1
20	(1).....	97.3	88.9	86.5	88.8	73.3	92.1
21	Cleveland, Ohio.....	90.3	94.5	90.8	98.7	95.0	91.7
22	Buffalo, N. Y.....	89.4	82.2	79.0	88.0	87.2	91.0
23	Chicago, Ill.....	86.2	85.3	88.4	90.3	95.2	90.9
24	Philadelphia, Pa.....	73.0	93.3	73.5	94.1	90.6	90.8
25	(1).....	86.2	84.7	84.1	80.8	88.9	90.6
26	Chicago, Ill.....	88.0	83.3	90.5	93.1	89.0	90.4
27	(1).....	86.9	80.0	91.9	82.9	92.8	90.2
28	Cincinnati, Ohio.....	92.3	89.3	91.5	91.6	85.2	89.4
29	New York, N. Y.....	87.0	82.8	73.0	85.3	75.3	89.1
30	(1).....	89.4	81.7	89.1	77.5	89.8	88.9
31	Cincinnati, Ohio.....	93.0	90.0	92.5	97.6	95.6	88.5
32	Pittsburgh, Pa.....	88.0	79.5	94.4	95.2	97.4	88.2
33	Cincinnati, Ohio.....	88.9	85.2	82.8	79.3	69.2	87.9
34	(1).....	86.9	89.1	86.8	90.3	93.2	87.8
35	(1).....	92.4	78.7	85.3	73.2	93.6	87.6
36	Pittsburgh, Pa.....	87.1	89.9	90.0	92.0	93.3	87.6
37	Philadelphia, Pa.....	87.3	90.5	91.2	88.5	88.7	87.3
38	Buffalo, N. Y.....	77.7	84.9	93.0	84.2	91.7	87.2
39	New York, N. Y.....	90.0	91.7	91.7	92.8	59.9	86.3
40	do.....	83.8	73.3	89.0	89.0	90.3	85.5
41	Cincinnati, Ohio.....	94.7	82.9	91.4	88.6	91.6	84.7
42	Baltimore, Md.....	85.6	73.8	79.9	82.8	88.2	84.6
43	Chicago, Ill.....	79.2	70.4	66.3	75.6	74.6	83.8

1 Location omitted in order to prevent possible identification of establishment.

TABLE 2.—PER CENT OF FULL-TIME EMPLOYMENT IN THE MEN'S CLOTHING INDUSTRY—Continued.

Plant No.	Location	1923	1924	1925	1926	1927	12 months ending October, 1928
44	(1).....	91.7	94.1	92.9	93.4	95.3	83.7
45	(1).....	94.7	95.3	94.7	94.6	90.1	83.6
46	Rochester, N. Y.....	92.4	88.0	92.1	86.8	90.6	82.3
47	(1).....	85.0	72.1	83.9	96.3	78.8	81.9
48	(1).....	95.5	90.9	93.8	88.8	68.3	81.8
49	Cincinnati, Ohio.....	88.2	80.6	83.3	75.7	88.5	81.5
50	(1).....	88.0	70.7	84.3	86.9	90.8	78.5
51	(1).....	89.1	92.3	85.5	75.9	81.6	77.8
52	New York, N. Y.....	89.3	89.9	95.4	93.9	80.8	77.5
53	Rochester, N. Y.....	84.8	80.0	77.8	84.5	83.3	77.2
54	New York, N. Y.....	92.5	88.3	84.5	88.6	84.8	76.2
55	Philadelphia, Pa.....	85.4	56.0	85.6	85.1	84.0	75.2
56	New York, N. Y.....	73.6	84.9	85.9	82.1	79.2	73.7
57	do.....	77.3	68.1	76.7	48.2	84.7	72.6
58	do.....	88.5	96.4	95.4	94.4	61.5	72.0
59	do.....	96.1	95.1	95.0	91.4	95.3	71.4
60	do.....	67.2	80.0	64.2	90.2	82.9	69.2
61	(1).....	78.1	76.8	81.2	82.8	88.4	57.9
62	(1).....	93.8	80.8	67.5	82.8	60.7	55.4
63	Baltimore, Md.....	88.4	43.6	73.1	72.1	72.2	49.1
64	St. Louis, Mo.....	83.0	87.0	81.4	76.8	64.4	34.7
	Average.....	87.9	85.1	85.8	87.8	87.0	85.1
	Highest.....	97.9	97.2	99.0	98.7	98.6	98.6
	Lowest.....	61.9	43.6	64.2	48.2	59.9	34.7
	Per cent of plants with employment stability of—						
	95 per cent and over.....	10.9	14.1	14.1	17.2	28.1	15.6
	90 to 94.9 per cent.....	29.7	20.3	32.8	31.3	23.4	26.6
	85 to 89.9 per cent.....	37.5	23.4	21.9	20.3	15.6	20.3
	80 to 84.9 per cent.....	6.3	20.3	14.1	17.2	10.9	14.1
	Under 80 per cent.....	15.6	21.9	17.2	14.1	21.9	26.4

¹ Location omitted in order to prevent the identification of establishment.

Stability of Employment in the Automobile Industry

THE PERCENTAGES of full-time employment, computed as described above, have been worked out for 78 automobile establishments for each of the years 1923 to 1927 and for the 12-month period ending November, 1928, the results being presented in the accompanying table.

These 78 establishments represent all establishments engaged in the manufacture of automobiles, trucks, busses, bodies, or some substantial part of an automobile for which data are available. Automobile accessories and specialties have been omitted in order that the establishments which are included might be fairly comparable as regards working conditions and market influences.

The establishments are arranged in the table in descending order according to the favorableness of their showing in 1928.

A few of the interesting facts developed by an examination of the employment indexes in the table are cited below.

The annual averages show consistently low percentages with little or no improvement apparent. In fact, with the exception of 1926 each year showed a lower average than 1923.

The industry as a whole did not vary much from year to year, but the individual establishments fluctuated widely and inconsistently with one another.

For every year since 1923, except 1926, the stability index for more than one-half the plants was under 85. Although the per cent of

plants with an index of 90 or more is lower for 1927 and 1928 than in preceding years, a slight improvement is shown in 1928 over 1927.

Only two plants (Nos. 3 and 4) had a record as good as 90 per cent for each of the six years.

TABLE 3.—PER CENT OF FULL-TIME EMPLOYMENT IN THE AUTOMOBILE INDUSTRY

Plant No.	Location ¹	Product	1923	1924	1925	1926	1927	12 months ending November, 1928
1	Cleveland, Ohio	Automobiles	81.8	83.8	90.2	94.1	86.9	97.1
2	Buffalo, N. Y.	Parts	83.6	73.7	86.1	88.5	77.3	95.8
3	Cincinnati, Ohio	Automobiles	94.9	98.8	96.4	96.4	91.0	94.4
4	New York City	do	91.7	96.2	97.2	95.7	90.0	94.3
5	Bridgeport, Conn.	do	54.5	73.4	89.6	82.7	77.2	92.1
6	New York	do	91.2	54.3	79.4	86.8	80.2	91.0
7	Chicago, Ill.	Parts	81.3	85.9	92.8	86.9	82.4	90.9
8	Detroit, Mich.	Automobiles	80.1	90.4	85.3	86.7	88.9	90.5
9	do	do	83.0	67.7	85.7	85.2	85.5	90.4
10	New Jersey	Parts	87.6	86.1	86.3	75.8	85.2	90.4
11	Ohio	Bodies	72.1	82.8	73.5	68.9	70.0	90.3
12	New York City	Automobiles	87.8	83.4	89.8	85.2	80.9	90.3
13	do	do	95.3	96.2	83.9	83.9	82.9	89.9
14	Detroit, Mich.	do	85.6	78.2	83.6	88.7	95.3	89.6
15	California	do	88.8	70.1	76.0	67.9	83.8	89.4
16	Philadelphia, Pa.	Bodies	63.7	63.3	74.2	65.8	88.1	89.2
17	Detroit, Mich.	Automobiles	87.4	73.2	75.9	90.4	90.9	89.1
18	do	Parts	88.0	78.6	77.1	90.7	81.8	89.0
19	Pontiac, Mich.	Automobiles	68.9	49.7	59.0	62.0	80.2	88.8
20	New York	Parts	91.1	67.4	87.9	86.5	91.3	88.7
21	Toledo, Ohio	do	75.0	83.8	86.5	74.3	54.0	87.2
22	Detroit, Mich.	Automobiles	85.2	80.9	88.0	87.1	84.4	87.0
23	Wisconsin	do	85.6	85.2	86.4	85.1	83.1	87.0
24	(²)	do	93.5	92.9	84.6	88.0	87.5	86.5
25	New York City	do	96.6	95.2	97.2	97.4	90.7	86.4
26	Chicago, Ill.	Parts	89.3	69.7	84.8	86.7	86.3	86.3
27	Detroit, Mich.	Bodies	85.8	76.0	78.0	86.8	91.2	86.2
28	Buffalo, N. Y.	Automobiles	83.2	79.8	88.1	81.5	80.8	86.2
29	Illinois	do	79.0	85.3	76.8	84.3	91.5	86.1
30	Pennsylvania	do	89.9	91.9	95.4	86.3	85.4	86.0
31	Michigan	do	88.5	95.2	76.5	85.9	89.2	85.9
32	New Jersey	do	88.7	93.1	88.0	84.7	87.6	85.6
33	Michigan	Parts	85.4	96.4	88.9	85.7	86.4	85.5
34	Lansing, Mich.	Automobiles	65.3	61.0	85.2	81.9	78.3	84.7
35	Indianapolis, Ind.	do	66.2	57.5	79.5	68.9	77.0	84.4
36	Ohio	do	79.1	84.3	84.0	90.9	71.0	84.4
37	Philadelphia, Pa.	Bodies	88.8	78.5	74.3	72.9	78.3	84.3
38	Detroit, Mich.	Parts	88.5	62.9	79.0	93.1	77.3	84.3
39	Chicago, Ill.	Automobiles	83.8	84.2	91.3	91.7	83.8	84.2
40	California	do	78.5	79.1	78.4	86.6	88.7	83.5
41	Wisconsin	Parts	97.5	74.5	89.1	81.9	80.4	83.4
42	Chicago, Ill.	Bodies	73.5	89.8	77.6	97.4	72.2	83.3
43	Highland Park, Mich.	Automobiles	91.2	91.1	92.4	83.0	88.1	82.1
44	New York	do	93.8	90.6	79.9	95.7	94.6	81.5
45	do	do	94.3	96.8	95.1	96.7	82.3	81.2
46	Chicago, Ill.	do	81.3	66.2	85.6	85.2	87.4	80.9
47	New York	Parts	82.2	67.6	73.9	66.1	81.2	80.7
48	Buffalo, N. Y.	do	81.3	94.4	91.5	90.8	91.5	80.3
49	Pennsylvania	Automobiles	91.3	93.4	97.8	81.4	80.0	79.7
50	New York	Parts	88.7	71.2	81.8	88.3	87.1	79.4
51	do	do	87.7	51.1	72.3	81.9	71.5	78.8
52	do	Bodies	94.1	98.7	89.9	89.4	82.9	78.5
53	Indiana	Parts	71.3	53.8	90.5	84.5	84.9	77.5
54	Highland Park, Mich.	Automobiles	80.2	85.9	51.7	83.6	88.5	76.7
55	Detroit, Mich.	do	72.0	79.1	77.8	64.7	69.7	76.4
56	Indianapolis, Ind.	do	64.6	66.2	86.9	84.3	78.9	74.8
57	Cleveland, Ohio	do	70.2	61.2	77.5	87.1	81.3	74.8
58	do	Parts	68.3	82.9	83.3	85.7	85.0	74.5
59	Chicago, Ill.	Automobiles	76.4	84.3	93.1	86.9	78.7	74.2
60	Indiana	do	91.6	80.6	73.6	76.0	76.5	73.8
61	Michigan	Bodies	83.8	90.5	75.3	77.8	73.5	73.3
62	Cincinnati, Ohio	Automobiles	80.0	86.1	90.1	92.8	87.4	73.0
63	Highland Park, Mich.	do	71.7	77.1	80.4	88.7	87.1	72.1
64	Ohio	do	83.7	62.8	78.4	74.7	76.2	71.8
65	do	do	62.3	63.2	66.0	77.8	54.3	70.0
66	Wisconsin	do	94.6	92.2	88.8	92.3	88.7	69.6
67	Cleveland, Ohio	do	81.5	68.6	67.0	87.7	67.0	69.0
68	Indiana	do	52.3	58.5	64.5	69.7	88.1	68.2
69	do	Bodies	92.0	68.6	70.5	64.9	50.2	67.0

¹ In cases where the name of the city would identify the plant, only the State is given.

² Location omitted in order to prevent possible identification of establishment.

TABLE 3.—PER CENT OF FULL-TIME EMPLOYMENT IN THE AUTOMOBILE INDUSTRY—Continued

Plant No.	Location	Product	1923	1924	1925	1926	1927	12 months ending November, 1928
70	Pennsylvania.....	Bodies.....	86.9	68.1	64.9	81.2	85.0	66.7
71	Detroit, Mich.....	Automobiles.....	79.0	60.0	82.1	62.4	74.1	66.7
72	Philadelphia, Pa.....	Parts.....	72.7	83.3	63.2	68.8	58.3	66.7
73	New Jersey.....	Bodies.....	86.1	93.4	85.9	90.3	86.7	65.4
74	New York.....	Parts.....	84.2	82.3	85.7	64.8	55.0	65.2
75	Pontiac, Mich.....	Automobiles.....	80.8	68.7	78.5	94.0	66.1	64.8
76	New York.....	do.....	74.0	83.9	95.4	95.4	78.3	63.8
77	Detroit, Mich.....	Bodies.....	82.9	75.6	73.8	80.1	79.6	50.8
78	Buffalo, N. Y.....	Automobiles.....	89.6	88.6	65.3	78.5	48.5	48.3
	Average.....		82.3	78.7	82.0	83.3	80.6	80.8
	Highest.....		97.5	98.8	97.8	97.4	95.3	97.1
	Lowest.....		52.3	49.7	51.7	62.0	48.5	48.3
	Per cent of plants with employment stability of—							
	95 and over.....		3.8	10.3	9.0	9.0	1.3	2.6
	90 to 94.9.....		16.7	14.1	10.3	14.1	11.5	12.8
	85 to 89.9.....		26.9	10.3	26.9	32.1	29.5	26.9
	80 to 84.9.....		23.1	16.7	11.5	19.2	23.1	19.2
	Under 80.....		29.5	48.7	42.3	25.6	34.6	38.5

Stability of Railroad Employment

EVERY operating railroad furnishes the Interstate Commerce Commission a monthly statement giving for each occupational classification the average number of employees during the month and also (except for the train and engine crews) the number of equivalent full-time positions. Reports of this character have been made since July, 1921. The resulting material is so voluminous that for the purpose of the present study it was necessary to select a limited number of occupations and railroads. The occupations selected were clerks (Class B), section laborers, machinists, telegraphers, road freight firemen, and yard brakemen, it being felt that these six occupations are fairly representative of the major classes of railroad labor. The choice of railroads was dependent to some extent upon the completeness and uniformity of their reports, but on the whole the 10 roads selected are probably as representative as 10 roads can be of the different conditions of climate, traffic density, and operating management existing in the United States. Except for machinists, the period studied covers the six years from 1922 (the earliest full calendar year reported on in the present detail) to 1927. In the case of machinists the data for 1922 are omitted, as the shopmen's strike of that year seriously affected the employment of machinists on most of the roads included here.

Employment Conditions in 1927

TABLE 4 shows the percentage of full-time employment in 1927 for each of the 6 selected occupations on each of the 10 selected railroads. The average percentages shown in the table indicate that the clerks and telegraphers, with an average percentage of 95.7 had the best opportunity for employment, closely followed by the machinists with an average percentage of 95.1. The next best showing is for yard brakemen (91.4 per cent), while the road freight firemen drop to 86.4 per cent and the section laborers to the low figure of 81.8 per cent.

TABLE 4.—PER CENT OF FULL-TIME EMPLOYMENT IN 6 SPECIFIED OCCUPATIONS ON 10 SPECIFIED RAILROADS, 1927

District and railroad	Clerks	Telegraphers	Section laborers	Ma-chinists	Road freight firemen	Yard brake-men
Northeastern district:						
New York Central.....	87.3	98.3	83.4	91.9	83.3	94.9
Pennsylvania.....	93.8	93.2	84.7	87.8	85.7	90.2
Baltimore & Ohio.....	97.8	97.5	82.9	94.2	92.7	94.9
Southeastern district:						
Southern.....	98.1	97.3	91.3	95.8	91.1	94.3
Louisville & Nashville.....	98.5	95.7	92.6	97.2	92.5	92.4
Northwestern district:						
Chicago, Milwaukee & St. Paul.....	96.3	96.7	68.5	95.6	90.5	96.3
Great Northern.....	93.6	89.1	66.8	98.4	72.9	77.9
Chicago, Burlington & Quincy.....	97.5	97.4	77.6	96.8	88.5	91.4
Southwestern district:						
Atchison, Topeka & Santa Fe.....	98.7	97.3	82.3	98.2	78.8	92.9
Southern Pacific.....	95.8	94.6	87.5	95.5	88.3	89.3
Average, all 10 roads.....	95.7	95.7	81.8	95.1	86.4	91.4

When individual roads are examined, certain striking contrasts appear. The Southern and Louisville & Nashville stand out with employment percentages of over 90 in all occupations. Also it might be noted that the Baltimore & Ohio and the Chicago, Milwaukee & St. Paul show percentages of over 90 in all occupations except section men.

Similar striking contrasts appear when the individual occupations are examined. The clerks and telegraphers show generally high percentages, but in one case the clerks' percentage drops to 87.3 and the telegraphers' to 89.1. Section laborers, on the other hand, have very low percentages on some roads, the lowest being 66.8. On the Louisville & Nashville, however, section laborers show an employment percentage of over 92. Generally speaking, the roads in the same geographical and climatic territory have similar employment trends, but this is by no means an invariable occurrence. Thus the percentage for road freight firemen on the Chicago, Milwaukee & St. Paul is 90.5, while for those on the Great Northern it is only 72.9.

Trend of Employment, by Years

TURNING to the second part of the inquiry, namely the trend of employment over the period 1922 to 1927 inclusive, the best method of procedure is to consider each occupation separately.

Clerks.—Table 5 shows for clerks the percentage of full-time employment by roads and by years, 1922 to 1927. Viewed as a whole, it appears that such employment among clerks noticeably improved over the period shown. Thus there were only 2 of the 10 roads which had an employment percentage of 97.5 or over in 1922; there were 3 in 1923 and 2 in 1924, whereas this number increased to 5 in 1925, 6 in 1926, and 5 in 1927.

TABLE 5.—PER CENT OF FULL-TIME EMPLOYMENT FOR CLERKS, BY ROADS AND YEARS

District and railroad	1922	1923	1924	1925	1926	1927	Number of years with 97.5 per cent or over
Northeastern district:							
New York Central.....	90.0	95.8	95.6	97.1	97.5	87.3	1
Pennsylvania.....	94.9	97.9	95.6	95.9	98.7	93.8	2
Baltimore & Ohio.....	93.2	94.8	97.0	97.5	97.4	97.8	2
Southeastern district:							
Southern.....	98.8	98.5	99.2	98.9	99.5	98.1	6
Louisville & Nashville.....	97.5	96.7	96.4	97.9	99.3	98.5	4
Northwestern district:							
Chicago, Milwaukee & St. Paul.....	95.9	98.3	95.3	97.1	97.1	96.3	1
Great Northern.....	93.2	95.9	95.6	96.0	95.4	93.6	0
Chicago, Burlington & Quincy.....	96.1	97.0	96.0	97.6	98.0	97.5	3
Southwestern district:							
Atchison, Topeka & Santa Fe.....	96.3	95.7	98.2	98.4	97.4	98.7	3
Southern Pacific.....	92.8	93.7	96.6	96.0	97.7	95.8	1
Number of roads with 97.5 per cent or over.....	2	3	2	5	6	5	-----

Machinists.—On the whole, there was a very marked improvement in the regularity of employment among machinists during the period 1923 to 1927. As shown in Table 6 the number of roads having an employment stability of 95 or over dropped from 4 in 1923 to 1 in 1924, but thereafter steadily increased—to 4 in 1925, 6 in 1926, and 7 in 1927.

TABLE 6.—PER CENT OF FULL-TIME EMPLOYMENT FOR MACHINISTS, BY ROADS AND YEARS

District and railroad	1923	1924	1925	1926	1927	Number of years with 95 per cent or over
Northeastern district:						
New York Central.....	91.5	86.8	93.4	95.9	91.9	1
Pennsylvania.....	95.3	88.3	93.0	93.4	87.8	1
Baltimore & Ohio.....	92.7	90.1	96.8	92.8	94.2	1
Southeastern district:						
Southern.....	95.4	90.6	93.6	98.4	95.8	3
Louisville & Nashville.....	96.3	90.0	98.3	98.5	97.2	4
Northwestern district:						
Chicago, Milwaukee & St. Paul.....	87.9	91.6	95.4	95.5	95.6	3
Great Northern.....	87.7	96.9	97.2	98.5	98.4	4
Chicago, Burlington & Quincy.....	88.9	82.3	88.5	96.9	96.8	2
Southwestern district:						
Atchison, Topeka & Santa Fe.....	96.4	92.4	90.0	94.6	98.2	2
Southern Pacific.....	91.7	82.3	93.8	92.8	95.5	1
Number of roads with 95 per cent or over.....	4	1	4	6	7	-----

Telegraphers.—The occupation of telegraphers, as indicated in Table 7, showed no continued improvement in regularity of employment over the period 1922 to 1927. The number of railroads with an average percentage of full-time employment of 97.5 or over for telegraphers rose irregularly from 1 in 1922 to 6 in 1926, but dropped to 2 in 1927.

TABLE 7.—PER CENT OF FULL-TIME EMPLOYMENT FOR TELEGRAPHERS, BY ROADS AND YEARS

District and railroad	1922	1923	1924	1925	1926	1927	Number of years with 97.5 per cent or over
Northeastern district:							
New York Central.....	94.0	98.9	95.7	96.5	99.2	98.3	3
Pennsylvania.....	94.0	97.7	97.8	96.3	98.9	93.2	3
Baltimore & Ohio.....	96.3	92.0	98.1	98.6	99.1	97.5	4
Southeastern district:							
Southern.....	97.7	93.3	99.1	98.1	97.7	97.3	4
Louisville & Nashville.....	96.1	94.0	90.9	94.3	95.3	95.7	0
Northwestern district:							
Chicago, Milwaukee & St. Paul.....	95.7	97.6	96.1	98.5	98.6	96.7	3
Great Northern.....	(1)	92.2	88.4	91.8	90.4	89.1	0
Chicago, Burlington & Quincy.....	95.0	98.0	96.8	95.3	99.0	97.4	2
Southwestern district:							
Atchison, Topeka & Santa Fe.....	94.7	95.0	95.8	96.5	95.4	97.3	0
Southern Pacific.....	91.4	94.2	91.2	94.3	95.1	94.6	0
Number of roads with 97.5 per cent or over.....	1	4	3	3	6	2	-----

¹ Original reports not clear.

Section laborers.—As shown in Table 8, not only was there low stability of employment among section laborers in all the years covered but no important improvement took place between 1922 and 1927. In 1922 only 2 roads had a percentage of 90 or over and in 1923 only 1 road. In 1924 and 1925 this number was increased to 4, but in 1926 and 1927 there was a drop to the level of 1922.

As regards individual roads, however, there are striking contrasts. The Louisville & Nashville had the excellent record of more than 90 per cent full-time employment in 5 of the 6 years, closely followed by the Southern and the Southern Pacific, each with a record of 90 per cent or over in 4 of the 6 years. The Pennsylvania shows 2 out of 6 years with more than 90 per cent employment, but none of the remaining 6 roads reached this level in any of the 6 years.

TABLE 8.—PER CENT OF FULL-TIME EMPLOYMENT FOR SECTION LABORERS, BY ROADS AND YEARS

District and railroad	1922	1923	1924	1925	1926	1927	Number of years with 90 per cent or over
Northeastern district:							
New York Central.....	77.2	85.0	80.7	83.3	82.9	83.4	0
Pennsylvania.....	88.3	85.2	90.0	94.5	88.3	84.7	2
Baltimore & Ohio.....	67.8	73.0	83.0	83.1	77.3	82.9	0
Southeastern district:							
Southern.....	89.0	88.1	91.4	93.5	93.9	91.3	4
Louisville & Nashville.....	94.5	88.3	90.5	95.3	95.4	92.6	5
Northwestern district:							
Chicago, Milwaukee & St. Paul.....	66.9	66.5	74.8	69.5	74.2	68.5	0
Great Northern.....	71.4	61.8	74.5	68.3	64.2	66.8	0
Chicago, Burlington & Quincy.....	64.6	68.8	71.1	75.8	75.2	77.6	0
Southwestern district:							
Atchison, Topeka & Santa Fe.....	86.0	83.8	80.3	84.6	84.1	82.3	0
Southern Pacific.....	91.7	90.4	92.0	90.7	89.4	87.5	4
Number of roads with 90 per cent or over.....	2	1	4	4	2	2	-----

Road freight firemen.—Regularity of employment among road freight firemen as shown in Table 9 improved markedly over the 6-year period. The number of roads having an employment stability percentage of 90 or over rose steadily from 1 in 1922 to 5 in 1926 and dropped only to 4 in 1927.

TABLE 9.—PER CENT OF FULL-TIME EMPLOYMENT FOR ROAD FREIGHT FIREMEN BY ROADS AND YEARS

District and railroad	1922	1923	1924	1925	1926	1927	Number of years with 90 per cent or over
Northeastern district:							
New York Central.....	65.8	86.7	89.5	82.7	91.2	83.3	1
Pennsylvania.....	84.2	96.2	90.1	91.5	89.9	85.7	3
Baltimore & Ohio.....	80.8	92.7	85.1	88.9	90.4	92.7	3
Southeastern district:							
Southern.....	79.8	89.9	94.1	92.3	93.2	91.1	4
Louisville & Nashville.....	89.2	87.5	85.0	88.5	89.3	92.5	1
Northwestern district:							
Chicago, Milwaukee & St. Paul.....	93.4	89.4	91.1	91.0	90.7	90.5	5
Great Northern.....	76.1	84.9	77.2	80.0	78.8	72.9	0
Chicago, Burlington & Quincy.....	78.6	80.8	83.8	85.4	90.1	88.5	1
Southwestern district:							
Atchison, Topeka & Santa Fe.....	73.5	89.5	82.4	76.5	77.0	78.8	0
Southern Pacific.....	83.5	86.9	87.9	80.1	85.2	88.3	0
Number of roads with 90 per cent or over.....	1	2	3	3	5	4	-----

Yard brakemen.—Among yard brakemen, regularity of employment showed no great improvement over the period reviewed, but on the whole conditions were somewhat better in the later years. Thus, as shown in Table 10, no road had a full-time employment percentage of 92.5 or over for this occupation in 1922. In 1923 the number of roads in this class jumped to 6, declined to 3 and 1, respectively, in 1924 and 1925, and then rose to 6 and 5, respectively, in 1926 and 1927.

TABLE 10.—PER CENT OF FULL-TIME EMPLOYMENT FOR YARD BRAKEMEN, BY ROADS AND YEARS

District and railroad	1922	1923	1924	1925	1926	1927	Number of years with 92.5 per cent or over
Northeastern district:							
New York Central.....	76.9	92.7	92.3	90.1	94.0	94.9	3
Pennsylvania.....	86.2	96.8	93.7	94.8	94.2	90.2	4
Baltimore & Ohio.....	81.2	94.1	87.4	91.5	93.8	94.9	3
Southeastern district:							
Southern.....	78.5	97.1	94.5	91.4	94.5	94.3	4
Louisville & Nashville.....	91.6	92.1	93.0	89.9	96.0	92.4	2
Northwestern district:							
Chicago, Milwaukee & St. Paul.....	85.4	93.9	90.3	92.3	93.4	96.3	3
Great Northern.....	80.6	91.1	81.5	82.5	79.1	77.9	0
Chicago, Burlington & Quincy.....	85.0	90.1	89.0	86.3	91.9	91.4	0
Southwestern district:							
Atchison, Topeka & Santa Fe.....	83.3	95.9	91.5	92.1	88.2	92.9	2
Southern Pacific.....	86.2	90.1	91.9	89.6	90.7	89.3	0
Number of roads with 92.5 per cent or over.....	0	6	3	1	6	5	-----

Unemployment Conditions in Europe in 1928

THE unemployment conditions in various European countries in the latter part of 1928 in comparison with 1927 conditions are shown in the table below, the source being the official statistics of the several countries.

UNEMPLOYMENT IN EUROPE IN LATE SUMMER OF 1927 AND 1928

[Except where otherwise indicated, data are for August of each year]

Country, and class of unemployed	1927		1928	
	Number	Per cent	Number	Per cent
Austria (persons in receipt of benefit).....	135,938	-----	¹ 143,447	-----
Belgium (members of unemployment insurance societies).....	7,542	1.2	3,376	0.5
Czechoslovakia (persons in receipt of benefit).....	² 11,845	-----	² 13,627	-----
Denmark (workers covered by trade-union and employment exchange statistics).....	45,300	16.3	35,599	13.1
Estonia (persons registered).....	809	-----	467	-----
Finland (persons registered).....	1,221	-----	857	-----
France (persons in receipt of benefit).....	14,825	-----	904	-----
Germany:				
Trade-unionists.....	194,635	5.0	288,375	6.5
Persons in receipt of benefit.....	403,851	-----	574,475	-----
Unemployed in receipt of emergency relief.....	-----	-----	³ 80,214	-----
Hungary (trade-unionists).....	11,247	-----	13,355	-----
Irish Free State (compulsorily insured persons).....	22,122	9.0	22,843	9.3
Italy (persons registered as totally unemployed).....	291,821	-----	248,100	-----
Latvia (persons registered).....	944	-----	965	-----
Netherlands (members of unemployment insurance societies).....	19,525	6.6	⁴ 14,728	⁴ 5.0
Norway:				
Trade-unionists.....	-----	² 17.3	² 2,208	² 13.0
Persons registered.....	15,727	-----	15,817	-----
Poland (persons registered).....	159,365	-----	88,593	-----
Sweden (trade-unionists).....	-----	7.8	-----	7.1
Switzerland (persons registered).....	8,854	-----	6,523	-----
United Kingdom (compulsorily insured persons) ⁵	⁶ 1,126,267	⁶ 9.3	⁶ 1,355,011	⁶ 11.5

¹ To make this figure comparable with that for 1927, old-age pensioners have been included, although under an act effective Oct. 1, 1927, such pensioners were separated from persons receiving unemployment benefits. This figure can be considered only as an approximation, since the number of old-age pensioners still actively employed could not be ascertained.

² July.

³ The German unemployment insurance act which came into force Oct. 1, 1927, provides that after the expiration of 26 weeks' payment of benefits unemployed persons are to be transferred to the emergency relief roll. (Labor Review, October, 1927, p. 68.)

⁴ Provisional figures for Aug. 20 to 25.

⁵ Great Britain and Northern Ireland. Includes those temporarily stopped.

⁶ September.

HOUSING

185

Building Permits in Principal Cities of the United States in 1928¹

Introduction and Summary

THIS article presents a summary of a study of building permits issued in cities of the United States having a population of 25,000 and over. According to the estimate of the Census Bureau as of July 1, 1928, there were 319 cities in the United States in this population group.

On January 1 of this year schedule forms were mailed by the bureau to all of these cities except those in States where local bureaus are collecting like information. In these States the information is collected by the State and mailed to the Federal bureau. Schedules were received from 310 cities and data for these cities are shown herein. The States of Illinois, Massachusetts, New Jersey, New York, and Pennsylvania are now cooperating with the bureau in this work.

The city building officials are also heartily cooperating with the work of the bureau. In 1922 it was necessary to send agents to 33½ per cent of the cities from which data were collected. In 1927 only 7½ per cent of the cities were visited by the bureau's agents and in collecting the 1928 information it was necessary to send to only 6.1 per cent of the cities.

The costs shown in the following tables refer to the cost of the building only, land costs not being included. The costs are estimated by the builder at the time of applying for his permit to build and are recorded on the application. There is probably a tendency in many cases to underestimate. Some cities are stricter than others in making applicants state a true cost.

Table 1 shows the total number of new buildings and the estimated cost of each of the different kinds of new buildings for which permits were issued in the 310 cities from which schedules were received for the year 1928, the per cent that each kind forms of the total number, the per cent that the cost of each kind forms of the total cost, and the average cost per building.

¹ Earlier reports concerning building permits issued in the United States are published in Bulletins Nos. 295, 318, 347, 368, 397, 424, 449, and 469 of the Bureau of Labor Statistics; also in issues of the Labor Review for July, 1921; April, 1922; July and October, 1923; June and October, 1924; June, September, and October, 1925; June, July, and October, 1926; May, June, July, October, and November, 1927; May, June, October, and November, 1928.

TABLE 1.—NUMBER AND COST OF NEW BUILDINGS AS STATED BY PERMITS ISSUED IN 310 CITIES DURING CALENDAR YEAR 1928, BY KIND OF BUILDING

Kind of buildings	New buildings for which permits were issued				
	Number of buildings	Per cent of total	Estimated cost		
			Amount	Per cent of total	Average per building
<i>Residential buildings</i>					
1-family dwellings.....	145,322	37.7	\$715,317,535	23.1	\$4,922
2-family dwellings.....	19,963	5.2	153,157,386	4.9	7,672
1-family and 2-family dwellings with stores combined.....	2,625	.7	26,702,412	.9	10,172
Multifamily dwellings.....	12,070	3.1	776,520,458	25.1	64,385
Multifamily dwellings with stores combined.....	1,528	.4	90,754,524	2.9	59,394
Hotels.....	235	.1	114,928,650	3.7	489,058
Lodging houses.....	37	(¹)	780,576	(¹)	21,097
All others.....	209	.1	35,559,169	1.1	170,140
Total.....	181,989	47.2	1,913,720,710	61.8	10,516
<i>Nonresidential buildings</i>					
Amusement buildings.....	950	.2	84,914,600	2.7	89,384
Churches.....	1,009	.3	49,059,444	1.6	48,622
Factories and workshops.....	3,973	1.0	152,649,534	4.9	38,422
Public garages.....	3,839	1.0	70,690,699	2.3	18,414
Private garages.....	156,457	40.6	55,140,483	1.8	352
Service stations.....	4,520	1.2	14,913,812	.5	3,300
Institutions.....	304	.1	65,080,263	2.1	214,080
Office buildings.....	1,353	.4	256,101,159	8.3	189,284
Public buildings.....	243	.1	29,378,349	.9	120,899
Public works and utilities.....	517	.1	38,690,950	1.2	74,837
Schools and libraries.....	852	.2	143,519,854	4.6	168,451
Sheds.....	11,787	3.1	4,895,029	.2	415
Stables and barns.....	367	.1	583,553	(¹)	1,590
Stores and warehouses.....	13,111	3.4	211,890,765	6.8	10,161
All others.....	4,158	1.1	7,710,836	.2	1,854
Total.....	203,440	52.8	1,185,219,330	38.2	5,826
Grand total.....	385,429	100.0	3,098,940,040	100.0	8,040

¹ Less than one-tenth of 1 per cent.

In the 310 cities for which reports were received for the year 1928 permits were issued for 385,429 buildings. Of this number, 181,989 buildings, or 47.2 per cent, were for residential purposes and 203,440, or 52.8 per cent, for nonresidential use.

Of the residential buildings 145,322 were 1-family dwellings; this is 37.7 per cent of the total number of new buildings for which permits were issued or 79.8 per cent of the total number of residential buildings. Two-family dwellings, the next most numerous group of residential buildings, comprised only 5.2 per cent of the total number of buildings. With the exception of private garages no other kind of building in either the residential or nonresidential group constituted as much as 5 per cent of the total number of buildings for which permits were issued.

In the nonresidential group private garages were far the most numerous kind of building. Of all buildings for which permits were issued in these 310 cities during the calendar year 1928, over 40 per cent were private garages, over 7 per cent more private garages being erected than 1-family dwellings.

Stores and warehouses ranked next after private garages in the nonresidential group and formed only 3.4 per cent of the total number of new buildings.

It will be seen from the above that out of every 100 buildings for which permits were issued in cities having a population of 25,000 or over, 78 were either 1-family dwellings or private garages.

The total estimated expenditure for new buildings in these 310 cities was \$3,098,940,040 of which \$1,913,720,710, or 61.8 per cent, was for residential buildings and \$1,185,219,330, or 38.2 per cent, for nonresidential buildings.

The Bureau of Labor Statistics has been collecting figures concerning building permits issued for every year since 1920, and in each of these years up to 1928, 1-family dwellings accounted for the greatest expenditure of any kind of buildings. In 1928, however, the permits issued for multifamily dwellings (apartment houses) show a larger estimated expenditure than those issued for 1-family dwellings. The estimated cost of apartment houses for which permits were issued in these 310 cities during 1928 was \$776,520,458, or 25.1 per cent of the expenditure for all new buildings, as compared with \$715,317,535, or 23.1 per cent, for 1-family dwellings.

If we group apartment houses and apartment houses with stores we find that the expenditure for both kinds of apartment houses equaled the expenditure for 1-family dwellings and 2-family dwellings combined. Each combination comprised approximately 28 per cent of the total estimated expenditure for all buildings.

In the nonresidential group, office buildings accounted for the largest expenditure of money, \$256,101,159 being expended for this class of structure. Stores and warehouses rated next in expenditures in this group, followed by factories, and schools and libraries in order. Private garages which comprise 40.6 per cent of the number of new buildings account for only 1.8 per cent of the cost.

The average cost per building of all new buildings in these 310 cities was \$8,040. In residential buildings the average cost was \$10,516 and in nonresidential buildings, \$5,826. The average cost of nonresidential buildings, however, is "pulled down" by the inclusion of a large number of private garages and sheds. If we exclude these two classes of buildings the average cost of the remaining nonresidential buildings is \$13,992 per building.

Families Provided For

TABLE 2 shows the number and per cent of families provided for by each of the different kinds of dwellings for which permits were issued in 302 identical cities during the calendar years 1927 and 1928, by kind of dwelling.

TABLE 2.—NUMBER AND PER CENT OF FAMILIES TO BE HOUSED IN NEW DWELLINGS FOR WHICH PERMITS WERE ISSUED IN 302 IDENTICAL CITIES DURING THE CALENDAR YEARS 1927 AND 1928, BY KIND OF DWELLING

Kind of dwelling	Number of new buildings for which permits were issued		Families provided for			
			Number		Per cent	
	1927	1928	1927	1928	1927	1928
1-family dwellings.....	164, 268	143, 889	164, 268	143, 889	39. 2	36. 1
2-family dwellings.....	25, 227	19, 956	50, 454	39, 912	12. 0	10. 0
1-family and 2-family dwellings with stores combined.....	3, 329	2, 620	5, 399	4, 276	1. 3	1. 1
Multifamily dwellings.....	13, 663	12, 063	179, 177	190, 282	42. 8	47. 8
Multifamily dwellings with stores combined.....	1, 768	1, 528	19, 580	19, 780	4. 7	5. 0
Total.....	208, 255	180, 056	418, 878	398, 139	100. 0	100. 0

Data were received from 302 cities for both 1927 and 1928. In these 302 cities 398,139 families were provided with dwellings in new buildings in 1928, as compared with 418,878 in 1927, a decrease of 20,739 dwelling units or 5.0 per cent in 1928 as compared with 1927.

There were 164,268 families accommodated in the new 1-family dwellings for which permits were issued in 1927 in these 302 cities. This is 39.2 per cent of the total number of families provided for during that year. In 1928, 1-family dwellings provided for 143,889 families, which was 36.1 per cent of the total number of families supplied with new dwelling places. In contrast, the number of families provided for in apartment houses increased from 179,177 in 1927 to 190,282 in 1928. In 1927, 42.8 per cent of the total number of family dwelling places for which permits were issued were in apartment houses, while in 1928 this percentage had risen to 47.8. The percentage of families supplied with residences in new 2-family dwellings decreased from 12 in 1927 to 10 in 1928.

Table 3 shows the number and percentage distribution of families provided for in the different kinds of dwellings in the 257 identical cities from which reports were received each year from 1921 to 1928, inclusive.

TABLE 3.—NUMBER AND PER CENT OF FAMILIES PROVIDED FOR IN THE DIFFERENT KINDS OF DWELLINGS IN 257 IDENTICAL CITIES, 1921 TO 1928, INCLUSIVE

Year	Number of families provided for in—				Per cent of families provided for in—		
	1-family dwellings	2-family dwellings ¹	Multi-family dwellings ¹	All classes of dwellings	1-family dwellings	2-family dwellings ¹	Multi-family dwellings ¹
1921	130, 873	38, 858	54, 814	224, 545	58. 3	17. 3	24. 4
1922	179, 364	80, 252	117, 689	377, 305	47. 5	21. 3	31. 2
1923	207, 632	96, 344	149, 697	453, 673	45. 8	21. 2	33. 0
1924	210, 813	95, 019	137, 082	442, 919	47. 6	21. 5	30. 9
1925	226, 159	86, 145	178, 918	491, 222	46. 0	17. 5	36. 4
1926	188, 074	84, 298	209, 842	462, 214	40. 7	13. 9	45. 4
1927	155, 512	54, 320	196, 263	406, 095	38. 3	13. 4	48. 3
1928	136, 907	43, 098	208, 673	388, 678	35. 2	11. 1	53. 7

¹ Includes 1-family and 2-family dwellings with stores combined.

² Includes multifamily dwellings with stores combined.

The trend toward apartment-house dwelling continues in full swing. This fact is amply shown by the above table. In 1921 accommodations were provided for 224,545 families in the new buildings for which permits were issued during that year. Of this number 58.3 per cent were sheltered in 1-family dwellings, 17.3 per cent in 2-family dwellings, and 24.4 per cent in apartment houses.

Seven years later, in 1928, it is found that 53.7 per cent of the 388,678 new family dwelling units were in apartment houses and only 35.2 per cent in 1-family dwellings and 11.1 per cent in 2-family dwellings.

The total number of families provided for in 1928 increased 73.1 per cent in 1928 over 1921. One-family dwellings, however, increased only 4.6 per cent in number in 1928 over 1921, while the family units provided in apartment houses in 1928 increased 280.7 per cent over those provided during 1921.

The per cent of families housed in 1-family dwellings has decreased each year from that of the preceding year, except that 1924 showed a slight increase over 1923. Apartment units have shown exactly the opposite trend; 1924 was the only year that the percentage of families housed in apartment houses was less than that of the preceding year. The percentage of families housed in 2-family dwellings reached a peak in 1924; since that year there has been a steady decline in the percentage of families housed in this class of dwelling.

Building Trend 1927 and 1928

TABLE 4 shows the number and cost of the different kinds of buildings for the 302 identical cities from which reports were received in 1927 and 1928 and the per cent of increase or decrease in the number and in the cost in 1928 as compared with 1927.

TABLE 4.—NUMBER AND COST OF NEW BUILDINGS FOR WHICH PERMITS WERE ISSUED IN 302 IDENTICAL CITIES DURING THE CALENDAR YEARS 1927 AND 1928, BY KIND OF BUILDING

Kind of building	New buildings for which permits were issued				Per cent of increase (+) or decrease (—) in 1928 compared with 1927	
	1927		1928		Number	Cost
	Number	Cost	Number	Cost		
<i>Residential buildings</i>						
1-family dwellings.....	164,268	\$789,382,883	143,889	\$710,900,837	—12.4	—9.9
2-family dwellings.....	25,227	208,578,118	19,956	153,128,386	—20.9	—26.6
1-family and 2-family dwellings with stores combined.....	3,329	34,978,625	2,620	26,678,912	—21.3	—23.7
Multifamily dwellings.....	13,663	736,830,490	12,063	776,419,458	—11.7	+5.4
Multifamily dwellings with stores combined.....	1,783	90,666,916	1,528	90,754,524	—14.3	+1
Hotels.....	201	69,393,263	234	114,289,650	+16.4	+64.7
Lodging houses.....	79	1,305,302	37	780,576	—53.2	—40.2
Other.....	213	30,763,923	207	35,369,533	—2.8	+15.0
Total.....	208,763	1,961,899,529	180,534	1,908,321,876	—13.5	—2.7
<i>Nonresidential buildings</i>						
Amusement buildings.....	943	128,208,773	947	94,676,800	+4	—34.0
Churches.....	1,118	58,890,438	1,002	48,852,444	—10.4	—17.0
Factories and workshops.....	4,181	141,307,499	3,932	152,410,564	—6.0	+7.9
Public garages.....	4,192	74,395,804	3,836	70,656,199	—8.5	—5.0
Private garages.....	181,859	65,449,178	155,478	54,921,052	—14.5	—16.1
Service stations.....	4,919	15,022,065	4,462	14,768,932	—9.3	—1.7
Institutions.....	332	75,132,340	303	65,001,863	—8.7	—13.5
Office buildings.....	1,271	242,853,223	1,352	255,801,159	+6.4	+5.3
Public buildings.....	339	47,450,619	243	29,378,349	—28.3	—38.1
Public works and utilities.....	593	45,389,033	516	38,670,950	—13.0	—14.8
Schools and libraries.....	837	155,542,100	843	142,154,423	+7	—8.6
Sheds.....	13,008	5,091,261	11,658	4,899,737	—14.3	—4.4
Stables and barns.....	358	823,018	356	551,478	—6	—29.3
Stores and warehouses.....	13,280	215,747,108	12,925	210,305,687	—2.7	—2.5
All other.....	4,283	7,239,146	4,127	7,703,679	—3.6	+6.4
Total.....	232,113	1,278,541,605	201,980	1,180,753,316	—13.0	—7.6
Grand total.....	440,876	3,240,441,134	382,514	3,089,075,192	—13.2	—4.7

In the 302 cities from which reports were received for both 1927 and 1928 permits were issued for 382,514 new buildings during the calendar year 1928 as compared with 440,876 during the calendar year 1927. This is a decrease, in the number of buildings, of 13.2

per cent. The estimated amount spent for the erection of the buildings for which permits were issued in 1928 was \$3,089,075,192, a decrease of 4.7 per cent from the \$3,240,441,134 spent during 1927.

Residential buildings decreased more in number but less in estimated expenditure than nonresidential buildings in 1928 as compared with 1927. The decrease in the number of residential buildings for which permits were issued during 1928, in these 302 cities, being 13.5 per cent over 1927, while nonresidential buildings decreased in number 13.0 per cent. In estimated costs, however, the decrease in residential buildings was only 2.7 per cent as compared with 7.6 per cent in nonresidential buildings.

All classes of residential buildings except hotels showed a decrease in the number of buildings, comparing 1928 with 1927. Hotels increased 16.4 per cent in number. The greatest decrease was in 1-family and 2-family dwellings with stores where there was a falling off of 21.3 per cent.

In estimated expenditure four classes of structures in the residential group showed a decrease and four showed an increase. The decreases ranged from 9.9 per cent in the case of 1-family dwellings to 40.2 per cent in lodging houses. The increases in estimated expenditure in this group ranged from one-tenth of 1 per cent for multifamily dwellings with stores combined to 64.7 per cent for hotels.

In the nonresidential group all classes of buildings showed a decrease in number except amusement buildings, office buildings, and schools and libraries, office buildings showing the largest increase with a gain of 6.4 per cent over 1927. The decreases ranged from six-tenths of 1 per cent for stables and barns to 28.3 per cent in the case of public buildings.

In amounts expended factory buildings, office buildings, and miscellaneous buildings showed an increase in 1928 as compared with 1927. All other nonresidential buildings showed a decrease in expenditures ranging from 1.7 per cent for service stations to 38.1 per cent for public buildings.

Per Capita Expenditure for Buildings

TABLE 5 shows the total and the per capita expenditures for new buildings, new housekeeping dwellings, repairs and additions, and for all kinds of buildings in each of the 310 cities for which reports were received for the calendar year 1928; the total number of families provided for and the ratio of families provided for to each 10,000 of population in these 310 cities; and the total expenditure for all classes of buildings in 302 cities in 1927.

In the 310 cities which reported for 1928 there was an expenditure of \$3,423,584,461 for building operations of all kinds. Of this amount, \$3,098,940,040 was for new buildings and \$324,644,421 for repairs to old buildings. Of the amount spent for new buildings, \$1,762,452,315 was for housekeeping dwellings. The expenditure for all buildings for the 302 cities which reported for 1927 was \$3,593,839,405.

The per capita expenditure for the cities from which reports were received for 1928 was \$76.18 for all building operations, divided as follows: \$68.96 for new buildings and \$7.22 for repairs; \$39.22 of

the amount expended for new buildings was for housekeeping dwellings. The population of these 310 cities, as estimated by the Bureau of the Census for July 1, 1928, was 44,940,049.

The five leading cities in per capita expenditure were White Plains, N. Y., \$440.15; Yonkers, N. Y., \$293.64; Evanston, Ill., \$276.85; Mount Vernon, N. Y., \$260.74; and New Rochelle, N. Y., \$230.19. All of these cities are suburban cities, four being suburbs of New York and one of Chicago. In all of these cities residential buildings accounted for the large per capita expenditure.

Following is a list of the five leading cities in total expenditure for the years 1920 to 1928, inclusive. It will be noted that the cities of New York, Chicago, Detroit, Los Angeles, and Philadelphia make up this list each year except for 1920 and 1921 when Cleveland was included and Philadelphia slumped below the leading five.

1920		1924—Continued	
New York.....	\$277, 695, 337	Los Angeles.....	\$150, 147, 516
Chicago.....	84, 602, 650	Philadelphia.....	141 402, 655
Detroit.....	77, 737, 215		
Cleveland.....	64, 198, 600		
Los Angeles.....	60, 023, 600		
1921		1925	
New York.....	442, 285, 248	New York.....	1,020,604,713
Chicago.....	133, 027, 910	Chicago.....	373, 803, 571
Cleveland.....	86, 680, 023	Detroit.....	180, 132, 528
Los Angeles.....	82, 761, 386	Philadelphia.....	171, 034, 280
Detroit.....	58, 086, 053	Los Angeles.....	152, 646, 436
1922		1926	
New York.....	645, 176, 481	New York.....	1,039,670,572
Chicago.....	229, 853, 125	Chicago.....	376, 808, 480
Los Angeles.....	121, 206, 787	Detroit.....	183, 721, 443
Philadelphia.....	114, 190, 525	Philadelphia.....	140, 093, 075
Detroit.....	93, 614, 593	Los Angeles.....	123, 006, 215
1923		1927	
New York.....	789, 265, 335	New York.....	880, 333, 455
Chicago.....	334, 164, 404	Chicago.....	365, 065, 042
Los Angeles.....	200, 133, 181	Detroit.....	145, 555, 647
Detroit.....	129, 719, 831	Los Angeles.....	123, 027, 139
Philadelphia.....	128, 227, 405	Philadelphia.....	117, 590, 650
1924		1928	
New York.....	836, 043, 604	New York.....	916, 671, 855
Chicago.....	308, 911, 159	Chicago.....	323, 509, 048
Detroit.....	160, 547, 723	Detroit.....	129, 260, 285
		Philadelphia.....	112, 225, 865
		Los Angeles.....	101, 678, 768

During 1928 accommodations were provided in the new dwellings for which permits were issued for 399,657 families, or at the rate of 88.9 families to each 10,000 of population in these 310 cities.

Following is a list of the five leading cities in the building of homes for each year since 1921. This list shows the number of families provided with homes in new buildings for each 10,000 of the city's population. Four of the five for 1928 are contiguous to the great metropolitan center of New York City.

1921		1925	
Long Beach.....	631. 9	Miami ¹	1, 342. 0
Los Angeles.....	320. 9	San Diego.....	392. 0
Pasadena.....	251. 7	Tampa.....	379. 3
Shreveport.....	249. 8	Irvington.....	374. 6
Lakewood.....	191. 3	Los Angeles ²	331. 0
1922		1926	
Long Beach.....	1, 081. 0	St. Petersburg.....	700. 3
Los Angeles.....	441. 6	Mount Vernon.....	644. 7
Lakewood.....	358. 9	Irvington.....	398. 6
Miami.....	268. 1	White Plains.....	367. 2
East Cleveland.....	267. 6	San Diego.....	339. 5
1923		1927	
Long Beach.....	1, 038. 1	Irvington.....	740. 5
Los Angeles.....	657. 4	White Plains.....	419. 5
Miami.....	611. 1	Mount Vernon.....	414. 8
Irvington.....	482. 1	Yonkers.....	349. 0
Lakewood.....	381. 5	East Orange.....	338. 1
1924		1928	
Miami ¹	2, 248. 9	Yonkers.....	347. 6
Irvington.....	501. 2	Mount Vernon.....	299. 1
Los Angeles ²	448. 3	White Plains.....	298. 3
San Diego.....	378. 0	Long Beach.....	297. 4
Long Beach.....	347. 6	Irvington.....	295. 4

¹ The ratio of families provided for in Miami in 1924 was based on the population as estimated by the Census Bureau for that year. In the light of the actual census taken by State enumeration in 1925, it would seem that the estimate for 1924 was below the actual population for that year, hence the ratio here shown for 1924 is probably higher than the actual population in that year would warrant.

² Population not estimated in 1924 or 1925; 1923 estimate used.

TABLE 5.—TOTAL AND PER CAPITA EXPENDITURES FOR NEW BUILDINGS AND FOR

City and State	Expenditure for new buildings, 1928	Expenditure for repairs and additions, 1928	Total expenditures		Expenditure for new housekeeping dwellings only, 1928
			1928	1927	
Akron, Ohio.....	\$17,837,500	\$1,647,599	\$19,485,096	\$20,196,088	\$12,164,148
Alameda, Calif.....	1,994,724	136,672	2,131,396	1,636,930	1,429,224
Albany, N. Y.....	12,503,715	2,389,810	14,893,525	16,188,743	7,460,200
Allentown, Pa.....	5,484,715	450,325	5,935,040	6,588,169	3,165,000
Altoona, Pa.....	2,898,276	462,631	3,360,907	3,041,304	930,090
Amsterdam, N. Y.....	677,675	6,000	683,675	607,530	242,600
Alton, Ill.....	816,115	228,340	1,044,455	(¹)	507,724
Anderson, Ind.....	2,169,014	283,819	2,452,833	2,213,382	881,550
Asheville, N. C.....	2,832,362	262,748	3,095,110	5,987,153	1,749,300
Ashtabula, Ohio.....	395,093	118,779	513,872	496,780	150,250
Atlanta, Ga.....	25,119,931	2,274,848	27,394,779	11,860,907	9,968,489
Atlantic City, N. J.....	5,786,810	1,624,032	7,410,842	5,822,864	259,265
Auburn, N. Y.....	356,870	158,726	515,596	843,194	159,125
Augusta, Ga.....	1,165,846	385,098	1,550,944	1,459,090	815,644
Aurora, Ill.....	2,650,700	299,772	2,950,472	2,791,528	1,561,549
Baltimore, Md.....	26,478,200	7,467,150	33,945,350	28,437,790	12,660,000
Bangor, Me.....	469,260	156,350	625,610	851,355	136,550
Battle Creek, Mich.....	2,686,505	184,807	2,871,312	4,751,866	752,750
Bay City, Mich.....	1,490,201	354,695	1,844,896	775,209	229,200
Bayonne, N. J.....	1,807,300	188,065	1,995,365	1,949,950	968,500
Beaumont, Tex.....	3,615,913	710,856	4,326,769	(¹)	1,486,841
Belleville, Ill.....	1,014,881	6,740	1,021,621	(¹)	666,000
Bellingham, Wash.....	1,608,105	264,213	1,872,318	1,787,110	674,000
Berkeley, Calif.....	5,517,950	558,676	6,076,626	6,683,088	4,107,551
Bethlehem, Pa.....	3,479,390	363,616	3,843,006	2,476,621	1,421,000
Binghamton, N. Y.....	2,762,317	694,076	3,456,393	4,290,909	1,264,421
Birmingham, Ala.....	12,820,664	1,403,913	14,224,577	21,786,696	7,130,335
Bloomfield, N. J.....	3,932,100	608,500	4,540,600	6,880,077	3,370,000
Bloomington, Ill.....	1,319,300	63,500	1,382,800	924,200	601,000
Boston, Mass.....	47,961,432	7,737,125	55,698,557	60,987,468	26,867,550
Bridgeport, Conn.....	3,070,524	456,098	3,526,622	5,186,712	1,945,000
Brockton, Mass.....	1,448,908	276,960	1,725,868	1,433,359	732,950
Brookline, Mass.....	5,738,345	553,077	6,291,422	5,902,440	5,065,100
Buffalo, N. Y.....	23,279,259	1,122,724	24,401,983	33,073,453	10,730,950
Burlington, Iowa.....	402,871	40,900	443,771	721,140	178,100
Butler, Pa.....	302,740	86,096	388,836	(¹)	258,300
Butte, Mont.....	215,050	151,390	366,440	68,249	11,500
Cambridge, Mass.....	7,146,113	937,610	8,083,723	9,557,469	3,581,300
Camden, N. J.....	6,762,090	665,965	7,428,055	5,330,327	1,104,950
Canton, Ohio.....	3,083,147	579,171	3,662,318	4,156,020	2,180,850
Cedar Rapids, Iowa.....	1,856,631	531,599	2,388,230	2,602,622	688,940
Central Falls, R. I.....	230,345	73,000	303,345	798,730	95,000
Charleston, S. C.....	383,228	177,407	560,635	588,099	160,300
Charleston, W. Va.....	2,613,790	259,390	2,873,180	2,038,709	860,000
Charlotte, N. C.....	7,048,994	409,270	7,458,264	5,554,584	4,432,020
Chattanooga, Tenn.....	3,978,069	725,417	4,703,486	4,874,201	1,862,875
Chelsea, Mass.....	898,540	265,175	1,163,715	966,060	573,000
Chester, Pa.....	1,537,867	208,675	1,746,542	2,396,265	1,000,000
Chicago, Ill.....	315,208,908	8,300,140	323,509,048	365,065,042	174,749,900
Chicopee, Mass.....	1,161,265	114,300	1,275,565	1,117,110	368,300
Cicero, Ill.....	3,560,114	299,966	3,860,080	4,635,829	2,537,600
Cincinnati, Ohio.....	30,679,990	4,778,740	35,458,730	30,570,299	21,628,235
Clarksburg, W. Va.....	1,075,450	113,935	1,189,385	1,007,635	357,235
Cleveland, Ohio.....	47,017,150	9,141,375	56,158,525	45,480,550	16,247,100
Clifton, N. J.....	3,437,510	104,545	3,542,055	3,388,565	2,539,650
Colorado Springs, Colo.....	614,466	198,029	812,495	577,398	340,440
Columbia, S. C.....	1,347,695	262,080	1,609,775	1,538,375	1,108,000
Columbus, Ga.....	984,848	169,154	1,154,002	1,539,749	700,724
Columbus, Ohio.....	14,857,790	1,379,460	16,237,250	23,282,600	11,533,300
Council Bluffs, Iowa.....	701,450	108,800	810,250	930,250	261,400
Covington, Ky.....	1,299,400	292,350	1,591,750	1,722,310	953,200
Cranston, R. I.....	3,607,224	103,025	3,710,249	2,669,634	2,775,200
Cumberland, Md.....	924,421	75,127	999,548	942,465	284,010
Dallas, Tex.....	6,360,840	1,728,159	8,088,999	9,773,523	3,187,924
Danville, Ill.....	752,159	163,189	915,348	1,036,791	599,086
Davenport, Iowa.....	1,070,362	289,379	1,349,741	2,053,351	635,650
Dayton, Ohio.....	9,010,900	1,347,478	10,358,378	10,332,026	2,703,488

¹ Not estimated by Census Bureau.² Estimate as of July 1, 1926.

REPAIRS, AND FAMILIES PROVIDED FOR, IN 310 CITIES IN THE CALENDAR YEAR 1928

City and State	Estimated population, July 1, 1928	Families provided for		Per capita expenditure, 1928				Per capita expenditure for house-keeping dwellings only, 1928
		Number	Ratio per 10,000	For new buildings	For repairs and additions	Total	Rank of city	
Akron, Ohio.....	(1)	2,557						
Alameda, Calif.....	32,400	504	155.6	\$61.57	\$4.22	\$65.78	78	\$44.11
Albany, N. Y.....	120,400	615	51.1	103.85	19.85	123.70	22	61.96
Allentown, Pa.....	99,400	556	55.9	55.18	4.53	59.71	93	31.84
Altoona, Pa.....	69,100	155	22.4	41.94	6.70	48.64	136	13.46
Amsterdam, N. Y.....	36,200	42	11.6	18.72	.17	18.89	258	6.70
Alton, Ill.....	26,797	167	62.3	30.46	8.52	38.98	171	21.19
Anderson, Ind.....	34,600	268	77.5	62.69	8.20	70.89	66	25.48
Asheville, N. C.....	32,000	370	115.6	88.51	8.21	96.72	40	54.67
Ashtabula, Ohio.....	25,500	20	7.8	15.49	4.66	20.15	254	5.89
Atlanta, Ga.....	255,100	3,170	124.3	98.47	8.92	107.39	27	39.08
Atlantic City, N. J.....	54,700	57	10.4	105.79	29.69	135.48	20	4.74
Auburn, N. Y.....	35,677	31	8.7	10.00	4.45	14.45	272	4.46
Augusta, Ga.....	50,700	318	56.1	20.56	6.79	27.35	223	14.39
Aurora, Ill.....	47,100	301	63.9	56.28	6.36	62.64	88	33.15
Baltimore, Md.....	830,400	2,884	34.7	31.89	8.99	40.88	160	15.25
Bangor, Me.....	26,800	38	14.2	17.51	5.83	23.34	243	5.10
Battle Creek, Mich.....	47,200	177	37.5	56.92	3.92	60.83	91	15.95
Bay City, Mich.....	49,600	57	11.5	30.04	7.15	37.20	180	4.62
Bayonne, N. J.....	95,300	436	45.8	18.96	1.97	20.94	250	10.16
Beaumont, Tex.....	56,300	540	95.9	64.23	12.63	76.85	53	26.41
Belleville, Ill.....	26,969	136	50.4	37.63	.25	37.88	178	24.70
Bellingham, Wash.....	26,300	264	100.4	61.14	10.05	71.19	64	25.63
Berkeley, Calif.....	71,000	1,330	187.3	77.72	7.87	85.59	47	57.85
Bethlehem, Pa.....	67,600	223	33.0	51.47	5.38	56.85	101	21.02
Binghamton, N. Y.....	74,800	306	40.9	36.93	9.28	46.21	145	16.90
Birmingham, Ala.....	222,400	2,539	116.4	57.65	6.31	63.96	87	32.06
Bloomfield, N. J.....	(1)	675						
Bloomington, Ill.....	30,700	90	29.3	42.97	2.07	45.04	148	19.58
Boston, Mass.....	799,200	6,805	85.1	60.01	9.68	69.69	67	33.62
Bridgeport, Conn.....	143,535	388	27.0	21.39	3.18	24.57	237	13.55
Brockton, Mass.....	65,343	141	21.6	22.17	4.24	26.41	229	11.22
Brookline, Mass.....	45,700	556	121.7	125.57	12.10	137.67	19	110.83
Buffalo, N. Y.....	555,800	3,181	57.2	41.83	2.02	43.90	149	19.34
Burlington, Iowa.....	27,100	55	20.3	14.87	1.51	16.38	296	6.57
Butler, Pa.....	25,230	40	15.9	12.00	3.41	15.41	267	10.24
Butte, Mont.....	43,600	7	1.6	4.93	3.47	8.40	288	.26
Cambridge, Mass.....	125,800	863	68.6	56.81	7.45	64.26	83	28.47
Camden, N. J.....	135,400	350	25.8	49.94	4.92	54.86	111	8.60
Canton, Ohio.....	116,800	374	32.0	26.40	4.96	31.36	210	18.67
Cedar Rapids, Iowa.....	58,200	157	27.0	31.90	9.99	41.89	157	11.84
Central Falls, R. I.....	25,700	44	17.1	8.96	2.84	11.80	282	3.58
Charleston, S. C.....	75,900	46	6.1	5.05	2.34	7.39	289	2.11
Charleston, N. Va.....	55,200	258	46.7	47.35	4.70	52.05	124	15.58
Charlotte, N. C.....	82,100	1,237	150.7	85.86	4.99	90.84	43	53.98
Chattanooga, Tenn.....	73,500	611	83.1	54.12	9.87	63.99	86	25.35
Chelsea, Mass.....	49,800	142	28.5	18.04	5.32	23.37	242	11.51
Chester, Pa.....	74,200	243	32.7	20.73	2.81	23.54	240	13.48
Chicago, Ill.....	3,157,400	34,447	109.1	99.83	2.63	102.46	32	55.35
Chicopee, Mass.....	45,400	102	22.5	25.58	2.52	28.10	221	8.11
Cicero, Ill.....	71,600	464	64.8	49.72	4.19	53.91	116	35.44
Cincinnati, Ohio.....	413,700	3,559	86.0	74.16	11.55	85.71	46	52.28
Clarksburg, W. Va.....	30,900	98	31.7	34.80	3.69	38.49	174	11.56
Cleveland, Ohio.....	1,010,300	3,167	31.3	46.54	9.05	55.59	107	16.08
Clifton, N. J.....	36,200	547	151.1	94.96	2.89	97.85	36	70.16
Colorado Springs, Colo.....	(1)	95						
Columbia, S. C.....	50,600	272	53.8	26.63	5.18	31.81	208	21.90
Columbus, Ga.....	46,600	321	68.9	21.13	3.63	24.76	236	15.04
Columbus, Ohio.....	299,000	2,477	82.8	49.69	4.61	54.31	114	38.57
Council Bluffs, Iowa.....	42,300	94	22.2	16.58	2.57	19.15	255	6.18
Covington, Ky.....	59,000	314	53.2	22.02	4.96	26.98	228	16.16
Cranston, R. I.....	37,500	559	149.1	96.19	2.75	98.94	35	74.01
Cumberland, Md.....	34,400	67	19.5	26.87	2.18	29.06	218	8.20
Dallas, Tex.....	217,800	1,199	55.1	29.20	7.93	37.14	181	14.64
Danville, Ill.....	38,800	164	42.3	19.39	4.21	23.59	239	15.44
Davenport, Iowa.....	62,469	140	26.7	20.21	5.52	25.72	233	12.11
Dayton, Ohio.....	184,500	732	39.7	48.84	7.30	56.14	102	14.65

*Data not collected.

*State census Jan. 1, 1925.

TABLE 5.—TOTAL AND PER CAPITA EXPENDITURES FOR NEW BUILDINGS AND FOR

City and State	Expenditure for new buildings, 1928	Expenditure for repairs and additions, 1928	Total expenditures		Expenditure for new housekeeping dwellings only, 1928
			1928	1927	
Decatur, Ill.	\$3,906,710	\$262,635	\$4,169,345	\$5,790,415	\$1,967,500
Denver, Colo.	15,113,000	1,657,750	16,770,750	15,754,600	8,249,200
Des Moines, Iowa	4,154,173	355,807	4,509,980	2,876,131	1,675,328
Detroit, Mich.	117,458,340	11,801,945	129,260,285	145,555,647	66,448,106
Dubuque, Iowa	764,425	112,961	877,386	1,288,207	269,500
Duluth, Minn.	2,283,368	1,006,036	3,289,404	4,431,435	947,650
Durham, N. C.	9,672,888	232,950	9,905,838	2,587,754	1,582,935
East Chicago, Ind.	3,126,499	355,405	3,481,904	4,304,366	950,850
East Cleveland, Ohio	1,678,961	110,291	1,789,252	1,220,620	186,000
Easton, Pa.	426,339	306,669	733,008	1,299,670	202,425
East Orange, N. J.	7,266,012	366,373	7,632,385	12,313,092	4,631,150
East Providence, R. I.	2,972,117	117,984	3,090,101	2,389,700	1,478,025
East St. Louis, Ill.	2,490,326	216,608	2,706,934	5,562,971	1,843,880
Elgin, Ill.	2,013,075	356,571	2,369,646	1,891,883	1,055,570
Elizabeth, N. J.	5,473,100	30,500	5,503,600	10,922,877	3,451,000
Elkhart, Ind.	832,616	231,273	1,063,889	2,660,566	590,261
Elmira, N. Y.	1,668,121	237,596	1,905,717	1,311,783	631,100
El Paso, Tex.	1,836,814	307,411	2,144,225	1,792,561	900,426
Erie, Pa.	3,846,534	917,154	4,763,688	5,393,056	2,104,500
Evanston, Ill.	12,306,175	872,050	13,178,225	15,917,225	7,714,000
Evansville, Ind.	4,780,090	330,724	5,110,814	3,415,998	1,488,250
Everett, Mass.	1,521,858	238,901	1,760,759	2,097,830	977,600
Everett, Wash.	677,590	509,000	1,186,590	(?)	262,300
Fall River, Mass.	2,546,384	289,260	2,835,644	1,840,768	469,020
Fitchburg, Mass.	570,115	252,235	822,350	637,975	110,500
Flint, Mich.	13,112,132	1,310,577	14,422,729	22,087,451	8,495,144
Fond du Lac, Wis.	493,631	85,499	579,130	1,000,179	203,000
Fort Smith, Ark.	1,004,184	604,518	1,608,702	(?)	184,488
Fort Wayne, Ind.	4,284,436	726,688	5,011,124	6,002,498	2,128,815
Fort Wayne, Tex.	10,083,937	1,459,850	11,543,787	28,483,764	6,402,445
Fresno, Calif.	1,205,652	455,913	1,661,565	2,690,578	480,645
Galveston, Tex.	2,308,562	368,246	2,676,808	2,974,415	1,146,686
Gary, Ind.	5,240,875	800,275	6,041,150	15,016,529	3,701,575
Grand Rapids, Mich.	6,435,245	1,751,510	8,186,755	12,319,420	3,584,100
Great Falls, Mont.	2,525,652	133,830	2,659,482	1,163,119	789,830
Green Bay, Wis.	1,831,861	160,000	1,991,861	2,508,898	834,180
Greensboro, N. C.	4,520,144	528,151	5,048,295	4,837,830	2,030,865
Greenville, S. C.	1,197,452	242,691	1,440,143	1,111,182	729,547
Greenwich, Conn.	5,736,745	867,635	6,604,380	5,700,062	4,559,300
Hagerstown, Md.	462,200	215,034	677,234	1,558,205	300,510
Hamilton, Ohio	1,920,934	142,099	2,063,033	1,782,749	1,538,487
Hammond, Ind.	6,057,980	469,300	6,527,280	6,431,200	2,750,700
Hamtramck, Mich.	1,056,930	288,045	1,344,975	1,545,815	404,200
Harrisburg, Pa.	4,713,635	881,140	5,594,775	3,569,365	1,214,500
Hartford, Conn.	9,394,186	1,884,257	11,278,443	17,529,941	4,650,269
Haverhill, Mass.	444,190	109,875	554,065	909,625	271,400
Hazleton, Pa.	1,011,988	183,022	1,195,010	2,072,504	343,264
Highland Park, Mich.	1,675,167	928,110	2,603,277	2,654,960	364,500
Hoboken, N. J.	320,700	244,173	564,873	1,519,599	70,500
Holyoke, Mass.	913,700	347,400	1,261,100	2,044,200	492,800
Houston, Tex.	34,508,940	710,563	35,309,503	27,326,475	17,806,385
Huntington, W. Va.	929,600	52,000	981,600	1,547,150	467,900
Hutchinson, Kans.	1,067,390	201,722	1,269,112	(?)	467,270
Indianapolis, Ind.	19,354,573	2,612,813	21,967,386	23,682,316	10,224,100
Irrington, N. J.	6,556,253	83,041	6,639,294	12,960,227	5,021,800
Jackson, Mich.	1,550,690	546,396	2,097,086	2,575,644	1,107,450
Jacksonville, Fla.	6,818,590	841,569	7,660,159	12,768,356	5,263,115
Jamestown, N. Y.	1,554,990	291,880	1,846,870	2,745,835	855,000
Jersey City, N. J.	12,043,194	933,050	13,876,244	13,851,780	7,649,000
Johnstown, Pa.	961,341	133,753	1,095,094	1,386,183	345,150
Joliet, Ill.	2,773,828	307,792	3,081,620	2,793,700	1,412,900
Joplin, Mo.	1,231,893	172,346	1,403,739	1,355,533	591,200

¹ Not estimated by Census Bureau.

² Estimate as of July 1, 1926.

³ Data not collected.

REPAIRS, AND FAMILIES PROVIDED FOR, ETC., IN THE CALENDAR YEAR 1928—Con.

City and State	Estimated population, July 1, 1928	Families provided for		Per capita expenditure, 1923				Per capita expenditure for house-keeping dwellings only, 1928
		Number	Ratio per 10,000	For new buildings	For repairs and additions	Total	Rank of city	
Decatur, Ill.	57,100	339	59.4	\$68.42	\$4.60	\$73.02	59	\$34.49
Denver, Colo.	294,200	1,869	63.5	51.37	5.63	57.00	100	28.06
Des Moines, Iowa	151,900	406	26.7	27.35	2.34	29.69	216	11.04
Detroit, Mich.	1,378,900	15,929	115.5	85.18	8.56	93.74	42	48.13
Dubuque, Iowa	42,300	67	15.8	18.07	2.67	20.74	253	6.37
Duluth, Minn.	116,800	196	16.8	19.55	8.61	28.16	220	8.11
Durham, N. C.	47,600	464	97.5	203.21	4.89	208.11	8	33.25
East Chicago, Ind.	50,800	204	40.2	61.55	7.00	68.54	69	18.72
East Cleveland, Ohio	39,400	136	34.5	42.61	2.80	45.41	147	4.72
Easton, Pa.	38,400	24	6.3	11.10	7.99	19.09	257	5.27
East Orange, N. J.	65,000	968	148.9	111.78	5.64	117.42	24	71.25
East Providence, R. I.	27,100	271	100.0	109.67	4.35	114.03	26	54.54
East St. Louis, Ill.	74,000	501	67.7	33.65	2.93	36.58	186	24.92
Elgin, Ill.	36,000	207	57.5	55.92	9.90	65.82	77	29.32
Elizabeth, N. J.	(1)	1,002						
Elkhart, Ind.	(1)	155						
Elmira, N. Y.	50,000	120	24.0	33.36	4.75	38.11	177	12.62
El Paso, Tex.	117,800	310	26.3	15.59	2.61	18.20	260	7.64
Erie, Pa.	(1)	397						
Evanston, Ill.	47,600	945	198.5	258.53	18.32	276.85	3	162.06
Evansville, Ind.	98,100	420	42.8	48.73	3.37	52.10	123	15.17
Everett, Mass.	43,300	283	65.4	35.15	5.52	40.66	162	22.58
Everett, Wash.	42,303	123	42.0	23.12	17.37	40.49	164	8.95
Fall River, Mass.	134,300	110	8.2	18.96	2.15	21.11	249	3.49
Fitchburg, Mass.	45,200	25	5.5	12.61	5.58	18.19	261	2.44
Flint, Mich.	148,800	2,221	149.3	88.12	8.81	96.93	39	57.09
Fond du Lac, Wis.	26,500	59	22.3	18.63	3.23	21.85	244	7.66
Fort Smith, Ark.	31,643	61	19.3	31.73	19.10	50.84	128	5.83
Fort Wayne, Ind.	105,300	407	38.7	40.69	6.90	47.59	139	20.22
Fort Worth, Tex.	170,600	1,758	103.0	59.11	8.56	67.67	72	37.53
Fresno, Calif.	64,000	146	22.8	18.84	7.12	25.96	232	7.61
Galveston, Tex.	50,600	369	72.9	45.62	7.28	52.90	121	22.66
Gary, Ind.	89,100	890	99.9	58.82	8.98	67.80	71	41.54
Grand Rapids, Mich.	164,200	895	54.5	39.19	10.67	49.86	133	21.83
Great Falls, Mont.	30,900	260	84.1	81.74	4.33	86.07	45	25.66
Green Bay, Wis.	36,100	188	51.5	50.74	4.43	55.18	109	23.11
Greensboro, N. C.	51,900	446	85.9	87.09	10.18	97.27	38	39.13
Greenville, S. C.	28,100	193	68.7	42.61	8.64	51.25	125	25.96
Greenwich, Conn.	(1)	344						
Hagerstown, Md.	32,000	82	25.6	14.44	6.72	21.16	248	9.39
Hamilton, Ohio	44,200	410	92.8	43.46	3.21	46.67	143	34.81
Hammond, Ind.	56,000	698	124.6	108.18	8.38	116.56	25	49.28
Hamtramck, Mich.	99,800	89	8.9	10.59	2.89	13.48	277	4.05
Harrisburg, Pa.	86,900	206	23.7	54.24	10.14	64.38	82	13.98
Hartford, Conn.	172,300	1,363	79.1	54.52	10.94	65.46	79	26.99
Haverhill, Mass.	49,232	68	13.8	9.02	2.23	11.25	283	5.61
Hazleton, Pa.	38,300	117	14.9	26.42	4.78	31.20	212	8.96
Highland Park, Mich.	86,400	117	13.5	19.39	10.74	30.13	215	4.22
Hoboken, N. J.	(1)	5						
Holyoke, Mass.	60,400	86	14.2	15.13	5.75	20.88	251	8.16
Houston, Tex.	164,954	4,463	270.6	209.78	4.31	214.08	6	107.95
Huntington, W. Va.	68,600	87	12.7	13.55	.76	14.31	274	6.82
Hutchinson, Kans.	(1)	146						
Indianapolis, Ind.	382,100	2,511	65.7	50.65	6.84	57.49	98	26.76
Irrington, N. J.	34,600	1,022	295.4	189.49	2.40	191.89	10	146.14
Jackson, Mich.	63,700	250	39.2	24.34	8.58	32.92	204	17.39
Jacksonville, Fla.	140,700	1,658	117.3	48.46	5.98	54.44	112	37.41
Jamestown, N. Y.	46,000	169	36.7	33.80	6.35	40.15	165	18.59
Jersey City, N. J.	324,700	2,155	66.4	59.86	2.87	62.73	152	23.56
Johnstown, Pa.	73,700	73	9.9	13.04	1.81	14.85	271	4.68
Joliet, Ill.	41,900	180	43.0	66.20	7.35	73.55	87	33.72
Joplin, Mo.	(1)	151						

* State census, Jan. 1, 1925.

* Estimate as of July 1, 1925.

TABLE 5.—TOTAL AND PER CAPITA EXPENDITURES FOR NEW BUILDINGS AND FOR

City and State	Expenditure for new buildings, 1928	Expenditure for repairs and addi- tions, 1928	Total expenditures		Expenditure for new housekeeping dwellings only, 1928
			1928	1927	
Kalamazoo, Mich.....	\$1,559,478	\$475,386	\$2,034,864	\$2,223,046	\$640,525
Kansas City, Kans.....	1,562,452	88,825	1,651,277	1,586,790	648,620
Kansas City, Mo.....	14,739,275	802,000	15,541,275	14,822,336	7,629,200
Kearny, N. J.....	6,115,160	136,430	6,251,590	5,795,875	2,945,000
Kenosha, Wis.....	3,291,659	434,745	3,726,404	4,468,453	2,484,513
Kingston, N. Y.....	1,020,006	716,784	1,736,790	2,140,093	683,050
Knoxville, Tenn.....	6,784,741	329,796	7,114,537	5,699,417	3,187,541
Kokomo, Ind.....	459,013	67,653	526,666	480,095	350,262
Lakewood, Ohio.....	4,512,046	110,050	4,622,096	3,516,399	2,172,400
Lancaster, Pa.....	1,528,895	860,180	2,389,075	3,004,838	839,050
Lansing, Mich.....	4,919,662	284,685	5,204,347	7,330,420	2,004,800
Lawrence, Mass.....	427,500	175,135	602,635	913,134	104,200
Lebanon, Pa.....	403,000	257,325	660,325	604,500	101,000
Lewiston, Me.....	985,000	5,000	990,000	469,100	148,000
Lexington, Ky.....	1,448,119	169,299	1,617,418	2,350,985	573,400
Lima, Ohio.....	295,217	159,217	454,434	707,313	86,100
Lincoln, Nebr.....	3,450,854	192,495	3,643,349	4,398,540	1,801,712
Little Rock, Ark.....	3,804,523	455,685	4,260,108	2,993,636	2,079,137
Long Beach, Calif.....	15,607,585	700,240	16,307,825	13,639,425	8,631,515
Lorain, Ohio.....	1,079,714	97,660	1,177,374	1,300,534	815,140
Los Angeles, Calif.....	91,279,946	10,398,822	101,678,768	123,027,139	60,977,127
Louisville, Ky.....	15,462,120	2,657,955	18,120,075	23,340,610	8,250,300
Lowell, Mass.....	630,805	310,945	941,750	971,115	170,600
Lynchburg, Va.....	916,244	176,839	1,093,083	1,528,729	499,710
Lynn, Mass.....	2,841,269	945,535	3,786,804	3,877,775	1,898,500
McKeesport, Pa.....	1,845,076	339,909	2,184,985	2,356,119	980,535
Macon, Ga.....	1,967,240	352,449	2,349,689	2,886,116	1,248,170
Madison, Wis.....	6,890,767	769,347	7,660,114	4,461,813	4,646,200
Malden, Mass.....	2,695,847	197,097	2,892,944	3,800,093	2,307,250
Manchester, N. H.....	827,360	231,359	1,058,719	1,940,074	339,625
Mansfield, Ohio.....	1,698,055	140,819	1,808,874	1,779,555	663,000
Marion, Ind.....	1,243,660	63,500	1,307,160	521,560	382,000
Marion, Ohio.....	1,106,345	33,940	1,140,285	557,793	439,900
Medford, Mass.....	4,324,637	190,196	4,514,833	4,370,512	3,689,450
Memphis, Tenn.....	12,223,414	2,059,625	14,283,039	12,402,920	6,100,030
Meriden, Conn.....	1,008,926	259,795	1,268,721	1,316,177	678,200
Miami, Fla.....	1,262,488	683,575	1,946,063	9,540,937	592,555
Milwaukee, Wis.....	31,764,594	3,641,787	35,406,381	37,747,895	19,159,289
Minneapolis, Minn.....	20,037,560	3,200,165	23,237,725	22,429,620	8,377,920
Mobile, Ala.....	3,158,310	187,508	3,345,818	2,146,241	1,690,456
Moline, Ill.....	1,458,440	201,335	1,659,775	1,170,010	553,084
Montclair, N. J.....	4,119,035	524,233	4,643,268	5,446,164	3,673,324
Montgomery, Ala.....	2,981,068	307,820	3,288,918	2,531,347	1,023,355
Mount Vernon, N. Y.....	13,650,885	611,564	14,262,449	16,775,452	10,991,935
Muncie, Ind.....	2,422,019	452,129	2,874,148	3,038,813	1,134,885
Muskegon, Mich.....	1,533,007	277,328	1,810,335	1,078,668	318,010
Muskogee, Okla.....	530,330	35,255	565,585	842,567	314,350
Nashville, Tenn.....	4,893,949	670,694	5,564,643	7,078,073	1,916,074
Newark, N. J.....	29,391,765	4,893,388	34,285,153	51,451,630	16,655,563
Newark, Ohio.....	1,038,316	28,600	1,066,916	653,822	338,300
New Bedford, Mass.....	808,753	286,622	1,095,375	2,166,627	281,100
New Britain, Conn.....	2,889,608	642,509	3,532,117	4,103,884	1,762,950
New Brunswick, N. J.....	1,757,670	426,395	2,184,065	2,839,066	807,925
Newburgh, N. Y.....	989,275	248,692	1,237,967	1,517,651	429,800
New Castle, Pa.....	1,358,740	107,500	1,466,240	3,037,495	938,825
New Haven, Conn.....	7,779,394	1,019,000	8,798,394	11,741,379	2,227,300
New London, Conn.....	1,919,465	269,187	2,188,652	1,801,715	1,455,400
New Orleans, La.....	9,858,184	2,769,494	12,627,678	15,896,775	5,305,913
Newport, Ky.....	259,810	167,140	426,950	439,225	185,300
Newport, R. I.....	564,520	115,545	680,065	906,330	305,300
Newport News, Va.....	600,111	219,194	819,305	548,015	347,203
New Rochelle, N. Y.....	10,386,272	847,046	11,233,318	9,735,614	8,639,450
Newton, Mass.....	10,094,405	707,673	10,802,078	10,138,666	8,986,720
New York City, N. Y.....	849,962,931	66,708,924	916,671,855	880,333,455	526,470,604
Niagara Falls, N. Y.....	4,270,153	599,325	4,869,478	4,791,480	2,447,273
Norfolk, Va.....	3,347,903	491,840	3,839,743	3,346,826	1,984,650
Norristown, Pa.....	981,025	313,940	1,294,965	1,826,101	574,000
Norwalk, Conn.....	4,228,963	555,740	4,784,703	3,592,009	2,371,683

¹ Not estimated by Census Bureau.² Estimate as of July 1, 1926.

REPAIRS, AND FAMILIES PROVIDED FOR, ETC., IN THE CALENDAR YEAR 1928—Con.

City and State	Estimated population, July 1, 1928	Families provided for		Per capita expenditure, 1928				Per capita expenditure for house-keeping dwellings only, 1928
		Number	Ratio per 10,000	For new build-ings	For re-pairs and additions	Total	Rank of city	
Kalamazoo, Mich.....	56,400	165	29.3	\$27.65	\$8.43	\$36.08	188	\$11.86
Kansas City, Kans.....	118,300	321	27.1	13.21	.75	13.96	275	5.48
Kansas City, Mo.....	391,000	1,969	50.4	37.70	2.05	39.75	169	19.51
Kearny, N. J.....	32,100	857	267.0	190.50	4.25	194.75	9	91.74
Kenosha, Wis.....	56,500	295	52.2	58.26	7.69	65.95	76	43.97
Kingston, N. Y.....	28,400	126	44.4	35.92	25.24	61.15	90	24.05
Knoxville, Tenn.....	105,400	940	89.2	64.37	3.13	67.50	73	30.24
Kokomo, Ind.....	40,400	82	20.3	11.36	1.67	13.04	279	8.67
Lakewood, Ohio.....	65,000	537	82.6	69.42	1.69	71.11	65	33.42
Lancaster, Pa.....	58,300	154	26.4	26.22	14.75	40.98	159	14.39
Lansing, Mich.....	79,600	443	55.7	61.80	3.58	65.38	80	25.19
Lawrence, Mass.....	93,500	32	3.4	4.57	1.87	6.45	290	1.11
Lebanon, Pa.....	25,300	19	7.5	15.93	10.17	26.10	231	3.99
Lewiston, Me.....	36,600	77	21.0	26.91	.14	27.05	227	4.04
Lexington, Ky.....	48,700	104	21.4	29.74	3.48	33.21	201	11.77
Lima, Ohio.....	49,700	19	3.8	5.94	3.20	9.14	286	1.73
Lincoln, Nebr.....	71,100	497	69.9	48.54	2.71	51.24	126	25.34
Little Rock, Ark.....	79,200	527	66.5	48.04	5.75	53.79	117	26.25
Long Beach, Calif.....	104,200	3,099	297.4	149.78	6.72	156.51	14	82.84
Lorain, Ohio.....	44,900	227	50.6	24.05	2.18	26.22	230	18.15
Los Angeles, Calif.....	(1)	21,081						
Louisville, Ky.....	329,400	1,542	46.8	46.94	8.07	55.01	110	25.05
Lowell, Mass.....	110,296	50	4.5	5.72	2.82	8.54	287	1.55
Lynchburg, Va.....	38,600	114	29.5	23.74	4.58	28.32	219	12.95
Lynn, Mass.....	105,500	501	47.5	26.93	8.96	35.89	189	18.00
McKeesport, Pa.....	50,400	203	40.3	36.61	6.74	43.35	151	19.46
Macon, Ga.....	61,200	321	52.5	32.63	5.76	38.39	175	20.39
Madison, Wis.....	50,500	542	107.3	135.86	15.23	151.09	16	92.00
Malden, Mass.....	53,400	718	134.5	50.48	3.69	54.17	115	43.21
Manchester, N. H.....	85,700	116	13.5	9.65	2.70	12.35	281	3.96
Mansfield, Ohio.....	32,500	127	39.1	51.32	4.33	55.66	105	20.40
Marion, Ind.....	(1)	158						
Marion, Ohio.....	33,400	172	51.5	33.12	1.02	34.14	199	13.17
Medford, Mass.....	52,900	745	140.8	81.75	3.60	85.35	48	69.74
Memphis, Tenn.....	190,200	1,887	99.2	64.27	10.83	75.09	54	32.07
Meriden, Conn.....	37,100	137	36.9	27.19	7.00	34.20	197	18.28
Miami, Fla.....	156,700	124	7.9	8.06	4.36	12.42	280	3.78
Milwaukee, Wis.....	544,200	4,965	91.2	58.37	6.69	65.06	81	35.21
Minneapolis, Minn.....	455,900	2,240	49.1	44.00	7.02	51.01	127	18.38
Mobile, Ala.....	69,600	638	91.7	45.38	2.69	48.07	138	24.29
Moline, Ill.....	35,600	109	30.6	40.97	5.66	46.62	144	15.54
Montclair, N. J.....	33,700	323	95.8	122.23	15.56	137.78	18	109.00
Montgomery, Ala.....	63,100	726	115.1	47.24	4.88	52.12	122	16.22
Mount Vernon, N. Y.....	54,700	1,636	299.1	249.56	11.18	260.74	4	200.95
Muncie, Ind.....	46,800	371	79.3	51.75	9.66	61.41	89	24.25
Muskegon, Mich.....	46,600	104	22.3	32.90	5.95	38.85	172	6.82
Muskogee, Okla.....	33,200	116	34.9	15.97	1.06	17.04	265	9.47
Nashville, Tenn.....	139,600	753	53.9	35.06	4.80	39.86	168	13.73
Newark, N. J.....	473,600	3,288	69.4	62.06	10.33	72.39	61	35.17
Newark, Ohio.....	30,600	108	35.3	33.93	.93	34.87	191	11.06
New Bedford, Mass.....	119,539	42	8.5	6.77	2.40	9.16	285	2.35
New Britain, Conn.....	72,800	327	44.9	39.69	8.83	48.52	137	24.22
New Brunswick, N. J.....	40,800	210	51.5	43.08	10.45	53.53	120	16.80
Newburgh, N. Y.....	30,400	74	24.3	32.54	8.18	40.72	161	14.14
New Castle, Pa.....	52,500	143	27.2	25.88	2.05	27.93	222	17.88
New Haven, Conn.....	187,900	546	29.1	41.40	5.42	46.82	141	11.85
New London, Conn.....	29,700	218	73.4	64.63	9.06	73.69	56	48.94
New Orleans, La.....	429,400	2,107	49.1	22.96	6.45	29.41	224	12.36
Newport, Ky.....	(1)	43						
Newport, R. I.....	27,757	61	22.0	20.34	4.16	24.50	238	11.14
Newport News, Va.....	53,300	101	18.9	11.26	4.11	15.37	268	6.51
New Rochelle, N. Y.....	48,800	1,205	246.9	212.83	17.36	230.19	5	177.04
Newton, Mass.....	57,300	939	163.9	176.17	12.35	188.52	11	156.84
New York City, N. Y.....	6,017,500	109,523	182.0	141.25	11.09	152.33	15	87.49
Niagara Falls, N. Y.....	68,300	506	74.1	62.52	8.77	71.30	62	35.83
Norfolk, Va.....	184,200	634	34.4	18.18	2.67	20.85	262	10.77
Norristown, Pa.....	36,200	96	26.5	27.10	8.67	35.77	190	15.86
Norwalk, Conn.....	30,100	358	118.9	140.40	18.46	158.86	13	78.79

1 State census, Jan. 1, 1925.

2 Estimate as of July 1, 1927.

TABLE 5.—TOTAL AND PER CAPITA EXPENDITURES FOR NEW BUILDINGS AND FOR

City and State	Expenditure for new buildings, 1928	Expenditure for repairs and addi- tions, 1928	Total expenditures		Expenditure for new housekeeping dwellings only, 1928
			1928	1927	
Oakland, Calif.....	\$17,824,002	\$1,713,163	\$19,537,165	\$20,518,417	\$8,107,443
Oak Park, Ill.....	9,074,251	216,244	9,290,495	9,080,676	5,265,455
Ogden, Utah.....	1,202,325	145,900	1,348,225	1,498,260	476,300
Oklahoma City, Okla.....	12,267,630	1,254,368	13,521,998	12,682,293	8,709,509
Okmulgee, Okla.....	227,615	25,350	252,965	262,150	45,550
Omaha, Nebr.....	8,422,073	628,337	9,050,410	4,567,218	2,257,950
Orange, N. J.....	2,708,090	398,409	3,106,499	5,581,523	1,306,400
Oshkosh, Wis.....	686,924	165,922	852,846	1,494,076	539,066
Ottumwa, Iowa.....	328,450	65,325	393,775	579,900	204,800
Paducah, Ky.....	527,590	81,015	608,605	356,000	202,735
Pasadena, Calif.....	5,056,253	893,300	5,949,553	8,965,720	3,347,929
Passaic, N. J.....	2,573,057	488,461	3,061,518	5,603,448	1,766,650
Paterson, N. J.....	6,214,604	1,142,027	7,356,691	6,369,917	2,680,513
Pawtucket, R. I.....	2,430,159	392,430	2,822,589	3,586,765	1,923,850
Peoria, Ill.....	3,411,295	539,965	3,951,260	3,409,575	2,182,500
Perth Amboy, N. J.....	910,022	457,337	1,367,359	1,671,872	432,082
Petersburg, Va.....	416,767	151,861	568,628	279,466	187,650
Philadelphia, Pa.....	100,023,155	12,202,710	112,225,865	117,590,650	51,432,580
Phoenix, Ariz.....	5,604,161	372,501	5,976,662	5,645,124	2,146,922
Pittsburgh, Pa.....	35,223,329	4,150,203	39,373,532	37,111,332	13,270,969
Pittsfield, Mass.....	1,657,915	155,215	1,813,130	1,650,690	1,117,200
Plainfield, N. J.....	3,058,148	406,623	3,464,771	5,046,011	2,066,779
Pontiac, Mich.....	12,637,246	477,980	13,115,226	17,558,296	5,801,365
Port Arthur, Tex.....	1,646,320	234,916	1,881,236	1,731,380	457,577
Port Huron, Mich.....	429,450	31,725	461,175	739,065	190,850
Portland, Me.....	2,218,792	520,094	2,738,886	2,326,783	1,046,350
Portland, Ore.....	18,407,440	2,868,530	21,275,970	28,973,455	9,907,285
Portsmouth, Ohio.....	1,145,200	101,885	1,247,085	1,585,007	615,350
Portsmouth, Va.....	534,945	153,586	688,531	463,385	242,055
Poughkeepsie, N. Y.....	1,460,119	204,701	1,664,820	1,147,607	691,550
Providence, R. I.....	13,172,494	2,831,025	16,003,519	23,132,819	7,190,600
Pueblo, Colo.....	1,170,983	295,820	1,466,812	1,625,382	911,825
Quincy, Ill.....	1,096,736	180,221	1,276,957	1,073,321	529,775
Quincy, Mass.....	6,505,572	364,440	6,870,012	5,231,872	3,695,600
Racine, Wis.....	4,134,138	283,351	4,417,489	6,391,171	3,109,193
Reading, Pa.....	2,809,366	998,954	3,808,320	4,614,067	1,507,650
Revere, Mass.....	1,118,897	108,245	1,227,142	1,602,120	942,645
Richmond, Ind.....	703,017	237,706	940,723	1,826,139	598,342
Richmond, Va.....	7,579,236	1,265,595	8,844,831	15,216,203	3,625,166
Roanoke, Va.....	3,108,331	171,082	3,279,423	2,583,996	1,369,582
Rochester, N. Y.....	15,683,912	1,936,886	17,620,798	22,589,418	7,960,709
Rockford, Ill.....	4,281,725	1,454,917	5,736,642	6,553,423	2,721,500
Rock Island, Ill.....	503,515	1,079,729	1,583,244	1,999,890	453,500
Sacramento, Calif.....	4,674,424	849,908	5,524,332	8,814,211	3,302,972
Saginaw, Mich.....	3,871,672	477,913	4,349,585	3,610,783	1,469,116
St. Joseph, Mo.....	1,878,643	125,975	2,004,618	768,898	374,200
St. Louis, Mo.....	38,215,329	4,613,168	42,828,495	41,417,221	19,228,980
St. Paul, Minn.....	7,026,558	1,672,955	8,699,513	10,071,216	4,529,238
St. Petersburg, Fla.....	1,540,000	306,100	1,846,100	2,907,500	828,100
Salem, Mass.....	1,323,125	396,560	1,719,685	2,729,080	707,000
Salt Lake City, Utah.....	3,930,626	1,346,778	5,277,404	4,855,845	2,297,410
San Antonio, Tex.....	16,732,750	1,567,609	18,300,359	12,190,280	8,661,556
San Diego, Calif.....	11,310,940	839,198	12,150,138	13,877,153	7,247,101
San Francisco, Calif.....	33,822,280	3,682,158	37,504,438	46,448,076	19,944,664
San Jose, Calif.....	2,233,010	308,290	2,541,300	3,554,430	1,301,010
Savannah, Ga.....	2,010,069	127,065	2,137,134	2,180,050	1,429,065
Schenectady, N. Y.....	2,962,070	466,410	3,428,480	4,318,270	1,669,500
Scranton, Pa.....	3,597,993	1,034,250	4,632,243	5,707,115	1,632,495
Seattle, Wash.....	30,540,015	4,266,960	34,806,975	29,070,080	15,533,350
Sheboygan, Wis.....	1,596,165	512,554	2,108,719	2,171,940	1,037,400
Shreveport, La.....	4,039,341	807,084	4,846,425	3,946,370	2,039,914
Sioux City, Iowa.....	1,966,060	204,380	2,170,440	1,867,375	1,058,750
Sioux Falls, S. Dak.....	1,843,540	161,185	2,004,725	2,042,505	858,920
Somerville, Mass.....	1,203,945	220,252	1,424,197	3,385,850	861,300
South Bend, Ind.....	6,032,415	330,770	6,363,185	4,888,600	2,951,350

¹Not estimated by Census Bureau.

² Estimate as of July 1, 1926.

REPAIRS, AND FAMILIES PROVIDED FOR, ETC., IN THE CALENDAR YEAR 1928—Con.

City and State	Estimated population, July 1, 1928	Families provided for		Per capita expenditure, 1928				Per capita expenditure for house-keeping dwellings only, 1928
		Number	Ratio per 10,000	For new build-ings	For re-pairs and additions	Total	Rank of city	
Oakland, Calif.....	274,100	2,430	88.7	\$65.03	\$6.25	\$71.28	63	\$29.58
Oak Park, Ill.....	57,700	745	129.1	157.27	3.75	161.01	12	91.26
Ogden, Utah.....	39,100	157	40.2	30.75	3.73	34.48	196	12.18
Oklahoma City, Okla.....	7,104,080	2,637	253.4	117.87	12.05	129.92	21	83.68
Oklmulgee, Okla.....	(1)	15						
Omaha, Nebr.....	222,800	412	18.5	37.80	2.82	40.62	163	10.13
Orange, N. J.....	36,500	281	77.0	74.19	10.92	85.11	49	35.79
Oshkosh, Wis.....	33,200	155	46.7	20.69	5.00	25.69	234	16.24
Ottumwa, Iowa.....	* 27,400	38	13.9	11.99	2.38	14.37	273	7.47
Paducah, Ky.....	* 26,100	94	36.0	20.21	3.10	23.32	241	7.77
Pasadena, Calif.....	62,100	600	96.6	81.42	14.38	95.80	41	53.91
Passaic, N. J.....	71,800	351	48.9	35.84	6.80	42.64	153	24.61
Paterson, N. J.....	144,900	748	51.6	42.89	7.58	50.77	129	17.81
Pawtucket, R. I.....	73,100	455	62.2	33.24	5.37	38.61	173	26.32
Peoria, Ill.....	84,500	437	51.7	40.37	6.39	46.76	142	25.83
Perth Amboy, N. J.....	50,100	104	20.8	18.16	9.13	27.29	225	8.62
Petersburg, Va.....	37,800	48	12.7	11.03	4.02	15.04	269	4.96
Philadelphia, Pa.....	2,064,200	10,576	51.2	48.46	5.91	54.37	113	24.92
Phoenix, Ariz.....	* 42,100	748	177.7	133.12	8.85	141.96	17	51.00
Pittsburgh, Pa.....	673,800	2,844	37.8	32.28	6.16	38.44	96	19.70
Pittsfield, Mass.....	50,000	211	42.2	33.16	3.10	36.26	187	22.34
Plainfield, N. J.....	* 32,500	311	95.7	94.10	12.51	106.61	30	63.59
Pontiac, Mich.....	61,500	1,735	282.1	205.48	7.77	213.26	7	94.36
Port Arthur, Tex.....	* 33,000	210	63.6	49.89	7.12	57.01	99	13.88
Port Huron, Mich.....	* 30,700	71	23.1	13.99	1.03	15.02	270	6.24
Portland, Me.....	75,600	261	33.2	28.23	6.62	34.85	192	13.31
Portland, Ore.....	(1)	2,321						
Portsmouth, Ohio.....	41,200	169	41.0	27.80	2.47	30.27	214	14.94
Portsmouth, Va.....	61,600	85	13.8	8.68	2.49	11.18	284	3.83
Poughkeepsie, N. Y.....	39,100	96	24.6	37.34	5.24	42.58	154	17.69
Providence, R. I.....	286,300	1,134	39.6	46.01	9.89	55.90	103	25.12
Pueblo, Colo.....	44,200	372	84.2	26.49	6.69	33.19	202	20.63
Quincy, Ill.....	39,800	133	33.4	27.56	4.53	32.08	205	13.31
Quincy, Mass.....	67,600	977	144.5	96.24	5.39	101.63	33	54.67
Racine, Wis.....	74,400	681	91.5	55.57	3.81	59.37	95	41.79
Reading, Pa.....	115,400	263	22.8	24.34	8.66	33.00	203	13.06
Revere, Mass.....	36,000	247	68.6	31.08	3.01	34.09	200	26.14
Richmond, Ind.....	* 31,000	153	49.4	22.68	7.67	30.35	213	19.30
Richmond, Va.....	194,400	764	39.3	38.99	6.51	45.50	146	18.65
Roanoke, Va.....	64,600	364	56.3	48.12	2.65	50.77	130	21.20
Rochester, N. Y.....	328,200	1,862	56.7	47.79	5.90	53.69	118	24.26
Rockford, Ill.....	82,800	779	94.1	51.71	17.57	69.28	68	32.87
Rock Island, Ill.....	42,700	146	34.2	11.79	25.29	37.08	182	10.62
Sacramento, Calif.....	75,700	917	121.1	61.75	11.23	72.98	60	43.63
Saginaw, Mich.....	75,600	577	76.3	51.21	6.32	57.53	97	19.43
St. Joseph, Mo.....	78,500	98	12.5	23.93	1.60	25.54	235	4.77
St. Louis, Mo.....	848,100	7,190	84.8	45.06	5.44	50.50	131	22.67
St. Paul, Minn.....	* 250,100	772	30.9	28.09	6.69	34.78	194	18.11
St. Petersburg, Fla.....	53,300	172	32.3	28.89	5.74	34.64	195	15.54
Salem, Mass.....	43,000	120	27.9	30.77	9.22	39.99	166	16.44
Salt Lake City, Utah.....	138,000	731	53.0	28.48	9.76	38.24	176	16.65
San Antonio, Tex.....	218,100	2,784	127.6	76.72	7.19	83.91	50	39.71
San Diego, Calif.....	119,700	2,146	179.3	94.49	7.01	101.50	34	60.54
San Francisco, Calif.....	585,300	6,084	103.9	57.79	6.29	64.08	85	34.08
San Jose, Calif.....	45,500	370	81.3	49.08	6.78	55.85	104	28.59
Savannah, Ga.....	99,900	430	43.0	20.12	1.27	21.39	246	14.31
Schenectady, N. Y.....	93,300	269	28.8	31.75	5.00	36.75	183	17.89
Scranton, Pa.....	144,700	292	20.2	24.87	7.15	32.01	206	11.28
Seattle, Wash.....	383,200	4,658	121.6	79.70	11.14	90.83	44	41.32
Sheboygan, Wis.....	35,100	188	53.6	45.47	14.60	60.08	92	29.56
Shreveport, La.....	81,300	713	87.7	49.68	9.93	59.61	94	25.09
Sioux City, Iowa.....	80,000	282	35.3	24.58	2.55	27.13	226	13.23
Sioux Falls, S. Dak.....	* 31,200	211	67.6	59.09	5.17	64.25	84	27.53
Somerville, Mass.....	102,700	199	19.4	11.72	2.14	13.87	276	8.39
South Bend, Ind.....	86,100	579	67.2	70.06	3.84	73.90	55	34.28

* Estimate of July 1, 1927.

TABLE 5.—TOTAL AND PER CAPITA EXPENDITURES FOR NEW BUILDINGS AND FOR

City and State	Expenditure for new buildings, 1928	Expenditure for repairs and addi- tions, 1928	Total expenditures		Expenditure for new housekeeping dwellings only, 1928
			1928	1927	
Spokane, Wash.....	\$4, 879, 063	\$857, 715	\$5, 736, 778	\$3, 656, 500	\$2, 244, 025
Springfield, Ill.....	3, 319, 125	420, 028	3, 739, 153	3, 770, 303	1, 929, 900
Springfield, Mass.....	4, 956, 324	1, 020, 475	5, 976, 799	8, 905, 819	2, 776, 050
Springfield, Mo.....	1, 366, 035	249, 620	1, 615, 655	(*)	677, 275
Springfield, Ohio.....	1, 407, 564	149, 203	1, 556, 767	1, 693, 927	987, 550
Stamford, Conn.....	4, 009, 610	1, 185, 688	5, 195, 278	6, 042, 716	2, 244, 550
Steubenville, Ohio.....	1, 151, 595	41, 815	1, 193, 410	1, 856, 435	708, 000
Stockton, Calif.....	1, 411, 142	363, 724	1, 774, 866	2, 803, 347	809, 210
Superior, Wis.....	1, 685, 705	186, 447	1, 852, 152	1, 277, 019	551, 850
Syracuse, N. Y.....	11, 861, 603	1, 358, 826	13, 220, 429	21, 990, 371	8, 000, 200
Tacoma, Wash.....	4, 026, 470	633, 945	4, 660, 415	4, 764, 728	2, 546, 000
Tampa, Fla.....	3, 042, 030	575, 024	3, 617, 054	6, 145, 201	1, 620, 260
Taunton, Mass.....	768, 247	114, 250	882, 497	1, 055, 999	215, 300
Terre Haute, Ind.....	605, 195	368, 292	973, 487	1, 212, 771	336, 050
Toledo, Ohio.....	14, 463, 296	2, 882, 899	17, 346, 195	15, 513, 710	6, 658, 125
Topeka, Kans.....	1, 832, 950	158, 564	1, 991, 514	2, 222, 196	1, 187, 550
Trenton, N. J.....	3, 314, 867	791, 054	4, 105, 921	4, 539, 632	1, 172, 100
Troy, N. Y.....	1, 061, 600	262, 064	1, 323, 664	3, 206, 057	786, 750
Tucson, Ariz.....	2, 726, 395	168, 996	2, 895, 391	2, 322, 550	1, 102, 972
Tulsa, Okla.....	12, 697, 207	713, 844	13, 411, 051	14, 791, 854	7, 613, 800
Union City, N. J.....	749, 085	371, 671	1, 120, 756	3, 409, 526	326, 300
Utica, N. Y.....	3, 475, 465	441, 505	3, 916, 970	3, 381, 105	2, 140, 100
Vallejo, Calif.....	372, 488	69, 359	441, 847	492, 898	182, 950
Waco, Tex.....	1, 997, 020	294, 319	2, 291, 339	1, 573, 641	631, 003
Waltham, Mass.....	2, 285, 970	191, 085	2, 477, 055	2, 217, 925	1, 744, 300
Warren, Ohio.....	1, 667, 940	143, 680	1, 811, 620	1, 425, 474	1, 084, 830
Washington, D. C.....	50, 284, 426	3, 690, 553	53, 974, 979	39, 263, 477	29, 601, 350
Waterbury, Conn.....	2, 944, 450	543, 850	3, 488, 300	5, 015, 638	1, 963, 500
Waterloo, Iowa.....	2, 460, 584	261, 610	2, 722, 194	1, 151, 981	848, 700
Watertown, Mass.....	2, 729, 425	94, 670	2, 824, 095	4, 281, 230	2, 246, 800
Watertown, N. Y.....	931, 030	221, 419	1, 152, 449	756, 204	278, 800
West New York, N. J.....	1, 272, 875	355, 510	1, 628, 385	1, 685, 293	577, 000
Wheeling, W. Va.....	1, 331, 806	635, 682	1, 967, 488	3, 014, 131	641, 280
White Plains, N. Y.....	12, 093, 064	539, 142	12, 632, 206	10, 125, 792	6, 365, 600
Wichita, Kans.....	7, 323, 973	650, 243	7, 974, 221	5, 848, 942	3, 976, 615
Wichita Falls, Tex.....	1, 315, 400	596, 012	1, 911, 412	4, 050, 687	906, 788
Wilkes-Barre, Pa.....	3, 223, 464	662, 881	3, 896, 345	4, 934, 339	753, 540
Williamsburg, Pa.....	1, 810, 556	105, 005	1, 915, 561	1, 932, 390	1, 009, 085
Wilmington, Del.....	1, 733, 765	347, 175	2, 080, 940	2, 732, 695	730, 090
Wilmington, N. C.....	4, 447, 657	1, 129, 452	5, 577, 109	6, 805, 900	2, 307, 463
Winston-Salem, N. C.....	592, 500	156, 000	748, 500	552, 125	222, 000
Woonsocket, R. I.....	8, 001, 722	529, 308	8, 531, 028	6, 539, 187	3, 597, 360
Worcester, Mass.....	464, 470	454, 073	918, 543	1, 360, 179	271, 300
Yonkers, N. Y.....	5, 772, 236	1, 488, 084	7, 260, 320	8, 814, 669	2, 509, 535
Yonkers, N. Y.....	34, 373, 299	1, 245, 525	35, 618, 824	32, 585, 888	29, 553, 210
York, Pa.....	1, 347, 932	717, 117	2, 065, 049	1, 588, 854	575, 300
Youngstown, Ohio.....	8, 108, 260	529, 415	8, 637, 675	9, 007, 160	5, 043, 935
Zanesville, Ohio.....	475, 276	72, 788	548, 064	1, 021, 100	372, 785
Total.....	3, 068, 940, 040	324, 644, 421	3, 423, 584, 461	3, 593, 839, 405	1, 762, 452, 315

* Not estimated by Census Bureau.

* Estimated as of July 1, 1926.

REPAIRS, AND FAMILIES PROVIDED FOR, ETC., IN THE CALENDAR YEAR 1928—Con.

City and State	Estimated population, July 1, 1928	Families provided for		Per capita expenditure, 1928				Per capita expenditure for house-keeping dwellings only, 1928
		Number	Ratio per 10,000	For new buildings	For repairs and additions	Total	Rank of city	
Spokane, Wash.	\$109, 100	574	52.6	\$44.72	\$7.86	\$52.58	119	\$20.57
Springfield, Ill.	67, 200	352	52.4	49.39	6.25	55.64	106	28.72
Springfield, Mass.	149, 800	647	43.2	33.09	6.81	39.90	167	18.53
Springfield, Mo.	51, 700	305	59.0	26.42	4.83	31.25	211	13.10
Springfield, Ohio	73, 000	315	43.2	19.28	2.04	21.33	247	13.53
Stamford, Conn.	43, 800	331	75.6	91.54	27.07	118.61	23	51.25
Steubenville, Ohio	* 32, 600	191	58.6	35.33	1.28	36.61	185	21.72
Stockton, Calif.	51, 000	226	44.3	27.67	7.13	34.80	193	15.87
Superior, Wis.	(1)	136						
Syracuse, N. Y.	199, 300	1, 661	78.3	59.52	6.82	66.33	75	40.14
Tacoma, Wash.	110, 500	822	74.4	36.44	5.74	42.18	156	23.04
Tampa, Fla.	113, 400	647	57.1	26.83	5.07	31.90	207	14.29
Taunton, Mass.	40, 600	60	14.8	18.92	2.81	21.74	245	5.30
Terre Haute, Ind.	73, 500	113	15.4	8.23	5.01	13.24	278	4.57
Toledo, Ohio	313, 200	1, 698	54.2	46.18	9.20	55.38	108	21.26
Topeka, Kans.	62, 800	304	48.4	29.19	2.52	31.71	209	18.91
Trenton, N. J.	139, 000	223	16.0	23.85	5.69	29.54	217	8.43
Troy, N. Y.	72, 300	157	21.7	14.68	3.62	18.31	259	10.88
Tucson, Ariz.	* 27, 600	336	122.2	99.14	6.15	105.29	31	40.11
Tulsa, Okla.	170, 500	2, 187	128.3	74.47	4.19	78.66	52	44.60
Union City, N. J.	64, 400	84	13.0	11.63	5.77	17.40	263	5.07
Utica, N. Y.	104, 200	342	32.8	33.35	4.24	37.59	179	20.54
Vallejo, Calif.	(1)	43						
Waco, Tex.	46, 600	177	38.0	42.85	6.32	49.17	135	13.54
Waltham, Mass.	37, 100	362	97.6	61.62	5.15	66.77	74	47.02
Warren, Ohio	* 36, 100	306	84.8	46.20	3.98	50.18	132	30.05
Washington, D. C.	552, 000	4, 305	78.0	91.09	6.69	97.78	37	53.63
Waterbury, Conn.	(1)	504						
Waterloo, Iowa	37, 100	270	72.8	66.32	7.05	73.37	58	22.88
Watertown, Mass.	* 26, 400	454	172.0	103.39	3.59	106.97	28	85.11
Watertown, N. Y.	33, 700	53	15.7	27.63	6.57	34.20	198	8.27
West New York, N. J.	* 41, 000	170	41.5	31.05	8.67	39.72	170	14.07
Wheeling, W. Va.	(1)	125						
White Plains, N. Y.	* 28, 700	856	298.3	421.36	18.79	440.15	1	221.80
Wichita, Kans.	99, 300	1, 207	121.6	73.76	6.55	80.30	51	40.05
Wichita Falls, Tex.	(1)	222						
Wilkes-Barre, Pa.	91, 900	174	18.9	35.18	7.21	42.40	155	8.20
Wilkinsburg, Pa.	* 28, 000	90	32.1	64.66	3.75	68.41	70	36.04
Williamsport, Pa.	44, 000	169	38.4	39.40	7.89	47.29	140	18.59
Wilmington, Del.	128, 500	365	28.4	34.61	8.79	43.40	150	17.96
Wilmington, N. C.	39, 100	64	16.4	15.15	3.99	19.14	256	5.68
Winston-Salem, N. C.	80, 000	965	120.6	100.02	6.62	106.64	29	44.97
Woonsocket, R. I.	53, 400	79	14.8	8.70	8.50	17.20	264	5.06
Worcester, Mass.	197, 600	474	24.0	28.21	7.63	36.74	184	12.70
Yonkers, N. Y.	121, 300	4, 216	347.6	283.37	10.27	293.64	2	243.64
York, Pa.	49, 900	144	28.9	27.01	14.37	41.38	158	11.53
Youngstown, Ohio	174, 200	929	53.3	46.55	3.04	49.58	134	28.95
Zanesville, Ohio	* 30, 600	138	45.1	15.53	2.38	17.91	262	12.18
Total	44, 940, 049	399, 657	88.9	68.96	7.22	76.18	-----	39.22

* Data not collected.

Average Construction Cost of Dwellings in Various Cities

DATA for this article are derived from the building-permit survey of the Bureau of Labor Statistics for the first half of 1928.

The figures regarding construction costs here presented show the cost per family of the different classes of dwellings as stated by the prospective builder at the time of application for his permit to build and do not include the cost of the land. There may be a profit or loss between the cost to the builder and the price paid by the home purchaser. The figures should not be interpreted as showing the cost of a dwelling built on identical plans and specifications in each city, for in some cities much cheaper dwellings are built than in others.

Table 1 shows the number of families provided for in the first half of 1928 and the average cost of dwelling accommodations per family in the different kinds of dwellings in each of the 14 cities of the United States having a population of 500,000 or over.

Multifamily dwellings as shown in this table include a few multifamily dwellings combined with stores. It might be thought that the cost per family would be higher in the apartment buildings with stores included than in those without stores. As a matter of fact, taking the cities as a whole, the cost per family was less in the apartments with stores than in those without stores. Individual cities, however, might show different results.

In these 14 cities permits were issued for 30,323 one-family dwellings, the average cost of these dwellings, as stated in the permits, being \$5,169. The city of Washington built the most costly single dwellings, as \$8,534 per dwelling was spent in the capital city for the erection of this type of dwelling. In St. Louis permits were issued for 934 one-family dwellings and their average cost was only \$3,619. The average cost in Baltimore (some 40 miles from Washington) was \$4,001. In other words, the average single-family dwelling for which permits were issued during the first half of 1928 cost over 100 per cent more in Washington than in St. Louis or Baltimore. Whether this means that Washingtonians are building 100 per cent better houses than St. Louisians or Baltimoreans, or are paying more for construction, could be determined only by an exhaustive comparison of plans and specifications in these cities.

There is also quite a contrast between the cost figures as shown for the two Pennsylvania cities listed, the average cost of the 1-family dwellings for which permits were issued in Philadelphia being \$4,373, while in Pittsburgh it was \$6,190. The average cost of New York's 1-family dwellings was \$5,782, while those of Chicago cost \$6,395.

The average cost per family for 2-family dwellings was \$4,356, the range in the different cities being from \$2,279 in Buffalo to \$5,974 in Chicago. Only 14,312 families were housed in this class of dwelling in these 14 cities.

TABLE 1.—AVERAGE COST OF DWELLING ACCOMMODATIONS PER FAMILY IN CITIES HAVING A POPULATION OF 500,000 OR OVER, BY KIND OF DWELLINGS: PERMITS FOR FIRST 6 MONTHS OF 1928

City	Number of families provided for	Average cost per family	City	Number of families provided for	Average cost per family
<i>1-family dwellings</i>			<i>Multifamily dwellings¹</i>		
St. Louis.....	934	\$3,619	St. Louis.....	2,264	\$2,063
Los Angeles.....	3,657	3,847	Los Angeles.....	7,049	2,180
Baltimore.....	1,707	4,001	San Francisco.....	2,097	2,403
Philadelphia.....	4,733	4,373	Milwaukee.....	1,190	2,735
Borough of Richmond ¹	648	4,416	Buffalo.....	488	3,048
San Francisco.....	1,320	4,445	Pittsburgh.....	86	3,140
Buffalo.....	401	4,541	Detroit.....	2,998	3,344
Detroit.....	3,526	5,292	Boston.....	2,198	3,499
Borough of Queens ¹	5,328	5,455	Borough of Queens ¹	10,976	3,590
New York (all boroughs).....	8,351	5,782	Borough of Richmond ¹	446	3,590
Boston.....	320	5,856	Borough of Brooklyn ¹	13,036	3,804
Cleveland.....	807	5,967	Cleveland.....	695	3,883
Milwaukee.....	535	6,064	Baltimore.....	276	4,112
Pittsburgh.....	891	6,190	Borough of the Bronx ¹	21,709	4,218
Chicago.....	2,396	6,365	New York (all boroughs).....	54,698	4,406
Borough of Brooklyn ¹	1,632	6,865	Chicago.....	16,105	5,167
Borough of the Bronx ¹	742	6,939	Philadelphia.....	1,855	5,395
Washington.....	745	8,534	Washington.....	1,369	5,597
			Borough of Manhattan ¹	8,531	7,014
Total (14 cities).....	30,323	5,169	Total (14 cities).....	93,368	4,214
<i>2-family dwellings²</i>			<i>All classes of dwellings</i>		
Buffalo.....	691	2,279	St. Louis.....	4,095	2,691
Washington.....	12	2,792	Los Angeles.....	11,730	2,823
St. Louis.....	897	3,300	Buffalo.....	1,580	3,091
Detroit.....	2,733	3,486	San Francisco.....	3,613	3,246
Los Angeles.....	1,024	3,591	Milwaukee.....	2,263	3,873
Milwaukee.....	538	4,184	Boston.....	3,682	3,900
San Francisco.....	196	4,195	Baltimore.....	1,983	4,016
Boston.....	1,164	4,213	Borough of Richmond ¹	1,247	4,106
Borough of Richmond ¹	1,153	4,296	Detroit.....	9,257	4,127
Borough of Queens ¹	1,712	4,447	Borough of Queens ¹	18,016	4,168
Pittsburgh.....	101	4,625	Borough of Brooklyn ¹	16,966	4,303
Cleveland.....	464	4,710	Borough of the Bronx ¹	23,237	4,346
New York (all boroughs).....	4,973	5,010	New York (all boroughs).....	68,022	4,619
Borough of Brooklyn ¹	2,318	5,302	Philadelphia.....	6,723	4,680
Borough of the Bronx ¹	786	5,440	Cleveland.....	1,966	4,934
Philadelphia.....	135	5,624	Chicago.....	19,885	5,371
Chicago.....	1,384	5,974	Pittsburgh.....	1,078	5,800
			Washington.....	2,126	6,610
Total (14 cities).....	14,312	4,356	Borough of Manhattan ¹	8,536	7,019
			Total (14 cities).....	138,003	4,438

¹A borough of "Greater New York."

²Includes 1-family and 2-family dwellings with stores, the number and cost of which are shown separately in the October Labor Review.

³Includes multifamily dwellings with stores, the number and cost of which are shown separately in the October Labor Review.

Permits were issued during the first six months of 1928 for multifamily dwellings to house 93,368 families, which is over three times as many families as provided for in 1-family dwellings in these 14 cities. The average cost per family of the multifamily dwellings was \$4,214, the greatest cost per family being found in the Borough of Manhattan where it cost \$7,014 per family to house the 8,531 families domiciled in apartment houses. New York City as a whole housed 54,698 families in apartment houses during this period and the average cost per family was \$4,406. The average cost per family was \$2,063 in St. Louis and \$5,597 in Washington.

There were 138,003 families provided for in all classes of dwellings for which permits were issued in these 14 cities during the first half of 1928, the average cost per dwelling unit being \$4,438. The most

expensive dwellings were built in the Borough of Manhattan where it cost \$7,019 per family. Considering each city as a whole, however, Washington paid more per family unit than any of the other cities. It cost \$6,610 per family to care for the 2,126 families provided for in Washington during the first half in 1928.

Table 2 shows the number of families provided for during the first half of 1928 and the average cost of dwelling accommodations per family in the different kinds of dwellings in each of the 22 cities of the United States which have a population of between 200,000 and 500,000.

TABLE 2.—AVERAGE COST OF DWELLING ACCOMMODATIONS PER FAMILY IN CITIES HAVING A POPULATION BETWEEN 200,000 AND 500,000, BY KIND OF DWELLING: PERMITS FOR FIRST 6 MONTHS OF 1928

City	Number of families provided for	Average cost per family	City	Number of families provided for	Average cost per family
<i>1-family dwellings</i>			<i>Multifamily dwellings ¹</i>		
Dallas, Tex.	411	\$2, 671	San Antonio, Tex.	500	\$1, 134
Birmingham, Ala.	1, 083	3, 003	Birmingham, Ala.	534	2, 041
Seattle, Wash.	1, 405	3, 452	Atlanta, Ga.	484	2, 191
San Antonio, Tex.	1, 140	3, 763	Oakland, Calif.	649	2, 499
New Orleans, La.	241	3, 886	Minneapolis, Minn.	469	2, 739
Oakland, Calif.	548	3, 903	Rochester, N. Y.	625	2, 826
Toledo, Ohio.	710	4, 178	Dallas, Tex.	82	3, 015
Minneapolis, Minn.	647	4, 184	Seattle, Wash.	1, 900	3, 084
Atlanta, Ga.	747	4, 216	Kansas City, Mo.	634	3, 138
Portland, Oreg.	1, 021	4, 320	Denver, Colo.	453	3, 243
Kansas City, Mo.	507	4, 672	Indianapolis, Ind.	517	3, 277
Indianapolis, Ind.	719	4, 699	New Orleans, La.	70	3, 316
Columbus, Ohio.	964	5, 056	Toledo, Ohio.	70	3, 429
Denver, Colo.	683	5, 119	Providence, R. I.	182	3, 788
Louisville, Ky.	499	5, 273	Jersey City, N. J.	807	3, 791
Rochester, N. Y.	445	5, 573	Omaha, Nebr.	25	3, 800
Omaha, Nebr.	168	5, 627	Cincinnati, Ohio.	801	3, 856
St. Paul, Minn.	308	5, 837	Columbus, Ohio.	484	3, 907
Jersey City, N. J.	5	6, 500	Portland, Oreg.	240	4, 373
Cincinnati, Ohio.	980	7, 840	St. Paul, Minn.	38	4, 737
Providence, R. I.	247	9, 612	Newark, N. J.	1, 758	5, 023
Newark, N. J.	30	9, 841	Louisville, Ky.	253	8, 301
Total (22 cities)	13, 508	4, 601	Total (22 cities)	11, 575	3, 457
<i>2-family dwellings ¹</i>			<i>All classes of dwellings</i>		
New Orleans, La.	866	2, 037	New Orleans, La.	1, 177	2, 491
Atlanta, Ga.	249	2, 114	Birmingham, Ala.	1, 624	2, 692
Indianapolis, Ind.	178	2, 395	Dallas, Tex.	665	2, 769
Oakland, Calif.	27	2, 826	San Antonio, Tex.	1, 728	2, 988
Dallas, Tex.	172	2, 887	Oakland, Calif.	1, 224	3, 135
Seattle, Wash.	14	2, 968	Atlanta, Ga.	1, 480	3, 200
Minneapolis, Minn.	144	3, 401	Seattle, Wash.	3, 319	3, 210
San Antonio, Tex.	88	3, 480	Minneapolis, Minn.	1, 260	3, 557
Toledo, Ohio.	88	3, 607	Kansas City, Mo.	1, 185	3, 849
Louisville, Ky.	71	3, 686	Indianapolis, Ind.	1, 414	3, 889
Denver, Colo.	34	3, 750	Jersey City, N. J.	933	3, 938
Portland, Oreg.	68	4, 000	Rochester, N. Y.	1, 151	3, 989
Columbus, Ohio.	199	4, 119	Toledo, Ohio.	868	4, 059
Birmingham, Ala.	7	4, 129	Portland, Oreg.	1, 329	4, 313
Rochester, N. Y.	81	4, 265	Denver, Colo.	1, 170	4, 353
Kansas City, Mo.	44	4, 614	Columbus, Ohio.	1, 647	4, 605
Jersey City, N. J.	121	4, 814	Newark, N. J.	2, 076	5, 244
Cincinnati, Ohio.	206	5, 078	Omaha, Nebr.	201	5, 574
St. Paul, Minn.	28	5, 207	St. Paul, Minn.	374	5, 678
Providence, R. I.	225	5, 376	Cincinnati, Ohio.	1, 987	5, 948
Newark, N. J.	288	6, 116	Louisville, Ky.	823	6, 067
Omaha, Nebr.	8	10, 000	Providence, R. I.	654	6, 534
Total (22 cities)	3, 206	3, 533	Total (22 cities)	28, 289	4, 012

¹ Includes 1-family and 2-family dwellings with stores.

² Includes multifamily dwellings with stores.

In contrast to the larger cities, it will be seen that these 22 cities provided for more families in 1-family dwellings than in apartment houses. In the 14 cities having a population of 500,000 or over, 67.7 per cent of the families provided for were cared for in apartment houses and only 22 per cent in 1-family dwellings. In the 22 cities having a population of from 200,000 to 500,000, 1-family dwellings housed 47.8 per cent of the total number of families provided for, while multifamily dwellings housed but 40.9 per cent.

The average cost of 1-family dwellings in these 22 cities was \$4,601. The cost range of this class of structure was from \$2,671 in Dallas, Tex., to \$9,841 in Newark, N. J.

The average cost of 2-family dwellings was \$3,533 per family, ranging from \$2,037 in New Orleans to \$10,000 in Omaha.

Multifamily dwellings averaged only \$1,134 per family in San Antonio, but \$8,301 in Louisville, the average cost in the 22 cities being \$3,457 per family.

The average cost of all dwelling units in these 22 cities was \$4,012 per family. Providence, R. I., provided for 654 families at a cost of \$6,534 per family, while New Orleans provided for 1,177 families at a cost of only \$2,491 per family.

The average cost per family in the cities of 500,000 and over was more for each class of dwelling than in the cities in the lower population group. The cost of 1-family dwellings averaged 12.3 per cent more in the larger cities than in the cities having a population of less than 500,000; the cost of 2-family dwellings averaged 23.3 per cent higher; that of multifamily dwellings, 21.9 per cent higher; and of all dwelling units, 10.6 per cent higher.

Because of lack of space, data are not shown separately for cities having a population of between 100,000 and 200,000. In the 49 cities in this population group permits were issued during the first half of 1928 for 16,030 one-family dwellings at an average cost of \$4,502. Two-family dwellings cost \$3,805 per family for the 3,146 families cared for, while multifamily dwellings provided for 9,739 families at an average cost of \$3,801. The total number of families provided for in dwelling houses of all types in these 49 cities was 28,914 and the average cost per family of the dwellings provided was \$4,190.

Apartment House Living in American Cities, 1927

BUILDING permits issued in cities of the United States and compiled by the United States Bureau of Labor Statistics clearly show that the proportion of families housed in multifamily dwellings is steadily increasing. A multifamily dwelling is one designed to accommodate three or more families. The term is equivalent to the less definite term "apartment house" or "tenement house."

Records from 257 identical cities from 1921 to 1927 are shown below in Table 1. In 1921 only 24.4 per cent of the families housed in new buildings were accommodated in multifamily dwellings compared with 58.3 per cent housed in 1-family dwellings. By 1926 the percentage housed in multifamily dwellings had risen to 45.4 and that housed in 1-family dwellings had fallen to 40.7. Permits issued for new buildings during 1927 reveal another decrease in the percent-

age housed in 1-family dwellings and a corresponding increase in those housed in apartment houses. Only 38.3 per cent of the families provided for in new buildings were housed in 1-family dwellings, according to permits issued in these 257 cities during 1927, compared with 48.3 per cent housed in apartment houses. Two-family dwellings housed 13.4 per cent of the families provided for in 1927, a decrease as compared with the six preceding years.

TABLE 1.—PER CENT OF FAMILIES PROVIDED FOR IN THE DIFFERENT KINDS OF DWELLINGS IN 257 IDENTICAL CITIES, 1921 TO 1927 INCLUSIVE

Year	Number of families provided for in all classes of dwellings	Per cent of families provided for in—		
		1-family dwellings	2-family dwellings ¹	Multi-family dwellings ²
1921.....	224, 545	58.3	17.3	24.4
1922.....	377, 305	47.5	21.3	31.2
1923.....	453, 673	45.8	21.2	33.0
1924.....	442, 919	47.6	21.5	30.9
1925.....	491, 222	46.0	17.5	36.4
1926.....	462, 214	40.7	13.9	45.4
1927.....	406, 095	38.3	13.4	48.3

¹ Includes 1-family and 2-family dwellings with stores combined.

² Includes multifamily dwellings with stores combined.

In the past most American cities have largely housed their inhabitants in single-family dwellings. However, while there are no details available of the percentage of families now living in apartment houses compared with those housed in 1-family dwellings, it is evident that if new family accommodations continue to be provided in the apartments at the increasing ratios that have been shown recently it will not be a great number of years until in many cities the majority of the population will be housed in this class of structure.

Aside from the question of the effect of this change upon home life and home ownership, the wage earners as a class are affected by the resulting change in the demand for labor. The erection of one-family dwellings gives employment for the most part to carpenters and bricklayers. A given amount of money spent in the erection of large apartment houses will give employment to fewer carpenters if not to fewer bricklayers. Further, the erection of apartment houses gives employment to many trades seldom if ever used in the building of 1-family dwellings. Among these are structural-iron workers, concrete workers, marble and stone cutters, terra cotta workers, etc.

Comparison of Conditions in Cities of over 500,000

THE PROPORTION of families housed in apartment houses is much greater in the large cities than in the 257 cities as a whole. In the 14 cities of the United States which have a population of 500,000 or over only 25.8 per cent of the families housed in new buildings in 1927 were cared for in 1-family dwellings, while 60.8 per cent were housed in apartment houses.

In 1921 only 34 per cent of new housing units were in apartment houses, while 44.2 per cent were in 1-family dwellings. In 1926 there were 281,172 families provided for in these 14 cities and 58 per cent were housed in apartment houses. Thus, it will be seen that the percentage of families housed in apartment houses was 3 points higher in 1927 than in 1926. The total number of families housed in 1927, however, fell to 236,113.

While the percentage of families housed in apartment houses was greater in 1927 than in 1926 in the 14 cities taken as a whole, an increase did not occur in each city. Six cities showed a decrease in the percentage of families housed in apartment houses and eight an increase.

The largest increase in the percentage of families housed in apartment houses was shown in Milwaukee, where in 1926 only 19.5 per cent of the families provided for that year were housed in apartment houses, while in 1927 this percentage had increased to 42.4 per cent. This was not due to any slackening of residential building in Milwaukee, for 4,252 families were provided for in 1927 compared with 3,629 in 1926.

In Los Angeles practically the same number of families were provided for in 1927 as in 1926, and the percentage housed in apartment houses increased from 39.8 per cent in 1926 to 51.8 per cent in 1927. Boston, Buffalo, and Chicago also provided for a much larger percentage of its families housed during 1927 in apartment houses than in 1926.

In contrast, Pittsburgh and Washington both showed fair gains in the percentage of families housed in 1-family dwellings in 1927 as compared with 1926 and a corresponding loss in the percentage housed in apartment houses. In Washington, however, this gain may be accounted for by the fact that residential building as a whole slumped greatly during 1927 as compared with 1926. In 1926 new homes were provided for 7,911 families, and of this number 43.3 per cent were accommodated in 1-family dwellings and 56.3 per cent in apartment houses. In 1927 the percentage of families housed in apartment houses fell to 52.2 and those housed in 1-family dwellings rose to 47.3. In 1927, however, dwelling accommodations were provided for only 3,938 families.

Baltimore continues to be the leading single-family dwelling city in the country. In 1926 this type of residence provided for 92.4 per cent of the new housing units, and in 1927 there was a still further increase in single residences to 94.4 per cent.

Figures are available for 1922 to 1925 in earlier publications but are omitted to economize space,

TABLE 2.—PER CENT OF FAMILIES PROVIDED FOR BY THE DIFFERENT TYPES OF DWELLINGS IN CITIES HAVING A POPULATION OF 500,000 OR OVER IN 1921, 1926, AND 1927

City, State, and year	Total number of families provided for	Per cent of families provided for in—			City, State, and year	Total number of families provided for	Per cent of families provided for in—		
		1-family dwellings	2-family dwellings ¹	Multifamily dwellings ²			1-family dwellings	2-family dwellings ¹	Multifamily dwellings ²
Baltimore, Md.:					New York City, N. Y.—Continued.				
1921.....	2,176	85.0	4.5	10.5	Queens—				
1926.....	5,135	82.4	0.7	6.8	1921.....	13,256	60.0	24.4	15.6
1927.....	3,546	94.4	0.2	5.4	1926.....	31,431	41.2	17.8	41.0
Boston, Mass.:					1927.....	31,205	33.4	17.1	49.5
1921.....	878	15.5	30.5	54.0	Manhattan—				
1926.....	3,882	16.2	41.4	42.6	1921.....	4,837	0.7	3.7	95.5
1927.....	5,316	10.3	32.2	57.5	1926.....	11,910	0.1	0.1	99.9
Buffalo, N. Y.:					1927.....	9,502	(³)	(³)	99.9
1921.....	2,405	51.6	48.0	0.4	Richmond—				
1926.....	3,286	47.5	33.0	19.5	1921.....	2,594	100.0	-----	-----
1927.....	3,373	34.2	36.7	29.1	1926.....	1,813	71.7	14.5	13.8
Chicago, Ill.:					1927.....	1,615	77.9	20.6	1.5
1921.....	12,252	37.9	17.6	44.6	Philadelphia, Pa.:				
1926.....	41,416	17.6	13.1	69.3	1921.....	2,406	93.3	6.7	-----
1927.....	41,201	13.6	10.2	76.2	1926.....	11,603	74.4	4.7	20.9
Cleveland, Ohio:					1927.....	12,197	71.2	3.3	25.5
1921.....	4,084	35.5	40.5	24.0	Pittsburgh, Pa.:				
1926.....	5,406	36.2	35.0	23.9	1921.....	1,335	59.3	26.8	13.9
1927.....	3,631	43.9	30.7	25.5	1926.....	2,731	68.0	7.7	24.3
Detroit, Mich.:					1927.....	2,588	73.8	7.6	18.7
1921.....	6,743	46.9	17.9	35.2	St. Louis, Mo.:				
1926.....	26,421	39.6	25.4	35.0	1921.....	2,072	49.0	24.1	26.8
1927.....	15,614	35.9	23.6	37.5	1926.....	8,020	23.7	17.8	58.4
Los Angeles, Calif.:					1927.....	5,463	29.1	16.8	54.1
1921.....	19,572	68.0	16.9	15.2	San Francisco, Calif.:				
1926.....	20,017	50.0	10.3	39.8	1921.....	2,683	37.6	17.0	45.4
1927.....	20,801	39.5	8.7	51.8	1926.....	8,539	39.8	6.9	53.3
Milwaukee, Wis.:					1927.....	8,674	31.1	9.5	59.3
1921.....	2,212	44.9	38.2	16.9	Washington, D. C.:				
1926.....	3,629	50.4	30.1	19.5	1921.....	2,195	75.4	-----	24.6
1927.....	4,252	30.9	26.7	42.4	1926.....	7,911	43.3	0.4	56.3
New York City, N. Y.:					1927.....	3,938	47.3	0.5	52.2
1921.....	51,360	31.6	24.2	44.2	Total (14 cities):				
1926.....	133,126	16.2	12.2	71.6	1921.....	112,373	44.2	21.7	34.0
1927.....	105,519	15.9	13.3	70.9	1926.....	281,172	28.2	13.8	58.0
Brooklyn—					1927.....	236,113	25.8	13.4	60.8
1921.....	16,636	24.1	44.0	31.9					
1926.....	45,663	12.9	15.2	71.9					
1927.....	33,172	11.6	17.5	71.0					
Bronx—									
1921.....	14,037	11.7	11.9	76.4					
1926.....	42,309	3.3	8.2	88.5					
1927.....	30,025	4.0	8.5	87.5					

¹ Includes 1-family and 2-family dwellings with stores combined.

² Includes multifamily dwellings with stores combined.

³ Less than one-tenth of 1 per cent.

Comparisons of Conditions in Cities under 500,000

IN TABLE 3 are shown cities having a population of 25,000 and under 500,000 which provided dwelling accommodations for 200 or more families in either 1925 or 1926. The table shows figures for 1921, 1926, and 1927 where data are available for these three years. When the information is not available for 1921 it is shown for the earliest year for which such data were collected. A few of the smaller cities, which have reached a population of 25,000 since 1920, are shown for 1926 and 1927 only.

That the apartment-house idea has spread rapidly to the suburban cities is illustrated by the fact that Highland Park, a town on the outskirts of Detroit, provided for 97 per cent of its new families in apartment houses in 1926 and 97.8 per cent in 1927. This city had an estimated population in July, 1927, of 81,700. Evanston and Oak Park, which are located on the outskirts of Chicago, provided for 65.1 per cent and 69.5 per cent, respectively, in apartment houses in 1926 and for 70.5 per cent and 77 per cent in apartment houses in 1927. White Plains, N. Y., provided for 66.8 per cent of its new family units in apartment houses in 1926 and for 73.7 per cent in this class of building in 1927. Mount Vernon, N. Y., during 1926 made provision for 88.5 per cent of the families provided for in apartment houses. In 1927 the percentage fell to 83.7.

Also smaller cities not near big cities in some cases are building quite a number of apartment houses. Allentown, Pa., which in 1926 provided for only 5.8 per cent of the families provided for that year in apartment houses, in 1927 provided for 23.1 per cent in these multifamily structures. The percentage increased from 11.6 per cent in 1926 to 23 per cent in 1927 in Charleston, W. Va., and from 10.2 per cent to 28.5 per cent in Asheville, N. C.

The smaller and medium sized cities of the Middle West and the South are as a rule builders of 1-family residences, while the New England cities build a much larger percentage of 2-family dwellings than the other sections of the country.

TABLE 3.—PER CENT OF FAMILIES PROVIDED FOR BY THE DIFFERENT KINDS OF DWELLINGS IN CITIES HAVING A POPULATION OF FROM 25,000 TO 500,000

City, State, and year	Total number of families provided for	Per cent of families provided for in—			City, State, and year	Total number of families provided for	Per cent of families provided for in—		
		1-family dwellings	2-family dwellings ¹	Multifamily dwellings ²			1-family dwellings	2-family dwellings	Multifamily dwellings ²
Akron, Ohio:					Anderson, Ind.:				
1921.....	234	100.0	-----	-----	1921.....	37	100.0	-----	-----
1926.....	1,968	95.5	-----	4.5	1926.....	329	81.2	3.0	15.8
1927.....	2,521	83.9	3.4	12.7	1927.....	456	72.4	1.5	26.1
Alameda, Calif:					Asheville, N. C.:				
1921.....	152	88.2	11.8	-----	1921.....	374	97.1	2.1	.8
1926.....	322	86.0	3.7	10.3	1926.....	979	89.4	.4	10.2
1927.....	239	81.2	5.4	13.4	1927.....	449	70.4	1.1	28.5
Albany, N. Y.:					Atlanta, Ga.:				
1921.....	302	59.3	39.7	1.0	1921.....	1,614	78.1	3.3	18.6
1926.....	808	44.8	26.4	28.8	1926.....	2,173	55.9	22.3	21.9
1927.....	558	48.9	44.6	6.5	1927.....	2,563	54.1	20.6	25.3
Allentown, Pa.:					Atlantic City, N. J.:				
1921.....	102	90.2	2.0	7.8	1921.....	366	51.9	27.9	20.2
1926.....	814	93.2	1.0	5.8	1926.....	363	17.9	13.2	68.9
1927.....	681	74.9	1.9	23.1	1927.....	248	25.8	33.9	40.3
Altoona, Pa.:					Aurora, Ill.:				
1921.....	91	93.4	6.6	-----	1921.....	126	100.0	-----	-----
1926.....	316	79.4	5.1	15.5	1926.....	526	96.8	1.7	1.5
1927.....	282	92.6	.4	7.1	1927.....	418	85.7	1.9	12.4
Amsterdam, N. Y.:					Battle Creek, Mich.:				
1921.....	70	71.4	28.6	-----	1921.....	127	92.1	1.6	6.3
1926.....	90	40.0	60.0	-----	1926.....	266	89.5	3.0	7.5
1927.....	67	41.8	58.2	-----	1927.....	268	91.8	5.2	3.0

¹ Includes 1-family and 2-family dwellings with stores combined.

² Includes multifamily dwellings with stores combined.

TABLE 3.—PER CENT OF FAMILIES PROVIDED FOR BY THE DIFFERENT KINDS OF DWELLINGS IN CITIES HAVING A POPULATION OF FROM 25,000 TO 500,000—Con.

City, State, and year	Total number of families provided for	Per cent of families provided for in—			City, State, and year	Total number of families provided for	Per cent of families provided for in—		
		1-family dwellings	2-family dwellings	Multi-family dwellings			1-family dwellings	2-family dwellings	Multi-family dwellings
Bayonne, N. J.:					Cicero, Ill.:				
1921.....	274	56.9	28.1	15.0	1921.....	453	57.8	40.8	1.3
1926.....	772	3.0	26.8	70.2	1926.....	591	34.9	31.3	33.8
1927.....	344	2.3	30.5	58.1	1927.....	559	26.3	27.0	46.7
Bellingham, Wash.:					Cincinnati, Ohio:				
1926.....	352	77.7	-----	22.3	1921.....	1,161	92.9	1.3	5.8
1927.....	243	90.8	-----	9.2	1926.....	2,530	58.4	19.3	22.3
Berkeley, Calif.:					1927.....	3,212	52.3	18.0	29.7
1921.....	706	77.6	1.7	20.7	Clifton, N. J.:				
1926.....	1,434	63.2	14.2	22.6	1921.....	540	39.8	58.2	2.0
1927.....	867	65.6	8.1	26.3	1926.....	578	50.2	28.7	21.1
Bethlehem, Pa.:					1927.....	557	58.9	22.8	17.3
1921.....	82	96.3	3.7	-----	Colorado Springs, Colo.:				
1926.....	229	47.2	35.8	17.0	1921.....	116	100.0	-----	-----
1927.....	230	35.7	46.1	18.3	1926.....	124	100.0	-----	-----
Binghamton, N. Y.:					1927.....	67	100.0	-----	-----
1921.....	327	55.7	30.6	13.8	Columbus, Ga.:				
1926.....	379	34.6	26.9	38.5	1921.....	89	68.2	-----	31.8
1927.....	310	31.6	32.3	36.1	1926.....	226	92.0	8.0	-----
Birmingham, Ala.:					1927.....	325	92.6	-----	7.4
1921.....	1,659	93.7	.5	5.7	Columbus, Ohio:				
1926.....	3,319	83.0	1.0	15.9	1921.....	1,317	65.8	31.7	2.5
1927.....	3,019	78.2	1.3	20.4	1926.....	3,192	62.3	33.6	4.2
Bridgeport, Conn.:					1927.....	2,430	60.5	19.7	19.8
1921.....	404	35.6	32.7	31.7	Council Bluffs, Iowa:				
1926.....	323	42.1	32.9	25.0	1921.....	423	84.2	6.4	9.5
1927.....	437	41.6	31.4	27.0	1926.....	227	81.1	7.9	11.0
Brookline, Mass.:					1927.....	136	74.3	2.9	22.8
1921.....	113	22.0	54.2	23.7	Covington, Ky.:				
1926.....	259	28.6	40.9	30.5	1921.....	198	95.5	2.5	2.0
1927.....	472	22.0	28.0	50.0	1926.....	379	90.0	8.2	1.8
Cambridge, Mass.:					1927.....	346	81.5	13.9	4.6
1921.....	43	7.0	93.0	-----	Cranston, R. I.:				
1926.....	688	5.4	30.8	63.8	1921.....	154	72.7	27.3	-----
1927.....	636	5.5	33.7	60.9	1926.....	437	78.3	18.5	3.2
Camden, N. J.:					1927.....	452	70.2	18.8	2.0
1921.....	145	100.0	-----	-----	Dallas, Tex.:				
1926.....	673	89.3	7.1	3.6	1921.....	2,846	80.8	5.6	13.6
1927.....	559	85.3	5.2	9.5	1926.....	3,104	50.3	16.1	33.6
Canton, Ohio:					1927.....	986	67.1	27.0	5.9
1921.....	403	86.1	1.0	12.9	Davenport, Iowa:				
1926.....	702	94.9	1.1	4.0	1921.....	192	77.1	4.2	18.7
1927.....	512	90.0	2.2	7.8	1926.....	109	100.0	-----	-----
Cedar Rapids, Iowa:					1927.....	125	95.2	1.6	3.2
1921.....	331	96.7	1.2	2.1	Dayton, Ohio:				
1926.....	170	97.6	.6	1.8	1921.....	546	66.0	2.2	1.8
1927.....	145	100.0	-----	-----	1926.....	813	59.9	21.9	18.2
Central Falls, R. I.:					1927.....	1,201	43.8	37.3	18.9
1921.....	230	.9	49.6	49.6	Decatur, Ill.:				
1926.....	74	4.1	41.9	54.1	1921.....	335	82.7	13.7	3.6
Charleston, W. Va.:					1926.....	568	98.1	-----	1.9
1921.....	712	77.7	6.0	16.4	1927.....	613	66.1	-----	3.9
1926.....	225	76.0	12.4	11.6	Denver, Colo.:				
1927.....	269	73.2	3.7	23.0	1921.....	1,624	87.8	4.8	7.4
Charlotte, N. C.:					1926.....	2,530	56.9	4.6	38.5
1921.....	322	93.2	3.1	3.7	1927.....	1,847	72.4	3.2	24.4
1926.....	738	68.0	3.3	28.7	Des Moines, Iowa:				
1927.....	1,052	48.1	13.3	38.6	1921.....	758	87.1	7.1	5.8
Chattanooga, Tenn.:					1926.....	502	90.4	-----	9.6
1921.....	226	65.9	5.8	28.3	1927.....	360	86.7	2.2	11.1
1926.....	902	56.8	28.5	14.7	Duluth, Minn.:				
1927.....	596	56.9	8.7	34.4	1921.....	637	96.4	1.7	1.9
Chester, Pa.:					1926.....	489	95.3	2.2	2.5
1921.....	47	91.5	8.5	-----	1927.....	303	95.0	2.0	3.0
1926.....	301	88.0	-----	12.0	Durham, N. C.:				
1927.....	361	82.3	9.4	8.3	1921.....	422	75.8	11.8	12.3
Chicopee, Mass.:					1926.....	508	81.1	9.1	9.8
1921.....	238	42.0	27.7	30.3					
1926.....	247	45.3	38.1	16.6					
1927.....	110	65.5	34.5	-----					

TABLE 3.—PER CENT OF FAMILIES PROVIDED FOR BY THE DIFFERENT KINDS OF DWELLINGS IN CITIES HAVING A POPULATION OF FROM 25,000 TO 500,000—Con.

City, State, and year	Total number of families provided for	Per cent of families provided for in—			City, State, and year	Total number of families provided for	Per cent of families provided for in—		
		1-family dwellings	2-family dwellings	Multi-family dwellings			1-family dwellings	2-family dwellings	Multi-family dwellings
East Chicago, Ind.:					Grand Rapids, Mich.:				
1921.....	168	57.1	31.0	11.9	1921.....	630	94.9	2.5	2.5
1926.....	443	34.1	43.8	22.1	1926.....	1,955	93.7	5.7	1.7
1927.....	406	40.9	32.5	26.6	1927.....	1,709	95.2	3.3	1.4
East Cleveland, Ohio:					Hamilton, Ohio:				
1921.....	472	13.1	39.8	47.0	1921.....	192	100.0	—	—
1926.....	332	5.4	7.8	86.7	1926.....	453	100.0	—	—
1927.....	258	4.7	9.3	86.0	1927.....	362	100.0	—	—
East Orange, N. J.:					Hammond, Ind.:				
1921.....	376	26.6	38.6	34.8	1921.....	288	87.8	12.2	—
1926.....	1,140	14.9	10.2	74.9	1926.....	905	77.1	16.1	6.7
1927.....	2,140	4.2	6.8	89.0	1927.....	1,141	60.5	6.0	33.6
East Providence, R. I.:					Hamtramck, Mich.:				
1921.....	247	74.5	24.3	1.2	1921.....	276	53.6	39.5	6.9
1926.....	249	79.9	17.7	2.4	1926.....	205	57.1	24.9	18.0
1927.....	249	79.9	17.7	2.4	1927.....	70	35.7	58.6	5.7
East St. Louis, Ill.:					Harrisburg, Pa.:				
1921.....	260	93.8	—	6.2	1921.....	179	48.6	44.7	6.7
1926.....	708	60.9	16.5	22.6	1926.....	501	77.8	2.4	19.8
1927.....	585	66.8	12.3	20.9	1927.....	319	98.7	1.3	—
Elgin, Ill.:					Hartford, Conn.:				
1921.....	67	52.2	20.9	26.9	1921.....	717	7.8	39.9	52.3
1926.....	348	83.9	.6	15.5	1926.....	2,676	6.8	17.9	75.3
1927.....	282	98.5	2.3	4.2	1927.....	1,270	11.0	21.7	67.2
Elizabeth, N. J.:					Hazleton, Pa.:				
1921.....	514	28.0	66.4	5.6	1921.....	38	31.6	31.6	36.8
1926.....	1,751	17.4	31.1	51.5	1926.....	200	33.0	61.0	6.0
1927.....	1,650	12.4	13.4	74.2	1927.....	126	33.3	66.7	—
Erie, Pa.:					Highland Park, Mich.:				
1921.....	518	62.5	37.5	—	1921.....	250	13.2	15.2	71.6
1926.....	547	76.8	22.7	.5	1926.....	564	1.2	1.8	97.0
1927.....	444	74.5	24.5	.9	1927.....	366	.5	1.6	97.8
Evanston, Ill.:					Holyoke, Mass.:				
1921.....	415	74.0	5.8	20.2	1921.....	99	53.5	46.5	—
1926.....	1,271	25.6	9.3	65.1	1926.....	197	33.5	22.3	44.2
1927.....	1,423	22.6	6.9	70.5	1927.....	275	14.2	11.6	74.2
Evansville, Ind.:					Houston, Tex.:				
1921.....	509	84.3	2.4	13.4	1921.....	2,572	88.9	3.4	7.7
1926.....	615	67.9	2.1	—	1926.....	3,815	64.2	11.4	24.4
1927.....	420	93.8	4.8	1.4	1927.....	4,536	59.9	20.3	19.8
Everett, Mass.:					Huntington, W. Va.:				
1921.....	15	46.7	53.3	—	1921.....	777	95.2	1.4	3.3
1926.....	425	10.8	73.9	15.3	1926.....	337	75.7	13.4	11.0
1927.....	440	13.9	69.1	17.0	1927.....	194	69.6	7.7	22.7
Fall River, Mass.:					Indianapolis, Ind.:				
1921.....	141	47.5	22.7	29.8	1921.....	2,565	56.1	21.4	22.5
1926.....	232	48.7	37.1	14.2	1926.....	2,424	63.8	21.2	15.0
1927.....	251	54.6	29.5	15.8	1927.....	2,400	58.5	19.1	22.4
Fitchburg, Mass.:					Irrington, N. J.:				
1921.....	119	51.3	38.7	10.1	1921.....	389	38.8	39.3	21.9
1926.....	147	63.9	25.9	10.2	1926.....	1,379	35.5	37.7	26.8
1927.....	67	77.6	17.9	4.5	1927.....	2,562	4.5	23.1	72.4
Flint, Mich.:					Jackson, Mich.:				
1921.....	348	61.8	33.0	5.2	1921.....	108	87.0	3.7	9.3
1926.....	2,171	93.7	1.6	4.7	1926.....	286	94.4	2.1	3.5
1927.....	3,559	92.2	4.9	2.9	1927.....	206	87.4	12.6	—
Fort Wayne, Ind.:					Jacksonville, Fla.:				
1921.....	586	81.4	14.2	4.4	1921.....	747	75.8	9.9	14.3
1926.....	972	98.9	.3	.8	1926.....	2,373	69.9	17.2	12.9
1927.....	485	98.4	1.6	—	1927.....	2,098	59.5	25.5	15.1
Fort Worth, Tex.:					Jamestown, N. Y.:				
1921.....	909	96.7	—	3.3	1921.....	161	94.4	3.7	1.9
1926.....	1,923	89.1	1.9	9.0	1926.....	252	71.8	14.3	13.9
1927.....	3,160	55.5	22.0	22.5	1927.....	225	77.8	8.9	13.3
Galveston, Tex.:					Jersey City, N. J.:				
1921.....	103	96.1	—	3.9	1921.....	970	4.4	46.3	49.3
1926.....	52	53.8	—	46.2	1926.....	2,601	1.8	27.3	70.9
1927.....	571	96.7	—	3.3	1927.....	1,287	1.9	25.8	72.3
Gary, Ind.:					Johnstown, Pa.:				
1921.....	494	59.1	.4	40.5	1921.....	593	46.4	40.1	13.5
1926.....	2,024	61.8	13.4	24.9	1926.....	213	77.9	15.0	7.0
1927.....	1,675	32.8	29.9	37.3	1927.....	128	72.7	24.2	3.1

TABLE 3.—PER CENT OF FAMILIES PROVIDED FOR BY THE DIFFERENT KINDS OF DWELLINGS IN CITIES HAVING A POPULATION OF FROM 25,000 TO 500,000—Con.

City, State, and year	Total number of families provided for	Per cent of families provided for in—			City, State, and year	Total number of families provided for	Per cent of families provided for in—		
		1-family dwellings	2-family dwellings	Multi-family dwellings			1-family dwellings	2-family dwellings	Multi-family dwellings
Kansas City, Kans.:					McKeesport, Pa.:				
1921.....	395	100.0	—	—	1921.....	127	89.0	11.0	—
1926.....	736	88.3	1.6	10.1	1926.....	274	93.8	6.2	—
1927.....	387	100.0	—	—	1927.....	246	90.7	4.1	5.3
Kansas City, Mo.:					Macon, Ga.:				
1921.....	2,578	70.1	1.7	28.2	1921.....	162	95.1	—	4.9
1926.....	3,728	51.7	4.6	43.7	1926.....	258	96.9	—	3.1
1927.....	3,104	33.1	2.3	64.6	1927.....	352	89.2	0.6	10.2
Kearney, N. J.:					Madison, Wis.:				
1921.....	205	52.7	35.6	11.7	1921.....	283	73.5	12.7	13.8
1926.....	541	29.0	37.0	34.0	1926.....	465	89.7	8.2	2.2
1927.....	696	31.5	35.3	33.2	1927.....	489	79.8	3.9	16.4
Kenosha, Wis.:					Malden, Mass.:				
1921.....	128	82.8	14.1	3.1	1921.....	94	40.4	27.7	31.9
1926.....	174	41.4	56.3	2.3	1926.....	419	30.5	68.5	1.0
1927.....	303	77.9	14.5	7.6	1927.....	415	36.9	55.9	7.2
Knoxville, Tenn.:					Manchester, N. H.:				
1921.....	489	98.8	1.2	—	1921.....	210	74.8	12.4	12.9
1926.....	641	95.8	1.7	2.5	1926.....	213	73.7	19.2	7.0
1927.....	818	83.9	0.9	15.2	1927.....	165	81.8	14.5	3.6
Lakewood, Ohio:					Mansfield, Ohio:				
1921.....	877	26.3	72.3	1.4	1921.....	72	100.0	—	—
1926.....	586	23.9	33.4	42.7	1926.....	254	76.8	13.8	9.4
1927.....	582	22.0	18.9	59.1	1927.....	157	96.2	—	3.8
Lancaster, Pa.:					Medford, Mass.:				
1921.....	73	76.7	19.2	4.1	1921.....	256	46.1	48.0	5.9
1926.....	204	79.4	20.6	—	1926.....	868	36.4	50.0	4.6
1927.....	247	97.6	2.4	—	1927.....	628	53.7	42.8	3.5
Lansing, Mich.:					Memphis, Tenn.:				
1921.....	492	93.7	3.9	2.4	1921.....	1,245	75.3	2.4	22.2
1926.....	542	95.8	7.6	3.3	1926.....	2,066	51.6	22.5	25.9
1927.....	420	87.1	1.9	11.0	1927.....	1,865	47.1	17.9	35.0
Lawrence, Mass.:					Meriden, Conn.:				
1921.....	307	16.3	63.2	20.5	1921.....	71	26.7	43.7	29.6
1926.....	141	17.0	22.7	60.3	1926.....	201	66.7	22.9	10.4
1927.....	43	27.9	27.9	44.2	1927.....	211	82.0	5.2	12.8
Lexington, Ky.:					Miami, Fla.:				
1921.....	127	100.0	—	—	1921.....	959	85.9	—	14.1
1926.....	164	100.0	—	—	1926.....	3,902	65.4	7.2	27.4
1927.....	160	100.0	—	—	1927.....	698	83.2	5.7	11.0
Lima, Ohio.:					Minneapolis, Minn.:				
1921.....	155	67.7	32.3	—	1921.....	3,574	75.9	5.2	18.9
1926.....	69	65.2	2.9	31.9	1926.....	2,760	75.9	7.9	16.2
1927.....	35	91.4	—	8.6	1927.....	2,189	65.2	11.8	23.0
Lincoln, Nebr.:					Montclair, N. J.:				
1921.....	241	97.5	—	2.5	1921.....	276	65.9	9.4	24.7
1926.....	378	94.7	—	5.3	1926.....	422	61.1	21.1	17.8
1927.....	388	80.7	—	19.3	1927.....	334	51.8	32.6	15.6
Little Rock, Ark.:					Mount Vernon, N. Y.:				
1921.....	749	96.0	1.3	2.7	1921.....	246	66.3	16.3	17.4
1926.....	772	79.0	—	20.9	1926.....	3,346	6.2	5.3	88.5
1927.....	514	83.9	0.4	15.8	1927.....	2,211	10.9	5.4	83.7
Long Beach, Calif.:					Muncie, Ind.:				
1921.....	3,882	33.2	7.3	59.5	1921.....	64	75.0	12.5	12.5
1926.....	978	67.2	9.3	23.5	1926.....	270	99.3	—	—
1927.....	1,479	57.6	10.6	31.8	1927.....	317	94.6	—	5.4
Lorain, Ohio:					Nashville, Tenn.:				
1921.....	146	87.7	6.8	5.5	1921.....	470	89.8	—	10.2
1926.....	317	65.6	17.4	17.0	1926.....	674	88.3	2.7	9.0
1927.....	237	99.6	0.4	—	1927.....	654	82.7	1.5	15.7
Louisville, Ky.:					Newark, N. J.:				
1921.....	677	88.9	—	11.1	1921.....	1,393	19.1	49.1	31.8
1926.....	2,581	68.7	17.6	13.7	1926.....	3,060	13.7	34.2	52.1
1927.....	1,574	70.0	7.5	22.5	1927.....	5,144	3.5	16.2	80.3
Lowell, Mass.:					New Bedford, Mass.:				
1921.....	259	66.4	24.3	9.3	1921.....	522	42.5	52.9	4.6
1926.....	145	74.5	23.4	2.1	1926.....	135	61.5	34.1	4.4
1927.....	79	92.4	7.6	—	1927.....	151	76.8	21.2	2.0
Lynn, Mass.:					New Britain, Conn.:				
1921.....	140	57.1	12.9	30.0	1921.....	215	20.0	38.1	41.9
1926.....	608	33.4	21.7	44.9	1926.....	410	33.9	42.9	23.2
1927.....	528	24.4	22.0	53.6	1927.....	537	28.7	30.2	41.2

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City, State, and year	Total number of families provided for	Per cent of families provided for in—			City, State, and year	Total number of families provided for	Per cent of families provided for in—		
		1-family dwellings	2-family dwellings	Multi-family dwellings			1-family dwellings	2-family dwellings	Multi-family dwellings
New Brunswick, N. J.:					Passaic, N. J.:				
1921.....	129	25.6	71.3	3.1	1921.....	426	16.4	60.1	23.5
1926.....	244	46.7	33.6	19.7	1926.....	354	13.0	37.0	50.0
1927.....	195	36.9	46.2	16.9	1927.....	467	11.6	15.0	73.4
New Castle, Pa.:					Paterson, N. J.:				
1926.....	227	90.3	7.0	2.6	1921.....	587	39.2	54.5	6.3
1927.....	182	80.2	19.8	---	1926.....	702	24.1	57.3	18.5
New Haven, Conn.:					1927.....	1,167	19.2	19.6	61.2
1921.....	444	21.2	40.1	38.7	Pawtucket, R. I.:				
1926.....	1,458	12.8	7.7	79.5	1921.....	277	45.8	32.5	21.7
1927.....	497	24.3	7.2	68.4	1926.....	700	29.3	58.6	12.1
New Orleans, La.:					1927.....	581	46.3	47.8	5.8
1921.....	2,335	41.8	47.2	11.0	Peoria, Ill.:				
1926.....	2,038	24.7	56.2	19.1	1921.....	300	82.0	12.7	5.3
1927.....	2,077	24.6	64.7	10.8	1926.....	362	91.2	1.9	6.9
New Rochelle, N. Y.:					1927.....	349	93.1	1.7	5.2
1921.....	247	74.9	17.8	7.3	Phoenix, Ariz.:				
1926.....	672	40.9	9.4	49.7	1921.....	407	73.9	---	26.1
1927.....	1,049	26.1	5.2	68.6	1926.....	531	68.4	26.0	5.6
Newton, Mass.:					1927.....	614	66.0	26.7	7.3
1921.....	249	83.5	15.3	1.2	Pittsfield, Mass.:				
1926.....	692	58.4	41.6	---	1921.....	43	95.3	4.7	---
1927.....	734	68.4	31.6	---	1926.....	77	57.1	37.7	5.2
Niagara Falls, N. Y.:					1927.....	118	61.0	29.7	9.3
1921.....	286	56.3	37.1	6.6	Plainfield, N. J.:				
1926.....	550	43.5	42.5	14.0	1921.....	135	100.0	---	---
1927.....	397	68.3	26.4	5.3	1926.....	627	39.9	29.8	30.3
Norfolk, Va.:					1927.....	507	49.3	8.9	41.8
1921.....	419	69.2	17.2	13.6	Pontiac, Mich.:				
1926.....	437	72.3	7.6	20.1	1921.....	60	96.7	3.3	---
1927.....	496	63.9	2.0	34.1	1926.....	838	68.7	3.4	27.9
Norristown, Pa.:					1927.....	1,069	55.2	12.0	32.8
1921.....	31	83.9	---	16.1	Port Arthur, Tex.:				
1926.....	89	89.9	2.2	7.9	1926.....	203	100.0	---	---
1927.....	66	84.8	15.2	---	1927.....	508	100.0	---	---
Norwalk, Conn.:					Portland, Me.:				
1921.....	72	83.3	16.7	---	1921.....	207	78.3	.5	21.3
1926.....	263	76.4	21.3	2.3	1926.....	186	77.4	7.5	15.1
1927.....	285	77.5	10.5	11.9	1927.....	216	68.1	3.7	28.2
Oakland, Calif.:					Portland, Oreg.:				
1921.....	2,681	77.9	4.3	17.8	1921.....	3,136	91.4	2.6	6.1
1926.....	4,519	66.4	6.4	27.2	1926.....	5,125	62.0	4.4	33.7
1927.....	2,694	57.1	4.1	38.8	1927.....	3,166	71.0	3.2	25.9
Oak Park, Ill.:					Portsmouth, Ohio:				
1921.....	720	70.3	4.7	25.0	1921.....	113	91.2	.9	8.0
1926.....	744	29.7	.8	69.5	1926.....	257	91.0	4.7	4.3
1927.....	918	22.7	.3	77.0	1927.....	224	95.1	3.6	1.3
Ogden, Utah:					Poughkeepsie, N. Y.:				
1921.....	477	91.2	---	8.8	1921.....	60	28.3	50.0	21.7
1926.....	245	82.4	3.3	14.3	1926.....	351	14.8	15.1	70.1
1927.....	200	89.5	---	10.5	1927.....	87	41.4	25.3	33.3
Oklahoma City, Okla.:					Providence, R. I.:				
1921.....	1,724	83.8	2.2	13.9	1921.....	566	33.9	51.2	14.8
1926.....	1,173	71.9	15.4	12.7	1926.....	1,205	37.0	40.2	22.7
1927.....	1,752	66.4	15.1	18.4	1927.....	1,188	37.4	37.3	25.3
Omaha, Nebr.:					Pueblo, Calif.:				
1921.....	1,298	76.1	.6	23.3	1921.....	288	98.6	---	1.4
1926.....	794	92.7	5.8	1.5	1926.....	270	93.7	5.2	1.1
1927.....	477	70.9	2.9	26.2	1927.....	401	89.3	10.7	---
Orange, N. J.:					Quincy, Ill.:				
1921.....	55	25.5	52.7	21.8	1921.....	20	90.0	10.0	---
1926.....	304	24.0	17.8	58.2	1926.....	190	99.5	.5	---
1927.....	722	6.8	6.4	86.8	1927.....	181	97.8	---	2.2
Oshkosh, Wis.:					Quincy, Mass.:				
1921.....	64	64.1	17.2	18.8	1921.....	404	57.2	34.4	8.4
1926.....	168	97.0	1.2	1.8	1926.....	971	59.4	24.3	16.3
1927.....	162	100.0	---	---	1927.....	926	52.8	16.6	30.6
Pasadena, Calif.:					Racine, Wis.:				
1921.....	1,262	85.9	2.2	11.9	1921.....	169	77.5	15.4	7.1
1926.....	839	80.0	4.4	15.6	1926.....	471	86.8	8.9	4.2
1927.....	790	57.8	5.3	36.8	1927.....	609	62.7	19.0	18.2

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		1-family dwellings	2-family dwellings	Multi-family dwellings			1-family dwellings	2-family dwellings	Multi-family dwellings
Reading, Pa.:					Scranton, Pa.:				
1922.....	333	56.2	27.0	16.8	1921.....	75	81.3	18.7	---
1926.....	290	94.8	3.1	2.1	1923.....	217	56.2	25.8	18.0
1927.....	233	82.4	3.4	14.2	1927.....	280	57.1	42.9	---
Revere, Mass.:					Seattle, Wash.:				
1921.....	152	69.7	30.3	---	1921.....	1,961	90.5	---	9.5
1926.....	264	33.7	37.5	23.8	1926.....	5,342	62.5	---	37.5
1927.....	241	50.2	38.2	11.6	1927.....	4,505	61.0	---	39.0
Richmond, Ind.:					Sheboygan, Wis.:				
1921.....	41	58.5	41.5	---	1921.....	90	95.6	4.4	---
1926.....	205	100.0	---	---	1923.....	334	80.2	18.9	.9
1927.....	228	100.0	---	---	1927.....	204	88.2	11.8	---
Richmond, Va.:					Shreveport, La.:				
1921.....	741	78.1	---	21.9	1921.....	1,157	100.0	---	---
1926.....	1,224	76.1	6.2	17.7	1926.....	597	100.0	---	---
1927.....	1,774	44.9	9.4	45.7	1927.....	185	66.5	15.1	18.4
Roanoke, Va.:					Sioux City, Iowa:				
1921.....	351	100.0	---	---	1921.....	638	90.4	5.0	4.5
1926.....	652	92.0	6.1	1.9	1923.....	359	87.2	3.3	9.5
1927.....	395	90.9	---	9.1	1927.....	297	72.7	---	27.3
Rochester, N. Y.:					Sioux Falls, S. Dak.:				
1921.....	1,319	72.1	17.1	10.8	1921.....	303	100.0	---	---
1926.....	2,304	58.8	10.7	30.5	1923.....	212	94.3	5.7	---
1927.....	2,448	50.4	8.1	41.5	1927.....	151	84.8	7.3	7.9
Rockford, Ill.:					Somerville, Mass.:				
1921.....	351	68.7	16.5	14.8	1921.....	204	5.4	75.5	19.1
1926.....	880	65.8	13.9	20.3	1926.....	352	2.0	53.4	44.6
1927.....	926	55.7	22.2	22.0	1927.....	399	1.0	54.1	44.9
Sacramento, Calif.:					South Bend, Ind.:				
1921.....	737	84.0	4.6	11.4	1921.....	665	78.0	13.8	8.1
1926.....	1,198	86.6	4.0	9.4	1926.....	1,086	96.8	2.7	.5
1927.....	959	82.7	5.0	12.3	1927.....	540	96.3	2.6	1.1
Saginaw, Mich.:					Spokane, Wash.:				
1921.....	251	96.8	1.6	1.6	1921.....	438	98.7	---	1.3
1926.....	351	100.0	---	---	1926.....	662	99.1	---	.9
1927.....	347	98.8	1.2	---	1927.....	595	85.2	.5	14.3
St. Joseph, Mo.:					Springfield, Ill.:				
1921.....	7	100.0	---	---	1921.....	210	76.7	6.7	16.6
1926.....	161	96.3	1.2	2.5	1926.....	431	80.0	2.3	17.6
1927.....	107	100.0	---	---	1927.....	354	92.7	3.1	4.2
St. Paul, Minn.:					Springfield, Mass.:				
1921.....	2,194	78.6	4.6	16.8	1921.....	827	59.9	30.0	10.2
1926.....	2,188	61.7	8.1	30.1	1926.....	1,329	40.8	27.5	31.7
1927.....	1,148	72.0	7.0	21.0	1927.....	1,240	36.5	18.2	45.2
St. Petersburg, Fla.:					Springfield, Ohio:				
1921.....	2,766	52.0	20.5	27.5	1921.....	253	90.9	9.1	---
1926.....	442	84.2	7.0	8.8	1926.....	274	89.1	10.9	---
1927.....	442	84.2	7.0	8.8	1927.....	285	84.9	15.1	---
Salt Lake City, Utah:					Stamford, Conn.:				
1921.....	826	90.0	3.8	6.2	1921.....	190	50.5	34.7	14.7
1926.....	912	58.3	6.4	35.3	1926.....	561	36.5	22.8	40.6
1927.....	850	56.1	8.0	35.9	1927.....	559	30.6	21.8	47.6
San Antonio, Tex.:					Steubenville, Ohio:				
1921.....	1,718	95.5	---	4.5	1921.....	84	89.3	---	10.7
1926.....	1,964	82.8	3.9	13.2	1926.....	210	41.9	21.0	37.1
1927.....	2,171	79.6	3.7	16.7	1927.....	171	73.7	11.1	15.2
San Diego, Calif.:					Stockton, Calif.:				
1921.....	1,450	83.6	.3	11.1	1921.....	624	66.8	---	33.2
1926.....	3,734	87.7	5.3	7.0	1926.....	332	76.2	4.8	19.0
1927.....	2,613	76.8	7.6	15.6	1927.....	412	70.9	2.9	26.2
San Jose, Calif.:					Syracuse, N. Y.:				
1921.....	300	83.7	3.6	12.7	1921.....	627	55.5	38.8	5.7
1926.....	683	85.8	3.7	10.5	1926.....	1,251	64.7	19.4	15.8
1927.....	385	73.0	10.4	16.6	1927.....	1,838	53.0	16.5	30.5
Savannah, Ga.:					Tacoma, Wash.:				
1921.....	347	81.0	---	19.0	1921.....	843	93.1	---	6.9
1926.....	331	75.5	13.0	11.5	1926.....	1,790	80.3	---	19.7
1927.....	401	72.6	15.0	12.5	1927.....	769	80.5	---	19.5
Schenectady, N. Y.:					Tampa, Fla.:				
1921.....	193	70.0	30.0	---	1921.....	422	89.3	5.2	5.5
1926.....	289	77.1	20.4	2.4	1926.....	2,623	80.3	.7	19.0
1927.....	349	71.3	9.7	18.9	1927.....	826	94.8	1.1	4.1

TABLE 3.—PER CENT OF FAMILIES PROVIDED FOR BY THE DIFFERENT KINDS OF DWELLINGS IN CITIES HAVING A POPULATION OF FROM 25,000 TO 500,000—Con.

City, State, and year	Total number of families provided for	Per cent of families provided for in—			City, State, and year	Total number of families provided for	Per cent of families provided for in—		
		1-family dwellings	2-family dwellings	Multi-family dwellings			1-family dwellings	2-family dwellings	Multi-family dwellings
Terre Haute, Ind.:					West New York, N. J.:				
1921	758	100.0			1921	269	6.3	62.5	31.2
1926	128	87.5	12.5		1926	419	3.6	14.3	82.1
1927	184	98.9	1.1		1927	283	8.5	3.5	88.0
Toledo, Ohio:					Wheeling, W. Va.:				
1921	600	80.3	15.7	4.0	1921	261	44.0	39.9	16.1
1926	1,545	78.9	7.2	13.9	1926	131	72.5	10.7	16.8
1927	1,749	81.0	8.3	10.6	1927	182	80.8	10.4	8.8
Topeka, Kans.:					White Plains, N. Y.				
1921	188	84.0		16.0	1926	1,054	29.9	3.3	66.8
1926	361	87.5	12.5		1927	1,204	22.5	3.8	73.7
1927	320	87.5		12.5	Wichita, Kans.:				
Trenton, N. J.:					1921	1,336	93.2	2.8	4.0
1921	317	89.3		10.7	1926	977	74.3	5.5	20.2
1926	437	95.9	1.4	2.7	1927	938	77.7	4.9	17.4
1927	316	96.2	1.9	1.9	Wichita Falls, Tex.:				
Tucson, Ariz.:					1926	1,537	77.9	18.5	3.6
1926	400	78.0	22.0		1927	548	90.5	5.8	3.7
1927	535	54.2	7.5	38.3	Wilkes-Barre, Pa.:				
Tulsa, Okla.:					1921	82	91.5	4.9	3.6
1921	1,138	77.5	5.1	17.4	1926	322	50.0	18.3	31.7
1926	862	66.7	11.6	21.7	1927	230	64.8	25.2	10.0
1927	1,434	68.1	13.9	18.1	Wilkinsburg, Pa.:				
Union City, N. J.:					1926	242	76.0	18.6	5.4
1921	56	33.9	14.3	51.8	1927	166	68.7	12.7	18.7
1926	352	3	9.9	89.8	Wilmington, Del.:				
1927	255		12.5	87.5	1921	66	71.2	7.6	21.2
Utica, N. Y.:					1926	359	92.8	1.7	5.5
1921	478	43.3	56.7		1927	366	83.1	.5	16.4
1926	443	78.6	20.5	.9	Winston-Salem, N. C.:				
1927	259	83.4	16.6		1921	356	94.1	.6	5.3
Waco, Tex.:					1926	566	78.6	9.9	11.5
1921	443	97.7	.5	1.8	1927	923	74.8	2.6	22.6
1926	187	97.3	.5	2.1	Woonsocket, R. I.:				
1927	171	98.8	1.2		1921	369	25.7	26.6	47.7
Waltham, Mass.:					1926	365	18.4	36.2	45.4
1921	137	92.7	4.4	2.9	1927	154	46.1	26.0	27.9
1926	321	44.0	23.0	33.0	Worcester, Mass.:				
1927	285	49.1	30.5	20.4	1921	715	67.0	17.8	15.2
Warren, Ohio:					1926	1,465	44.8	13.6	41.6
1921	171	94.7	5.3		1927	795	59.0	18.6	22.4
1926	453	75.3	12.4	12.4	Yonkers, N. Y.:				
1927	321	95.3	4.7		1921	433	76.0		24.0
Waterbury, Conn.:					1926	2,706	18.0	7.7	74.3
1921	271	43.2	22.9	33.9	1927	4,146	14.3	6.7	79.1
1926	691	42.1	21.9	36.0	Youngstown, Ohio:				
1927	675	54.4	20.7	24.9	1921	724	62.2	20.7	17.1
Watertown, Mass.:					1926	1,089	83.2	8.6	8.2
1926	844	25.1	74.9		1927	1,148	80.8	11.8	7.3
1927	759	14.1	85.9						

Relative Cost of Material and Labor in Building Construction

A STUDY of the relative cost of material and labor in the building industry, and of the relative cost of each class of work, was made by the Bureau of Labor Statistics in the early part of 1928. The study covered the cities of Washington, D. C., Cincinnati, Ohio, and Decatur, Ill., these being selected as being fairly representative of the different types of urban communities. It is to be emphasized, however, that the results obtained apply to these three cities only and should not be interpreted as reflecting the exact situation for the United States as a whole.

The cost figures stated in the present article are the net cost figures, representing only the actual cost of the building from the time excavation started. They do not include overhead expenses, profits, cost of land, or finance charges.

The cost of the material is its actual cost as delivered to the job, including freight and hauling. The labor costs are costs of labor on the job, and do not include any shop labor such as the making up of millwork or the cutting of stone at the quarries.

The buildings selected for the study were chosen from the types usually built in the city, and the number selected from each type was roughly in proportion to the number built in the city.

Relative Cost of Material and Labor in New Buildings

TABLE 1 shows the percentage of labor and material cost in the construction of residential and nonresidential buildings in each of the three cities from which data were obtained and the weighted total of all buildings in each of these cities and for the three combined.

TABLE 1.—PER CENT OF COST OF CONSTRUCTION OF BUILDINGS CHARGEABLE TO LABOR AND MATERIALS IN THREE SPECIFIED CITIES

Type of building	Cincinnati, Ohio		Decatur, Ill.		Washington, D. C.		Total	
	Material	Labor	Material	Labor	Material	Labor	Material	Labor
Residential.....	Per cent 55.6	Per cent 44.4	Per cent 62.8	Per cent 37.2	Per cent 52.6	Per cent 47.4	Per cent 54.0	Per cent 46.0
Nonresidential.....	62.4	37.6	61.0	39.0	50.3	40.7	61.7	38.3
Weighted total.....	60.2	39.8	61.3	38.7	54.3	45.7	58.1	41.8

In the three cities taken as a whole, material accounted for 54 per cent of the total cost of residential building and 61.7 per cent of nonresidential building, while labor accounted for 46 per cent of the cost of residential building and 38.3 per cent of the cost of nonresidential building. If each class of building is weighted by the proportion it formed of all building in the year 1927 it is found that of the total cost of all building 58.1 per cent is for material and 41.8 per cent is for labor.

It was found that the proportion of costs did not differ greatly in the different cities, but as regards the individual buildings for which data were obtained there was a moderate range in the proportion of material to labor. In Cincinnati the lowest material cost on any one residential building was 48.4 per cent and the highest 56.9 per cent, while the lowest labor cost was 43.1 per cent and the highest 51.6 per cent. In Decatur the range of material cost of residential buildings was from 60.7 to 66.1 per cent and of labor 33.9 to 39.3 per cent. In Washington the cost of material formed 49.7 per cent of the cost of the residential building where material cost was lowest and 56 per cent of the cost of the one where the material cost was highest.

Of nonresidential buildings in Cincinnati the building where material formed the highest portion of the total cost showed a ratio of material to labor of 65.1 to 34.9 per cent. On the building where labor formed the highest proportion of the total cost labor was only

46.6 per cent of the total cost, and material 53.4 per cent. In Decatur the difference in the proportion of material to labor in nonresidential buildings ranged from 56.4 per cent for material and 43.6 per cent for labor to 65.3 per cent for material and 34.7 per cent for labor. In Washington this range was from 55.2 per cent for material and 44.8 per cent for labor to 61 per cent for material and 39 per cent for labor.

It was impossible to determine whether this range in material and labor cost is caused by more efficient labor on one building than on another or whether more costly materials were used in the construction of some buildings than others

Relative Material and Labor Costs in Each Item of Building

TABLE 2 shows the percentage of material cost and labor cost of the different items in the erection of residential buildings in each of the cities from which data were received and in the three cities combined.

TABLE 2.—PER CENT OF COST OF SPECIFIED CLASS OF CONSTRUCTION WORK CHARGEABLE TO LABOR AND MATERIAL IN THREE CITIES—RESIDENTIAL BUILDINGS

Class of work	Cincinnati		Decatur		Washington		Total	
	Material	Labor	Material	Labor	Material	Labor	Material	Labor
	<i>Per cent</i>	<i>Per cent</i>	<i>Per cent</i>	<i>Per cent</i>	<i>Per cent</i>	<i>Per cent</i>	<i>Per cent</i>	<i>Per cent</i>
Excavating and grading.....	10.0	90.0	100.0		100.0	4.3	95.7	
Brickwork.....	54.6	45.4	45.9	54.1	52.8	47.2	53.2	46.8
Carpenter work (builders' hardware, lumber, and millwork).....	53.6	41.4	69.3	30.7	54.5	45.5	56.5	43.5
Tile work.....	52.8	47.2	61.8	38.2	57.7	42.3	55.2	44.8
Concrete work.....	43.4	56.6	55.6	34.4	58.8	41.2	51.9	48.1
Electric wiring and fixtures.....	61.7	38.3	72.0	28.0	68.9	31.1	65.5	34.5
Plumbing.....	63.9	31.1	77.9	22.1	60.8	39.2	64.8	35.2
Heating.....	71.0	29.0	78.5	21.5	72.8	27.2	72.2	27.8
Painting.....	40.3	59.7	49.4	50.6	25.3	74.7	33.4	66.6
Papering.....	22.3	77.7	31.5	68.5	33.2	66.8	26.6	73.4
Plastering.....	45.8	54.2	45.0	55.0	37.8	62.2	38.3	61.7
Roofing.....	48.4	51.6	67.8	32.2	56.4	43.6	54.8	45.2
Miscellaneous.....	87.2	12.8	95.8	4.2	63.0	37.0	74.8	25.2

Similar data for nonresidential buildings are shown in Table 3.

TABLE 3.—PER CENT OF COST OF SPECIFIED CLASS OF CONSTRUCTION WORK CHARGEABLE TO LABOR AND MATERIAL IN THREE CITIES—NONRESIDENTIAL BUILDINGS

Class of work	Cincinnati		Decatur		Washington		Total	
	Material	Labor	Material	Labor	Material	Labor	Material	Labor
	<i>Per cent</i>	<i>Per cent</i>	<i>Per cent</i>	<i>Per cent</i>	<i>Per cent</i>	<i>Per cent</i>	<i>Per cent</i>	<i>Per cent</i>
Excavating and grading.....	11.6	88.4	100.0		1.9	98.1	7.4	92.6
Brickwork.....	57.4	42.6	59.3	40.7	58.6	41.4	57.9	42.1
Carpenter work (builders' hardware, lumber, and millwork).....	74.9	25.1	62.2	37.8	50.5	49.5	68.7	31.3
Tile work.....	69.5	30.5	40.7	59.3	73.7	26.3	69.9	30.1
Concrete work.....	49.1	50.9	58.4	41.6	55.9	44.1	51.5	48.5
Structural steel.....	49.2	50.8	79.9	20.1	76.9	23.1	56.7	43.3
Electric wiring and fixtures.....	61.7	38.3	63.1	36.9	68.6	31.4	62.9	37.1
Heating and ventilating.....	67.7	32.3	78.8	21.2	72.8	27.2	69.4	30.6
Plumbing.....	74.5	25.5	74.3	25.7	59.6	40.4	72.5	27.5
Plastering.....	48.3	51.7	36.6	63.4	29.1	70.9	45.1	54.9
Painting.....	32.6	67.4	32.9	67.1	30.9	69.1	32.3	67.7
Roofing.....	68.0	32.0	74.8	25.2	49.0	51.0	64.2	35.8
Glass and glazing.....	82.0	18.0	57.3	42.7	91.7	8.3	80.1	19.9
Miscellaneous.....	84.4	15.6	73.5	26.5	75.0	25.0	83.0	17.0

How the Building Dollar Goes

TABLE 4 shows the percentage that the cost of each process in building forms of the total cost of residential building in each of the cities and for all three combined. These figures include both labor and materials.

TABLE 4.—PERCENTAGE THAT COST OF EACH CLASS OF WORK FORMS OF TOTAL COST OF RESIDENTIAL BUILDINGS IN THREE CITIES

Class of work	Per cent of total cost chargeable to specified class of work in—			
	Cincinnati, Ohio	Decatur, Ill.	Washington, D. C.	Total
Excavating and grading.....	2.3	2.0	1.9	2.0
Brick work.....	12.7	11.8	13.4	15.1
Carpenter work.....	31.4	45.0	33.0	32.7
Tile work.....	2.8	1.0	1.6	2.1
Concrete work.....	11.3	7.1	8.4	9.5
Electric wiring and fixtures.....	3.6	2.5	2.3	2.8
Heating.....	5.6	6.4	5.3	5.5
Plumbing.....	11.0	7.8	8.3	9.3
Plastering and lathing.....	9.0	5.9	8.4	8.6
Painting.....	2.8	5.5	5.4	4.4
Papering.....	.8	.7	1.0	.9
Roofing.....	1.6	4.2	2.5	2.2
Miscellaneous.....	5.1	.1	3.5	4.0
Total.....	100.0	100.0	100.0	100.0

Similar data for nonresidential buildings are shown in Table 5.

TABLE 5.—PERCENTAGE THAT COST OF EACH CLASS OF WORK FORMS OF TOTAL COST OF NONRESIDENTIAL BUILDINGS IN THREE CITIES

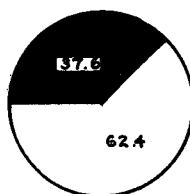
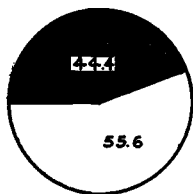
Class of work	Per cent of total cost chargeable to specified class of work in—			
	Cincinnati, Ohio	Decatur, Ill.	Washington, D. C.	Total
Excavating and grading.....	1.2	2.2	2.3	1.5
Brick work.....	11.1	12.8	22.3	13.3
Carpenter work.....	12.9	15.8	14.8	13.5
Tile work.....	7.3	.9	6.9	6.6
Concrete work.....	18.3	32.0	11.9	18.5
Structural steel.....	9.3	6.7	10.0	9.2
Electric wiring and fixtures.....	3.7	6.4	3.2	3.8
Heating and ventilating.....	7.2	6.2	5.7	6.8
Plumbing.....	5.7	5.9	4.2	5.4
Plastering and lathing.....	7.3	2.3	5.4	6.4
Painting.....	1.6	2.7	2.3	1.8
Roofing.....	.3	2.4	1.3	.8
Glass and glazing.....	1.6	2.3	1.4	1.6
Miscellaneous.....	12.6	1.4	8.4	10.7
Total.....	100.0	100.0	100.0	100.0

PERCENT OF COST OF LABOR AND MATERIALS IN THREE SPECIFIED CITIES.

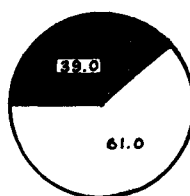
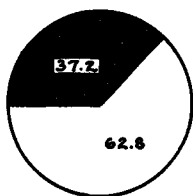
Labor ■ Materials □

RESIDENTIAL BUILDINGS. | NON-RESIDENTIAL BUILDINGS.

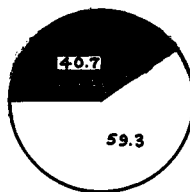
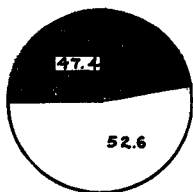
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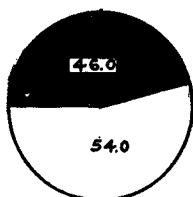
DECATUR, ILL.



WASHINGTON, D.C.



TOTAL OF THREE CITIES.

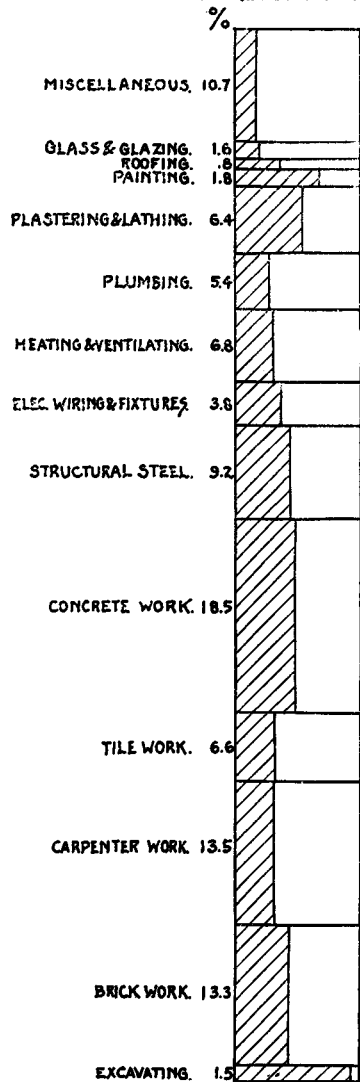
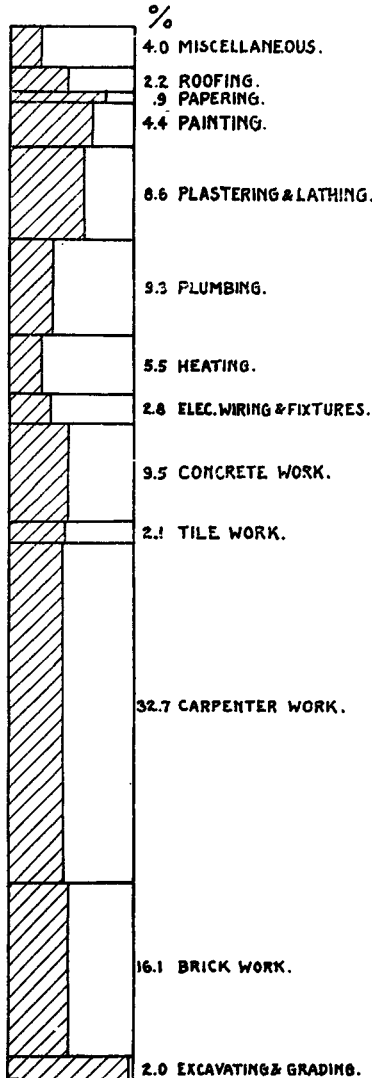


PERCENT THAT COST OF EACH CLASS OF WORK FORMS OF TOTAL COST OF BUILDING IN THREE SELECTED CITIES.

LABOR MATERIALS 

RESIDENTIAL

NON-RESIDENTIAL



R/

There are a few slight differences in the processes involved in the erection of residential and nonresidential buildings. In residential building papering is included; there is no papering in nonresidential building. Glass and glazing is a separate item in nonresidential building, while in residential building the millwork ordinarily comes already glazed and this item is, therefore, included under carpenter work in this class of building. The cost of ventilating systems is included with heating in nonresidential buildings. No such item was found in residential building.

Financing the Home

HUNDREDS of thousands of families who set out to own their homes each year find financing the most trying problem they have to surmount, according to the division of building and housing of the United States Bureau of Standards which issued a booklet in 1928 entitled "Present Home Financing Methods." This booklet, which was prepared with the cooperation of leading home-financing agencies, was written to assist home buyers and home builders who have to borrow, and also for persons and organizations who are interested in improving local home-financing facilities.

Choosing a helpful home-financing agency and a good plan of financing may save a family from much unnecessary expense, or even determine the success of the undertaking. In order to avoid costly mistakes a family, particularly if it has to borrow more than can be obtained on a first mortgage, needs to know something about the sources of home loans, and the types of services furnished by the agencies supplying them. The report under review describes the services rendered by building and loan associations, life insurance companies, savings banks, trust companies, and other agencies which lend to home seekers, and also takes up the question of second and third mortgages and the land-contract method of purchase. It points out various pitfalls to be avoided, and gives much practical information, such as suggestions for use in applying for loans.

The discussion of the second mortgage, a subject of vital interest to thousands of homeseekers, deals with the methods and practices of second-mortgage lenders, and the effect of discounts and commissions on the interest rate paid by the borrower. Since the borrower is usually required to curtail the loan periodically, and therefore, does not have the use of the whole amount for the entire loan period, the discount rates of 4 to 10 per cent a year, which are common in many localities, are in reality considerably higher. In fact, under the usual regularly amortized loan the real discount rate is approximately double the nominal rate. On a typical second-mortgage loan, for example, running for three years on the monthly payment plan, and at a 7 per cent nominal interest rate and with a 15 per cent discount (5 per cent annually, so called) the actual rate of interest paid by the borrower on his outstanding balances is approximately 18 per cent a year.

The appendix of the booklet explains in simple terms how answers to similar problems may be found by prospective borrowers who wish to compare different loan plans available to them.

In many communities the high rates charged for second mortgage funds have tended to discourage home building, but instances are

given of successful efforts by public-spirited local groups to improve such conditions.

Tax Exemption for Housing Corporations in New York City¹

EARLY in June, 1927, the New York municipal assembly passed an ordinance exempting from local taxes for a period of 20 years all model tenements which limited-dividend corporations may build, either on land now occupied or formerly occupied by old-law tenements or undesirable buildings. Under the State law, passed in May, 1926, such corporations are exempted from the payment of any and all franchise, organization, income, mortgage recording, and other taxes to the State and its officers, and their bonds and mortgages, with the interest thereon and their dividends, are also freed from State taxation. The State could not remit local taxes on buildings and improvements, but it authorized municipalities to do so, and provided that whenever a municipality took advantage of this permission, the buildings and improvements should be to the same extent freed from State taxes.

Public limited-dividend housing corporations are required to furnish, through the actual sale of stock for cash, one-third of the capital required for any project undertaken, the remainder being secured through bonds bearing 5 per cent on first mortgage and 5½ per cent on debenture bonds. All projects must be approved by the housing board, and rent must not exceed \$12.50 per room per month in New York proper, the bathroom not being counted as a room. Dividends are limited to 6 per cent. Should returns reach a figure which, allowing for cost of maintenance, depreciation, and the like, would justify a higher return, rents are to be lowered proportionately.

It is definitely expected that this action will lead to the substitution of new and improved housing for the old-law tenements which have been one of the dark spots in New York's housing problem. A survey of the most congested parts of the city, made in the latter part of 1926, showed some 950 assessment blocks suitable for housing of the kind contemplated, on which, allowing for all costs of condemnation proceedings, compensation, etc., it would be possible to build model tenements of the kind desired to rent within the limits set.²

The housing board, whose approval must be secured before any building may be erected, has decided upon various types of housing which it will sanction. All require the three forms of economy which the large semiphilanthropic corporations have found practicable—cheap land, cheap capital, and efficient large-scale construction. The land in the blocks covered by the survey referred to ranged from \$6 to \$14 a square foot, the rates which may be paid for capital are strictly limited, and examples of efficient large-scale construction are not wanting. It is intended that not more than 50 per cent of the land shall be occupied by the building, leaving a large amount for court and playground space, air, and light. According to the New York Record and Guide (June 11, p. 5), it is estimated that \$25,000,000 is needed to make a satisfactory beginning of the movement, and it is hoped that this will be raised without delay.

¹ New York Times, June 12, 1927.

² See Labor Review, March, 1927, p. 178.

IMMIGRATION AND EMIGRATION

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Immigration Movement in 1928

THE IMMIGRATION laws of the United States are administered by the Bureau of Immigration of the United States Department of Labor. Data regarding the immigration movement are compiled monthly by the Bureau of Immigration and published currently in the Labor Review of the Bureau of Labor Statistics. The annual reports of the Commissioner General of Immigration give similar data in more expanded form and for a period of years. The figures and text in this section are taken from the above-mentioned sources and also from the annual reports of the Secretary of Labor for 1927 and 1928.

In the fiscal year ended June 30, 1928, a total of 500,631 aliens were admitted to the United States, as compared with a total of 538,001 aliens for the previous year. During the fiscal year 274,356 aliens departed, as compared with 253,508 departures during 1927. Therefore, for the past fiscal year there was a net gain of 226,275 as compared with a net gain of 284,493 aliens for the year 1927. Of the 500,631 aliens admitted, 307,255 were immigrants or newcomers for permanent residence in this country and 193,376 were either returning from a temporary trip abroad or coming here for a visit. Of the 274,356 aliens who departed from the United States during the past year, 196,899 were aliens who had been here for a short stay or who intended to return to the United States after visiting a foreign country. The remaining 77,457 departed without expressing an intention to return. About three-fourths of the present-day immigrant aliens are in the prime of life, 16 to 44 years of age, which percentage runs about the same as in the previous fiscal year. Of the immigrants admitted during the year, 230,832 were from 16 to 44 years of age, 49,680 were under 16 years of age and the remaining 26,743 were 45 years of age or over. During the previous fiscal year the male immigrants outnumbered the female immigrants, 194,163 males and 141,012 females being admitted in that year. Again, during the fiscal year 1928 the males outnumbered the females, 165,977 males and 141,278 females being admitted. However, a number of countries sent more females than males. For instance, Greece sent 410 males and 1,918 females and Italy sent 6,075 males and 11,653 females. Statistics show that most of the countries sending an excess of females over males are located in southern Europe where the quotas are small. The excess of females over males is due largely to the fact that many of these females are wives of American citizens and as such are exempt from the quota provisions of the immigration act of 1924.

As in the previous fiscal year, countries in the Western Hemisphere furnished almost half the immigrants admitted, due to the fact that quota restrictions do not apply to most countries in this hemisphere. Immigrants to the number of 73,154 were admitted from Canada and 59,016 from Mexico. These two figures constitute 43 per cent of the total number of immigrants for the year. Europe sent 158,513 immigrants during this year, Germany leading with 45,778,

being followed by the Irish Free State with 24,544 and Great Britain with 19,958. Italy sent 17,728 and the combined Scandinavian countries (Denmark, Norway, and Sweden) 16,184.

A study of the following figures will show what a tremendous effect the present restrictive immigration laws have. In a single year prior to the war, and of course prior to the first quota law, which was passed in 1921, immigration exceeded the million mark. A larger number of aliens arrived during individual years in that period from single countries in Europe than now come from the entire Continent of Europe. As an example, in the year 1913 the Russian Empire, as it was then known, contributed 291,040 immigrants to this country, Italy 265,542, and former Austria-Hungary 254,825, whereas in the fiscal year just passed only 158,513 alien immigrants were admitted from all European countries.

Immigration from Mexico

THE NUMBER of Mexican aliens admitted to the United States during the fiscal year 1927-28 was 61,622—57,765 immigrant and 3,857 nonimmigrant—a decline of 19,017 from the previous year, when 80,639 aliens of this race entered the country. The number of Mexican immigrants dropped from 66,766 in the year 1927 to 57,765 in 1928, a decrease of 13.5 per cent; 47,686 were over 16 years, of age and 10,079 were children under 16 years of age; 37,965 were males and 19,800 females. The single immigrants numbered 32,209, married 22,882, widowed 2,637, and divorced 37. Unskilled workers continued to predominate; 19,964 Mexicans admitted last year gave their occupation as that of common laborer, 4,989 were farm laborers, and 2,065 were servants. The professional class numbered 1,013, skilled workers 5,725, commercial and miscellaneous classes 1,715, and 22,294 were listed as having no occupation.

In the past fiscal year a total of 62,374 aliens (61,622 of whom were Mexicans) were recorded in immigration statistics as entering the United States by way of the Mexican border. Hundreds of thousands of aliens and citizens residing on either side of the boundary, mainly in towns contiguous thereto, cross and recross daily or periodically upon social or business errands. Treating each entry of these "crossers" as a separate transaction, and adding thereto all other transactions, the total volume of entrants is estimated to have been approximately 27,000,000 for the past year. As on the Canadian border, the examinations of these regular "crossers" is greatly facilitated by the use of identification cards.

While Mexican immigrants generally give one of the several border States as their destination, a large proportion of these newcomers eventually find their way into the interior of the country, where their labor is in demand by industries and agricultural interests. In short, the border States are to a very large extent mere stepping-stones. The vacancies thus created are being continually filled by newcomers. The drop in Mexican immigration during the past year was contrary to all expectations. A substantial increase had been confidently expected. Various causes contributed to the decrease. Agricultural prosperity along the west coast of Mexico, with its resultant demand for labor at good wages, kept many Mexicans at home in that region. The lumber industry in the northwestern part of the United States is

reported to have released a great many workers. These in turn were absorbed by other industries and by agriculture to such an extent that the demand for Mexican labor was substantially curtailed. The sugar-beet sections of the North and Northwest are reported to have curtailed largely their acreage, with resultant lessening of the demand for Mexican labor. The usual seasonal demand for labor on the part of railroads in the Southwest did not materialize. At El Paso, notably, many immigrants, upon arriving at the border and learning the true conditions of affairs, returned to their homes in the interior. Many of them had to be assisted by the Mexican Government. In view of these adverse conditions the curtailment of Mexican immigration was, as hereinabove indicated, surprisingly small.

Immigration from Canada

IMMIGRATION from Canada has decreased from year to year since the present quota law became effective July 1, 1924, requiring visas of all immigrants seeking admission to the United States. In 1925 immigration through Canadian border land ports was 102,496; in 1926, 91,786; in 1927, 81,982; and in 1928, 73,605. The successive decreases were 98,338, 10,710, 9,804, and 8,377, a total drop in immigration during the four years of 127,229. In 1924, the peak year of immigration from Canada, 200,834 immigrants came in over the northern land border.

During the fiscal year covered by this report 73,154 immigrants, who gave Canada as their last permanent residence, were admitted to the United States, mainly at the land-border stations, comparatively few newcomers from that country entering at our seaports. Of this number 62,229, or 85.1 per cent, were of the English, French, Irish, and Scotch races.

In the same period 72,616, or 98.6 per cent of the 73,605 immigrants coming in via the Canadian border, gave Canada as their last permanent residence; and 99.3 per cent of the immigrants giving Canada as their last permanent residence came in over the northern land border. Therefore it may be stated that, with few exceptions, all the immigrants admitted from Canada came in via the Canadian border, and all the immigrants coming in that way gave Canada as their last permanent residence.

As in the case of the Mexican border, hundreds of thousands of aliens and citizens residing on either side of the boundary, mainly in towns contiguous thereto, cross and recross daily or periodically on social or business errands. Treating each entry of these regular "crossers" as a separate transaction, and adding thereto all other transactions, the total volume of entrants during the past year is estimated at approximately 26,000,000. The examination of these regular "crossers" is greatly facilitated by the use of identification cards.

About one out of every seven immigrants admitted along the Canadian border was a child; 11,009, or 15 per cent of the total for the past year, being under 16 years of age, while 17,045 ranged in age from 16 to 21 years, 21,181 from 22 to 29 years, 10,111 from 30 to 37 years, 5,450 from 38 to 44 years, and 8,809 from 45 to 55 years and over. The male immigrant aliens numbered 39,397, and the female 34,208; the single males, 25,283; single females, 20,069;

married males, 13,309; married females, 12,196; widowers, 740; widows, 1,813; male divorced, 65, and female divorced, 130. Among these immigrants 18,730 gave skilled occupations, 6,510 were common laborers, 2,838 were farm laborers, 4,127 servants, 3,181 farmers, and 5,072 were of the mercantile and miscellaneous classes. The number listed as having no occupation, largely women and children, was 29,263. Only 3,884 gave a professional occupation.

About four-fifths of the newcomers entering from Canada settled in States along the border. Michigan received the largest number, 18,294; New York State, 14,096; Massachusetts, 10,830; Washington, 3,716; Maine, 3,453; Connecticut, 1,637; New Hampshire, 1,371; Vermont, 1,415; Minnesota, 969; and North Dakota, 379.

About four-fifths of the immigrant aliens admitted at Canadian border-land stations during the fiscal year ended June 30, 1928, were born in Canada. The major portion of the remainder were found to be natives of European countries, principally Great Britain and Ireland.

Chinese Immigration

THE NUMBER of Chinese admitted during the fiscal year 1927-28 was 7,996, of which number 931 were immigrants and 7,065 were nonimmigrants. Of this latter number 4,653 were passing in transit through the United States and 398 were entering as temporary visitors. In the previous fiscal year 8,305 were admitted, 1,051 being immigrants and 7,254 being nonimmigrants. It will be seen therefore that the number of Chinese aliens who came to the United States during the past year was slightly lower than during the preceding year. Chinese numbering 9,357 departed during the past year as compared with 9,881 the previous year. During the fiscal year 1928 the departures of Chinese exceeded the arrivals by 1,361, as compared with 1,576 more departures than arrivals for the fiscal year 1927. Statistics show that in recent years the number of Chinese coming to the United States is decreasing. During 1928, 462 aliens of the Chinese race were refused admission as compared with 598 refusals for the year before.

The act of 1924 operates in such a manner that the coming of Chinese aliens, except for temporary stay or more extended but not permanent residence, is practically a thing of the past.

The main problem in connection with Chinese immigration has to do, not with alien Chinese, but with Chinese who claim American citizenship. While a considerable number of alleged citizens claiming birth in the United States apply for readmission, for the most part citizen applicants are those who claim to be citizens by reason of the birth of their alleged fathers in this country. During the fiscal year 1928 there applied for admission 3,276 Chinese who claimed citizenship as against 3,176 of this class who applied for admission during the fiscal year 1927. It has become increasingly difficult to combat successfully the fraudulent claims which are constantly presented by such applicants by reason of the attitude assumed by both the district and appellate courts in some jurisdictions when after rejection the applicants apply for writs of habeas corpus. On the theory that the disagreements in such testimony are on matters not in direct issue—that is, on home life and association rather than in direct statements of relationship—these courts have held there is no substan-

tial reason for denying the claimed relationship, and have in a number of cases pronounced the hearing unfair and discharged the petitioners. The question of whether the courts have the right to assume their present attitude in view of the decision of the Supreme Court in the case of *Chin Yow v. United States* (208 U. S. 8) has not been presented to the Supreme Court but no doubt in the near future a test case will be brought before that body.

Chinese immigration within the past few years has reached the stage in point of time when the grandchildren of Chinese who were born in the United States are applying for admission in considerable numbers. The department took the position that the son of the son of a person born in the United States was not a citizen thereof if at the time of the birth of such grandson of a native-born citizen his father had never resided in the United States. The matter was carried to the Supreme Court in the case of *Chin Yow v. United States*, and a few days before the beginning of the fiscal year 1928 the Supreme Court upheld the department's position and held that such persons were not citizens. The effect of this decision is to prevent the immigration of a vast army of Chinese who otherwise would have been eligible for admission regardless of any law governing the admission of aliens.

Aliens Ineligible to Citizenship

ALIENS ineligible to citizenship entering the country during the fiscal year 1927-28 numbered 15,983. Of the total number admitted, 7,996 were Chinese, 193 East Indians, 7,712 Japanese, 70 Koreans, and 12 Pacific Islanders; 837 entered as Government officials, their families, attendants, servants, and employees; 1,909 as visitors for business or pleasure; 6,732 as returning residents; 424 as students; and 85 as ministers or professors and their wives and children; 5,132 as transits; and 864 to carry on trade under existing treaties.

Immigration and Emigration, by Months

TABLE 1 shows the inward and outward passenger movement for the fiscal year ended June 30, 1928, and also for the last six months of 1928.

In considering this and later tables it is important to note the distinction between the terms "immigrant" and "nonimmigrant" and similarly between "emigrant" and "nonemigrant." In general the term immigrant refers to persons who come to the United States with the declared intention of staying here a year or more. When such persons later leave the United States without having become naturalized citizens they are classed as "emigrant" aliens departed. The terms "nonimmigrant" and "nonemigrant" refer to persons who come to the United States for business, education, or other purposes, but who do not intend becoming permanent residents. Practically all discussion of immigration as a "problem" and of restrictive legislation on the subject, is concerned with the "immigrant" alien. (See former handbook (Bul. No. 439), p. 199.)

TABLE 1.—INWARD AND OUTWARD PASSENGER MOVEMENT FROM JULY 1, 1927, TO DECEMBER 31, 1928

Period	Inward				Aliens de- barred from enter- ing ¹	Outward					Aliens de- ported after land- ing ¹	
	Aliens admitted			United States citiz- ens ar- rived		Total	Aliens departed			United States citiz- ens de- parted		Total
	Imm- igrant	Non- imm- igrant	Total				Emi- grant	Non- emi- grant	Total			
1927												
July.....	23,420	15,973	39,393	29,935	69,328	2,002	9,230	18,509	27,739	65,686	93,425	700
August.....	28,418	19,011	47,429	57,701	105,130	1,574	6,322	17,014	23,336	43,039	66,375	1,346
September.....	31,000	25,619	56,619	75,557	132,176	1,600	7,625	16,885	24,510	39,748	64,258	901
October.....	31,719	21,578	53,297	50,254	103,551	1,567	6,402	16,424	22,826	24,396	47,222	932
November.....	27,758	13,841	41,599	24,325	65,924	1,723	5,871	16,886	22,757	22,612	45,369	1,030
December.....	22,350	10,452	32,802	18,922	51,724	1,679	9,085	21,418	30,503	25,209	55,712	999
1928												
January.....	18,146	8,579	26,725	19,909	46,634	1,348	5,323	15,632	20,955	27,126	48,081	808
February.....	20,888	10,393	31,281	31,941	63,222	1,390	4,708	10,070	14,778	34,810	49,588	933
March.....	26,270	14,348	40,618	34,217	74,835	1,569	4,931	12,242	17,173	29,422	46,595	950
April.....	30,709	17,982	48,691	32,586	81,277	1,346	4,515	12,553	17,068	29,506	46,574	951
May.....	26,158	17,814	43,972	28,407	72,379	1,601	6,240	19,272	25,512	34,993	60,505	766
June.....	20,419	17,786	38,205	27,201	65,406	1,440	7,205	19,994	27,199	53,028	80,227	1,309
Total, fiscal year 1927- 28.....	307,255	193,376	500,631	430,955	931,586	18,839	77,457	196,899	274,356	429,575	703,931	11,625
1928												
July.....	20,682	15,976	36,658	32,974	69,632	1,286	7,804	20,249	28,053	68,463	96,516	768
August.....	24,629	18,620	43,249	63,191	106,440	1,412	6,488	15,960	22,448	50,323	72,771	1,180
September.....	29,317	26,397	55,714	80,233	135,947	1,364	8,093	17,231	25,324	42,105	67,429	915
October.....	29,917	24,797	54,714	49,831	104,545	1,798	7,479	16,693	24,172	34,643	58,815	807
November.....	24,805	14,480	39,285	23,198	62,483	1,694	6,549	14,611	21,160	22,380	43,540	927
December.....	18,357	10,213	28,570	16,911	47,481	1,551	8,264	20,002	28,266	25,173	53,439	1,054
Total.....	147,707	110,483	258,190	268,338	526,528	9,105	44,677	104,746	149,423	243,087	392,510	5,651

¹ These aliens are not included among arrivals, as they were not permitted to enter the United States.² These aliens are included among aliens departed, they having entered the United States, legally or illegally, and later being deported.

Country of Birth, Race, Sex, and Age of Immigrants and Emigrants, 1928

TABLE 2 gives the net increase or decrease of population by admission and departure of aliens, for the fiscal year 1927-28 according to country of last residence in the case of immigrants and of future residence in the case of emigrants. Table 3 gives similar information, by race or people, sex, and age periods.

TABLE 2.—NET INCREASE OR DECREASE OF POPULATION, BY ADMISSION AND DEPARTURE OF ALIENS, FISCAL YEARS ENDED JUNE 30, 1928, BY COUNTRIES

Country of last or intended future permanent residence ¹	Aliens admitted			Aliens departed			Increase (+) or decrease (-)
	Immigrant	Nonimmigrant	Total	Emigrant	Nonemigrant	Total	
Albania.....	263	7	270	90	8	98	+172
Austria.....	1,277	565	1,842	580	403	983	+859
Belgium.....	698	673	1,371	485	529	1,014	+357
Bulgaria.....	158	46	204	110	41	151	+53
Czechoslovakia.....	3,571	428	3,999	2,070	501	2,571	+1,428
Danzig, Free City of.....	224	12	236	1	25	26	+210
Denmark.....	2,473	803	3,276	540	621	1,161	+2,115
Estonia.....	136	32	168	11	13	24	+144
Finland.....	473	230	703	585	402	987	-284
France, including Corsica.....	4,438	4,066	8,504	2,030	3,493	5,523	+3,011
Germany.....	45,778	6,488	52,266	6,645	5,692	12,337	+39,929
Great Britain and Northern Ireland:							
England.....	7,338	15,681	23,019	6,039	15,208	21,247	+1,772
Northern Ireland.....	724	179	903	185	51	236	+667
Scotland.....	11,085	2,430	13,515	1,498	1,652	3,150	+10,365
Wales.....	1,535	430	1,965	39	72	111	+1,854
Greece.....	2,328	313	2,641	2,461	352	2,813	-172
Hungary.....	857	832	1,689	920	577	1,497	+192
Irish Free State.....	24,544	738	25,282	1,115	1,062	2,177	+23,105
Italy, including Sicily and Sardinia.....	17,728	2,703	20,431	17,324	2,689	20,013	+418
Latvia.....	258	74	332	55	24	79	+253
Lithuania.....	531	63	594	319	47	366	+228
Luxemburg.....	106	13	119	18	19	37	+82
Netherlands.....	1,843	1,121	2,964	514	1,186	1,700	+1,264
Norway.....	5,660	1,562	7,222	1,686	965	2,651	+4,571
Poland.....	8,755	450	9,205	3,071	350	3,421	+5,784
Portugal, including Azores, Cape Verde, and Madeira Islands.....	584	149	733	1,358	524	1,882	-1,149
Rumania.....	1,376	220	1,596	1,002	223	1,225	+371
Russia.....	1,254	312	1,566	426	260	686	+880
Spain, including Canary and Balearic Islands.....	455	806	1,261	1,933	912	2,895	-1,634
Sweden.....	8,051	884	8,935	1,282	1,019	2,301	+6,634
Switzerland.....	1,904	946	2,850	726	700	1,426	+1,514
Turkey in Europe.....	242	82	324	38	20	58	+266
Yugoslavia.....	1,385	74	1,460	1,941	190	2,131	-671
Other Europe ²	300	35	425	38	19	57	+368
Total, Europe.....	158,513	43,477	201,990	57,185	39,849	97,034	+104,956
Armenia.....	21	3	24	18	3	21	+3
China.....	1,320	3,458	4,778	4,364	3,384	7,748	-2,970
India.....	102	450	552	156	209	365	+187
Japan.....	550	2,425	2,975	1,085	2,009	3,094	-119
Palestine.....	554	152	706	77	97	174	+532
Persia.....	50	12	62	23	14	37	+25
Syria.....	504	89	593	245	85	330	+263
Turkey in Asia.....	59	17	76	61	23	84	-8
Other Asia ³	220	180	400	44	93	137	+263
Total, Asia.....	3,380	6,780	10,166	6,073	5,917	11,990	-1,824
Canada.....	73,154	14,346	87,500	2,529	29,426	31,955	+55,545
Newfoundland.....	2,127	569	2,696	532	688	1,220	+1,476
Mexico.....	59,016	5,490	64,506	3,957	7,660	11,617	+52,889
Cuba.....	3,012	9,404	12,416	1,953	9,911	11,864	+552
Other West Indies.....	1,046	5,334	6,380	2,291	5,111	7,402	-1,022
British Honduras.....	31	135	166	19	124	143	+23
Other Central America.....	1,720	2,490	4,210	739	2,281	3,020	+1,190
Brazil.....	1,213	604	1,817	139	226	365	+1,452
Other South America.....	2,953	3,615	6,568	1,461	3,600	5,061	+1,507
United States ⁴		95,338	95,338		87,353	87,353	+7,985
Other America ⁵	9	10	19		11	11	+8
Total, America.....	144,281	137,335	281,616	13,620	146,391	160,011	+121,605
Egypt.....	215	142	357	19	87	86	+271
Other Africa.....	260	596	856	122	306	428	+428
Australia and appertaining islands.....	385	3,675	4,060	325	3,218	3,543	+517
New Zealand and appertaining islands.....	103	1,191	1,294	100	1,022	1,122	+262
Other Pacific islands ⁶	28	174	202	13	129	142	+60
Total, all countries.....	307,255	193,376	500,631	77,457	196,899	274,356	+226,275

¹ Residence of a year or more is regarded as permanent residence.² Comprises Andorra, Gibraltar, Iceland, Liechtenstein, Malta, Monaco, and San Marino.³ Includes Afghanistan, Arabia, Bhutan, Iraq (Mesopotamia), Muscat, Nepal, Siam, Siberia, and "Asia, not specified."⁴ "United States" under nonimmigrants covers aliens returning to this country to resume residence therein after a temporary stay abroad; and under nonemigrants covers aliens departing for a visit abroad with the intention of returning within 1 year to renew permanent residence in this country.⁵ Comprises Greenland and the islands of St. Pierre and Miquelon.⁶ Comprises Nauru, New Guinea, Samoa, Yap, and "Pacific islands, not specified."

TABLE 3.—NET INCREASE OR DECREASE OF POPULATION BY ADMISSION AND DEPARTURE OF ALIENS, FISCAL YEAR ENDED JUNE 30, 1928, BY RACE OR PEOPLE, SEX, AND AGE PERIODS

Race or people	Aliens admitted			Aliens departed			Increase (+) or decrease (—)
	Immigrant	Nonimmigrant	Total	Emigrant	Nonemigrant	Total	
African (black).....	956	2,698	3,654	789	1,556	2,345	+1,309
Armenian.....	1,062	253	1,315	47	107	154	+1,161
Bohemian and Moravian (Czech).....	1,248	1,109	2,357	1,327	1,884	3,211	—854
Bulgarian, Serbian, and Montenegrin.....	531	664	1,195	1,396	832	2,228	—1,033
Chinese.....	931	7,065	7,996	4,300	5,057	9,357	—1,361
Croatian and Slovenian.....	938	909	1,847	534	441	975	+872
Cuban.....	2,058	6,533	8,591	1,282	7,006	8,288	+303
Dalmatian, Bosnian, and Herzegovinian.....	95	180	275	361	764	1,125	—850
Dutch and Flemish.....	2,880	3,723	6,603	1,684	3,896	4,980	+1,623
East Indian.....	38	155	193	106	107	213	—20
English.....	33,597	41,500	75,097	8,780	49,660	58,440	+16,657
Finnish.....	544	1,350	1,894	647	2,113	2,760	—866
French.....	17,963	8,380	26,343	1,915	8,615	10,530	+15,813
German.....	54,157	22,188	76,345	8,086	20,272	28,358	+47,987
Greek.....	2,848	2,919	5,767	2,525	1,829	4,354	+1,413
Hebrew.....	11,639	3,737	15,376	253	1,698	1,951	+13,425
Irish.....	38,193	7,107	45,300	1,649	7,476	9,125	+36,175
Italian (north).....	2,653	5,160	7,813	1,626	3,158	4,784	+3,029
Italian (south).....	16,087	17,588	33,675	15,834	14,600	30,434	+3,241
Japanese.....	522	7,190	7,712	1,055	9,614	10,669	—2,957
Korean.....	22	48	70	39	64	103	—33
Lithuanian.....	326	341	667	351	403	754	—87
Magyar.....	1,112	2,051	3,163	1,024	1,521	2,545	+618
Mexican.....	57,765	3,857	61,622	3,873	9,198	13,071	+48,551
Pacific Islander.....	2	10	12	3	9	12	—
Polish.....	4,238	2,308	6,546	3,046	2,762	5,808	+738
Portuguese.....	844	2,398	3,242	1,430	1,977	3,407	—165
Rumanian.....	443	562	1,005	908	928	1,836	—831
Russian.....	1,249	1,265	2,514	642	1,121	1,763	+751
Ruthenian (Russniak).....	411	91	502	59	90	149	+353
Scandinavian (Norwegians, Danes, and Swedes).....	18,664	11,359	30,023	3,767	12,170	15,937	+14,086
Scotch.....	23,177	11,513	34,690	2,268	10,053	12,321	+22,369
Slovak.....	2,197	1,294	3,491	746	711	1,457	+2,034
Spanish.....	1,018	6,635	7,653	2,578	6,385	8,963	—1,310
Spanish American.....	3,490	4,691	8,181	1,720	4,854	6,574	+1,607
Syrian.....	613	660	1,273	232	457	689	+584
Turkish.....	143	186	329	116	135	251	+78
Welsh.....	1,723	942	2,665	85	518	603	+2,062
West Indian (except Cuban).....	394	2,104	2,498	785	2,132	2,917	—419
Other peoples.....	484	653	1,137	189	726	915	+222
Total.....	307,255	193,376	500,631	77,457	196,899	274,356	+226,275
SEX							
Male.....	165,977	115,973	281,950	54,786	118,678	173,464	+108,486
Female.....	141,278	77,403	218,681	22,671	78,221	100,892	+117,789
AGE							
Under 16 years.....	49,680	10,172	59,852	3,500	10,201	13,701	+46,151
16 to 21 years.....	73,092	10,508	83,600	3,176	10,835	14,011	+69,589
22 to 29 years.....	95,727	44,453	140,180	16,977	45,308	62,285	+77,895
30 to 37 years.....	42,642	47,735	90,377	20,841	48,685	69,526	+20,851
38 to 44 years.....	19,371	32,301	51,672	15,124	33,552	48,676	+2,996
45 years and over.....	26,743	48,207	74,950	17,839	48,318	66,157	+8,793

Occupations of Immigrants and Emigrants, 1928

TABLE 4 gives in detail the occupations of aliens admitted and departed in the fiscal year 1927-28:

TABLE 4.—OCCUPATIONS OF ALIENS ADMITTED AND DEPARTED, FISCAL YEAR ENDED JUNE 30, 1928, BY CLASSES

Occupation	Admitted			Departed		
	Immi- grant	Nonim- migrant	Total	Emi- grant	Nonem- igrant	Total
Actors.....	196	1,337.	1,533	280	1,265	1,545
Architects.....	237	560	797	75	444	519
Clergy.....	1,130	1,977	3,107	376	1,483	1,859
Editors.....	30	185	215	14	157	171
Electricians.....	1,327	398	1,725	160	411	571
Engineers (professional).....	1,655	3,671	5,326	668	3,201	3,869
Lawyers.....	131	1,014	1,145	80	779	859
Literary and scientific persons.....	346	1,444	1,790	159	913	1,072
Musicians.....	627	976	1,603	177	868	1,045
Officials (Government).....	478	3,262	3,740	245	2,173	2,418
Physicians.....	454	1,340	1,794	207	1,454	1,661
Sculptors and artists.....	132	712	844	76	358	434
Teachers.....	2,391	3,228	5,619	564	2,829	3,393
Other professional.....	1,797	1,881	3,678	563	2,051	2,614
Total professional.....	10,931	21,985	32,916	3,644	18,386	22,030
Bakers.....	1,489	724	2,213	292	682	974
Barbers and hairdressers.....	1,128	711	1,839	249	559	808
Blacksmiths.....	839	258	1,097	86	242	328
Bookbinders.....	75	24	99	10	20	30
Brewers.....	10	10	20	1	10	11
Butchers.....	1,066	402	1,468	181	362	543
Cabinetmakers.....	168	99	267	128	254	382
Carpenters and joiners.....	4,615	2,636	7,251	1,159	2,532	3,691
Cigarette makers.....	11	2	13	6	15	21
Cigar makers.....	146	488	634	321	433	754
Cigar packers.....	23	16	39	6	41	47
Clerks and accountants.....	15,122	7,377	22,499	2,238	8,776	11,014
Dressmakers.....	1,437	692	2,129	219	649	868
Engineers (locomotive, marine, and station- ary).....	810	1,122	1,932	60	571	631
Furriers and fur workers.....	119	162	281	62	175	237
Gardeners.....	735	459	1,194	176	831	1,007
Hat and cap makers.....	75	42	117	3	34	37
Iron and steel workers.....	1,857	597	2,454	326	616	942
Jewelers.....	270	186	456	52	220	272
Locksmiths.....	1,935	248	2,233	13	118	131
Machinists.....	2,032	965	2,997	632	1,414	2,046
Mariners.....	1,093	2,495	3,588	706	1,808	2,514
Masons.....	1,377	1,101	2,478	255	624	879
Mechanics (not specified).....	3,888	1,317	5,205	511	1,374	1,885
Metal workers (other than iron, steel, and tin).....	517	153	670	153	358	511
Millers.....	211	64	275	103	107	210
Milliners.....	318	164	482	23	116	139
Miners.....	1,830	860	2,690	573	986	1,559
Painters and glaziers.....	1,681	808	2,489	232	688	901
Pattern makers.....	80	37	117	14	43	57
Photographers.....	206	120	326	32	101	133
Plasterers.....	249	97	346	74	234	308
Plumbers.....	557	204	761	82	212	294
Printers.....	631	307	938	57	171	228
Saddlers and harness makers.....	163	45	208	3	12	15
Seamstresses.....	1,328	312	1,640	46	153	199
Shoemakers.....	1,190	695	1,885	265	360	615
Stokers.....	264	259	523	11	60	71
Stonecutters.....	108	96	264	28	57	85
Tailors.....	1,695	813	2,508	361	732	1,093
Tanners and curriers.....	82	49	131	9	21	30
Textile workers (not specified).....	195	77	272	16	59	75
Tinners.....	298	53	351	34	69	103
Tobacco workers.....	12	31	43	2	24	26
Upholsterers.....	159	55	214	23	70	93
Watch and clock makers.....	218	93	311	12	44	56
Weavers and spinners.....	689	300	989	182	588	770
Wheelwrights.....	19	5	24	2	4	6
Woodworkers (not specified).....	149	47	195	54	113	167
Other skilled.....	5,649	1,416	7,065	451	1,043	1,494
Total skilled.....	58,928	29,293	88,221	10,524	28,765	39,289

TABLE 4.—OCCUPATIONS OF ALIENS ADMITTED AND DEPARTED, FISCAL YEAR ENDED JUNE 30, 1928, BY CLASSES—Continued

Occupation	Admitted			Departed		
	Immi-grant	Nonim-migrant	Total	Emi-grant	Nonemi-grant	Total
Agents.....	1,222	4,012	5,234	160	2,031	2,191
Bankers.....	107	1,313	1,420	143	1,473	1,616
Draymen, hackmen, and teamsters.....	767	196	963	26	189	215
Farmers.....	8,773	3,881	12,654	1,523	4,261	5,784
Farm laborers.....	24,161	5,407	29,568	241	1,052	1,293
Fishermen.....	951	514	1,465	114	468	582
Hotel keepers.....	93	555	648	169	446	615
Laborers.....	36,218	17,825	54,043	29,396	27,260	56,656
Manufacturers.....	165	1,472	1,637	126	1,317	1,443
Merchants and dealers.....	3,378	18,083	21,461	2,284	17,121	19,405
Servants.....	28,751	15,226	43,977	4,253	12,542	16,795
Other miscellaneous.....	7,718	8,842	16,560	2,798	9,953	12,751
Total miscellaneous.....	112,304	77,326	189,630	41,233	78,113	119,346
No occupation (including women and children).....	125,092	64,772	189,864	22,056	71,635	93,691
All occupations.....	307,255	193,376	500,631	77,457	196,899	274,356

Aliens Admitted under Quota Act of 1924, as amended

UNDER the immigration act of 1924, the total immigration of aliens from quota countries is limited to 164,667 (see former hand-book (Bul. No. 439), p. 204). Table 5 shows the quota allotments by individual countries and also the number admitted from each country in the fiscal year ended June 30, 1928:

TABLE 5.—ALIENS ADMITTED TO THE UNITED STATES UNDER THE IMMIGRATION ACT OF 1924 (AS AMENDED), FISCAL YEAR ENDED JUNE 30, 1928, BY PRINCIPAL CLASS AND BY COUNTRY OR AREA OF BIRTH, AS SPECIFIED

[Quota immigrant aliens are charged to the quota; nonimmigrant and nonquota aliens are not charged to the quota]

Country or area of birth	Annual quota	Admitted			Total
		Quota im-migrant	Nonim-migrant	Nonquota immigrant	
Albania.....	100	108	8	588	704
Andorra.....	100	10	11	15	15
Austria.....	785	849	672	1,113	2,634
Belgium.....	512	558	714	853	2,125
Bulgaria.....	100	88	55	156	299
Czechoslovakia.....	3,073	2,939	636	3,575	7,150
Danzig, Free City of.....	228	211	25	22	258
Denmark.....	2,789	2,557	1,041	1,295	4,893
Estonia.....	124	122	40	64	226
Finland.....	471	485	441	1,255	2,181
France.....	3,954	3,548	3,192	3,256	9,996
Germany.....	51,227	47,576	7,129	10,697	65,402
Great Britain and Northern Ireland:					
England.....		12,102	18,012	9,196	39,310
Northern Ireland.....	34,007	1,998	358	346	2,702
Scotland.....		14,622	4,117	5,744	24,483
Wales.....		1,747	710	490	2,947
Greece.....	100	194	433	3,633	4,260
Hungary.....	473	507	971	1,389	2,867
Iceland.....	100	50	17	14	81
Irish Free State.....	28,567	27,093	1,405	4,157	32,655
Italy.....	3,845	4,020	3,657	31,696	39,373
Latvia.....	142	148	110	147	405
Liechtenstein.....	100	15	2	17	17
Lithuania.....	344	386	165	531	1,082
Luxemburg.....	100	93	29	61	183
Monaco.....	100	9	8	9	26
Netherlands.....	1,648	1,543	1,353	997	3,893
Norway.....	6,453	5,944	1,808	2,442	10,194
Poland.....	5,982	6,129	1,202	6,387	13,718
Portugal.....	503	498	212	2,244	2,954
Rumania.....	603	846	450	1,423	2,719
Russia.....	2,248	2,060	1,379	1,586	5,025
San Marino.....	100	61	6	2	69
Spain.....	131	167	2,840	2,990	5,997
Sweden.....	9,561	8,605	1,145	3,382	13,132
Switzerland.....	2,081	1,874	1,193	1,350	4,417

TABLE 5.—ALIENS ADMITTED TO THE UNITED STATES UNDER THE IMMIGRATION ACT OF 1924 (AS AMENDED), FISCAL YEAR ENDED JUNE 30, 1928, BY PRINCIPAL CLASS AND BY COUNTRY OR AREA OF BIRTH, AS SPECIFIED—Continued.

Country or area of birth	Annual quota	Admitted			
		Quota immigrant	Nonimmigrant	Nonquota immigrant	Total
Turkey in Europe.....	100	83	159	575	817
Yugoslavia.....	671	665	151	2,331	3,147
Other Europe.....	(1)	291	32	124	447
Total Europe.....	161,422	150,795	55,877	106,131	312,803
Afghanistan.....	100	—	5	1	6
Arabia.....	100	35	5	6	46
Armenia.....	124	91	26	87	204
Bhutan.....	100	—	—	—	—
China.....	100	148	5,723	2,159	8,080
India.....	100	103	439	164	706
Iraq (Mesopotamia).....	100	102	20	14	136
Japan.....	100	17	2,801	5,026	7,844
Muscat.....	100	—	1	—	1
Nepal.....	100	—	—	—	—
Palestine.....	100	186	175	185	546
Persia.....	100	100	19	54	173
Siam.....	100	1	12	3	16
Syria.....	100	131	366	474	971
Turkey in Asia.....	(1)	71	129	969	1,169
Other Asia.....	(1)	168	85	73	326
Total Asia.....	1,424	1,153	9,806	9,215	20,174
Cameroon (British).....	100	—	2	1	3
Cameroon (French).....	100	—	3	1	4
Egypt.....	100	108	129	47	284
Ethiopia.....	100	—	3	—	3
Liberia.....	100	9	26	2	37
Morocco.....	100	40	21	12	73
Ruanda and Urundi.....	100	—	—	—	—
South Africa.....	100	116	349	85	560
South West Africa.....	100	—	5	2	7
Tanganyika.....	100	—	1	—	1
Togoland (British).....	100	—	—	1	1
Togoland (French).....	100	—	—	—	—
Other Africa.....	(1)	68	66	40	174
Total Africa.....	1,200	341	605	191	1,137
Australia.....	121	154	3,223	310	3,687
Nauru.....	100	—	—	—	—
New Zealand.....	100	113	948	107	1,168
New Guinea.....	100	—	3	2	5
Samoa.....	100	3	28	7	38
Yap.....	100	—	7	3	10
Other Pacific.....	(1)	11	76	28	115
Total Pacific.....	621	281	4,285	457	5,023
Canada.....	—	—	9,542	56,236	65,778
Newfoundland.....	—	—	573	3,539	4,112
Mexico.....	—	—	3,500	59,149	62,649
Cuba.....	—	—	5,822	3,928	9,750
Dominican Republic.....	—	—	844	400	1,244
Haiti.....	—	—	134	125	259
British West Indies ²	—	522	3,035	2,287	5,844
Dutch West Indies ²	—	5	164	32	201
French West Indies ²	—	34	27	37	98
British Honduras ²	—	27	90	17	134
Canal Zone.....	—	—	35	94	129
Other Central America.....	—	—	1,953	1,735	3,688
Brazil.....	—	—	367	1,061	1,428
British Guiana ²	—	58	133	80	271
Dutch Guiana ²	—	3	10	14	27
French Guiana ²	—	—	3	—	3
Other South America.....	—	—	2,808	3,020	5,828
Greenland ²	—	1	—	—	1
Miquelon and St. Pierre ²	—	11	18	20	49
Total America.....	—	661	29,059	131,774	161,494
All countries.....	164,667	² 153,231	99,632	247,768	500,631

¹Annual quota for colonies, dependencies, or protectorates in other Europe, other Asia, other Africa, other Pacific, and in America, is included with the annual quota for the European country to which they belong. Quota for Turkey in Asia is included with that for Turkey in Europe.

²Also includes aliens to whom visas were issued during the latter part of the fiscal year ended June 30, 1927, and charged to the quota for that year. Nationality for quota purposes does not always coincide with actual nationality. (See sec. 12 of the immigration act of 1924.)

Immigration Legislation

National Origin Act

SECTION 11 (a) of the immigration act of 1924, known as the quota act, provides that the annual quota of any nationality shall be 2 per cent of the number of foreign-born individuals of such nationality resident in continental United States as determined by the United States census of 1890, but the minimum quota of any nationality shall be 100.

In the same section of the same act, paragraph b, there is a provision that the annual quota of any nationality for the fiscal year beginning July 1, 1927, and for each fiscal year thereafter, shall be a number which bears the same ratio to 150,000 as the number of inhabitants in continental United States in 1920 having that national origin (ascertained as provided for in the section) bears to the number of inhabitants in continental United States in 1920; but the minimum quota of any nationality shall be 100. This is known as the national-origin plan. It did not go into effect on July 1, 1927. The operative date of this plan was postponed to July 1, 1929. (See 45 Stat. 400.)

Other Recent Legislation

DURING the fiscal year 1926-27 no new immigration legislation of any particular importance was passed and the Bureau of Immigration continued to administer the selective immigration act (partial) of February 5, 1917, and the numerical restrictive act, known as the immigration act of 1924, frequently referred to as the quota act of 1924. The 1917 act provides for the exclusion and deportation from the United States of certain classes of undesirable aliens, including physically and mentally disabled persons, anarchists, criminals, immoral persons, and the like, and the 1924 act limits the number of aliens of each nationality that may annually be admitted to the United States.

During the fiscal year 1927-28 three laws were passed having an important bearing on immigration, which laws, of course, are enforced in addition to all other immigration laws, principally the immigration act of February 5, 1917, frequently referred to as the general immigration law, and the immigration act of May 26, 1924, as amended, referred to as the quota or numerical restrictive act.

On March 31, 1928, an act was passed postponing the adoption of the national-origins quota plan until 1929 and keeping in effect the present quota plan which is based on 2 per cent of the number of foreign-born individuals of each nationality resident in continental United States as determined by the United States census of 1890, but placing a minimum quota of 100 for any nationality.

On April 2, 1928, an act was passed to the effect that the provision of law in the immigration act of May 26, 1924, excluding, with certain exceptions, aliens ineligible to citizenship, should have no application to the right of American Indians born in Canada to cross the borders of the United States. This act does not extend to persons whose membership in Indian tribes or families was created by adoption.

On May 29, 1928, an act was passed changing, to some degree, the nonquota classes and the preference class under the quota as specified

in the act of 1924. The purpose of this act is to enable, as far as possible, foreign resident members of families of United States citizens to be reunited; also to shorten the time within which foreign resident members of families of aliens lawfully admitted to the United States for permanent residence will have to wait before they may secure quota visas. In other words, the purpose of this legislation was to unite, with the least possible delay, families of citizens and aliens lawfully resident in the United States. As an example of the way in which this policy is to work out, the act of May 29, 1928, increased from 18 to 21 the age of unmarried children of citizens of the United States who may secure nonquota visas because of relationship; permitted the husband of a citizen of the United States by marriage occurring prior to June 1, 1928, to come as a nonquota immigrant; and made a nonquota immigrant of a woman who was a citizen of the United States and who prior to September 22, 1922, lost her citizenship by reason of her marriage to an alien, but who at the time of filing her application for an immigration visa, is unmarried. As to the classes of aliens who are entitled to preference in securing immigration quota visas, the act provided that wives and unmarried children under 21 years of age of alien residents of the United States who have been lawfully admitted for permanent residence, may secure preference under the quota in applying for immigration visas. It likewise increased from 16 to 18 years the age of dependent children of skilled agriculturists who are entitled to preference.

A redraft of the quota act is favored. Some of the desired amendments have already been embodied in Senate bill 3019 of the last Congress, among them—

1. The provision fixing an exact number of immigrants who may enter the United States annually from all sources, instead of from certain countries only, as under our present system.
2. The provision under which a considerable part of our immigration could be selected with a view to meeting the needs of agriculture, industry, and other activities in the United States.

Other proposed provisions indorsed by the Secretary of Labor in his 1928 report include immigration visas to families as units and a nonquota status for "the unmarried child under 18 years of age, or the wife of an alien who was legally admitted to the United States for permanent residence prior to July 1, 1924, and who has continued to reside therein."

The Secretary also holds that "the protection of our labor will not be complete until quota restrictions in some form are applied to the countries of the Western Hemisphere." (For discussion of proposed immigration legislation, see annual report of Secretary of Labor for fiscal year ended June 30, 1928.)

Immigration into United States, 1820 to 1928

RECORDS of immigration into the United States began with the year 1820. Table 1 shows the immigration by periods, from 1820 to 1928, and by certain important geographical divisions and countries. Over the whole period of 109 years the total immigration was 37,240,634, of which over 18,000,000 came from northern and

western Europe. The great influx from southern and eastern Europe came in the years 1901 and 1921, since which time the immigration from southern and eastern Europe has been greatly reduced.

Table 1, just referred to, deals solely with immigration. Corresponding data for emigration and net increase of population is not available for years earlier than 1908. Table 2 gives this information, by years, from 1908 to 1928.

TABLE 1.—IMMIGRATION TO THE UNITED STATES FROM NORTHERN AND WESTERN EUROPE, SOUTHERN AND EASTERN EUROPE, ASIA, CANADA, AND NEWFOUNDLAND, MEXICO, WEST INDIES, AND OTHER COUNTRIES, BY SPECIFIED PERIODS¹

Period or year	Total number of immigrants	Number from—							
		Europe			Asia	Canada and Newfoundland ¹	Mexico	West Indies	Other countries ²
		Northern and western ³	Southern and eastern ³	Total					
1820-1830	151,824	103,119	3,389	106,508	15	2,486	4,818	3,998	33,999
1831-1840	599,125	489,739	5,949	495,688	48	13,624	6,399	12,301	70,865
1841-1850	1,713,251	1,592,062	5,439	1,597,501	82	41,723	3,271	13,528	57,146
1851-1860	2,598,214	2,431,336	21,324	2,452,660	41,455	59,309	3,078	10,660	31,052
1861-1870	2,314,824	2,031,642	33,628	2,065,270	64,630	153,878	2,191	9,046	19,809
1871-1880	2,812,191	2,070,373	201,889	2,272,262	123,823	383,640	5,162	13,957	13,347
1881-1890	5,246,613	3,778,633	958,413	4,737,046	68,380	393,304	1,913	29,042	16,928
1891-1900	3,687,564	1,643,492	1,915,486	3,558,978	71,236	3,311	971	33,066	20,002
1901-1910	8,795,386	1,910,035	6,225,981	8,136,016	243,567	179,226	49,642	107,548	79,387
1911-1920	5,735,811	997,438	3,379,126	4,376,564	192,559	742,185	219,004	123,424	82,075
1921-1928	3,585,831	1,072,436	1,099,381	2,171,817	89,107	792,810	406,430	65,368	60,239
1911	878,587	202,391	562,366	764,757	17,428	56,830	19,889	13,403	6,280
1912	858,172	161,290	557,585	718,875	21,449	55,990	23,238	12,467	6,153
1913	1,197,892	132,886	872,969	1,055,855	35,358	73,502	11,926	12,458	8,493
1914	1,218,480	164,133	894,258	1,058,391	34,273	86,139	14,614	14,451	10,612
1915	326,700	79,200	118,710	197,919	15,211	82,215	12,340	11,598	7,417
Total	4,459,831	789,900	3,005,897	3,795,797	123,719	354,976	82,007	61,377	38,955
1916	298,826	51,055	94,644	145,699	13,204	101,551	18,425	12,027	7,920
1917	295,403	38,500	94,583	133,083	12,756	105,399	17,899	15,507	10,789
1918	110,618	12,946	18,117	21,063	12,701	32,452	18,524	8,879	6,909
1919	141,132	18,039	6,588	24,627	12,674	57,782	29,818	8,826	7,406
1920	430,001	86,998	159,297	246,295	17,505	90,025	52,361	13,808	10,007
Total	1,275,980	207,538	373,229	580,767	68,840	387,209	136,997	59,047	43,120
1921	805,228	138,551	513,813	652,364	25,034	72,317	30,758	13,774	10,981
1922	309,556	79,437	136,948	216,385	14,263	46,810	19,551	7,449	5,098
1923	522,919	156,429	151,491	307,920	13,705	117,011	63,768	13,181	7,334
1924	706,896	203,346	160,993	364,339	22,065	200,690	89,336	17,559	12,907
1925	294,314	125,248	23,118	148,366	3,578	102,753	32,964	2,106	4,547
Total	2,638,913	703,011	986,363	1,689,374	78,645	539,581	236,377	54,069	40,867
1926	304,488	126,437	29,125	155,562	3,413	93,368	43,316	3,222	5,607
1927	335,175	126,721	41,647	168,368	3,669	84,580	67,721	4,019	6,818
1928	307,255	116,267	42,246	158,513	3,380	75,281	59,016	4,058	7,007
Grand total	37,240,634	18,120,305	13,850,005	31,970,310	894,902	2,765,496	703,079	421,938	484,909

¹ No official records were made of the influx of foreign population to this country prior to 1820. Although the number of immigrants arrived in the United States from the close of the Revolutionary War up to 1820 is not accurately known, it is estimated by good authorities at 250,000. For 1820 to 1867 the figures are for alien passengers arriving; for 1868 to 1903, for immigrants arriving; for 1904 to 1906, for aliens admitted; and for 1907 to 1928, for immigrant aliens admitted. The years from 1820 to 1831 and 1844 to 1849, inclusive, are those ending September 30; from 1833 to 1843 and 1851 to 1867 those ending December 31; and 1869 to 1927 those ending June 30. The other periods cover 15 months ending December 31, 1832; 9 months ending December 31, 1843; 15 months ending December 31, 1850; and 6 months ending June 30, 1868.

² Northern and western Europe comprises Belgium, Denmark, France, Germany, Luxembourg (in 1925, 1926, 1927, and 1928), Netherlands, Norway, Sweden, Switzerland, and England, Ireland, Scotland, Wales, United Kingdom not specified. Southern and eastern Europe comprises the other countries on that continent.

³ From 1820 to 1898 includes all British North American possessions.

⁴ Includes Central and South America, Africa, Australia, Pacific islands, and countries not specified.

TABLE 1.—IMMIGRATION TO THE UNITED STATES FROM NORTHERN AND WESTERN EUROPE, SOUTHERN AND EASTERN EUROPE, ASIA, CANADA, AND NEWFOUNDLAND, MEXICO, WEST INDIES, AND OTHER COUNTRIES, BY SPECIFIED PERIODS—Continued

Period of year	Per cent from—							
	Europe			Asia	Canada and New-found-land	Mexico	West Indies	Other countries
	North-ern and western	South-ern and eastern	Total					
1820-1830	68.0	2.2	70.2	-----	1.6	3.2	2.6	22.4
1831-1840	81.8	1.0	82.8	-----	2.2	1.1	2.1	11.8
1841-1850	93.0	.3	93.3	-----	2.4	.2	.8	3.3
1851-1860	93.6	.8	94.4	1.6	2.3	.1	.4	1.2
1861-1870	87.8	1.4	89.2	2.8	6.6	.1	.4	.9
1871-1880	73.6	7.2	80.8	4.4	13.6	.2	.5	.5
1881-1890	72.0	18.3	90.3	1.3	7.5	-----	.6	.3
1891-1900	44.6	51.9	96.5	1.9	.1	-----	.9	.6
1901-1910	21.7	70.8	92.5	2.8	2.0	.6	1.2	.9
1911-1920	17.4	58.9	76.3	3.4	12.9	3.8	2.2	1.4
1921-1928	29.9	30.7	60.6	2.5	22.1	11.3	1.8	1.7
1911	26.0	64.0	87.0	2.0	6.5	2.3	1.5	.7
1912	19.2	66.5	85.7	2.6	6.7	2.8	1.5	.7
1913	15.3	72.9	88.2	3.0	6.1	1.0	1.0	.7
1914	13.4	73.4	86.8	2.8	7.1	1.2	1.2	.9
1915	24.2	36.3	60.5	4.7	25.2	3.8	3.5	2.3
Total	17.7	67.4	85.1	2.8	8.0	1.8	1.4	.9
1916	17.1	31.7	48.8	4.4	33.9	6.2	4.0	2.7
1917	13.0	32.0	45.0	4.3	35.7	6.0	5.3	3.7
1918	11.7	16.4	28.1	11.5	29.3	16.8	8.0	6.3
1919	12.8	4.7	17.5	9.0	40.9	21.1	6.3	5.2
1920	20.2	37.1	57.3	4.1	20.9	12.2	3.2	2.3
Total	16.3	29.3	45.6	5.4	30.3	10.7	4.6	3.4
1921	17.2	63.8	81.0	3.1	9.0	3.8	1.7	1.4
1922	25.7	44.2	69.9	4.6	15.1	6.3	2.4	1.7
1923	29.9	29.0	58.9	2.6	22.4	12.2	2.5	1.4
1924	28.8	22.8	51.6	3.1	28.4	12.6	2.5	1.8
1925	42.6	7.9	50.5	1.2	34.9	11.2	.7	1.5
Total	26.6	37.4	64.0	3.0	20.5	8.9	2.1	1.5
1926	41.5	9.6	51.1	1.1	30.7	14.2	1.1	1.8
1927	37.8	12.4	50.2	1.1	25.3	20.2	1.2	2.0
1928	37.9	13.7	51.6	1.1	24.5	19.2	1.3	2.3
Grand total	48.7	37.2	85.9	2.4	7.4	1.9	1.1	1.3

TABLE 2.—NET INCREASE OF POPULATION, BY ADMISSION AND DEPARTURE OF ALIENS, FISCAL YEARS ENDED JUNE 30, 1908 TO 1928

Period or year	Admitted			Departed			Increase
	Immigrant	Nonim- migrant	Total	Emigrant	Nonem- igrant	Total	
1908.....	782,870	141,825	924,695	395,073	319,755	714,828	209,867
1909.....	751,786	192,449	944,235	225,802	174,580	400,382	543,843
1910.....	1,041,570	156,467	1,198,037	202,436	177,982	380,418	817,619
1911.....	878,587	151,713	1,030,300	295,666	222,549	518,215	512,085
1912.....	838,172	178,983	1,017,155	333,262	282,030	615,292	401,863
1913.....	1,197,892	229,335	1,427,227	308,190	303,734	611,924	815,306
1914.....	1,218,480	184,601	1,403,081	303,338	330,467	633,805	769,273
1915.....	326,700	107,544	434,244	204,074	180,100	384,174	50,070
1916.....	298,826	67,922	366,748	129,765	111,042	240,807	125,941
1917.....	295,403	67,474	362,877	66,277	80,102	146,379	216,498
1918.....	110,618	101,235	211,853	94,585	98,683	193,268	18,585
1919.....	141,132	95,889	237,021	123,522	92,709	216,231	20,790
1920.....	430,001	191,575	621,576	288,315	139,747	428,062	193,514
Total, 1911-1920.....	5,735,811	1,376,271	7,112,082	2,146,994	1,841,163	3,988,157	3,123,925

TABLE 2.—NET INCREASE OF POPULATION, BY ADMISSION AND DEPARTURE OF ALIENS, FISCAL YEARS ENDED JUNE 30, 1908 TO 1928—Continued

Period or year	Admitted			Departed			Increase
	Immigrant	Nonimmigrant	Total	Emigrant	Nonemigrant	Total	
1921.....	805, 228	172, 935	978, 163	247, 718	178, 313	426, 031	552, 132
1922.....	309, 556	122, 949	432, 505	198, 712	146, 672	345, 384	87, 121
1923.....	522, 919	150, 487	673, 406	81, 450	119, 136	200, 586	472, 820
1924.....	706, 896	172, 406	879, 302	76, 789	139, 956	216, 745	662, 557
1925.....	294, 314	164, 121	458, 435	92, 728	132, 762	225, 490	232, 945
Total, 1921-1925.....	2, 638, 913	782, 898	3, 421, 811	697, 397	716, 839	1, 414, 236	2, 007, 575
1926.....	304, 488	191, 618	496, 106	76, 992	150, 763	227, 755	268, 351
1927.....	335, 175	202, 826	538, 001	73, 366	180, 142	253, 508	284, 493
1928.....	307, 255	193, 376	500, 631	77, 457	196, 899	274, 356	226, 275
Grand total.....	11, 897, 868	3, 237, 730	15, 135, 598	3, 895, 517	3, 758, 133	7, 653, 650	7, 481, 948

Changes in Occupational Character of Immigration Since the War

IT IS a matter of general knowledge that since the war, and more particularly since the passage of the "quota" immigration acts of 1921 and 1924, there has been not only a great reduction in the immigration of aliens into the United States but also a marked change in the racial composition of such immigration. An equally significant although less observed change has occurred in the occupational character of the immigration. This was clearly developed by a study made by the Bureau of Labor Statistics in the early part of 1927. The following is a summary of the results of that study. Broadly speaking, the tendency has been toward a sharp decrease in the proportion of unskilled laborers and a very sharp increase in the proportion of those with skilled trades, professions, or business training. This appears in striking manner when comparison is made between the four pre-war years, 1911 to 1914, and the two most recent years, 1925 and 1926, the years referred to being here, as elsewhere in this article, the fiscal years ending June 30 of the year named. Thus, during the pre-war period, 1911 to 1914, the average annual immigration of skilled laborers (154,317) was only about one-third as great as that of the unskilled (426,859), whereas in the period—1925, 1926—the average number of the skilled (55,673) was substantially as great as that of the unskilled (55,870).

Again, it may be pointed out that in the pre-war immigration the unskilled laborers outnumbered more than 2 to 1 the total number of skilled mechanics, professional, and business people and farmers, whereas in the past two years this condition has been reversed, the immigrants with trades and professions greatly outnumbering the unskilled laborers. The average annual number of immigrant farmers, indeed, was actually larger in the past two years (11,798) than in the pre-war period (11,249).

Moreover, it should be noted that the above comparisons are based on the figures of gross immigration. As a matter of fact, a continuous emigration of aliens from the United States is going on, and since the war this emigration has been proportionately very much larger among the unskilled workers than among those with trades, profes-

sions, and business training. As a result, if attention is limited solely to net immigration, that is to say, the actual increase of immigrant population, the decrease in the importance of the unskilled immigrant becomes still more striking. Thus, in the pre-war period, 1911 to 1914, the average annual net immigration into the United States was 723,169, of which 234,427, or 32.4 per cent, were rated as unskilled; only 141,779, or 19.6 per cent, being in the skilled groups (mechanics, professional and business people, and farmers). On the other hand, in the two years ending in 1926, the average annual net immigration was 214,541, of which only 14,227, or 6.6 per cent, were rated as unskilled laborers, whereas 68,681, or 32 per cent, were in the skilled groups of mechanics, professional and business people, and farmers.

The detailed data on which the above summary statements are based are presented in an article in the Labor Review for February 1927, from which the following tables have been taken.

Quota Acts

IT WILL be recalled that the act approved May 19, 1921,¹ restricted the number of aliens of any nationality admissible under the immigration laws to the United States in any fiscal year to "3 per cent of the number of foreign-born persons of such nationality resident in the United States as determined by the United States census of 1910." There were of course exceptions which need not be taken up at this time. This was the first strictly immigration act that provided for actually limiting the number of aliens other than Asiatics who may be admitted to the United States.

The immigration act of 1924 (Pub. No. 139, 68th Cong.) provides "that the annual quota of any nationality shall be 2 per cent of the number of foreign-born individuals of such nationality resident in continental United States as determined by the United States census of 1890."

Occupation Trends in Immigration After Passage of Quota Acts

TABLE 1 gives the average immigration, emigration, and net immigration by occupational groups for the four fiscal years immediately preceding the World War (1911-1914), for the three fiscal years following the approval of the quota act of 1921 (1922-1924), and for the two fiscal years after the quota law of 1924 went into effect (1925-26); the per cent that each group forms of the total; and also the percentage changes in the volume of annual average immigration, emigration, and net immigration in 1922-1924 and 1925, 1926 as compared with the pre-war period.

¹ See Labor Review, July, 1921, pp. 222-226.

TABLE 1.—PER CENT EACH OCCUPATIONAL GROUP FORMED OF AVERAGE ANNUAL IMMIGRATION, EMIGRATION, AND NET IMMIGRATION OF ALIENS, IN SPECIFIED PERIODS, 1911 TO 1926, AND PER CENT OF CHANGE IN VOLUME FROM 1911-1914

Occupational group	Annual average			Per cent occupational group formed of total			Per cent of change from 1911-1914 to—	
	1911-1914	1922-1924	1925, 1926	1911-1914	1922-1924	1925, 1926	1922-1924	1925, 1926
Immigration:								
Professional and business	27,943	28,699	16,531	2.7	5.6	5.5	+2.7	-40.8
Skilled labor	154,317	105,811	55,673	14.9	20.6	18.6	-31.4	-63.9
Farmers	11,249	13,500	11,798	1.1	2.6	3.9	+20.0	+4.9
Unskilled labor	426,859	96,068	55,870	41.3	18.7	18.7	-77.5	-96.9
Servants	127,077	49,478	28,756	12.3	9.6	9.6	-61.1	-77.4
Miscellaneous	12,215	19,386	13,949	1.2	3.8	4.7	+58.7	+14.2
No occupation	273,624	200,181	116,826	26.5	39.0	39.0	-26.8	-57.3
Total	1,033,284	513,123	299,403	100.0	100.0	100.0	-50.3	-71.0
Emigration:								
Professional and business	9,081	6,205	4,434	2.9	5.2	5.2	-31.7	-51.2
Skilled labor	34,427	11,269	9,459	11.1	9.5	11.1	-67.3	-72.5
Farmers	8,222	2,772	1,428	2.7	2.3	1.7	-66.3	-82.6
Unskilled labor	192,432	58,040	41,643	62.1	48.8	49.1	-69.8	-78.4
Servants	14,278	3,793	3,699	4.6	3.2	4.4	-73.4	-74.1
Miscellaneous	3,850	3,767	3,126	1.2	3.2	3.7	-2.2	-18.8
No occupation	47,825	33,137	21,073	15.4	27.9	24.8	-30.7	-55.9
Total	310,115	118,983	84,862	100.0	100.0	100.0	-61.6	-72.6
Net immigration:								
Professional and business	18,862	22,494	12,097	2.6	5.7	5.6	+19.3	-35.9
Skilled labor	119,890	94,542	46,214	16.6	24.0	21.5	-21.1	-61.5
Farmers	3,027	10,728	10,370	1.4	2.7	4.8	+254.4	+242.6
Unskilled labor	234,427	38,028	14,227	32.4	9.6	6.6	-83.8	-93.9
Servants	112,799	45,685	25,057	15.6	11.6	11.7	-59.5	-77.8
Miscellaneous	8,365	15,619	10,823	1.2	4.0	5.0	+86.7	+29.4
No occupation	225,799	167,044	95,753	31.2	42.4	44.6	-26.0	-57.6
Total	723,169	394,140	214,541	100.0	100.0	100.0	-45.5	-70.3

¹ Includes some unknown occupations.

Immigration and Emigration Compared

THE PERCENTAGE relation of annual average emigration to immigration within the occupational groups for the three periods under discussion is shown in Table 2:

TABLE 2.—PERCENTAGE RELATION OF AVERAGE ANNUAL EMIGRATION TO AVERAGE ANNUAL IMMIGRATION

Occupation	Period		
	1911-1914	1922-1924	1925, 1926
Professional and business	Per cent 32.5	Per cent 21.6	Per cent 26.8
Skilled labor	22.3	10.6	17.0
Farmers	73.1	20.5	12.1
Unskilled labor	45.1	60.4	74.5
Servants	11.2	7.6	12.9
Miscellaneous	31.5	19.4	22.4
No occupation	17.5	16.6	13.0
Total	30.0	23.2	28.3

While, as indicated by the above figures, the percentage of average annual emigration to immigration was 30.0 in 1911-1914 and only 23.2 in 1922-1924, it rose in 1925, 1926 to 28.3. The emigration, however, of the unskilled was equivalent to 45.1 per cent of the average annual number of immigrant aliens admitted in 1911-1914, 60.4 per cent of the number of immigrant aliens admitted in 1922-1924 and 74.5 per cent in 1925, 1926. In these two later periods as compared with 1911-1914, appreciably smaller percentages of aliens in business professions and skilled trades emigrated from this country as based on the numbers in similar occupational groups coming in.

The emigration of farmers as contrasted with their immigration shows a substantial reduction for the 1922-1924 and 1925, 1926 periods, the percentages for such periods being only 20.5 and 12.1 as compared to 73.1 per cent in the pre-war period (1911-1914).

It is beyond the scope of the present analysis to attempt to trace the influences of the individual provisions and regulations of the two quota acts upon these various occupational trends or to evaluate the complex factors of any other direct, contributory, or potential causes of such trends.

Naturalization of Aliens, 1907 to 1928

THE ANNUAL report of the Commissioner of Naturalization for the fiscal year ended June 30, 1928, gives the following data regarding the naturalization of aliens in the United States:

TABLE 1.—DECLARATIONS AND PETITIONS FILED AND CERTIFICATES OF CITIZENSHIP ISSUED FOR FISCAL YEARS 1907 TO 1928 INCLUSIVE

Year	Declarations	Petitions			Certificates		
		Civilian	Military	Total	Civilian	Military	Total
1907	73,658	21,113		21,113	7,941		7,941
1908	127,571	44,032		44,032	25,975		25,975
1909	145,745	43,141		43,141	38,374		38,374
1910	169,348	55,750		55,750	39,448		39,448
1911	189,249	74,740		74,740	56,683		56,683
1912	171,133	95,661		95,661	70,310		70,310
1913	182,095	95,380		95,380	83,561		83,561
1914	214,104	124,475		124,475	104,145		104,145
1915	247,958	106,399		106,399	91,848		91,848
1916	209,204	108,767		108,767	87,831		87,831
1917	440,651	130,865		130,865	88,104		88,104
1918	342,283	105,514	63,993	169,507	87,456	63,993	151,449
1919	391,156	128,523	128,335	256,858	89,023	128,335	217,358
1920	299,076	166,760	51,972	218,732	125,711	51,972	177,683
1921	303,904	177,898	17,636	195,534	163,656	17,636	181,292
1922	273,511	153,170	9,468	162,638	160,979	9,468	170,447
1923	296,636	158,059	7,109	165,168	137,975	7,109	145,084
1924	424,540	166,947	10,170	177,117	140,340	10,170	150,510
1925	277,218	162,258		162,258	152,457		152,457
1926	277,539	172,107	125	172,232	146,239	92	146,331
1927	258,295	235,298	5,041	240,339	195,493	4,311	199,804
1928	254,588	235,328	4,993	240,321	228,006	5,149	233,155
Total	5,579,462	2,762,185	298,842	3,061,027	2,321,555	298,235	2,619,790

TABLE 2.—ALIENS (CIVILIAN AND MILITARY) ADMITTED TO CITIZENSHIP DURING THE FISCAL YEAR 1928, ARRANGED BY NATIONALITIES (EXCLUSIVE OF ALASKA, HAWAII, PORTO RICO, AND VIRGIN ISLANDS)

Country	Number	Country	Number
Italy.....	53,206	Austria.....	4,237
Poland.....	35,293	Norway.....	2,498
British Empire:		Holland.....	2,011
Ireland.....	13,183	Finland.....	1,506
England.....	9,127	Switzerland.....	1,987
Canada.....	7,712	France.....	1,294
Scotland.....	4,486	Belgium.....	1,356
Wales.....	404	Spain.....	784
Australia.....	163	Portugal.....	994
Others.....	2,975	Central and South America.....	386
Total British Empire.....	38,053	Bulgaria.....	350
Russia.....	17,931	Luxemburg.....	132
Germany.....	9,380	Mexico.....	120
Czechoslovakia.....	10,553	Denmark.....	1,856
Greece.....	9,005	Lithuania.....	3,767
Serbs, Croats, and Slovenes.....	6,669	Syria and Lebanon.....	1,334
Hungary.....	5,979	Repatriated Americans.....	3,747
Sweden.....	4,584	Miscellaneous.....	2,266
Turkey.....	5,022		
Rumania.....	6,386	Total.....	232,686

INDUSTRIAL ACCIDENTS

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Present Status of Accident Statistics

THE United States Bureau of Labor Statistics has issued four bulletins bringing together as far as possible the important records of industrial accidents on a national scale.¹ A fifth bulletin, covering the period up to the end of 1927, is now in press.

For convenience of reference the following account of the present status of accident statistics, including a description of the method of computing frequency and severity rates, is reproduced from the former handbook (Bul. No. 439).

In the introduction to the second bulletin on accidents, issued by the Bureau of Labor Statistics in 1915, it was noted: "At the present time there are no entirely complete and trustworthy industrial accident statistics for even a single important industry in the United States. The most reliable data are those for the iron and steel industry, mining, and railways." As time has gone on the three Federal agencies concerning themselves with accident statistics, namely, the Interstate Commerce Commission, the Bureau of Mines, and the Bureau of Labor Statistics, have so improved their methods of collecting and handling accident data that what they offer may fairly claim to be "trustworthy," though in the nature of the case it would be beyond reasonable expectation that they should be "entirely complete."

As compensation legislation spread rapidly over the several States there rose necessarily a new and insistent demand for accident statistics which would shed light on the various problems of compensation administration. In response to this demand there has been immense accumulation of the raw material of statistics. It would appear to be a rather simple matter to combine the records of the several States and so produce a national compilation of much interest and utility. Unfortunately the States have adopted procedures sufficiently different to make it difficult and in many cases impossible to combine these records in a general exhibit. The primary reason for this is that the State agencies have found themselves so involved in the multiplied problems of compensation that they have been quite unable to give adequate attention to the really more important problems of accident prevention. Ultimately it will be necessary for all States to do what some have already done, namely, to grapple with the matter of accident prevention.

In addition to the above-mentioned public agencies, a number of private agencies have also concerned themselves with the work of accident prevention and accident reporting. Among these the National Safety Council occupies an outstanding place, having been active in fostering all kinds of safety work over a period of years and assembling and publishing accident records of very great value.

Importance of Accident Rates

THE PURPOSE of accident statistics is the very practical one of finding out where and why accidents occur, and whether they are increasing or decreasing. To do this, the statistics must show clearly not only the number but also the rate of accidents. Present-day practice is to show two kinds of rates—frequency rates and severity

¹ U. S. Bureau of Labor Statistics Buls. Nos. 78, 157, 339, and 425.

rates. The steps by which such rates are determined, as well as certain other factors which it is essential to know about accidents in order to make accident statistics of practical value, are briefly described below:²

(1) *Exposure to hazard*.—A very large part of the statistical effort regarding accidents has been devoted to the mere sorting and recording of cases. That this gives little information which can be utilized for the purpose now under consideration may be established by a few illustrations. When the accidents for a 6-year period in Pennsylvania are grouped by industries it appears that coal mining has 300,524 accidents while metals and metal products have 343,163. A hasty inference from this result would be that the production of metals and metal products is more dangerous than coal mining. A little reflection will show the inaccuracy of that conclusion. While metals and metal products have more accident cases it may be that there are many more people employed therein than in coal mining. In other words, exposure to hazard in metals and metal products may be much greater both because more people are employed and because they work longer hours. Clearly, to understand the relation of these two groups something more is necessary than merely to know the number of accidents occurring in each.

This raises the question of an appropriate method of expressing this element of exposure to hazard. The Germans were the first to attack the problem. Their solution was to note the number of days during which each workman was employed. The sum of the days worked by all the workmen was then divided by 300 on the supposition that the usual working year was one of 300 days of 10 hours each. The quotient thus derived gave the number of 300-day or full-year workers. The number of accidents was then divided by this base and the quotient multiplied by 1,000 to avoid small decimals. The use of this theoretical 300-day worker as a base for calculating accident rates was adopted by the Bureau of Labor Statistics when it began its accident studies.

There were, however, troublesome difficulties in the use of this base and the International Association of Industrial Accident Boards and Commissions finally determined, at the instance of its committee on statistics and accident insurance cost, to cut loose from the idea of the number of workers and use instead the hours of employment. It was agreed that accident frequency rates should be expressed as number of cases per 1,000,000 hours of exposure while accident severity rates should be expressed as number of days lost per 1,000 hours of exposure. The method of determining severity rates and days lost is discussed in a succeeding paragraph.

The importance of exposure as an element in the study of industrial accidents has become more and more recognized with the passage of time. The Bureau of Labor Statistics was the first to utilize it on an extended scale. For some years now the Bureau of Mines and the Interstate Commerce Commission have presented their facts on this basis and many sections of the National Safety Council develop their accident data in this way.

(2) *Number of accidents*.—Having secured information regarding exposure to hazard the next step is to secure a record of the number

² For full account of standard method of computing frequency and severity rates, see U. S. Bureau of Labor Statistics Bul. No. 276, p. 68.

of cases of injury. A serious difficulty presents itself at once in the fact that the definition of an accident varies in the different States. The most widely used definition is that of a "tabulatable accident." This definition is "an accident causing death, permanent disability, or temporary disability beyond the day or turn in which the accident occurred." The differences between the State definitions arise in respect to temporary disabilities. Some States exclude cases of one day's duration, others of two days' duration, still others of seven days' duration. This lack of uniformity impairs the value of the record as an index of the changes taking place. It is not greatly important what definition is used, but until a uniform definition is established it will remain impossible to compile satisfactory national statistics from the State records.

(3) *Severity of accident.*—When items 1 and 2 (exposure and number of accidents) are known, it is possible to compute accurate frequency rates; i. e., the number of accidents per 1,000,000 hours of exposure. It is evident, however, that in frequency rates a death influences the accident rate to the same extent as does temporary disability for one day, and thus a true and complete picture of conditions is not presented.

The first effort to meet this difficulty was the separation of the accidents into three groups, according to their results, namely, death, permanent disability, and temporary disability. This did make possible a separate comparison of fatalities in different industries but still did not afford comparability of the permanent and the temporary disabilities with each other and with the fatalities. What was needed was to translate the different casualties into common terms. This was accomplished by means of a schedule of fixed time allowances³ for death and for permanent disabilities, beginning with 6,000 days for death, the loss of an arm being given 4,000 days, the loss of an eye 1,800 days, and so on through the list. The application of these constants gives for each sort of casualty a value in terms of days somewhat proportional to its economic importance. The temporary disabilities are evaluated by the actual days of recorded disability.

The value of the severity rate is evident. In considering frequency rates alone it is hardly possible to avoid the impression that the numerically larger figure of temporary disability is important in proportion to its size. As a corrective to this impression we need the severity rates in which all injuries, including death, are weighted according to their severity. The frequency rate fails to tell the whole story, because in it units are combined which are not comparable. The severity rate corrects this condition through the use of a procedure which reduces these units to approximately common terms.

(4) *Classification by industries.*—In order to have information useful for accident prevention the classification of the injuries must extend to industries and if possible to departments and occupations. Departmental and occupational rates, however, present a difficulty in that such detailed analysis is likely to render the numbers in the groups so small that they lose statistical significance.

(5) *Causes of accident.*—An industrial classification indicates *where* remedial effort is called for but does not suggest *what* needs to

³ See U. S. Bureau of Labor Statistics Bul. No. 276, p. 77.

be done. This information must come, so far as statistical treatment can give it, from a study of accident causes. Here, as in the case of occupations, there is constant danger of subdividing the material until the portions are too small to have any meaning. This, however, is a risk well worth taking, since here, if anywhere, the statistician can be of real service to the cause of safety.

In addition to the five items listed above as essential, a certain value attaches to information regarding nature of injury and location of injury, though these items are of much less practical importance than are accident causes.

Accident Record by Industry

Building Construction

TABLE 1 presents several interesting phases of hazard in building construction. The rates for Group A illustrate the effect of accident-prevention effort directed primarily toward severe accidents. In this group there was marked improvement in the severity rates while frequency rates were practically at a standstill. The rates for Group B show what can be accomplished by intensive effort applied to the reduction of both frequency and severity of accidents. Data for Groups C1 and C2 illustrate the fluctuating and very high rates which thus far have appeared in every record of experience in fabrication and erection.

The figures for Group D represent the experience of building construction firms belonging to the construction section of the National Safety Council. While accident frequency declined from 1926 to 1927, accident severity increased.

TABLE 1.—NUMBER OF FULL-YEAR WORKERS, NUMBER OF ACCIDENTS, AND ACCIDENT RATES IN BUILDING CONSTRUCTION, 1919 TO 1927, BY YEARS

Year	Hours of exposure (thousands)	Full-year workers	Number of accidents	Frequency rates (per 1,000,000 hours' exposure)	Severity rates (per 1,000 hours' exposure) ^c
Group A (general contractors):					
1919	4,140	1,380	216	52.2	6.1
1920	7,635	2,545	300	39.3	10.1
1921	3,695	1,232	184	49.8	3.4
1922 ¹	17,527	5,842	1,268	72.4	5.8
1923 ²	22,633	7,544	1,226	54.2	4.8
1924 ³	19,009	6,337	1,118	58.8	4.6
Group B (general contractors):⁴					
1919	14,788	4,929	247	16.7	3.1
1920	11,362	3,787	177	15.6	1.2
Group C1 (fabricators and erectors):					
1922 ¹	3,949	1,316	564	142.8	5.4
1923 ²	533	178	122	228.9	65.6
Group C2 (fabricators and erectors):⁵					
1923	2,043	681	213	104.0	8.3
1924	2,546	849	251	97.0	22.6
1925	2,592	864	196	76.0	10.0
Group D:⁶					
1926	43,710	14,570	3,079	70.45	5.54
1927	38,973	12,991	2,652	68.05	8.92

¹ National Safety News, July, 1923, p. 48.

² Idem, July, 1924, p. 42.

³ Idem, July, 1925, p. 40.

⁴ Idem, August, 1921, p. 23.

⁵ Idem, May, 1926, p. 10.

⁶ National Safety Council. Industrial Experience of Members of National Safety Council, 1927. Chicago, 1928, p. 9. Reproduced through courtesy of National Safety Council.

Chemical Industry

THE EXPERIENCE from 1908 to 1920 of a large company engaged in the manufacture of explosives, dyes, and chemicals is presented in the first part of Table 2. The second part of the table covers the experience from 1923 to 1927 of companies which are members of the chemical section of the National Safety Council. The figures show a very decided declining tendency both in frequency and severity.

TABLE 2.—NUMBER OF FULL-YEAR WORKERS, NUMBER OF ACCIDENTS, AND ACCIDENT RATES IN THE MANUFACTURE OF CHEMICALS, 1908 TO 1927, BY YEARS¹

Year	Hours of exposure	Full-year workers	Frequency rates (per 1,000,000 hours' exposure)		
			Fatal accidents	Nonfatal accidents	Total
1908.....	9,963,000	3,321	3.50	-----	-----
1909.....	12,129,000	4,043	2.06	-----	-----
1910.....	14,070,000	4,690	2.20	-----	-----
1911.....	14,184,000	4,728	1.20	-----	-----
1912.....	13,719,000	4,573	.80	-----	-----
1913.....	12,873,000	4,291	1.71	-----	-----
1914.....	12,399,000	4,133	.57	-----	-----
1915.....	160,398,000	53,466	.59	25.87	26.46
1916.....	112,581,000	37,527	1.07	36.05	37.12
1917.....	119,202,000	39,734	.43	35.33	35.76
1918.....	195,405,000	65,135	.46	25.69	26.15
1919.....	51,624,000	17,208	.41	18.22	18.63
1920.....	48,396,000	16,132	.50	16.30	16.80

Year	Hours of exposure	Full-year workers	Number of accidents	Frequency rates (per 1,000,000 hours' exposure)	Severity rates (per 1,000 hours' exposure)
1910.....	14,070,000	4,690	430	30.57	14.43
1920.....	48,396,000	16,132	813	16.80	3.67
1923 ²	18,044,000	6,015	443	24.55	4.78
1924 ²	43,450,000	16,150	1,266	29.13	3.07
1925 ²	124,148,000	41,883	2,597	20.91	2.71
1926 ²	196,332,000	65,444	3,584	18.26	2.28
1927 ²	254,045,000	84,661	4,364	17.18	1.90

¹ National Safety News, Feb. 21, 1921, p. 4.

² National Safety Council. Industrial Experience of Members of National Safety Council, 1927. Chicago, 1928, p. 6. Reproduced through the courtesy of the National Safety Council.

Coal Mines

THE DATA presented here for accidents in coal mines are derived from the publications of the United States Bureau of Mines. The rates in the tables are given in terms of 1,000,000 hours' exposure. This is an approximation, since it was impossible from the data available to determine exactly the number of hours worked. The relations of these rates among themselves are correct, but they are not perfectly comparable with similar rates found in other portions of this handbook.

It will be noticed that in Table 3 there are two methods of presenting the facts; namely, the rate per 1,000,000 hours' exposure and the rate per 1,000,000 tons mined. It is desirable to consider both of these rates. That based on hours of exposure gives a measure of the hazard of fatal injury encountered by the men. The rate

by quantity mined measures the cost of coal in terms of fatal accidents. It may be regarded as a satisfactory condition when both of these rates are declining with reasonable rapidity.

From 1907 to 1927 fatalities per 1,000,000 hours' exposure declined 28.8 per cent, while fatalities per 1,000,000 tons mined declined 45 per cent. This more rapid decline of cost as compared with hazard is largely due to the introduction of machinery and improved methods. While a more rapid decline might fairly be expected, it is gratifying that the movement is in the right direction.

TABLE 3.—MEN EMPLOYED, AVERAGE PRODUCTION PER MAN, MEN KILLED, AND FATALITY RATES IN COAL MINES, 1907 TO 1927, BY YEARS

Year	Tons mined (short tons)	Men employed		Average production per man (tons)		Men killed	Fatality rate per 1,000,000 hours' exposure	Produc- tion per death (short tons)	FATALI- ties per 1,000,000 tons mined
		Actual number	Full-year workers	Per year	Per day				
1907	477,892,536	674,613	519,452	708	3.07	3,242	2.08	147,407	6.78
1908	409,309,857	678,873	441,267	603	3.09	2,445	1.85	167,407	5.97
1909	460,807,263	666,535	531,689	691	3.14	2,642	1.77	174,416	5.73
1910	501,596,378	725,030	534,122	692	3.10	2,656	1.66	177,808	5.62
1911	496,371,126	728,348	541,997	682	3.29	2,419	1.49	186,887	5.35
1912	534,466,580	722,662	593,131	740	3.20	2,785	1.57	220,945	4.33
1913	570,048,125	747,644	526,598	762	3.25	2,454	1.55	204,685	4.89
1914	513,525,477	763,185	511,598	673	3.46	2,269	1.48	209,261	4.78
1915	531,619,487	734,008	565,766	724	3.42	2,696	1.42	234,297	4.27
1916	590,098,175	720,971	634,666	818	3.48	2,226	1.31	265,094	3.77
1917	651,402,374	757,317	654,973	860	3.41	2,317	1.42	241,618	4.14
1918	678,211,904	762,426	542,217	890	3.65	2,271	1.26	262,873	3.80
1919	553,952,259	776,569	601,283	713	3.56	1,987	1.40	239,082	4.18
1920	658,264,932	784,621	474,529	839	3.92	1,979	1.63	289,857	3.45
1921	506,395,401	823,253	560,000	615	3.91	2,458	1.46	254,854	3.92
1922	476,951,121	848,932	499,894	565	3.92	2,381	1.50	233,576	4.15
1923	657,903,671	860,560	480,227	764	4.04	2,230	1.55	267,492	3.74
1924	571,613,400	779,613	559,426	733	3.92	2,518	1.50	240,072	4.17
1925	581,869,890	748,805	503,065	777	3.96	2,231	1.48	260,461	3.84
1926	657,804,437	759,033		867				261,241	3.83
1927	597,858,916	759,177		788				267,978	3.73

Table 4 summarizes the facts regarding the place of occurrence and the cause of fatal accidents in coal mines from 1916 to 1927. The underground occupations have much the larger share of fatalities, and fully half of the underground fatalities result from falls of material from roof or face. Attention has perhaps been too much directed to those startling "major casualties" in which by explosion of gas or dust many hundreds of lives may be suddenly brought to a close. Inspection of the rates in Table 4 will show that such explosions stand third in order of importance, except in 1924 when they were in second place.

It would be advantageous if the underground and surface exposure could be separated. The underground rates would doubtless be higher and surface rates lower than those of the table, which are based upon the entire exposure, it not being possible from the data at hand to make this separation.

TABLE 4.—FATALITIES IN COAL MINES, 1916 TO 1927, BY YEARS, PLACE OF OCCURRENCE, AND CAUSES

Place and cause	1916	1917	1918	1919	1920	1921	1922	1923	1924	1925	1926	1927
Number of fatalities												
Underground:												
Falls of roof or of face...	962	1,218	1,294	1,100	1,132	1,024	905	1,162	1,062	1,078	1,214	1,149
Cars and locomotives...	390	482	506	381	408	341	341	415	350	360	433	355
Explosions, gas or dust...	170	362	129	191	164	116	311	372	536	345	422	247
Explosives...	146	111	135	206	128	152	92	114	100	102	96	110
Electricity...	90	79	88	69	76	80	74	75	81	84	96	100
Miscellaneous...	269	127	129	130	112	118	77	117	100	100	104	119
Total underground...	2,027	2,379	2,281	2,077	2,020	1,831	1,800	2,255	2,229	2,069	2,365	2,080
Shaft...	49	52	52	53	56	36	41	46	29	34	35	29
Surface:												
Haulage...	75	114	118	93	78	45	54	59	70	40	50	46
Machinery...	26	51	47	28	29	17	23	26	8	9	9	10
Miscellaneous...	49	100	82	66	88	58	61	72	60	78	59	66
Total surface...	150	265	247	187	195	120	138	157	138	127	118	122
Grand total...	2,226	2,696	2,580	2,317	2,271	1,987	1,979	2,458	2,396	2,230	2,518	2,231
Fatality rates (per 1,000,000 hours' exposure)												
Underground:												
Falls of roof or of face...	0.57	0.64	0.66	0.63	0.63	0.72	0.74	0.69	0.70	0.75	0.72	0.76
Cars and locomotives...	.23	.25	.26	.23	.23	.24	.28	.25	.23	.25	.26	.24
Explosions, gas or dust...	.10	.19	.07	.12	.09	.08	.26	.22	.36	.24	.25	.16
Explosives...	.09	.06	.07	.13	.07	.11	.08	.07	.07	.07	.06	.07
Electricity...	.05	.04	.04	.04	.04	.06	.06	.04	.05	.06	.06	.07
Miscellaneous...	.16	.07	.06	.08	.06	.08	.06	.07	.07	.07	.06	.08
Total underground...	1.19	1.25	1.16	1.28	1.12	1.29	1.48	1.34	1.48	1.44	1.41	1.38
Shaft...	.03	.03	.03	.03	.03	.03	.03	.03	.02	.02	.02	.02
Surface:												
Haulage...	.05	.06	.06	.06	.04	.03	.05	.04	.05	.03	.03	.03
Machinery...	.02	.03	.02	.02	.02	.01	.02	.01	.01	.01	.01	.01
Miscellaneous...	.03	.05	.04	.04	.05	.04	.05	.04	.03	.05	.03	.04
Total surface...	.09	.14	.12	.11	.11	.08	.12	.09	.09	.09	.07	.08
Grand total...	1.31	1.42	1.31	1.42	1.26	1.40	1.63	1.46	1.59	1.55	1.50	1.48

Coke Ovens

ACCIDENT RATES for coke ovens, compiled from data published by the United States Bureau of Mines, are shown in Table 5. A striking feature is the very great falling off in the number employed in the beehive ovens, the number employed in 1927 amounting to only 21 per cent of the number of employees in 1916. This represents the discarding of a wasteful and inefficient process. The larger use of machinery in by-product ovens has not resulted, as might be anticipated, in higher accident rates, but in material decreases in both fatality and injury rates. The fatality rate for coke ovens as a group has declined from an average of 0.60 for the 5-year period 1916 to 1920 to 0.47 for the 5-year period ending with 1925 and to 0.36 for the year 1927.

TABLE 5.—NUMBER OF MEN EMPLOYED AND ACCIDENTS AND ACCIDENT RATES IN BEEHIVE AND BY-PRODUCT COKE OVENS, 1916 TO 1927, BY YEARS

Year	Men employed		Men killed	Men injured	Frequency rates (per 1,000,000 hours' exposure)	
	Actual number	Full-year workers			Men killed	Men injured
Beehive ovens:						
1916.....	18,570	18,591	24	1,866	0.43	33.46
1917.....	18,820	19,295	25	1,822	.43	31.48
1918.....	16,442	16,436	19	2,155	.39	43.70
1919.....	13,333	10,829	10	1,364	.31	41.99
1920.....	10,955	10,094	11	1,035	.36	34.18
Average, 5 years.....	15,624	15,049	18	1,649	.40	33.53
1921.....	6,011	2,835	5	336	.59	39.51
1922.....	7,871	4,823	8	474	.55	32.76
1923.....	8,515	7,144	12	875	.56	40.83
1924.....	6,450	4,025	3	457	.25	37.85
1925.....	7,246	5,140	4	498	.26	32.30
Average, 5 years.....	7,219	4,793	7	528	.49	36.70
1926.....	6,605	4,847	6	645	.41	44.36
1927.....	3,976	3,071	2	287	.22	31.15
By-product ovens:						
1916.....	13,033	15,528	21	3,371	.45	72.36
1917.....	13,597	16,300	51	4,891	1.04	100.02
1918.....	15,947	19,040	54	5,637	.95	98.69
1919.....	15,408	16,845	43	2,667	.85	52.78
1920.....	17,184	19,827	38	2,380	.64	40.01
Average, 5 years.....	15,034	17,508	41	3,789	.78	72.14
1921.....	10,193	11,033	12	1,517	.36	45.83
1922.....	11,407	13,413	21	1,236	.52	30.72
1923.....	15,214	18,483	33	1,718	.60	30.98
1924.....	14,001	16,656	21	1,188	.42	23.78
1925.....	16,008	18,914	24	1,198	.42	21.11
Average, 5 years.....	13,365	15,700	22	1,371	.47	29.11
1926.....	16,510	19,441	45	1,277	.77	21.90
1927.....	16,091	20,162	23	998	.38	16.51
All coke ovens:						
1916.....	31,603	34,119	45	5,237	.44	51.16
1917.....	32,417	35,595	76	6,713	.71	62.86
1918.....	32,389	35,476	73	7,792	.69	73.21
1919.....	28,741	27,674	53	4,031	.64	48.55
1920.....	28,139	29,921	49	3,415	.55	38.04
Average, 5 years.....	30,658	32,557	59	5,438	.60	55.68
1921.....	16,204	13,868	17	1,853	.41	44.54
1922.....	19,278	18,236	29	1,710	.53	31.26
1923.....	23,729	25,627	45	2,593	.59	33.73
1924.....	20,451	20,681	24	1,645	.39	26.51
1925.....	23,254	24,054	28	1,696	.39	23.50
Average, 5 years.....	20,583	20,493	29	1,899	.47	30.89
1926.....	23,115	24,288	51	1,922	.70	26.38
1927.....	20,667	23,227	25	1,285	.36	18.44

Iron and Steel Industry

ACCIDENTS in the iron and steel industry in the year 1926 showed a decrease as compared with 1925, according to the Bureau of Labor Statistics' annual study of such accidents. This decline has been almost constant during the whole period that the bureau has been compiling such statistics. There is a great difference, however, between the experience of plants in which energetic and continuous safety work has been carried on and plants in which safety work has

not been given such prominence. In the former group the reduction in accident frequency since 1913 has been approximately 89 per cent, while in the group in which safety work has not been so stressed the reduction has been only about 15 per cent.

The Bureau of Labor Statistics now has records covering the experience of the iron and steel industry from 1910 to the present. To illustrate what has happened during this period and also to show the results obtained by intensive accident-prevention effort, Tables 6 and 7 are presented.

Table 6 shows the accident experience of a group of plants in the iron and steel industry which produce approximately 50 per cent of the output, and which were not only among the first to undertake accident prevention, but have continued a safety campaign with great energy and persistence. Table 7 shows the accident experience of all the plants covered by the study, including the plants of Table 6 as well as another group in which safety work has been less emphasized.

The two tables are not identical in form but in a general way they are comparable. Table 6 is on an annual basis, while Table 7 is for periods of five years.

TABLE 6.—ACCIDENT FREQUENCY RATES (PER 1,000,000 HOURS' EXPOSURE) FOR A SELECTED GROUP OF IRON AND STEEL PLANTS, 1913 TO 1926, BY PRODUCTS AND BY YEARS

Year	Fabi- cated products	Sheets	Wire and products	Tubes	Miscellaneous steel		Total
					Group A	Group B	
1913.....	100.3	61.6	59.3	27.2	70.9	41.3	60.3
1914.....	59.0	47.2	46.2	12.5	50.7	27.6	43.5
1915.....	53.5	37.3	52.4	10.8	51.9	23.0	41.5
1916.....	52.1	34.0	48.2	12.4	67.6	28.2	44.4
1917.....	51.3	33.9	32.5	10.2	51.3	20.5	34.5
1918.....	38.2	25.9	18.8	9.1	42.0	31.4	28.8
1919.....	32.8	25.8	12.5	9.1	39.7	23.0	26.1
1920.....	35.3	22.7	12.0	8.9	35.3	18.6	22.9
1921.....	28.4	17.5	7.5	6.1	15.8	12.1	13.2
1922.....	33.8	16.9	7.9	7.1	14.5	10.8	13.0
1923.....	32.6	17.2	7.9	7.0	13.9	9.8	12.7
1924.....	33.4	10.3	6.2	5.1	11.8	7.9	10.2
1925.....	27.4	11.4	4.2	4.0	9.8	3.7	8.2
1926.....	24.3	9.4	3.9	3.6	6.6	3.8	6.8

If the rates in the total column of Table 6 for the year 1913, be compared with the rates for all departments in Table 7 for the 5-year period ending with 1913 it will be noted that the frequency rates are 60.3 for Table 6 and 62.1 for Table 7. That is to say, up to the time indicated the results in the section represented by the selected plants in Table 6 were but slightly more satisfactory than in the industry at large, including those special plants. Computing the rate for that half of the industry not included in Table 6 it is found to be 63.9. This compared with 60.3, the rate for plants grouped in Table 6, gives an idea of the progress made at that time by concerns most actively engaged in accident prevention as compared with those which had more recently, and in some cases not yet, undertaken an effort for safety.

If the figures for the year 1925 and for the 5-year period ending with 1925 are compared it will be found that Table 6 shows a frequency of

8.2 while a computation for the portion not included in Table 6 gives a frequency of 54.4. In other words, the portion of the industry which has devoted most attention to accident prevention has made an 86 per cent reduction while the portion of the industry not included in Table 6 has made a 15 per cent reduction.

The fact that one table is on an annual and the other on a 5-year basis makes this comparison somewhat unfair to the plants shown only on the 5-year basis. It is safe to say, however, that in the companies which have undertaken the task of accident prevention most seriously the results have been the most striking. The important thing is that a similar result is possible to any plant which is willing to make a corresponding effort.

TABLE 7.—ACCIDENT RATES IN THE IRON AND STEEL INDUSTRY, BY DEPARTMENTS AND BY 5-YEAR PERIODS

Period	All departments	Blast furnaces	Bessemer converters	Open hearth furnaces	Foundries	Heavy rolling mills	Plate mills	Sheet mills
Frequency rates (per 1,000,000 hours' exposure)								
1907 to 1911.....	69.2	76.1	101.5	84.2	60.1	61.0	69.4	44.1
1908 to 1912.....	65.1	67.7	79.5	79.5	61.5	57.0	60.8	47.9
1909 to 1913.....	62.1	62.4	92.3	78.6	65.1	51.7	55.9	49.1
1910 to 1914.....	59.2	62.3	89.8	75.0	63.6	46.1	49.9	51.1
1911 to 1915.....	53.3	50.3	65.0	67.6	59.3	39.4	44.7	48.1
1912 to 1916.....	51.3	47.8	76.1	64.8	57.8	37.3	41.5	47.4
1913 to 1917.....	48.2	41.4	68.3	58.4	60.4	32.1	36.6	41.3
1914 to 1918.....	43.6	40.5	60.7	53.5	57.0	31.1	39.8	35.8
1915 to 1919.....	41.6	39.0	57.7	50.5	61.0	32.4	39.2	32.7
1916 to 1920.....	41.1	38.0	53.1	50.2	61.0	31.4	38.4	33.7
1917 to 1921.....	39.5	36.3	47.0	44.8	63.1	29.9	37.6	33.4
1918 to 1922.....	36.5	34.0	39.9	41.3	60.4	27.6	36.7	35.2
1919 to 1923.....	34.9	32.9	30.5	33.0	61.7	23.8	31.4	37.2
1920 to 1924.....	33.6	30.7	24.9	32.9	62.7	21.2	29.4	35.1
1921 to 1925.....	31.3	29.0	17.0	29.9	63.1	18.1	26.8	33.2
1922 to 1926.....	29.9	28.7	16.7	28.3	62.8	16.6	25.6	30.6
Severity rates (per 1,000 hours' exposure)								
1907 to 1911.....	5.0	10.6	7.6	7.5	2.7	4.4	5.1	3.1
1908 to 1912.....	4.3	8.8	7.4	6.6	3.1	4.2	4.1	2.8
1909 to 1913.....	4.4	8.3	6.7	6.8	3.5	4.0	3.8	3.0
1910 to 1914.....	4.1	7.0	6.4	6.6	3.6	3.6	3.9	2.6
1911 to 1915.....	3.6	6.2	5.3	5.8	3.3	3.4	3.1	2.2
1912 to 1916.....	3.7	5.8	6.1	5.5	3.1	3.5	2.8	2.3
1913 to 1917.....	3.7	5.6	7.1	5.1	3.3	3.6	2.6	2.1
1914 to 1918.....	3.5	5.4	7.3	5.8	3.2	3.4	2.6	1.8
1915 to 1919.....	3.6	5.8	6.9	6.5	3.4	3.9	2.5	1.5
1916 to 1920.....	3.5	5.7	6.3	6.3	3.2	3.5	2.6	1.8
1917 to 1921.....	3.4	5.7	5.4	5.8	3.2	3.3	2.5	1.7
1918 to 1922.....	3.1	5.5	4.2	5.3	2.7	2.9	2.5	1.8
1919 to 1923.....	3.0	5.0	3.2	4.2	2.7	2.4	2.4	1.9
1920 to 1924.....	2.8	4.5	2.6	4.2	2.8	2.3	2.4	2.1
1921 to 1925.....	2.7	4.6	3.2	4.0	3.1	2.6	2.6	1.9
1922 to 1926.....	2.8	4.7	4.0	4.6	3.2	2.6	2.6	1.8

Table 8 is derived from information regarding the group of iron and steel plants included in Table 6 and gives accident frequency rates (per 1,000,000 hours' exposure), by causes, from 1913 to 1926. There is not a single case in which the rate for 1926 is not lower than that for 1913, and usually very much lower. The important rôle still played by machinery in accident experience is indicated by the first line of the table. In every such compilation the frequency of accidents due to handling is in excess of that from any other cause. The decreases from 1913 to 1926 for the main groups of the

cause classification are as follows: Machinery, 79 per cent; vehicles, 87 per cent; hot substances, 90 per cent; falls of persons, 78 per cent; handling, 89 per cent; unclassified, 97 per cent.

TABLE 8.—ACCIDENT FREQUENCY RATES (PER 1,000,000 HOURS' EXPOSURE) IN A PORTION OF THE IRON AND STEEL INDUSTRY, 1913 TO 1926, BY YEARS AND CAUSES

Accident cause	1913	1914	1915	1916	1917	1918	1919	1920	1921	1922	1923	1924	1925	1926	1913 to 1926
Machinery.....	7.3	5.0	4.9	5.4	4.5	4.0	3.3	3.4	1.8	2.2	2.3	2.0	1.6	1.5	3.4
Working machines.....	3.8	2.7	2.6	2.6	2.0	1.8	1.4	1.5	.8	1.1	1.0	.8	.7	.7	1.6
Caught in.....	2.5	1.8	1.7	1.7	1.2	1.1	.9	1.0	.6	.8	.7	.6	.5	.5	1.1
Breakage.....	1	.1	.1	.1	.1	.1	.1	.1	.1	(1)	(1)	(1)	(1)	(1)	.1
Moving material in.....	1.2	.8	.8	.8	.7	.6	.4	.4	.1	.3	.2	.2	.2	.2	.5
Cranes, etc.....	3.5	2.3	2.3	2.8	2.5	2.2	1.9	1.9	1.0	1.2	1.3	1.2	.9	.9	1.8
Overhead.....	2.8	1.9	2.0	2.5	2.2	1.9	1.6	1.5	.8	1.0	1.1	.9	.7	.7	1.5
Locomotive.....	.3	.2	.2	.2	.2	.2	.2	.2	.2	.1	.1	.1	.1	.1	.2
Other hoisting apparatus.....	.4	.2	.1	.1	.1	.1	.1	.2	.1	.1	.1	.1	.1	.1	.1
Vehicles.....	2.3	1.9	1.6	1.7	1.7	1.3	1.2	1	.5	.4	.6	.5	.3	.3	1.0
Hot substances.....	5.4	3.6	3.7	4.5	3.6	3.0	2.8	2.5	1.2	1.1	1.2	.9	.6	.5	2.4
Electricity.....	.5	.4	.2	.4	.3	.3	.2	.3	.1	.1	(1)	(1)	(1)	(1)	.2
Hot metal.....	3.6	2.1	2.3	3.0	2.5	2.1	2.0	1.8	.8	.7	.9	.6	.4	.4	1.6
Hot water, etc.....	1.3	1.1	1.2	1.1	.8	.6	.6	.4	.2	.3	.2	.2	.1	.1	.6
Falls of persons.....	4.5	4.1	3.5	3.7	3.2	2.8	2.8	2.5	1.7	1.5	1.4	1.4	1.1	1.0	2.4
From ladders.....	.3	.1	.1	.1	.1	.2	.1	.1	.1	.1	.1	(1)	(1)	(1)	.1
From scaffolds.....	.2	.2	.2	.2	.3	.2	.2	.2	.1	.1	.1	.1	.1	.1	.2
Into openings.....	.2	.1	.1	.3	.2	.1	.1	.1	(1)	(1)	(1)	(1)	(1)	(1)	.1
Due to insecure footing.....	3.8	3.7	3.1	3.1	2.6	2.3	2.3	2.1	1.4	1.3	1.1	1.1	.9	.8	2.0
Falling material, not otherwise specified.....	1.2	.7	.7	.6	.4	.3	.4	.4	.1	.1	.1	.1	.1	.1	.3
Handling.....	26.7	19.4	20.6	21.5	15.7	12.8	11.7	10.4	6.5	5.8	5.5	3.9	3.4	2.9	11.4
Dropped in handling.....	11.2	7.3	7.6	8.4	6.1	5.5	5.0	4.4	2.6	2.6	2.3	1.9	1.5	1.2	4.7
Caught between.....	3.4	2.6	2.6	3.1	2.1	1.7	1.7	1.3	.7	.7	.5	.4	.3	.4	1.4
Trucks.....	1.9	1.0	1.4	1.4	1.2	.9	.7	.6	.5	.4	.4	.2	.2	.2	.8
Lifting.....	2.5	2.3	2.5	2.5	2.0	1.4	1.4	1.1	.8	.8	.5	.3	.3	.3	1.3
Flying from tools.....	.2	.2	.1	.1	.1	.1	.1	.1	.1	.1	(1)	(1)	(1)	(1)	.1
Sharp points and edges.....	3.8	3.4	3.8	3.1	2.2	1.5	1.3	1.5	1.1	.6	.6	.3	.4	.4	1.6
Tools.....	3.7	2.6	2.6	2.9	2.0	1.7	1.4	1.4	.8	.7	.8	.6	.5	.5	1.5
Miscellaneous.....	12.9	8.8	6.5	7.0	5.4	4.6	4.1	3.1	1.3	1.9	1.8	1.6	1.1	1.4	3.9
Asphyxiating gas.....	.3	.2	.1	.1	.1	.1	.2	.1	.5	(1)	(1)	(1)	(1)	(1)	.1
Flying, not striking eye.....	.8	.6	.6	.5	.4	.5	.3	.2	.1	.3	.2	.2	.1	.1	.3
Flying, striking eye.....	2.9	2.1	1.7	1.9	1.6	1.6	1.3	1.1	.5	.4	.2	.3	.2	.1	1.1
Heat.....	.9	.8	.4	.4	.1	.2	.1	.1	.1	.1	(1)	(1)	(1)	(1)	.1
Other.....	8.0	5.1	3.7	4.1	3.2	2.2	2.2	1.5	.6	1.3	1.1	1.0	.8	.2	2.2
Grand total.....	60.3	43.5	41.5	44.4	34.5	28.8	26.3	22.0	13.3	13.0	12.8	10.2	8.2	6.8	24.8

¹ Less than one-tenth of 1 per cent.

The causes of accidents in the iron and steel industry for three selected departments, by years, are shown in Table 9, on the basis of both frequency rates and severity rates.

In both frequency and severity rates there are examples of remarkable declines over the period shown. The severity rates are rather irregular, as should be expected, since the exposure is not large enough to smooth out these irregularities.

TABLE 9.—ACCIDENT RATES IN SELECTED DEPARTMENTS IN THE IRON AND STEEL INDUSTRY, 1910 TO 1914 AND 1920 TO 1924, BY YEARS AND ACCIDENT CAUSES

<i>Blast furnaces</i>										
Accident cause	1910	1911	1912	1913	1914	1920	1921	1922	1923	1924
Accident frequency rates (per 10,000,000 hours' exposure)										
Machinery.....	21.6	38.3	23.0	28.0	8.7	17.6	7.2	10.1	12.2	15.2
Vehicles.....	19.7	2.3	6.0	4.0	-----	13.7	8.7	8.1	9.1	6.8
Hot substances.....	113.2	132.7	89.3	86.6	57.4	50.0	30.2	32.6	34.5	30.2
Falls of persons.....	78.7	33.7	53.0	26.0	43.0	23.1	17.9	12.7	14.7	15.8
Falling objects.....	143.0	55.3	66.7	62.3	31.7	21.9	14.3	16.6	15.6	18.7
Handling.....	108.3	94.3	74.3	56.3	43.0	61.2	41.4	27.9	37.1	35.3
Unclassified.....	138.0	65.0	103.0	40.3	65.7	41.7	26.5	27.9	20.9	20.5
Total.....	622.5	421.6	415.3	303.5	249.5	229.2	146.2	135.9	144.1	142.5

TABLE 9.—ACCIDENT RATES IN SELECTED DEPARTMENTS IN THE IRON AND STEEL INDUSTRY, 1910 TO 1914 AND 1920 TO 1924, BY YEARS AND ACCIDENT CAUSES—Con.

Blast furnaces—Continued

Accident cause	1910	1911	1912	1913	1914	1920	1921	1922	1923	1924
Accident severity rates (per 10,000 hours' exposure)										
Machinery.....	1.3	0.6	2.0	14.0	0.3	3.31	1.10	7.11	7.60	8.04
Vehicles.....	5.3	16.0				2.12	.11	4.55	7.14	2.05
Hot substances.....	2.0	20.3	.6	4.3	4.6	11.87	18.08	9.41	4.76	19.73
Falls of persons.....	34.3	1.0	.7	14.0	1.0	.31	13.38	2.80	3.79	2.32
Falling objects.....	1.7	.7	.7	.3	.7	1.08	.28	.37	.43	4.35
Handling.....	3.3	1.3	1.3	2.3	2.3	1.56	.88	.83	1.14	2.82
Unclassified.....	20.3	16.7	14.3	14.0	39.0	3.00	5.68	2.81	7.01	7.76
Total.....	68.2	56.6	19.6	48.9	47.9	23.25	39.51	27.88	31.87	47.07

Open hearth furnaces

Accident frequency rates (per 10,000,000 hours' exposure)										
Machinery.....	86.0	70.0	61.0	44.0	47.0	49.6	26.0	25.9	33.5	23.2
Vehicles.....	28.0	27.0	42.0	49.0	8.0	28.0	15.0	13.3	13.6	10.1
Hot substances.....	122.0	133.0	127.0	110.0	83.0	72.1	50.2	39.8	47.1	43.4
Falls of persons.....	(1)	(1)	(1)	(1)	(1)	27.8	28.1	21.4	21.7	23.2
Falling objects.....	(1)	(1)	(1)	(1)	(1)	41.0	42.7	37.5	29.7	33.1
Handling.....	111.0	82.0	84.0	77.0	75.0	99.0	87.9	57.8	47.6	59.8
Unclassified.....	292.0	198.0	209.0	225.0	169.0	51.7	43.2	30.5	26.7	21.4
Total.....	639.0	510.0	523.0	505.0	382.0	369.2	293.1	226.2	219.9	214.2
Accident severity rates (per 10,000 hours' exposure)										
Machinery.....	19.3	10.0	2.0	1.0	1.0	15.37	3.40	6.62	13.28	10.87
Vehicles.....	11.0	10.0	12.0	17.0	4.0	11.15	2.80	2.41	11.08	5.24
Hot substances.....	3.0	3.0	9.0	18.0	23.0	8.62	5.62	7.56	9.49	6.48
Falls of persons.....	(1)	(1)	(1)	(1)	(1)	1.75	.50	.38	5.03	4.59
Falling objects.....	(1)	(1)	(1)	(1)	(1)	5.66	.73	2.59	4.07	2.63
Handling.....	3.0	1.0	1.0	1.0	2.0	3.76	5.43	1.30	2.21	3.05
Unclassified.....	13.7	3.0	10.0	44.0	3.0	3.55	5.11	.90	3.89	.26
Total.....	50.0	27.0	34.0	81.0	33.0	49.86	23.69	21.76	49.05	33.12

Plate mills

Accident frequency rates (per 10,000,000 hours' exposure)										
Machinery.....	164.0	120.0	135.0	93.0	49.0	49.3	31.9	35.4	27.5	32.0
Vehicles.....	18.0	12.0	18.0	17.0	2.0	1.6	2.2	1.6	3.4	-----
Hot substances.....	53.0	47.0	55.0	55.0	24.0	23.0	15.4	24.4	11.0	12.0
Falls of persons.....	(1)	(1)	(1)	(1)	(1)	16.1	11.0	15.0	8.9	17.6
Falling objects.....	(1)	(1)	(1)	(1)	(1)	40.8	27.5	53.5	33.7	38.4
Handling.....	(1)	(1)	(1)	(1)	(1)	101.0	87.6	62.1	41.2	34.4
Unclassified.....	491.0	450.0	552.0	434.0	220.0	68.4	39.5	40.1	9.6	28.8
Total.....	726.0	629.0	760.0	599.0	295.0	300.2	215.1	232.1	135.3	163.2
Accident severity rates (per 10,000 hours' exposure)										
Machinery.....	34.0	2.0	8.0	17.0	1.3	18.83	1.52	1.66	5.35	8.08
Vehicles.....	15.0	.3	.3	14.0	-----	.01	.02	.20	.16	-----
Hot substances.....	1.0	1.0	1.0	1.0	.3	3.77	.19	.54	.20	.39
Falls of persons.....	(1)	(1)	(1)	(1)	(1)	.21	.11	.33	4.72	4.42
Falling objects.....	(1)	(1)	(1)	(1)	(1)	.56	6.82	.82	.64	5.57
Handling.....	(1)	(1)	(1)	(1)	(1)	1.12	3.77	2.36	3.58	2.49
Unclassified.....	11.0	10.7	21.7	6.0	5.4	3.76	.70	.44	.23	.68
Total.....	61.0	14.0	31.0	38.0	7.0	28.26	13.13	6.35	14.88	17.63

¹ Not separately shown; included in "Unclassified."

Metal Mines

ACCIDENT RATES for all metal mines from 1911 to 1927, as published by the United States Bureau of Mines, are shown in Table 10. The rate for injuries had a rising tendency up to 1925, but in 1925 and in 1926 the rate declined. The rising tendency was due in considerable measure to better reporting rather than to increased hazard. Fatality rates for underground workers declined from 1.83 in 1911 to 1.36 in 1927 (26 per cent). Since fatalities are always more completely reported than are minor injuries, this change may fairly be taken as an index of the shift in hazard during this period. Inspection of the items of the table will convince that there has been a real downward tendency in fatality frequency.

TABLE 10.—NUMBER OF FULL-YEAR WORKERS AND ACCIDENT FREQUENCY RATES FOR METAL MINES, 1911 TO 1927, BY YEARS

Year	Full-year workers			Accident frequency rates (per 1,000,000 hours' exposure)					
				Men killed			Men injured		
	Under-ground	Surface	Total	Under-ground	Surface	Total	Under-ground	Surface	Total
1911	98,389	57,700	156,089	1.83	0.88	1.48	72.43	30.03	56.76
1912	105,153	56,509	161,662	1.65	.82	1.36	78.81	34.65	63.37
1913	121,293	62,300	183,593	1.51	.72	1.24	70.15	39.84	59.86
1914	91,659	50,960	142,619	1.70	.61	1.31	87.27	40.68	70.62
1915	89,821	52,176	141,997	1.67	.65	1.30	106.62	41.95	82.85
1916	125,601	66,854	192,455	1.52	.61	1.21	102.04	48.80	83.55
1917	126,815	65,270	192,085	1.91	.64	1.48	96.61	48.67	80.32
1918	113,441	67,565	181,006	1.51	.66	1.19	96.87	49.08	79.03
1919	85,769	50,513	136,282	1.51	.53	1.14	96.39	44.25	77.06
1920	80,215	54,325	134,540	1.39	.56	1.05	103.66	46.73	80.67
1921	45,199	29,311	74,510	1.34	.55	1.03	104.28	50.76	83.23
1922	59,454	37,684	97,138	1.67	.41	1.18	116.24	47.30	89.49
1923	73,669	48,197	121,866	1.31	.54	1.00	120.85	47.40	91.80
1924	72,631	46,482	119,113	1.62	.46	1.17	122.27	46.43	92.68
1925	78,784	45,124	123,908	1.32	.94	1.00	121.65	46.85	94.51
1926	78,985	44,885	123,870	1.48	.54	1.16	102.86	45.00	81.67
1927	71,307	42,140	113,447	1.36	.49	1.03	95.59	37.23	73.85

Metallurgical Works

THE ACCIDENT experience in metallurgical plants from 1913 to 1927, as compiled by the United States Bureau of Mines, is recorded in Table 11. Neither fatal nor nonfatal accident rates show any regular trend. In smelting plants the fatality rates declined from 0.64 to 0.27 during the period and injury rates declined from 58.24 to 28.56, a drop of 51 per cent.

TABLE 11.—ACCIDENTS AND ACCIDENT RATES IN METALLURGICAL PLANTS, 1913 TO 1927, BY YEARS

Kind of plant and year	Men employed		Men killed	Men injured	Frequency rates (per 1,000,000 hours' exposure)	
	Actual number	Full-year workers			Men killed	Men injured
Ore-dressing plants:						
1913.....	14,985	16,154	16	1,977	0.33	40.79
1914.....	15,128	15,225	23	1,434	.50	31.40
1915.....	18,564	19,107	30	2,095	.52	36.55
1916 ¹	22,470	23,470	33	3,184	.47	45.22
1917 ¹	24,111	24,372	47	2,952	.64	40.37
1918 ¹	21,809	22,517	35	3,142	.62	46.51
1919 ¹	17,262	16,862	25	2,057	.49	40.74
1920 ¹	16,827	16,813	21	2,624	.42	52.02
1921 ¹	10,047	8,037	4	1,214	.17	50.35
1922 ¹	11,076	11,052	12	1,984	.36	59.84
1923 ¹	14,899	14,782	24	2,549	.64	57.48
1924 ¹	15,735	16,093	20	2,511	.41	52.01
1925 ¹	16,945	17,082	17	2,232	.33	43.55
1926 ¹	16,685	17,385	13	2,294	.25	43.92
1927 ¹	15,328	15,643	17	1,801	.36	39.38
Smelting plants:²						
1913.....	20,564	24,309	47	4,247	.64	58.24
1914.....	27,879	32,336	33	5,073	.34	58.48
1915.....	31,327	36,262	38	5,718	.35	52.56
1916 ¹	43,829	49,363	36	9,656	.24	65.20
1917 ¹	44,376	50,659	33	7,745	.35	50.96
1918 ¹	39,899	45,439	42	6,743	.31	49.47
1919 ¹	28,777	31,324	34	4,431	.36	47.15
1920 ¹	26,099	30,411	20	4,147	.22	45.46
1921 ¹	14,621	14,204	14	2,120	.33	49.96
1922 ¹	19,495	20,887	16	3,002	.26	47.90
1923 ¹	22,439	26,677	17	3,487	.21	43.57
1924 ¹	24,941	29,231	16	3,293	.18	37.55
1925 ¹	25,144	29,658	19	3,376	.21	37.94
1926 ¹	24,399	29,049	20	3,181	.23	36.50
1927 ¹	22,696	26,693	22	2,287	.27	28.56
Auxiliary works:³						
1913, 1914, 1915 ¹						
1916.....	14,007	15,763	14	2,240	.30	47.37
1917.....	15,555	17,014	16	2,881	.31	56.44
1918.....	18,044	20,111	17	2,808	.28	46.54
1919.....	15,081	16,172	5	1,638	.10	33.76
1920.....	16,306	18,363	20	2,092	.36	37.97
1921.....	8,762	8,308	9	1,151	.36	46.18
1922.....	12,829	14,069	17	1,692	.40	40.09
1923.....	16,533	18,040	17	2,388	.31	44.12
1924.....	15,520	17,624	19	2,422	.36	45.81
1925.....	16,846	19,480	8	2,103	.14	35.99
1926.....	16,642	19,253	15	1,804	.26	31.23
1927.....	15,453	17,955	15	1,653	.28	30.69

¹ Not including auxiliary works, such as shops, yards, etc.² Not including iron blast furnaces.³ Included under ore dressing and smelting plants.

Paper and Pulp Mills

THE FIGURES in Table 12 show the experience of the firms that are members of the paper and pulp section of the National Safety Council. In the interval from 1920 to 1927 frequency declined from 46.34 to 27.42, or 41 per cent, and severity from 2.60 to 1.57, or 40 per cent.

TABLE 12.—NUMBER OF FULL-YEAR WORKERS, NUMBER OF ACCIDENTS, AND ACCIDENT RATES IN PAPER AND PULP MILLS, 1920 TO 1927, BY YEARS

Year	Hours of exposure (thousands)	Full-year workers	Number of accidents	Frequency rates (per 1,000,000 hours' exposure)	Severity rates (per 1,000 hours' exposure)
1920 ¹	79,574	26,525	3,684	46.34	2.60
1921 ¹	81,196	27,065	3,380	41.68	2.53
1922 ¹	106,830	35,610	5,106	47.77	2.36
1923 ¹	115,902	38,684	5,042	43.50	2.73
1924 ¹	100,300	33,433	4,171	41.58	2.07
1925 ¹	104,623	34,874	4,021	38.43	2.15
1926 ¹	126,706	42,235	4,659	36.77	1.95
1927 ¹	185,370	61,790	5,084	27.42	1.57

¹ National Safety News, June, 1925, p. 30.² National Safety Council. Industrial Experience of Members of National Safety Council, 1927. Chicago, 1928, p. 22. Reproduced through courtesy of National Safety Council.

Petroleum Industry

THE ACCIDENT data given in Table 13 are taken from the experience of the members of the petroleum section of the National Safety Council. While in the period from 1921 to 1927 the accident frequency rates declined from 36.16 to 31.15, severity rates increased from 1.86 to 2.65.

TABLE 13.—NUMBER OF FULL-YEAR WORKERS, NUMBER OF ACCIDENTS, AND ACCIDENT RATES IN THE PETROLEUM INDUSTRY, 1921 TO 1923 AND 1925 TO 1927, BY YEARS ¹

Year	Hours of exposure (thousands)	Full-year workers	Number of accidents	Frequency rates (per 1,000,000 hours' exposure)	Severity rates (per 1,000 hours' exposure)
1921	27,010	9,003	841	36.16	1.86
1922	72,815	24,272	2,617	35.94	1.86
1923	131,090	43,697	4,442	34.14	2.58
1925	214,055	71,352	5,855	27.35	2.33
1926	250,802	83,601	7,332	29.23	2.47
1927	221,430	73,810	6,807	31.15	2.65

¹ National Safety Council. Industrial Experience of Members, 1927. Chicago, 1928. Reproduced through the courtesy of the National Safety Council.

Portland Cement Industry

THE ACCIDENT data for the Portland cement industry set forth in Table 14 are taken from the annual statistical number of the Accident Prevention Magazine (May-June, 1928) issued by the Portland Cement Association. This organization was among the first to compile statistics on a satisfactory basis and its annual studies are models of statistical presentation. According to the report, a production increase of more than 200 per cent in the nine years from 1919 to 1927 has been accompanied by a steady decrease in the accident frequency rate (except in 1920), this decrease amounting to 67.8 per cent, and there has also been a decrease in the accident severity rate of 55 per cent.

TABLE 14.—NUMBER OF FULL-YEAR WORKERS, NUMBER OF ACCIDENTS, AND ACCIDENT RATES IN THE MANUFACTURE OF PORTLAND CEMENT, 1919 TO 1927, BY YEARS

Year	Hours of exposure (thousands)	Full-year workers	Number of accidents	Number of deaths	Frequency rates (per 1,000,000 hours' exposure)	Severity rates (per 1,000 hours' exposure)
1919.....	48,743	16,248	2,119	38	43.5	6.7
1920.....	59,586	19,862	2,615	53	43.8	7.3
1921.....	62,247	20,749	2,646	44	42.4	6.2
1922.....	63,527	21,176	2,592	52	41.7	6.5
1923.....	76,641	25,547	3,197	45	41.6	5.4
1924.....	87,767	29,256	3,058	60	35.3	5.9
1925.....	97,415	32,472	2,548	61	27.0	5.0
1926.....	97,381	32,460	2,172	45	22.0	4.0
1927.....	93,871	31,290	1,340	30	14.0	3.0

Quarries

THE FACTS regarding quarry accidents, as published by the United States Bureau of Mines, are shown in Table 15. The fatality rate for the first 5-year period is slightly higher than that for the second period, and in the last period there has been a further pronounced drop. The exposure during the interval has been singularly uniform. The declining death rate, which reaches its lowest point in 1927, reflects the improvement in equipment and in method.

TABLE 15.—NUMBER OF MEN EMPLOYED, NUMBER OF ACCIDENTS, AND ACCIDENT, FREQUENCY RATES FOR QUARRIES IN THE UNITED STATES, 1911 TO 1927, BY YEARS, AND BY 5-YEAR PERIODS

Year	Men employed		Men killed	Men injured	Frequency rates (per 1,000,000 hours' exposure)	
	Actual number	Full-year workers			Men killed	Men injured
1911.....	110,954	84,417	188	5,390	0.74	21.28
1912.....	113,105	93,837	213	6,552	.76	23.67
1913.....	136,278	87,141	183	7,739	.70	29.60
1914.....	87,936	68,187	180	7,836	.88	38.31
1915.....	100,740	82,447	148	9,671	.60	39.10
Average, 5 years.....	133,803	83,206	182	7,437	.73	29.80
1916.....	90,707	76,457	173	13,427	.75	58.54
1917.....	82,290	71,525	131	13,242	.61	61.71
1918.....	68,332	59,285	125	8,719	.70	49.02
1919.....	75,505	63,794	123	9,199	.64	48.07
1920.....	86,488	77,089	178	11,217	.77	48.50
Average, 5 years.....	80,682	69,630	146	11,161	.70	53.43
Average, 10 years.....	92,243	76,418	104	9,299	.72	40.56
1921.....	77,185	59,958	120	10,465	.67	58.18
1922.....	79,081	68,861	132	11,839	.64	57.31
1923.....	92,455	85,153	143	14,990	.56	58.68
1924.....	94,242	84,246	138	14,777	.54	58.34
1925.....	91,872	83,487	149	14,165	.59	56.56
Average, 5 years.....	86,967	76,377	136	13,247	.59	57.81
1926.....	91,146	82,361	154	13,201	.62	53.43
1927.....	91,517	82,609	135	13,459	.54	54.31

Railways, Electric

THE ACCIDENT experience of the electric railways, as published by the Interstate Commerce Commission, is rather limited, and accident rates on the basis of man-hours exposure are not available. Table 16 presents the latest and most significant data reported, taken from figures published by the American Electric Railway Association. There were 105 companies which reported fully on the items included in the inquiry.

It will be noted that in nearly every comparison possible to make, the year 1924 was more satisfactory than 1923. This is particularly true in cases of injury per 1,000,000 passengers carried, the figures being 6.48 for 1923 and 5.53 for 1924.

TABLE 16.—ACCIDENT EXPERIENCE OF 105 AMERICAN ELECTRIC RAILWAYS IN 1923 AND 1924

Item	1923	1924	Item	1923	1924
Car-miles operated.....	448,489,978	445,200,730	Accidents per 1,000,000 car-miles—Continued.		
Passengers carried.....	3,051,621,122	3,239,039,582	By collision with cars.....	9.65	8.08
Number of accidents to—			To employees.....	10.87	10.39
Employees.....	4,875	4,627	To passengers.....	44.11	40.29
Passengers.....	19,784	17,935	To other persons.....	21.61	21.91
Other persons.....	9,691	9,758	Total.....	76.59	72.59
Total.....	34,350	32,320	Accidents to passengers per 1,000,000 passengers carried.....	6.48	5.53
Number of fatalities.....	337	338			
Accidents per 1,000,000 car-miles:					
By collision with motor vehicles....	195.87	194.35			

Railways, Steam

ACCIDENT DATA for American railways which are available cover a longer period and are more comprehensive than those of any other industry. The data in the tables which follow are derived from the accident bulletins of the Interstate Commerce Commission, which contain very detailed information.

Table 17 presents summary figures showing the number killed and injured during the period from 1888 to 1927. The greatly lessened hazard is shown very conclusively by the figures for passenger casualty. The peak of passenger fatality was in 1907 when 610 were killed. The high year for passenger injuries was 1913 with 15,130 cases. From this point there has been an irregular decline until 1927 when 88 passengers were killed and 3,893 injured.

The data for employees show the peak of fatality (4,534) also in 1907, the peak of injury (176,923) being in 1916. By 1925 fatalities had declined to 1,569 and injuries to 88,223.

TABLE 17.—NUMBER OF PASSENGERS, EMPLOYEES, AND OTHER PERSONS KILLED OR INJURED IN REPORTABLE STEAM RAILWAY ACCIDENTS OF ALL KINDS, 1888 TO 1927, BY YEARS¹

Year ending—	Passengers		Employees		Other persons		Total	
	Killed	Injured	Killed	Injured	Killed	Injured	Killed	Injured
June 30, 1888.....	315	2,138	2,070	20,148	2,897	3,602	5,282	25,888
June 30, 1889.....	310	2,146	1,972	20,028	3,541	4,135	6,823	26,309
June 30, 1890.....	286	2,425	2,451	22,396	3,598	4,206	6,335	29,027
June 30, 1891.....	293	2,972	2,660	26,140	4,076	4,769	7,029	33,881
June 30, 1892.....	276	3,227	2,554	28,267	4,217	5,158	7,147	36,652
June 30, 1893.....	299	3,229	2,727	31,729	4,320	5,435	7,346	40,393
June 30, 1894.....	324	3,034	1,823	23,422	4,300	5,433	6,447	31,889
June 30, 1895.....	170	2,375	1,811	25,696	4,155	5,677	6,126	33,748
June 30, 1896.....	181	2,873	1,861	29,969	4,406	5,845	6,448	38,687
June 30, 1897.....	222	2,795	1,693	27,667	4,522	6,269	6,437	36,731
June 30, 1898.....	221	2,945	1,958	31,761	4,680	6,176	6,859	40,882
June 30, 1899.....	239	3,442	2,210	34,923	4,674	6,255	7,123	44,620
June 30, 1900.....	249	4,128	2,550	39,643	5,066	6,549	7,865	50,320
June 30, 1901.....	282	4,988	2,675	41,142	5,498	7,209	8,455	53,339
June 30, 1902.....	345	6,683	2,969	50,524	5,274	7,455	8,588	64,662
June 30, 1903.....	355	8,231	3,606	60,481	5,879	7,841	9,840	76,553
June 30, 1904.....	441	9,111	3,632	67,067	5,973	7,977	10,046	81,155
June 30, 1905.....	537	10,457	3,361	66,833	5,805	8,718	9,703	86,008
June 30, 1906.....	359	10,764	3,929	76,701	6,330	10,241	10,618	97,706
June 30, 1907.....	610	13,041	4,534	87,644	6,095	10,331	11,839	111,016
June 30, 1908.....	381	11,556	3,405	82,487	6,402	10,187	10,188	104,230
June 30, 1909.....	253	10,311	2,610	75,006	5,859	10,309	8,722	95,626
June 30, 1910.....	324	12,451	3,382	95,671	5,976	11,385	9,682	119,507
June 30, 1911.....	299	12,042	3,602	126,039	6,495	12,078	10,396	150,159
June 30, 1912.....	283	14,938	3,635	142,442	6,667	12,158	10,585	169,538
June 30, 1913.....	350	15,130	3,715	171,417	6,899	13,761	10,964	200,308
June 30, 1914.....	232	13,887	3,259	165,212	6,811	13,563	10,302	192,662
June 30, 1915.....	199	10,914	2,152	138,092	6,270	13,034	8,621	162,040
June 30, 1916.....	239	7,488	2,687	160,663	6,438	12,224	9,364	180,375
Dec. 31, 1916.....	246	7,152	2,941	176,923	6,814	12,647	10,001	196,722
Dec. 31, 1917.....	301	7,532	3,199	174,247	6,587	12,976	10,087	194,805
Dec. 31, 1918.....	471	7,316	3,419	156,113	5,396	11,246	9,286	174,575
Dec. 31, 1919.....	273	7,456	2,138	131,018	4,567	10,579	6,978	149,053
Dec. 31, 1920.....	229	7,591	2,578	149,414	4,151	11,304	6,958	168,309
Dec. 31, 1921.....	205	5,584	1,446	104,530	4,345	10,571	5,996	120,685
Dec. 31, 1922.....	200	6,153	1,657	117,197	4,468	11,521	6,325	134,871
Dec. 31, 1923.....	138	5,847	2,026	152,678	5,221	13,187	7,385	171,712
Dec. 31, 1924.....	149	5,354	1,543	125,319	4,925	13,066	6,617	143,739
Dec. 31, 1925.....	171	4,952	1,599	119,224	4,996	13,259	6,766	137,435
Dec. 31, 1926.....	152	4,461	1,672	111,903	5,206	13,871	7,090	130,235
Dec. 31, 1927.....	88	3,893	1,569	88,223	5,335	12,701	6,992	104,817

¹ Figures for years 1911 to 1915 include industrial and other nontrain accidents to employees only; and for years 1908 to 1910 do not cover switching and terminal roads; otherwise, the statement covers all reportable accidents.

Table 18 (as is Table 17) is drawn from Accident Bulletin No. 96 of the Interstate Commerce Commission (p. 106) and relates solely to trainmen on Class I roads (i. e., roads whose annual operating revenues are above \$1,000,000). The figures in the table have been rearranged to permit comparisons which are somewhat difficult to make in the original form. The rates have also been recalculated on the basis of 1,000,000 hours' exposure rather than of 1,000 men employed. This renders them fairly comparable with rates computed for other industries. It is an important step toward general comparability that the Interstate Commerce Commission has in recent years required exposure to be reported in terms of man-hours.

The table is of particular interest in view of recent discussion of the question, "Are accidents increasing?" In the course of such discussion it has become quite evident that our accident statistics are as yet neither sufficiently extended nor sufficiently precise to make possible a general answer to this question. There is a strong tendency to draw conclusions from current experiences, and if the

present year shows higher rates or greater cost than the preceding year to suspect that this is an indication of a general tendency.

The showing of the railway accident statistics is accordingly important because records have been kept long enough and are of such a degree of accuracy as to justify regarding their indications as dependable. They afford an opportunity for testing the immediate impression by the trend disclosed by a longer interval.

In this case, as always, the really informative figures are those of rates for fatality and for injury. If the number of trainmen, of fatalities, and of injuries be considered separately it will be difficult, if not impossible, to see clearly what the figures indicate. It is only when it is possible to unite the exposure with the number of cases or with the loss of time expressed in days and so to produce frequency or severity rates that the significance becomes evident. In this railway group it is not possible to determine severity rates.

The following observations regarding accident frequency on the railroads are suggested by inspection of the tables:

1. There is a marked downward tendency in the period 1916 to 1927.

2. There are two years during the period (1920 and 1923) in each of which there is a decided upward tendency as compared with the preceding years.

3. In fatalities the lowest rates are found in 1924, while the lowest rates for injuries are in 1927.

These figures are quite conclusive that whatever may be true of other industries, American railways have maintained a successful fight against conditions which tend toward increased accident rates.

TABLE 18.—FATALITIES AND INJURIES AND FREQUENCY RATES THEREFOR AMONG RAILROAD TRAINMEN, 1916 TO 1927, BY YEARS AND OCCUPATIONS

Number of trainmen

Occupation	1916	1918	1920	1921	1922	1923	1924	1925	1926	1927
Yard service:										
Engineers.....	15, 878	21, 310	21, 363	16, 929	18, 703	22, 142	20, 593	21, 349	22, 253	21, 562
Firemen.....	16, 190	21, 979	21, 549	17, 343	19, 249	22, 664	21, 106	21, 804	22, 727	22, 100
Conductors.....	15, 362	20, 823	20, 236	16, 745	18, 639	22, 002	20, 545	21, 170	22, 066	21, 437
Brakemen.....	40, 175	53, 790	50, 799	42, 721	46, 963	55, 301	51, 775	52, 952	55, 334	53, 653
Total.....	87, 605	117, 902	113, 947	93, 738	103, 544	122, 109	114, 019	117, 275	122, 380	118, 752
Road freight service:										
Engineers.....	31, 675	34, 990	33, 594	28, 317	29, 372	34, 137	31, 015	30, 653	31, 563	30, 521
Firemen.....	33, 637	38, 102	35, 756	30, 317	31, 507	36, 504	33, 346	32, 714	33, 544	32, 315
Conductors.....	25, 430	27, 679	27, 297	22, 598	23, 254	26, 901	24, 864	24, 919	25, 733	24, 821
Brakemen.....	63, 285	69, 048	67, 127	56, 620	57, 746	65, 750	60, 539	59, 981	61, 576	59, 384
Total.....	154, 027	169, 819	163, 774	137, 852	141, 879	163, 292	149, 764	148, 267	152, 416	147, 041
Road passenger service:										
Engineers.....	13, 429	12, 709	12, 930	12, 924	12, 710	13, 042	12, 977	12, 930	13, 027	12, 971
Firemen.....	13, 131	12, 419	12, 630	12, 768	12, 491	12, 754	12, 674	12, 561	12, 946	12, 254
Conductors.....	10, 633	10, 444	10, 788	10, 546	11, 380	11, 756	11, 730	11, 726	11, 710	11, 652
Brakemen.....	14, 800	14, 423	15, 849	15, 315	14, 350	14, 558	14, 369	14, 218	14, 072	13, 938
Baggagemen.....	5, 618	5, 371	5, 661	5, 751	5, 729	5, 871	5, 846	5, 801	5, 768	5, 712
Total.....	57, 611	55, 366	57, 858	57, 304	56, 660	57, 981	57, 596	57, 236	57, 073	56, 527
All trainmen..	299, 243	343, 087	335, 579	288, 894	302, 083	343, 382	321, 379	322, 778	331, 869	322, 320

TABLE 18.—FATALITIES AND INJURIES AND FREQUENCY RATES THEREFOR AMONG RAILROAD TRAINMEN, 1916 TO 1927, BY YEARS AND OCCUPATIONS—Continued

Fatalities

Occupation	1916	1918	1920	1921	1922	1923	1924	1925	1926	1927
Number										
Yard service:										
Engineers.....	11	11	9	11	12	12	7	12	9	3
Firemen.....	22	27	18	7	5	17	5	9	4	6
Conductors.....	71	73	67	39	43	59	45	44	53	49
Brakemen.....	341	397	363	169	202	263	195	238	222	208
Total.....	445	508	457	226	262	351	252	303	288	266
Road freight service:										
Engineers.....	70	84	63	32	46	55	37	34	25	37
Firemen.....	107	132	84	36	44	59	43	30	30	46
Conductors.....	72	104	62	48	37	60	47	40	59	43
Brakemen.....	432	527	396	186	201	262	168	188	197	172
Total.....	681	847	605	302	328	436	295	292	311	298
Road passenger service:										
Engineers.....	45	59	69	37	40	44	32	44	39	34
Firemen.....	52	50	52	33	39	45	31	36	37	30
Conductors.....	6	11	6	9	3	7	4	5	5	5
Brakemen.....	8	25	16	10	9	10	13	7	8	2
Baggagemen.....	2	5	4	2	6	3	1	4	3	4
Total.....	113	150	147	94	97	109	81	96	92	75
All trainmen..	1,239	1,505	1,209	622	687	896	628	691	691	639
Frequency rates (per 1,000,000 hours' exposure)										
Yard service:										
Engineers.....	0.23	0.17	0.14	0.22	0.21	0.18	0.11	0.19	0.13	0.05
Firemen.....	.45	.41	.23	.13	.09	.25	.08	.14	.06	.09
Conductors.....	1.54	1.17	1.10	.73	.77	.89	.73	.69	.80	.76
Brakemen.....	2.83	2.46	2.38	1.32	1.43	1.59	1.26	1.50	1.34	1.29
Total.....	1.69	1.44	1.34	.80	.84	.96	.74	.86	.78	.75
Road freight service:										
Engineers.....	.74	.80	.63	.38	.52	.54	.40	.37	.26	.40
Firemen.....	1.03	1.15	.73	.40	.47	.54	.43	.31	.30	.47
Conductors.....	.94	1.25	.76	.71	.53	.74	.63	.54	.76	.58
Brakemen.....	2.23	2.54	1.97	1.00	1.16	1.33	.93	1.04	1.07	.97
Total.....	1.47	1.66	1.23	.73	.77	.89	.66	.66	.68	.68
Road passenger service:										
Engineers.....	1.12	1.55	1.73	.95	1.05	1.12	.82	1.13	1.00	.87
Firemen.....	1.32	1.34	1.37	.94	1.04	1.18	.82	.96	.99	.82
Conductors.....	.19	.35	.19	.23	.09	.20	.11	.14	.14	.14
Brakemen.....	.18	.58	.34	.22	.21	.23	.30	.16	.19	.15
Baggagemen.....	.12	.31	.24	.12	.35	.17	.06	.23	.17	.23
Total.....	.65	.90	.85	.55	.57	.63	.47	.56	.54	.44
All trainmen..	1.38	1.46	1.20	.72	.76	.87	.65	.71	.69	.66

TABLE 18.—FATALITIES AND INJURIES AND FREQUENCY RATES THEREFOR AMONG RAILROAD TRAINMEN, 1916 TO 1927, BY YEARS AND OCCUPATIONS—Continued

Injuries

Occupation	1916	1918	1920	1921	1922	1923	1924	1925	1926	1927
Number										
Yard service:										
Engineers.....	1,078	908	1,023	546	746	835	727	654	721	566
Firemen.....	1,644	1,708	1,691	854	1,082	1,561	1,104	1,123	1,117	806
Conductors.....	1,993	1,440	1,607	1,094	1,414	1,630	1,498	1,595	1,739	1,416
Brakemen.....	12,209	10,472	11,666	6,711	7,562	10,223	8,328	8,663	9,369	7,552
Total.....	16,924	14,528	15,987	9,205	10,804	14,249	11,657	12,035	12,946	10,400
Road freight service:										
Engineers.....	2,360	2,547	2,130	1,404	1,649	1,832	1,370	1,271	1,343	959
Firemen.....	5,145	5,706	5,085	2,791	3,274	4,036	2,747	2,584	2,645	2,016
Conductors.....	3,051	2,832	2,503	1,921	2,227	2,501	2,209	2,223	2,378	2,118
Brakemen.....	13,115	11,938	11,439	7,012	7,613	9,409	7,629	7,632	7,904	6,758
Total.....	23,671	23,023	21,847	13,128	14,763	17,778	13,955	13,710	14,270	11,851
Road passenger service:										
Engineers.....	714	777	804	602	715	761	617	532	582	445
Firemen.....	1,245	1,253	1,535	997	1,144	1,205	1,017	943	957	792
Conductors.....	298	304	274	209	282	304	302	241	274	251
Brakemen.....	718	674	688	570	570	639	587	533	572	468
Baggagemen.....	361	283	344	269	308	316	303	303	263	255
Total.....	3,336	3,291	3,645	2,647	3,019	3,315	2,826	2,552	2,648	2,211
All trainmen.....	43,921	40,842	40,979	24,980	28,586	35,342	28,438	28,297	29,864	24,462
Frequency rates (per 1,000,000 hours' exposure)										
Yard service:										
Engineers.....	22.63	14.20	15.96	10.75	13.30	12.57	11.77	10.21	10.80	8.75
Firemen.....	33.85	25.90	26.16	13.41	18.74	22.97	17.44	17.17	16.38	13.06
Conductors.....	43.25	23.05	26.47	21.78	25.29	24.69	24.30	25.11	26.27	22.02
Brakemen.....	101.90	64.89	76.55	52.36	53.68	61.62	53.61	54.53	56.44	46.92
Total.....	64.40	41.07	46.77	32.73	34.78	38.90	34.08	34.21	35.26	29.19
Road freight service:										
Engineers.....	24.83	24.26	21.13	16.53	18.71	17.90	14.72	13.82	14.18	10.47
Firemen.....	50.99	49.91	47.40	30.69	34.64	36.85	27.46	26.33	26.28	20.80
Conductors.....	39.99	34.10	32.89	28.34	31.52	20.99	29.61	29.74	30.83	28.44
Brakemen.....	69.08	57.63	56.80	41.28	43.95	47.70	42.01	42.41	42.79	37.93
Total.....	51.23	45.19	43.45	31.74	34.68	36.29	31.06	30.82	31.21	26.87
Road passenger service:										
Engineers.....	17.72	20.38	20.73	15.53	18.75	19.45	15.85	13.71	14.89	11.44
Firemen.....	31.60	33.63	40.51	26.03	30.53	33.87	26.75	25.02	25.53	21.54
Conductors.....	9.34	9.70	8.47	6.61	8.26	8.62	8.58	6.85	7.80	7.18
Brakemen.....	16.17	15.58	14.47	12.41	13.24	14.63	13.62	12.50	13.55	11.19
Baggagemen.....	21.42	17.56	20.26	15.56	17.92	17.94	17.28	17.41	15.20	14.88
Total.....	19.30	19.81	21.00	15.40	17.43	19.06	16.36	14.86	15.47	13.04
All trainmen.....	48.94	39.68	40.70	28.82	31.54	34.31	29.50	29.22	30.30	25.30

Rubber Industry

THE RUBBER section of the National Safety Council has maintained a very carefully worked out statistical presentation of its experiences for the past seven years. The rates are somewhat irregular, with no definite trend.

TABLE 19.—NUMBER OF FULL-YEAR WORKERS, NUMBER OF ACCIDENTS, AND ACCIDENT RATES IN RUBBER INDUSTRY, 1921 TO 1927,¹ BY YEARS

Year	Hours of exposure (thousands)	Full-year workers	Number of accidents	Frequency rates (per 1,000,000 hours' exposure)	Severity rates (per 1,000 hours' exposure)
1921.....	83, 101	27, 700	2, 196	26. 42	0. 94
1922.....	123, 152	41, 051	4, 431	35. 97	. 87
1923.....	134, 272	44, 757	4, 182	31. 15	1. 32
1924.....	125, 594	41, 865	3, 449	27. 46	1. 00
1925.....	173, 438	57, 813	5, 054	29. 15	1. 11
1926.....	176, 698	58, 899	5, 313	30. 09	1. 17
1927.....	151, 239	50, 413	5, 809	38. 41	1. 00

¹ National Safety News, March, 1923, p. 15; August, 1923, p. 39; November, 1923, p. 40; and Industrial Accident Experience of Members of National Safety Council, 1927 (data reproduced through the courtesy of the National Safety Council).

Textile Industry

THE EXPERIENCE of the members of the textile section of the National Safety Council from 1923 to 1927 shows no decided trend in accident frequency and severity, though the rates for 1927 are some lower than those for 1923. While the textile industry is relatively of low hazard, the fact that accident frequency in such mills is greater than that in some of the best steel mills makes it obvious that there is opportunity for improvement.

Table 20 records the experience of the five-year period 1923 to 1927:

TABLE 20.—NUMBER OF FULL-YEAR WORKERS, NUMBER OF ACCIDENTS, AND ACCIDENT RATES IN THE TEXTILE INDUSTRY, 1923 TO 1927, BY YEARS¹

Year	Hours of exposure (thousands)	Full-year workers	Number of accidents	Frequency rates (per 1,000,000 hours' exposure)	Severity rates (per 1,000 hours' exposure)
1923.....	46, 343	15, 448	604	13. 03	0. 67
1924.....	53, 196	17, 732	601	11. 29	. 89
1925.....	77, 925	25, 975	1, 061	13. 61	. 45
1926.....	110, 483	36, 828	1, 449	13. 13	. 64
1927.....	140, 213	46, 738	1, 749	12. 47	. 53

¹ National Safety Council. Industrial Experience of Members of National Safety Council, 1927. Chicago, 1928. Reproduced through courtesy of National Safety Council.

Accident Hazards in Window Cleaning

A STUDY conducted by the Bureau of Labor Statistics during 1928, which revealed a condition somewhat at variance with the generally accepted ideas on the subject, was one covering an investigation of the window-washing industry, including accident hazards to which these workers are exposed and a comparison of the workmen's compensation experience as applied to the industry in the various States. Unfortunately, the data obtained were meager because of the small number of window washers, even in the large cities, the fact that they are not generally organized, and the fact that in the making of compensation insurance rates they are not always considered as a separate industry, the workers being class-

ified instead in the building-service group with which the accident experience of window washers is so closely interwoven as to render it almost impossible to present such data without being affected by considerations and conditions which are alien to it. Thus the available data regarding this industry are incomplete and their value as a basis for definite conclusions somewhat impaired.

An outstanding conclusion of the investigation appears to be the fact that insurance rates in the States which provide separate rates for this industry are unnecessarily high and should be revised on the basis of the experience at hand, even though inadequate and incomplete. It is difficult to escape the conclusion that these rates have been made on the theory that window washing is the most hazardous of occupations, in which practically every accident means a death. The bureau found that this theory is not correct. The records of 12 States, which are the only ones out of 33 reports received that could be used, covering periods during the interval from November 1, 1923, to November 12, 1926, show that of 202 reported accidents to window cleaners, only 6.9 per cent resulted in death, while the New York State Industrial Commission reported that during the year ended June 30, 1926, 7 deaths and 102 nonfatal injuries were reported to the authorities as occurring to those engaged in "cleaning—vacuum and window." This is a fatality per cent of 6.4. An insurance company, said to write a majority of these risks, reported that of 122 cases filed during 1924, only 5, or 4.1 per cent, resulted in death, but that, covering a 6-year period, 47 injuries were reported by New York City alone, of which 23, or 48.9 per cent, resulted in death. The difference between these percentages may be accounted for only by incomplete reporting. Many of the minor accidents are doubtless not reported at all, or they are buried in some other classification, as, for instance, the building-service group which includes janitors, etc.

The general assumption that fatalities in window washing are due to falls seems to be borne out by the data obtained. Thus, of 25 fatalities reported by nine States and one insurance company during 1924, 1925, and 1926, 24 resulted from falls. Of the nonfatal injuries, about 60 per cent resulted from falls, and 11.8 per cent were due to falling objects striking cleaners. In New York State, for the year ended June 30, 1925, all of the three fatalities reported resulted from falls.

Accidents in the Federal Government Service

ACCIDENT frequency rates in the various departments of the Federal Government are shown in the table following. The tabulation was made from figures compiled by the United States Employees' Compensation Commission and covers civilian employees only.

INDUSTRIAL ACCIDENTS

NUMBER OF ACCIDENTS AND ACCIDENT FREQUENCY RATES IN THE GOVERNMENT SERVICE, 1921 TO 1927, BY DEPARTMENTS AND YEARS

[Based on number of employees shown by the Civil Service Commission's yearly reports and on number of accidents reported to the United States Employees' Compensation Commission]

Year	Number of employees	Number of accidents			Frequency rates (per 1,000,000 hours' exposure)		
		Fatal	Nonfatal	Total	Fatal accidents	Nonfatal accidents	Total
All Government services							
1921.....	560,673	362	18,042	18,404	0.25	12.88	13.13
1922.....	535,185	353	17,905	18,258	.26	13.38	13.64
1923.....	535,781	279	17,713	17,992	.20	13.22	13.43
1924.....	546,981	278	20,260	20,538	.20	14.82	15.02
1925.....	538,290	314	20,374	20,688	.23	15.14	15.37
1926.....	536,426	318	19,209	19,527	.25	15.08	15.33
1927.....	525,843	357	20,190	20,547	.28	15.99	16.27
Total.....	3,779,179	2,261	133,693	135,954	.25	14.75	15.00
Department of Agriculture							
1921.....	18,722	10	638	648	0.22	13.63	13.85
1922.....	19,773	11	919	930	.22	18.59	18.82
1923.....	20,078	17	971	988	.34	19.34	19.68
1924.....	20,385	25	1,287	1,312	.49	25.25	25.74
1925.....	20,098	26	1,291	1,317	.52	25.69	26.21
1926.....	20,688	34	1,652	1,686	.68	33.27	33.95
1927.....	21,518	27	1,760	1,787	.52	34.08	34.60
Total.....	141,262	150	8,518	8,668	.44	25.12	25.56
Department of Commerce							
1921.....	11,748	9	246	255	0.31	8.38	8.69
1922.....	11,267	15	272	287	.53	9.66	10.19
1923.....	11,199	11	332	343	.40	11.86	12.25
1924.....	12,119	8	319	327	.26	10.52	10.79
1925.....	14,631	11	348	359	.30	9.52	9.82
1926.....	14,682	11	433	444	.30	12.28	12.58
1927.....	14,950	11	414	425	.31	11.54	11.85
Total.....	90,596	76	2,364	2,440	.35	10.87	11.22
Government Printing Office							
1921.....	4,403	2	89	91	0.18	8.09	8.27
1922.....	4,024	1	63	64	.10	6.26	6.36
1923.....	3,989	-----	42	42	-----	4.21	4.21
1924.....	4,269	-----	44	44	-----	4.13	4.13
1925.....	3,984	-----	27	27	-----	2.71	2.71
1926.....	4,109	1	39	40	.10	3.95	4.05
1927.....	4,078	-----	42	42	-----	4.29	4.29
Total.....	28,856	4	346	350	.06	4.98	5.04
Department of the Interior							
1921.....	19,735	14	957	971	0.29	19.39	19.68
1922.....	17,834	18	1,041	1,059	.41	23.35	23.75
1923.....	17,082	16	1,415	1,431	.37	33.12	33.49
1924.....	16,679	19	1,676	1,695	.46	40.20	40.64
1925.....	13,125	11	1,019	1,030	.34	31.06	31.39
1926.....	13,468	8	609	617	.25	18.54	19.09
1927.....	14,960	9	676	685	.25	18.83	19.08
Total.....	112,893	95	7,393	7,488	.35	27.29	27.64

NUMBER OF ACCIDENTS AND ACCIDENT FREQUENCY RATES IN THE GOVERNMENT SERVICE, 1921 TO 1927, BY DEPARTMENTS AND YEARS—Continued

Year	Number of employees	Number of accidents			Frequency rates (per 1,000,000 hours' exposure)		
		Fatal	Nonfatal	Total	Fatal accidents	Nonfatal accidents	Total
Department of Labor							
1921.....	3,768	1	112	113	0.11	11.89	11.99
1922.....	3,744	2	100	102	.22	10.68	10.90
1923.....	3,821		112	112		11.72	11.72
1924.....	3,876	1	111	112	.11	11.46	11.56
1925.....	3,614	5	107	112	.55	11.84	12.40
1926.....	4,011	2	90	92	.21	9.45	9.66
1927.....	4,050	2	74	76	.21	7.82	8.03
Total.....	26,884	13	706	719	.20	10.94	11.14
Department of the Navy							
1921.....	60,653	36	2,918	2,954	0.24	19.25	19.48
1922.....	42,515	27	1,516	1,543	.25	14.27	14.52
1923.....	40,557	30	1,423	1,453	.30	14.04	14.33
1924.....	42,686	28	1,882	1,910	.26	17.64	17.90
1925.....	42,842	24	1,662	1,686	.23	15.52	15.74
1926.....	42,973	39	1,778	1,817	.38	17.24	17.62
1927.....	43,198	27	1,696	1,723	.26	16.36	16.62
Total.....	315,424	211	12,875	13,086	.28	17.01	17.29
Post Office Department							
1921.....	281,658	62	5,218	5,280	0.08	7.42	7.50
1922.....	284,207	64	6,196	6,260	.10	8.72	8.81
1923.....	294,226	50	6,559	6,609	.07	8.92	8.99
1924.....	301,000	42	7,395	7,437	.06	9.83	9.89
1925.....	304,092	47	7,488	7,535	.06	9.85	9.91
1926.....	289,080	56	7,896	7,952	.08	11.35	11.43
1927.....	278,637	54	8,862	8,916	.08	13.25	13.33
Total.....	2,033,800	375	49,614	49,989	.08	10.17	10.24
Department of the Treasury							
1921.....	68,648	30	1,157	1,187	0.18	6.74	6.91
1922.....	56,392	44	1,203	1,247	.31	8.53	8.84
1923.....	53,604	17	938	955	.13	7.00	7.13
1924.....	53,121	16	1,013	1,029	.12	7.63	7.75
1925.....	52,607	22	1,037	1,059	.17	7.88	8.05
1926.....	51,569	19	864	883	.11	4.93	5.04
1927.....	51,741	22	983	1,005	.18	7.92	8.10
Total.....	387,682	170	7,195	7,365	.18	7.70	7.88
Department of War							
1921.....	53,553	124	6,125	6,249	0.92	45.74	46.68
1922.....	46,840	104	5,648	5,752	.89	48.23	49.12
1923.....	44,842	96	4,913	5,009	.85	43.82	44.68
1924.....	45,906	102	5,295	5,397	.89	46.14	47.03
1925.....	38,975	115	5,793	5,908	1.18	59.45	60.64
1926.....	45,285	63	4,700	4,763	.58	43.24	43.82
1927.....	42,771	124	4,496	4,620	1.21	43.80	45.01
Total.....	318,172	728	36,970	37,698	.95	48.42	49.37
All other Government services							
1921.....	37,785	74	582	656	0.78	6.16	6.95
1922.....	48,589	67	947	1,014	.55	7.80	8.34
1923.....	46,373	42	1,008	1,050	.36	8.70	9.06
1924.....	46,940	37	1,238	1,275	.31	10.55	10.86
1925.....	44,322	53	1,602	1,655	.48	14.46	14.94
1926.....	49,661	85	1,148	1,233	.71	9.63	10.34
1927.....	49,940	81	1,187	1,268	.68	9.90	10.58
Total.....	323,610	439	7,712	8,151	.57	9.93	10.50

Comparative Accident Experience of a Large Group of Plants in 1925 and 1926

IN THE former handbook (Bul. No. 439, p. 251) the accident experience of American industry in 1925, as computed by the National Safety Council from reports of 1,231 industrial plants holding membership therein, is given. Similar figures for 1926 representing 1,725 plants, are set forth in the Safety News for September, 1927. This represents an increase of 494 (40 per cent) over the number of plants reporting in 1925. The accident frequency rate (per 1,000,000 hours' exposure) of all plants reporting is 31.87 as compared with 30.6 in 1925, while the severity rate (days lost per 1,000 hours' exposure) was 2.50 and 2.02, respectively. One out of every 13 workers suffered a lost-time injury, and the average time lost per injury was 78 days.

The experience of 687 plants reporting both in 1925 and 1926 shows a reduction in frequency and severity rates, the former being lowered more than 13 per cent and the latter about 11 per cent. The following table gives the data for these 687 plants, classified by industrial group, for 1925 and 1926:

ACCIDENT EXPERIENCE OF 687 PLANTS BELONGING TO THE NATIONAL SAFETY COUNCIL, 1925 AND 1926

Industry group	Number of plants	Total hours worked		Lost-time accidents	
		1925	1926	1925	1926
Automotive.....	56	193, 170, 392	292, 250, 161	6, 012	5, 789
Cement.....	114	95, 164, 043	91, 246, 572	2, 480	2, 079
Chemical.....	52	65, 660, 528	63, 908, 310	1, 763	1, 688
Construction.....	30	22, 707, 156	26, 810, 713	1, 549	1, 860
Metals.....	172	366, 980, 532	420, 892, 130	14, 282	14, 479
Packers and tanners.....	9	10, 297, 413	10, 244, 703	279	694
Paper and pulp.....	79	83, 444, 770	91, 511, 224	2, 967	2, 926
Petroleum.....	14	202, 568, 652	216, 977, 595	5, 230	5, 554
Power press.....	66	134, 925, 769	158, 204, 457	3, 743	3, 335
Quarry.....	11	9, 140, 291	9, 590, 566	472	467
Textile.....	24	62, 459, 152	62, 875, 420	832	836
Woodworking.....	60	38, 070, 771	37, 260, 639	1, 589	1, 418
Total.....	687	1, 284, 589, 469	1, 481, 772, 490	41, 188	¹ 41, 126

Industry group	Days lost		Accident frequency rates (per 1,000,000 hours' exposure)		Accident severity rates (per 1,000 hours' exposure)	
	1925	1926	1925	1926	1925	1926
Automotive.....	305, 578	329, 953	31.1	19.8	1.58	1.13
Cement.....	486, 385	349, 856	26.0	22.8	5.11	3.83
Chemical.....	206, 667	204, 524	26.9	26.4	3.15	3.20
Construction.....	165, 840	187, 962	68.2	69.4	7.31	7.01
Metals.....	797, 838	862, 537	38.9	34.4	2.17	2.05
Packers and tanners.....	12, 039	29, 180	27.1	67.8	1.17	2.85
Paper and pulp.....	158, 246	180, 105	35.4	32.0	1.90	1.97
Petroleum.....	445, 494	455, 865	25.8	25.6	2.20	2.10
Power press.....	172, 539	204, 229	27.8	21.1	1.28	1.29
Quarry.....	66, 289	71, 916	51.6	48.7	7.25	7.50
Textile.....	26, 106	33, 011	13.3	13.3	.42	.53
Woodworking.....	88, 647	103, 619	41.7	38.1	2.42	2.78
Total.....	¹ 2, 923, 368	3, 012, 757	32.1	27.7	2.28	2.03

¹ This is not the sum of the items but is as appears in the original.

Safety Codes

THE United States Bureau of Labor Statistics is represented on a considerable number of the sectional committees which are engaged in the formulation of national safety codes under the procedure of the American Standards Association. The Department of Labor delegates to the bureau the responsibility of providing representatives of the workers on the committees for the preparation of safety codes. The Commissioner of Labor Statistics is the authorized representative of the department on the Standards Council. The development of the safety-code program is described in the former handbook (Bul. No. 439).

The safety codes thus far projected are some 40 in number. Of these 30 have been completed and approved. The bureau has published 14 of these codes for extended distribution to State industrial boards and industrial concerns. A list of the codes published by the bureau follows:

Bul. No.

- 331. Code of lighting factories, mills, and other work places.
- 336. Safety code for foundries.
- 350. Laboratory tests for electric headlighting devices for motor vehicles.
- 351. Safety code for ladders.
- 375. Safety code for laundries.
- 378. Safety code for woodworking plants.
- 382. Code of lighting school buildings.
- 410. Safety code for paper and pulp mills.
- 430. Safety code for power presses and foot and hand presses.
- 433. Safety codes for prevention of dust explosions.
- 436. Safety code for abrasive wheels.
- 447. Safety code for rubber mills and calenders.
- 451. Safety code for forging and hot-metal stamping.
- 463. Safety code for mechanical power transmission.

American Engineering Council's Report on Safety and Production⁴

AS THE result of the serious increase in the last few years in the cost of accidents—for example, the premiums received by the companies reporting to the State of New York from 1923 to 1926 were \$44,000,000 less than their compensation losses—the American Engineering Council was asked by the National Bureau of Casualty and Surety Underwriters to make a survey of the situation.

This increase in cost of accidents was found to be coincident with a consistent and even spectacular decline in accident rates in the larger and more thoroughly organized industries and a remarkable increase in the product of industry.

Apparently the increased seriousness of accidents during the last few years has been the direct result of the increased intensity of industrial activity during that period. Increased activity requires the employment of new, inexperienced men and the shifting of old men to new jobs. Periods of rising accident rates have, in general, corresponded to periods of heightened industrial activity. * * *

This, then, is the modern problem which definitely underlies this present study: How can accidents be controlled under modern conditions, conditions which are becoming continuously more difficult? * * * Can they be controlled?

⁴ American Engineering Council. Safety and Production. New York, 1928.

Findings of the Committee

THE INFORMATION obtained upon which the committee based its findings and conclusions embraced 13,898 companies, 2,464,413 employees, and 54,430,707,000 man-hours. A comparison of the 1925 experience with that of 1922 showed that productivity had increased 14.4 per cent, accident frequency had decreased 10.4 per cent, and accident severity had increased 2.5 per cent.

The detail findings of the committee were as follows:

1. Industrial accidents can be controlled under modern conditions of highly efficient productivity.
2. The experience of a large group of companies shows that material reductions in accident rates can be obtained together with an increasing production rate.
3. Major industrial executives have as much responsibility to initiate accident prevention as to initiate improvements in productivity.
4. Efforts to improve safety performance do not interfere with production.
5. Maximum productivity is ordinarily secured only when accident occurrence is tending downward.
6. The production and the accident performance of the best plants in each industry clearly show that the majority of plants can achieve notable further improvement.
7. The incidental cost of industrial accidents is an economic loss which should not be neglected.
8. Organized safety work is being carried on in a relatively small percentage of industrial plants.
9. A large number of industrial establishments keep no accident records and make no attempt to analyze their experience as a first step in decreasing accidents.

Recommendations of the Committee

THE COMMITTEE made the following recommendations:

1. That the same executive direction and control be given to decreasing industrial accidents as is given to increasing productivity.
2. That those agencies which collect and disseminate accident statistics adopt uniform terminology and standardized records so that all data will be compiled on a nationally comparable basis.
3. That the executives of those plants having high accident frequency and accident severity rates initiate, direct, and control ways and means of lowering such rates. * * *
4. That industrial trade associations, engineering societies, and other agencies concerned with the improvement of industrial operation bring to the attention of their members the necessity of improvement in safety performance as a vital step in the strengthening of their industrial position.
5. That industrial trade associations secure, compile, and analyze accident statistics for the purpose of determining the lowest accident rate possible of attainment for their respective industries.
6. That industrial trade associations endeavor to secure such action on the part of executives of their industries as will result in each plant having the lowest accident rates obtainable.

Other Findings of the Report

Experiences of particular industries.—Eighty per cent of the industrial groups showed an increasing production rate, 52 per cent had a declining frequency rate, and 68 per cent had a declining severity rate.

Levels of performance.—To determine the level of performance of the plants, grouped according to experience, a classification of the changes in accident and production rates from year to year was made, and designated as follows: A, increase in production rate and decrease in accident frequency rate; B, increase in production rate and increase in accident frequency rate; C, decrease in production rate and decrease in accident-frequency rate; D, decrease in production rate and increase in accident-frequency rate.

There were 330 plants which gave an experience record of four years or more, and for this group the percentages of the total changes in accident and production rates during this experience which fell in the different classes were as follows: Class A, 30.6; class B, 30.3; class C, 22.4; class D, 16.7. Of these 330 plants, 81, whose record showed that 60 per cent or more of the production-rate changes were increases and 60 per cent or more of the accident frequency rate changes were decreases, constituted the high level of performance group. For this group the percentages were as follows: Class A, 54.6; class B, 21.5; class C, 17.5; class D, 6.3.

Increased productivity and reduction of accidents.—Comparing 1925 with 1922, 26 industries show increasing production and 10 industries decreased production; accident frequency rates decreased in 23 industries and increased in 16, and accident severity rates decreased in 22 industries and increased in 15.

Accidents in terms of production.—In relation to production 19 industries had an annual average declining accident frequency and 3 had increasing accident frequency, while there was decreasing accident severity in 17 industries and increasing accident severity in 5 industries.

The report also presents the showing of the individual industries as to the relation of frequency and severity to production, and devotes a section to illustrative special cases.

Cost of Infections in Industry

AN INDICATION of the cost of infections is given in the January, 1928, issue of the Industrial Bulletin, published by the New York Industrial Commissioner. In 4,355 cases of infection resulting from handling sharp and rough objects during 1926-27 a total of \$820,020 in compensation was involved, or an average of \$188 per case, whereas the average cost of 2,010 cases of injury so caused but not infected was only \$93, the total compensation being \$187,793. The causes given indicate the little things which may produce most serious results—slivers of wood, nails, wires, and metal straps, slivers of metal, sheet metal, glass, and bones. The first named heads the list, with 24.4 per cent of all infected cases. Infections occur mostly in simple injuries from the most ordinary causes, to which all workers are constantly exposed and which have had comparatively little attention in accident prevention.

The 13,304 cases of infection for which awards were made in 1926-27 included 2,180 permanent partial disabilities and 94 deaths or permanent total disabilities. The awards in all these cases amounted to about \$3,000,000. Assuming that infection approximately doubles the cost of injuries, \$1,500,000 in compensation could have been saved if the infection could have been prevented.

Penalties for Violation of Safety Orders

THE LAW of Wisconsin provides for a penalty of 15 per cent of the compensation in the case of violation of safety rules or orders by employer or employee. That there are frequent violations of such orders by both employers and employees appears in a report of the Industrial Commission of Wisconsin in the July 1, 1927, issue of Wisconsin Labor Statistics.

Out of the total of 22,177 cases closed during 1926 there were 539 cases in which employers paid the increased benefits. Recovery of increased benefits was most frequent from violations of safety orders governing power presses (118), circular saws (96), solid scaffolds (46), and gears (40). These comprised approximately three-fifths of the total number of violations. The amount of normal compensation paid in these cases was \$315,479.71. and the increased compensation incurred amounted to \$47,851.03.

During the same period there were only 12 employees whose compensation was reduced for violation of safety orders or rules, 6 of these being for failure to use guards on machinery and 6 for intoxication at the time of injury. The amount of normal indemnity in these cases was reduced from \$4,568.34 to \$3,891.79.

The frequency of the violations in the two classes is in the proportion of 45 to 1, which is quite a contrast when it is considered that the employees outnumber the employers many times.

Eye Conservation Through Compulsory Use of Goggles in Workshops

BY THE compulsory use of goggles in all the repair shops and yards of the Pullman Co. the eyes of approximately a thousand of their men have been saved from serious injury or destruction during the past five years, only one eye having been lost among these workers during that time, according to Harry Guilbert, director of safety of that company, in an address at a conference on the prevention of blindness held in Chicago in October, 1927, by the National Safety Council and the National Committee for the Prevention of Blindness.⁵

In the opinion of Mr. Guilbert, nothing short of compelling the men to wear the goggles will serve, as every effort was made to get them to wear them prior to issuing the order, through spectacular bulletins, horrible examples, pleading and threatening, all with very little success, and he believes that the elimination of eye accidents will never be attained until every industrial employee is required to wear goggles at work on penalty of dismissal. This rule is rigidly enforced in every repair shop of the Pullman Co. and applies not only to the employees, but to officials of the company and to visitors.

As reasons for such drastic measures to prevent industrial eye accidents the experience of Pennsylvania and New York in recent years was cited. In Pennsylvania up to October, 1927, the sight of 6,842 eyes had been completely destroyed in industrial accidents since 1916, while from January 1, 1927, 383 eyes had been made sightless

⁵ National Committee for the Prevention of Blindness. Press release dated October 14, 1927.

in industries of that State, the industries in which these accidents occurred ranging from coal mines to restaurants. In one year more than \$800,000 was paid in compensation, representing an estimated total economic loss of \$5,000,000. In New York the loss was even greater, as the compensation for eye accidents amounted to \$1,700,000 last year. According to the National Safety Council's estimate that the total cost of industrial accidents is five times the amount of the compensation payments, this class of accidents cost the workers, the employers, and the public more than \$8,000,000 in the single year.

All safety engineers recognize the difficulty of getting the workmen to protect their most valuable asset—their sight—and it is said that the Pullman shops are the only shops where goggles are worn by all, from president down to office boys and even by visitors who may come into the plant for only a few minutes. It is useless to expect workmen to use goggles and other protective devices if managers, foremen, and safety engineers do not set a good example by protecting their own eyes.

An examination of the eyes of 4,000 men in the Pullman shops showed that only 1,139, or 28 per cent, had normal vision without glasses; 1,539, or 38 per cent, had normal vision in both eyes when they wore glasses, while the remaining 1,322, or 33 per cent, had defective vision. Seventeen per cent of the total number examined had only 5 per cent of normal vision, in many cases as the result of early eye injuries.

Carbon Dioxide a Safe Substitute for Explosives in Mining Coal⁷

A NEW METHOD of bringing down coal at the face which avoids the hazards present in the use of the ordinary explosives was tested in at least six different mines in Indiana and Illinois a year or so ago. The tests were carried out on three different types of faces and in coal seams varying from 39 inches to 8½ feet in thickness.

Liquid carbon dioxide compressed within a steel cylinder or bomb 4 inches in diameter and approximately 37 inches long is used in bringing down the coal. A heating element or priming charge composed of certain chemicals, which will evolve heat quickly under the action of a powerful electric current, is placed in the bomb, and the bomb is so constructed that under the action from the force within the gas is liberated against the coal at four points. The detonation of the gas is not in any sense an explosion nor even a chemical process, but its action is entirely physical, exerting a true heave on the coal. In order to be successful the transformation of the liquid to gas must be in an extremely brief interval, about one-twentieth of a second, otherwise it will give inefficient results or will fail to bring down the coal at all.

The amount of carbon dioxide in the bombs ranges from 2 to 5 pounds and the amount of heating element required to gasify exactly the liquid charge can be calculated within close limits. Each day's supply of bombs or cartridges can be taken into the mine at any time, as they are comparatively inert. It takes from 150 to 250

⁷ Coal Age, May 12, 1927, pp. 688, 689: Carbon Dioxide Furnishes Safe Means of Bringing Down Coal at Face, by Frank H. Kneeland.

amperes of current at 80 volts or more to start the reaction in the heating element, and stray currents within the mines are entirely too small to start this reaction as, so far, the maximum stray current discovered in any American coal mine is approximately 15 amperes at 30 volts. The bombs can also be used in extremely gassy places, as the maximum gas temperature developed is less than one-half the temperature required to ignite the most explosive mixture of air and methane.

The bombs are placed in holes driven in the face in much the same manner as the ordinary explosive, and after connection to the lead wires is made, the bomb is discharged by the momentary closing of a switch. It is not necessary for the workmen to retire to any great distance, but it is desirable that they should not stand in line with the bore hole, as the bomb is occasionally blown out of the hole. In practice, however, the new method has been developed to the point where it is at least 98 per cent reliable and misfires or "duds" are rare. If it does fail to go off, there is no danger in approaching the hole at once, as in that event the liquid will gasify so slowly as to have no effect. The effect of the bomb on the coal face resembles the dumping of a carload of coal and there is practically no vitiation of the atmosphere, the increase in carbon dioxide content of the air seldom exceeding 0.5 per cent.

The bombs are strongly constructed and, while they are fairly expensive at first, they can be used indefinitely. There is also no hazard connected with their transportation when loaded, as dropping or crushing, and short circuiting them with electric current has no effect. Although the actual expense involved in the use of this material has so far been slightly greater than when explosives are used, it is believed that this expense will eventually be appreciably decreased; and those using the carbon dioxide agree that the advantages secured, such as greater safety and a better quality of output, far more than offset the comparatively slight increase in expense.

Dust Explosions in Industrial Plants

ONLY in recent years has direct attention been given to the causes of dust explosions in industrial plants and to the measures undertaken for the control of this hazard. Large losses of life, property, and foodstuffs are occurring annually from such explosions, many of them in lines of industry in which they have not previously taken place. The expansion of manufacturing operations and the utilization of by-products and waste materials, resulting in the accumulation of large quantities of explosive dusts, have greatly increased the hazard. At least 28,000 plants, employing over 1,324,000 persons and manufacturing products valued at over \$10,000,000,000 annually, are subject to the hazard of dust explosions.

Industries in Which Explosive Dusts are Found

SPECIAL engineering and chemical research investigations to determine causes of dust explosions in manufacturing establishments and to develop methods of control and prevention have been conducted

for a number of years by the Bureau of Chemistry of the United States Department of Agriculture, in cooperation with other Government departments, State industrial commissions, fire prevention and insurance associations, and other national and State bodies interested in dust explosion and fire prevention. At first, investigation was confined to handling or milling of grain, but it soon became apparent that explosions were occurring in other types of industrial plants.

Practically all types of dusts created during manufacturing operations are explosive and when mixed with air in proper proportions can be readily ignited by various external sources. The only exceptions would seem to be the inert dusts, such as shale, limestone, gypsum, and the like.

In addition to grain plants, explosions have occurred in starch factories, chocolate-manufacturing plants, oilcloth factories, cork plants, cotton mills, fertilizer plants, powdered-milk factories, paper mills, woodworking plants, phonograph factories, sulphur-grinding plants, tanneries, spice mills, shoddy mills, in celluloid-manufacturing, and rubber-reclaiming plants, and in fur-cleaning establishments. Explosions of aluminum dust, magnesium dust, zinc dust, and similar types of metallic dusts have also been reported.

A temperature as low as 540° C. (1004° F.), which is considerably below dull red heat, will ignite some dusts, while for some of the more explosive dusts an explosive mixture is formed by 7 milligrams of dust in a liter of air. There is no record of a spontaneous dust explosion, a spark, flame, or other cause being necessary to ignite the dust.

Cost of Dust Explosions

RECORDS of dust explosions compiled in the Bureau of Chemistry indicate that they occurred as far back as 1860. Most of the early explosions seem to have occurred in flour mills, many of them probably being chronicled simply as fires. Up to 1880 those actually on record cost 18 lives and \$1,000,000 in property. Between 1880 and 1890 explosions in breweries and malt houses, woodworking plants, confectionery houses, and fur-cleaning establishments were reported. During the next 10 years the loss of life and property remained approximately the same. Flour mills suffered heavily, a sugar refinery, a Soapine plant, and a lumber mill had explosions and the first grain-elevator explosion occurred. During the following decade, 1900-1910, explosions were reported in a number of new lines of industry, including starch factories, cork-handling plants, cotton mills, and fertilizer plants. Twenty-eight lives were lost and the property damage amounted to \$3,700,000. From 1910 to 1920 the losses from this cause showed a big increase—194 persons killed, 332 injured, and property damage of more than \$19,000,000. In grain elevators alone 30 catastrophes occurred, resulting in the death of 34 persons and injury to 47, and property loss of \$7,500,000; in the 17 explosions in feed and cereal mills 58 persons were killed, 122 injured, and property valued at more than \$3,600,000 was lost; starch plants had 10 disasters, with 64 killed, 79 injured, and \$3,200,000 property damage. A variety of other industries also suffered from this cause.⁸

⁸ Factory, the Magazine of Management, Chicago, August, 1926, p. 222.

Up to July, 1926, at least 281 dust explosions had been reported to the Department of Agriculture. In 70 of them 459 persons were killed and in 92 of them 760 were injured. The property loss in 144 cases amounted to more than \$33,529,350, an average of more than \$230,000 for each explosion. These statistics do not, of course, take into consideration the interruption to production, loss of time, and general disturbance of manufacturing operations as a result of explosions and fires of this character.

Safety Codes for Prevention of Dust Explosions

SAFETY CODES for the prevention of dust explosions in industrial establishments have been issued by the United States Bureau of Labor Statistics as Bulletin No. 433, the plants covered being starch factories, flour and feed mills, terminal grain elevators, and sugar, cocoa, and fuel-pulverizing plants. The codes represent the joint work of the United States Bureau of Chemistry and the National Fire Protection Association.

Generally speaking, the problem of preventing dust explosions falls into two great classes: (1) Industries in which dust or powder, such as starch, flour, sugar, etc., is the product, and (2) industries where dust is merely a by-product or incident to the factory operations. If the explosive dust is a by-product, the problem is to prevent dust clouds from forming and to eliminate sources of ignition. If the product itself is a dusty material, different methods must be adopted to eliminate the hazard. Attention should be given to construction and arrangement of plants and equipment, process of manufacturing, packing of the product, removal of dust, and prevention of ignition. The safety codes published cover these points.

Accidents in Small Plants

THAT the accident rates in small plants are higher than those in large plants is shown in a report on accident prevention in 299 small plants in Michigan, Illinois, Indiana, Kentucky, Ohio, and Rhode Island, prepared for the executive committee of the National Safety Council. The following unfavorable facts, revealed by the reports from these plants, emphasize the importance of keeping and analyzing accident records:

1. No one in the average small plant keeps any record of accidents except the records made out for the State and insurance companies. The average small plant executive says and believes that he has no accidents in his plant.
2. These executives are often the financiers, managers, sales managers, and shop superintendents of their plants, and thus do not have or take sufficient time to pay any attention whatever to accident prevention.
3. Small plants pay their compensation insurance premiums, and after complying with the demands of the State and the insurance company, think they have no further responsibility in accident prevention. They do not realize that accidents cost them approximately four times as much as they cost the insurance carriers.

The following analysis of figures taken at random from the sectional statistics of the National Safety Council indicates that the small plants have more accidents than the large plants; that, for instance, a group of 10 plants with a total of 1,000 workers has a worse accident record than 1 plant with the same number of workers.

ACCIDENT FREQUENCY AND SEVERITY RATES IN ONE LARGE PLANT AND IN SEVERAL SMALL PLANTS

Item	Machine shops with foundry		Gray-iron foundries		Machinery and machine-tool manufacturing		Sawmills and logging		Paper mills		Auto and motor manufacturing	
	9 small plants	1 large plant	8 small plants	1 large plant	11 small plants	1 large plant	11 small plants	1 large plant	10 small plants	1 large plant	11 small plants	1 large plant
Number of employees	792	761	586	599	1,255	1,250	1,853	1,850	659	633	633	644
Accident frequency rates	21.10	20.51	80.49	82.71	34.15	12.80	79.94	47.60	63.18	4.82	36.21	0.40
Accident severity rates	1.76	1.00	.52	.43	.81	.16	7.07	.57	10.90	.26	21.40	.19

Cost of Accidents in the Home ⁹

THE NUMBER of fatal accidents occurring annually in the home (17,000) is nearly equal to the number due to automobiles. The automobile casualties have naturally attracted a great deal of attention and much effort has been directed at their control, but because the facts regarding home injuries have not been brought to public attention there has been no organized effort toward their control. This class of hazards is of sufficient size and importance to deserve serious consideration.

More than one-third of the accidental deaths occurring in the home involve children under 15 years of age, while one-fourth involve persons over 65 years of age who are to a considerable degree infirm and helpless. The records of the Metropolitan Life Insurance Co. for 1925 indicate that of the domestic accidents one-tenth are due to falls, one-tenth to burns, and one-tenth to drowning. The one-tenth due to burns arise from the gas and electric supply, the heating apparatus, and cooking and other devices requiring heat. The careless householder will occasionally fill a wooden box with hot ashes from the furnace or go exploring for a gas leak with a lighted match.

It is rather surprising that drowning in bathtubs and other water containers is as serious a menace as are objects dangerous on account of heat. Also a very considerable proportion of the cases of fatal injury are due to accidental discharge of firearms, indicating the need of much more rigorous restriction of the sale and possession of such weapons.

The hazard of the family medicine closet is not inconsiderable. Adults are sometimes reckless in the use of poisonous substances, but nearly one-half the fatalities from poisonous substances were of children under 15. Winding and narrow stairways present another source of danger.

Much of the gas dispensed in American cities contains a considerable proportion of carbon monoxide, and constant vigilance to keep the gas apparatus in proper order is the only safeguard against casualty. We are, from time to time, reminded of the deadly character of carbon monoxide gas by the death of the citizen who starts his automobile engine in a closed garage.

Practically everyone is exposed to these domestic dangers. As a beginning in combating them, a vigorous educational effort is necessary to acquaint the public with their seriousness.

⁹ National Safety News, February, 1927, p. 11: Cost of Accidents in the Home, by E. W. Kopf.

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Federal Agencies Concerned with Problems of Industrial Health

THE PRINCIPAL divisions of the Federal Government concerned with the problem of health among industrial workers are the Public Health Service, the Bureau of Mines, and the Bureau of Labor Statistics. Each of these has made extensive inquiries, and issued numerous reports concerning various phases of industrial health, with particular reference to methods of protection and prevention.

United States Bureau of Labor Statistics

THE Bureau of Labor Statistics was one of the pioneer organizations in this country in the study of occupational hazards and diseases and through its work it has been an active force in the movement toward reducing the casualties among workmen resulting from the use of hazardous processes and substances. In the furtherance of this work many investigations of special hazards in different industries have been made while active steps have been taken in a number of instances to effect the desired reforms in the processes employed or the materials used. Notable work has been done, therefore, by the bureau in exposing the dangers of various types of employment with the result that conditions in regard to the safeguarding of the workers have been much improved. To mention only one example, the investigations of the hazards of lead in many industries were of the utmost value in furthering the knowledge of the effects of this mineral and its various compounds and providing for the institution of measures for the prevention of lead poisoning. As new industrial processes develop and new chemical combinations are used, hazards which are not understood or foreseen are certain to arise so that it is necessary to be continually on guard against the development of these dangers.

Among the special studies published in the industrial accidents and hygiene series are included the various bulletins on lead poisoning in different industries, and studies of the poisons used in the rubber industry, in the manufacture of explosives, and in the manufacture of coal-tar dyes and dye intermediates as well as studies of the hazards from dust and fumes, from phosphorus in the manufacture of fireworks, from the anthrax bacillus, etc. These and other bulletins have formed the contribution of the bureau to existing knowledge in regard to the specific hazards of industry and to the safeguarding of workers who are exposed in the course of their employment to contact with these dangerous substances.

The most recent bulletin in this series published by the bureau is a report of a simple laboratory method for the detection of early absorption of lead by workers exposed to lead in its various forms. This bulletin by Dr. Carey P. McCord is entitled "A New Test for Lead Poisoning" (Bul. No. 460). Other studies now nearing com-

pletion are a study of the hazards of radioactive substances in the painting of watch and clock dials with luminous paint and a study of the hazards of spray painting.

United States Public Health Service

ACTIVITIES of the office of industrial hygiene and sanitation of the United States Public Health Service include investigation of occupational health hazards, studies of the effects of industrial poisons, and statistical studies of causes of sickness and absenteeism in industry together with certain special studies carried out in cooperation with other Government departments and with industrial and other agencies.

Among recent investigations made either by this office alone or in conjunction with other investigative agencies may be cited the studies of tetra-ethyl lead gasoline and the extent of occupational exposure to lead in commercial garages; investigation of the effects of municipal dust and of dust in the cement, granite-cutting, metal-polishing, anthracite and soft-coal mining, and cotton-manufacturing industries; investigation of the problems of ventilation and of the effect of varying conditions of illumination upon vision and production; the loss of light due to smoke in New York City; and the carbon monoxide hazard from automobiles, streets, and shops. In addition to the investigation of special hazards such as these which are taken up from time to time as the need arises, a general study of industrial morbidity among large groups of workers is continued from year to year, monthly reports being received of sickness causing a disability of one week or longer among a large number of employees who are members of sick benefit associations. Analyses of these figures are published periodically and show the frequency and severity of disabilities, by sex, and according to the type of sickness, season of the year, etc., for this representative sample of the industrial population.

United States Bureau of Mines

THE HEALTH work of the Bureau of Mines is carried on by the health and safety branch. The eighteenth annual report of the director states that there is probably no industry in which greater care is required to safeguard the health of workmen than mining since miners usually work in remote places underground where adequate ventilation is difficult to obtain and where there is likely to be exposure to poisonous gases, unwholesome dusts, and unhealthful conditions of temperature and humidity.

The health division working in cooperation with the United States Public Health Service, investigates the health and sanitation problems, therefore, of the mining industry with a view to improving working conditions. Among the investigations carried on by the bureau are exhaustive studies of toxic mine gases with special reference to methods of detection, the physiological effects of these gases on the workmen, and the provision of protective devices. Special attention has been given by the bureau to carbon monoxide, sometimes called the universal poison gas, since almost everyone is at times exposed to its insidious attacks and as an outgrowth of the bureau's intensive studies of this and other noxious mine gases it is frequently

called upon to help to solve problems due to the presence of dangerous gases in other places than mines. The health division investigates sanitary conditions in mining communities, and studies the physiological effects of exposure to the various types of rock dust in mines; and studies are made also of the causes of death among miners as well as of the extent of the silicosis and tuberculosis problem. While the work of this branch of the bureau is specially directed toward mining problems many of the researches have a wider application and have been of benefit, therefore, to other branches of industry.

Recent Studies of Industrial Diseases and Poisons

IN ADDITION to the original studies of industrial poisons and diseases carried out by the Bureau of Labor Statistics, the office follows developments in the field of industrial hygiene through the medium of the Monthly Labor Review, digests appearing in this publication each month of investigations by scientific organizations and of articles appearing in the various medical and scientific journals. As the bureau receives many requests for information on these subjects summaries are given below of the more important articles and bulletins which have been published during the past two years together with references to the articles published in the former handbook (Bul. No. 439).

Abrasive Industry

See Abrasive industry: dust hazard in the manufacture of artificial abrasive wheels. Former handbook (Bul. No. 439), pages 261-263.

Anemia

See Radioactive substances: anemia occurring among workers handling radioactive substances.

Agriculture: Occupational Diseases of Agricultural Laborers ¹

A STUDY of occupational diseases among agricultural workers forms the subject of a brochure issued by the International Labor Office as part of the Encyclopedia of Hygiene, Pathology, and Social Welfare.

The report points out that conditions among agricultural workers vary greatly not only between different countries but also between different districts in the same country, and that as a result of these differences in living conditions, education, etc., as well as the existence of overpopulation or underpopulation, there is great variation in the hygiene and pathology of these workers. It is generally considered that agriculture has no specific occupational diseases, but that long hours and fatigue due to carrying heavy loads are the principal causes of those diseases due to the occupation. It is true that agriculture presents certain advantages over industrial employment, such as work in the open air and in the sunlight, but on the other hand there is a variety of hazards, including exposure to rapid changes of

¹ International Labor Office. Occupation and Health Brochure No. 73: Occupational Diseases of Agricultural Laborers. Geneva, 1927. 7 pp.

weather and temperature, to diseases connected with the work in various crops and those contracted as the result of tending stock, and to accidents from farm machinery in wood cutting, etc.

Among the operations which are particularly fatiguing are mowing, harvesting, digging, and threshing. The occupations frequently cause acute morbid symptoms, the result of fatigue, such as fever, headache, pains in the joints, intense thirst, and drowsiness. Such attacks are of short duration, lasting usually for one or two days. Acute inflammation of the tendon sheaths of the flexor muscles of the hand is frequently found among young workers. This condition is caused by fatigue and is quickly cured by rest. An inflammatory condition of the muscles of the back resembling sciatica is often the result of work which puts an undue amount of strain on the muscles in the lumbar region.

Agricultural workers who tend stock are subject to the risk of accidents and to infectious diseases: Anthrax, tetanus, glanders, foot and mouth disease, actinomycosis, the bacillus of abortion, etc. Various mites and animal parasites are transmissible to workers and cause different forms of dermatitis. There is a variety of conditions which cause irritation and disease of the eyes. These include conjunctivitis due to dust raised during threshing operations; hay fever caused by the pollen of flowers and by the extremely fine hairs found on the surface of leaves and fruits, while the dust of certain bulbs such as hyacinths and crocuses, also sets up conjunctival inflammation. Severe retinitis results from exposure, without protection, to the sun's rays in summer. A specific disease, vibrio gangrene, is found among workers who carry and spread manure. This disease is a serious one in which there is the formation of ulcers on the eyelids which rapidly pass into a moist gangrene and which is accompanied with swelling of the face, chest, and neck and a high fever. This disease always results in serious deformity of the eyelids. One authority considers this disease characteristic of southern countries while another thinks it can also occur in colder climates. Ocular accidents, the result of injury or of foreign bodies penetrating the conjunctival mucous membrane, are frequent. Workers about stables are often the victims of typhoid fever, of intestinal affections due to the *Bacillus coli*, and of vaccines. Diseases of the circulatory organs, including heart disease, arteriosclerosis, etc.; of the digestive system; and of the peripheral nervous system (neuritis, especially of muscles fatigued from work such as potato digging, milking, etc.) are common, while deformities of the spine and of the leg are frequently seen.

In general much needs to be done in a legislative way to correct the unfavorable conditions among agricultural workers in nearly all countries. Measures advocated by the International Labor Conference for ratification by the different countries include measures for the prevention of unemployment; protection of women before and after childbirth; prohibition of the work of children under 14 years of age; regulation of the night work of women; vocational training for children; improvement in technical education in agriculture; improved housing; recognition of the rights of association and combination; compensation for accidents; and social insurance.

Anthrax: Extent of Anthrax Hazard in Pennsylvania²

STUDIES of the occurrence of anthrax in the horsehair-dressing industry and the tanning industry, made by the Pennsylvania Department of Labor and Industry in 1920 and 1921, showed that there was a definite anthrax hazard, especially in the tanning industry. In view of this fact a study was made which included all cases, both industrial and nonindustrial, reported to the department over the 5-year period 1922-1926. During this time there were reported 7 fatal and 75 nonfatal cases of an industrial and 9 of a nonindustrial origin. By far the largest number of cases have occurred in the tanning industry. In the latest study half of the 80 cases were in this industry, 20 in the woolen and worsted industry, 12 in the hair industry, 6 in the transportation industry, and 2 cases which were not strictly industrial were classified as miscellaneous. One of these cases was a veterinary surgeon and the other a medical student handling anthrax cultures in a laboratory. Of the nonindustrial cases, three were the result of shaving-brush infection, and in the other cases the source of infection could not be definitely fixed. The majority of the industrial cases occurred in the age group between 20 and 39 years—the years of the most active industrial employment.

General statistics show that the anthrax lesions occur most frequently on the exposed portions of the body and the present study confirms this observation. There are several factors which account for this fact. The face, neck, and forearm are often the sites of pimples or other small breaks in the skin, and the neck and shoulders are often scratched by the sharp edges of materials carried on the shoulder. Such breaks may be infected either by coming in contact with the infected material or through the medium of the hands. It would appear that the hands would be the most frequent site of infection, since they most frequently come in contact with the infected material, but as a matter of fact the lesions seldom appear on the hands, only two of the cases reported having occurred in this location. The reason for this failure to develop the infection in the hands is considered to lie in the fact that they are washed more frequently and more thoroughly than other parts of the body, and the organism has less opportunity, therefore, to gain a foothold.

The data show that early treatment of the disease is of great importance, and the report states that there is no reason why a case of anthrax, if it is promptly recognized and properly treated, should not make a speedy and uneventful recovery. The study also brings out the fact that cases occurring in an industry in which the hazard is recognized have a better chance for recovery than cases of a nonindustrial origin, since in the latter case the condition is frequently undiagnosed until the chance for recovery is past.

Analysis of the data relating to the length of disability shows that the average disability is shorter in those cases receiving the earliest treatment. In the tanning industry the average number of days lost per nonfatal case was 47.7; in the woolen and worsted industry 57.4 days; in the hair industry, 59.1 days; and in the transportation industry, 58.5 days.

² Pennsylvania. Department of Labor and Industry. Labor and Industry, Harrisburg, June, 1927, pp. 5-16: Pennsylvania's 5-year Experience With Anthrax, by Elizabeth B. Bricker, M. D.

In the control of a disease of this kind it is important to know the countries from which the infected materials come. It is extremely difficult, however, to trace the source of infection since materials from several countries are usually handled at the same time. At the present time, although the United States Department of Agriculture through the Bureau of Animal Industry has certain regulations in effect designed to control and prevent the spread of anthrax among livestock in this country, these regulations do not sufficiently protect the workers in industries handling foreign hides and wool. Under the present system part of the material is not disinfected until it reaches its destination, giving opportunities for the infection of persons handling the material at various points along the way. It is suggested in the report that the situation might be dealt with either by establishing disinfecting stations at shipping points in foreign countries or by the establishment of disinfecting stations by the Federal Government at the several ports in the United States where such material is received.

In the absence of such regulations, however, it is advocated, in order to minimize the danger in manufacturing plants, that adequate washing facilities should be provided and their use required; dust removal systems should be installed in dusty processes, and vacuum cleaning or thorough wetting of floors before sweeping should be substituted for dry sweeping; there should be proper medical care of employees, including prompt dressing of all breaks in the skin and subsequent daily inspection of such injuries until they are healed; and all workers should be instructed as to the danger of infection and the necessity for immediate medical attention for all affections of the skin. The value of colored posters which show the different stages of the cutaneous form of anthrax has been demonstrated in a number of instances. In two of the cases reported in this study, where the patients were familiar with such posters, the diagnosis was suggested to the attending physician by the patient himself.

Arsenic Trichloride

See Arsenic trichloride: effects of exposure on workers. Former handbook (Bul. No. 439), pages 263-265.

Asthma: Caused by Castor-Bean Dust

A REPORT of outbreaks of asthma occurring over a period of years in a certain section of Toledo, Ohio, was given in the Journal of the American Medical Association,³ January 14, 1928.

The existence of an "asthma colony" in East Toledo had been known to physicians of the city for some years, but although a linseed-oil mill in the district had been suspected of being the cause of the trouble, investigation by the city health department and the State department of health had failed to show the relationship between the mill and the asthmatic attacks occurring among the residents in the vicinity.

The mill in question manufactures both linseed oil and castor oil, and the residue after the oil is extracted from the castor bean is

³ Journal of the American Medical Association, Jan. 14, 1928: Endemic Asthma Due to Castor-bean Dust, by Karl D. Figley, M. D., and Robert H. Elrod, M. D.

made into a fertilizer known as castor-bean pomace. In making the pomace the "cake" which is formed after the oil is pressed out is ground, and during this process there is considerable fine dust produced, which does not fall through the screen of the grinding mill but is carried out at the roof through pipes. When the mill was in operation, a fine cloud of this very fine and light dust could be seen issuing from these pipes.

The patients had always asserted that their attacks coincided with the odor of linseed oil from the mill when the wind was in the right direction, and because of this fact all the investigations had been directed to the linseed oil as the causative agent. The writers found, however, that after the oil was expressed from the flaxseed there was still about 9 per cent of oil in the seed, making it too heavy to be carried by the wind. As the castor-bean dust, which was present in quantities, is practically odorless as compared with the linseed oil fumes, it had been entirely overlooked as a possible cause of the trouble.

The persons who had developed an asthmatic condition included numerous pupils in a school across the street from the oil mill and residents of the district within a radius of a mile from the mill. Of 32 individuals who reported for examination, 30 were found to have asthma at all times of the year. Their histories were quite similar, as none had had asthma before moving to the district and the attacks occurred at night among men who worked during the day at a distance from their homes and during either day or night among those who remained in the vicinity all the time. The attacks were most frequent during the spring and fall months, when the wind attained its greatest velocity, and the patients were most free from attacks during June, July, and August, when the mill was not run at night.

Sensitization tests showed that all of the persons examined reacted to castor-bean dust, while five gave cutaneous reactions to flaxseed, although in a lesser degree. An account of eight illustrative cases bringing out the factor of exposure to the dust at different times of the day or night and under different conditions includes one employee of the mill whose attacks became so frequent and severe that he had to give up his employment and find work at a safe distance from the mill.

Asthma

See also Woodworking industries: health hazards in Australian woodworking industries.

Benzol Poisoning: Hazard from the Industrial Use of Benzol

THE HAZARD connected with the industrial use of benzol has been the subject of numerous studies. The exhaustive study by a committee appointed by the National Safety Council which issued its final report in May, 1926, showed that chronic benzol poisoning is most liable to occur in the group of industries in which benzol is used as a solvent and is evaporated into the air of the workroom resulting in the continuous or repeated exposure of employees to the fumes. It was found as the result of the physical examination of a group of workers exposed to the fumes, many of whom gave evidence of chronic poisoning, that a concentration of benzol of 100 parts per million presented a distinct hazard and it was also shown that there were few

exhaust ventilation systems capable of keeping the concentration below that figure. It was recommended, therefore, that closed systems should be used wherever possible and that in other cases there should be effective local exhaust ventilation. Physical examination upon employment and once a month thereafter was advised together with removal from exposure of any worker who showed a decrease of more than 25 per cent in either white or red blood cells or hemoglobin below 70 per cent.

While the hazard in certain industries such as the rubber industry and the manufacture of paints and lacquers is well recognized, therefore, and in most cases more or less effectively guarded against there are undoubtedly numerous instances where adequate precautions are not taken in the use of benzol. It was recently brought to the attention of the United States Public Health Service that benzol is used to a considerable extent in chemical laboratories, particularly in those where tests are conducted in connection with rubber, paint, varnish, and oil products to determine the solubility of compounds in various solvents such as benzol, carbon disulphide, and acetone.

Several such laboratories were accordingly investigated ⁴ in order to determine whether or not the benzol was used in quantities or in such a manner as to create a health hazard. It was found that from 3 to 5 gallons of benzol were used each week in these laboratories, and that in certain tests the material was centrifuged with benzol, a process which liberated considerable benzol in the air. The amount of benzol in the atmosphere of these places was shown by air analyses to vary from 28 parts per million in one room to 223 parts per million in another, in the latter room two centrifuges being used intermittently for the tests.

In addition to the use of benzol for testing materials it was found that the workers in the laboratories were also using the solvent for cleaning apparatus and for washing off stains on their hands and arms. Its use in this way was very common, as many of the materials tested contained such substances as asphalt, coal tar, and varnishes which are difficult to remove, both from utensils and from the skin. In one laboratory as much as 3 gallons of benzol per week was used for this purpose. This practice, it is evident, releases additional benzol vapor in the air of the laboratory, and some less toxic solvent such as xylol should, therefore, be used for this purpose, even though the use of benzol for experimental purposes may be justified in certain instances.

The earliest and most characteristic symptom in chronic benzol poisoning is a reduction in the number of white blood cells, and the blood examinations of these workers showed that in three cases the cell count, while not definitely abnormal, indicated a departure in the relationship between the various types of white blood cells which, coupled with a definite exposure to benzol, was indicative of benzol absorption.

It is recommended, therefore, as a result of the investigation that such solvents as toluol, xylol, or highflash naphtha should be substituted for benzol in chemical laboratories where possible, or if the use of benzol is continued it should be limited to the testing of materials only and should not be used as a cleansing agent.

⁴ U. S. Public Health Service. Public Health Reports, July 20, 1928: Benzol Poisoning as a Possible Hazard in Chemical Laboratories, by J. J. Bloomfield.

Benzol Poisoning: Chronic Benzol Poisoning Among Women⁵

IN VIEW of the seriousness of the benzol hazard and because more information as to the early effect of benzol upon women was needed, a study was made during the summer and fall of 1926 by the New York Bureau of Women in Industry to secure data relative to the prevalence of unrecognized chronic benzol poisoning among woman workers and to the earliest symptoms of such poisoning.

In the chemical industries, including the manufacture of dyes and paints, and in the blending of motor fuels benzol is handled in closed systems so that there is comparatively little danger of the development of chronic poisoning through the inhalation of fumes, but in processes in which it is used as a solvent there is constant risk of poisoning. Benzol has a direct destructive action on the blood and on the blood-forming centers. It attacks and destroys the white blood cells causing the condition known as leucopenia and secondarily destroys the red blood cells, resulting in a corresponding decrease in hemoglobin. The anemia resulting from the action of the benzol is called "aplastic anemia" as there is little effort on the part of the blood-forming organs to produce new cells. It also destroys the parent cells of the blood platelets, causing a tendency to hemorrhage because of the interference with the normal clotting mechanism. This is the most serious symptom in the advanced cases.

The effects upon the blood do not give rise to symptoms usually until considerable damage has been done, and the condition may remain practically stationary in a mild chronic form for some time. The development of serious symptoms comes suddenly and the disease then tends to progress even with withdrawal from exposure to the poison. It appears that susceptibility varies in individuals, as the length of exposure before symptoms developed in various recorded cases ranged from less than a week to several years.

The characteristic sign of benzol poisoning, if there is a history of exposure to benzol fumes, is the presence of leucopenia, and it is necessary, therefore, in all suspected cases to examine the blood.

In early cases it is often enough to remove the patient from exposure to the fumes, but if there is anemia, rest, fresh air, sunlight, a nourishing diet, and proper medical care are required, though even with proper care recovery is usually slow. If serious symptoms such as purpuric spots and bleeding from the mucous membranes have occurred, hospital care is necessary and blood transfusions offer the best hope of recovery.

The study was carried out in six factories in New York State located in large industrial centers. The industries investigated included three factories in which sanitary tin cans were manufactured and one each manufacturing tires and rubber goods, cameras, and shoes. Seventy-nine women who in the course of their work were exposed to the fumes of benzol from the cements or lacquers used were given physical examinations. Forty-four were exposed directly to the fumes, through actual use or handling objects to which the substance had been applied and 35 were indirectly exposed through working in the same room where it was used. Of the first group 17,

⁵ New York. Department of Labor. Bureau of Women in Industry. Special Bulletin No. 150: Chronic Benzol Poisoning Among Women Industrial Workers. Albany, 1927.

or 38.6 per cent, and of the second, 8, or 22.8 per cent, showed evidence of poisoning. In addition there were five suspected cases.

The shortest length of exposure among the women showing positive or suspicious signs of poisoning was 2 months, while one woman who was one of the suspected cases had been exposed for 11 years. Practically all of the women exposed had a look of fatigue and in the majority there was a striking degree of pallor. There were no cases with purpuric spots or bleeding from the mucous membranes, but less serious symptoms, such as headache, nausea, excessive fatigue, etc., were present in practically all of the women even when there was no positive sign of poisoning. The blood changes in the 30 cases showed unmistakably that the blood was seriously affected and the hemoglobin was moderately reduced in all but four cases. The severe anemia seems to develop only in the later stages after bleeding has commenced.

The conclusions reached as a result of the study were as follows: Benzol as used in the industries investigated results in chronic poisoning of practically one out of every three women; exposure to the fumes in the workroom even for those not working directly with the benzol is accompanied by risk; more than one-third of those who did not show definite signs of poisoning had symptoms which were probably caused by exposure to benzol; there did not seem to be any difference in the susceptibility to benzol poisoning between young and older workers; the most frequent symptoms accompanying blood changes which show early chronic poisoning are headache, excessive fatigue, dizziness, nausea, loss of appetite, nervousness, and disturbances of sensation such as numbness and tingling in the extremities; and the blood changes in addition to the leucopenia, the most characteristic sign of chronic benzol poisoning, include various other changes in different blood cells.

As a result of the study it is recommended that there should be a franker attitude on the part of employers toward the risk involved in its use and that workers should be warned of the possible danger to their health; that benzol should be used only in connection with efficient systems of local exhaust ventilation; that whenever possible substitutes for benzol, should be used; and that exposed workers should be under thorough and persistent medical supervision.

In connection with this report an account of a fatal case of benzol poisoning reported in the *Boston Medical and Surgical Journal*, September 29, 1927 (pp. 521-524), is of interest. The patient, who was treated in the Massachusetts General Hospital, was a Canadian girl 20 years old, who had been employed for eight months cementing rubber heels in a rubber-shoe factory. For four months before admission to the hospital she had felt very exhausted. She had also had dizziness and had felt nauseated by the smell of the cement. For two months before admission there had been bleeding from mucous membranes. The immediate cause of admission to the hospital was profuse hemorrhage from the nose. Hemorrhages from various membranes, for which she was given eight blood transfusions, occurred at intervals during the 20 days which elapsed before her death. She had other symptoms of benzol poisoning, such as purpuric spots, and the blood tests showed changes in the various cells characteristic of this form of poisoning. The case was diagnosed by the different physicians concerned in the treatment as benzo

poisoning. It was learned that the cement used by this patient in her work contained 80 per cent of benzol and also that there had been seven almost exactly similar cases reported from this factory.

Benzol Poisoning

See also Spray painting: study of hazards of spray coating; results of two studies of spray painting hazards.

Brass Foundries

See Brass foundries: health hazards. Former handbook (Bul. No. 439), pages 270-272.

Cancer: Mule-Spinners' Cancer

It is only recently that mule-spinners' cancer has been recognized as a separate disease entity, and the causative factors are still a matter of dispute among the different physicians and scientists who have been attempting to solve the connection of this type of malignant growth with the occupation. The majority of the cases among textile workers have occurred in England, particularly among workers in the Lancashire mills, and an attempt has been made, therefore, to ascertain whether there was some particular factor operative in this locality which was the cause of the condition but which was absent among such workers in other countries.

An article by Frederick L. Hoffman reviewing the literature relating to this disease states that the occupational distribution of 33 deaths from cancer of the scrotum which occurred in the United States registration area during 1926, and for which original death certificates were furnished by the Division of Vital Statistics of the Census Office, was as follows: Laborers, not specified, 6; textile workers, of whom three were mule spinners, 6; farmers, 4; clerks, 4; and one each of the following occupations: Foreman, truck drivers, porters, tanners, polishers, plumbers, coal miners, barbers, oil pressmen, bakers, and druggists; there was also one retired person and one whose occupation was unknown. The average age at death for the 33 persons under review was 59 years. The foregoing clearly emphasizes that cancer of the scrotum is widely distributed in occupations which apparently have nothing in common and it is obvious, therefore, that different causative factors enter into the problem.

Since the discovery of mule-spinners' cancer, a number of important communications have appeared in British medical journals, many of which have pointed out that the disease had not been reported for this country, and that, therefore, the alleged causative factor assumed to be operative in England or in the Lancashire cotton mills could not be the true cause, since otherwise the disease would also have been met with in the United States. The fact that three cases of mule-spinners' cancer have now been reported in this country suggests, therefore, that this disease may be a hazard of the occupation here which has heretofore escaped the attention of the medical attendant, although these are not clear-cut cases, since two of these workers were born in England and one in Canada and therefore the disease may not have been contracted in the United States. It is unfortunately too common that the occupational aspects of a disease are

ignored by the physician, although in filling out the death certificate the information is readily at hand. In the case of the three death certificates from cancer of the scrotum in mule spinners, there was obvious failure on the part of the physician to recognize the occupational factor, the importance of which has been a matter of medical discussion for the last four or five years.

Carbon Monoxide: A Common Peril

THE WIDESPREAD danger of poisoning from carbon monoxide is shown in an article published in *Safety Engineering*, February, 1927.

Carbon monoxide (CO) is an extremely active gas which is ceaselessly endeavoring to find one more atom of oxygen and thus form carbon dioxide. In contrast with some gases which are chemically inert at normal temperatures but which become violently active at high temperatures, carbon monoxide readily combines with oxygen at ordinary temperature, and this property makes it highly dangerous if inhaled, as it finds the oxygen it seeks in the hemoglobin of the blood.

Carbon monoxide is the product of incomplete combustion of any carbonaceous material, and will not be formed if sufficient oxygen is present and if the process of combustion is not interrupted, as is the case when flames strike relatively cold stove tops, or other fire-resistant materials. The hazard is increased by the fact that the gas is invisible, odorless, tasteless, and nonirritant, so that there is no way in which the body is warned of its presence.

Iron and steel workers are almost constantly exposed to carbon monoxide, as blast furnace and producer gas contain from 25 to 30 per cent of this gas. In mines it is present in "white damp," "after damp," and "powder smoke," and it is also produced in mine fires.

Deaths occasionally occur from carbon monoxide in lime burning and charcoal making; coke plants also present their hazards, as gases containing carbon monoxide escape without the slightest warning to the workers; and gas works are particularly dangerous, since ordinary coal or illuminating gas contains about 16 per cent carbon monoxide, water gas about 30 per cent, and Blau gas, 40 per cent.

In the garment industry there is danger of carbon monoxide from gas-heated pressing irons, as these can seldom be properly ventilated, and the amount of carbon monoxide discharged into the workroom frequently results in chronic poisoning.

Gas-fired type-metal heating kettles for linotype machines are frequent causes of carbon-monoxide poisoning. The symptoms of chronic poisoning from the gas—headache, nausea, and a general feeling of illness—are characteristic among linotype operators, and the cause is rarely suspected.

Numerous deaths occur each year in small and tightly closed private garages. An automobile engine running in a closed garage will in a few minutes produce enough carbon monoxide to cause death. In large or public garages deaths from the poison are less frequent, but there is much "subacute" or "chronic" poisoning from breathing the contaminated air. An investigation of conditions in public garages in 1923 by the New York State Department of Labor showed that ventilation was inadequate in all the garages visited, not one having

a system of artificial ventilation. Carbon monoxide was found in the blood of 65.5 per cent of the workers in these garages.

The writer also points out the hazards present in the homes from living-room gas logs, hot-water heaters, kitchen gas ranges, and oil-burning stoves, which should always have outdoor connections.

The Schaefer "prone pressure method of resuscitation," which is generally used now in such cases, is advocated by the writer, who refers also to the pyrotannic-acid method for determination of carbon monoxide in the blood, which was developed by the United States Bureau of Mines.

Carbon Monoxide: Hazard in Commercial Garages and Automobile Repair Shops⁶

A SERIES of tests in 71 commercial garages and repair shops showing the extent of the carbon-monoxide hazard in these work places was made by the bureau of industrial hygiene of the New York Department of Labor during the latter part of 1927. The study was made because of the fact that the danger of carbon-monoxide poisoning in any inclosed, ill-ventilated space into which the exhaust gases from internal-combustion engines are being discharged demands attention both in the designing of new buildings and in the correction of ventilation defects in old buildings.

Experiments on the physiological effects of carbon monoxide have shown the concentrations which can ordinarily be tolerated. For a duration of exposure of one hour or less it is believed that as much as 4 parts of carbon monoxide per 10,000 parts of air will not have any ill effect, while in case of exposure to the gas during a whole working-day it is recommended that the amount of carbon monoxide should not exceed 1 part per 10,000 parts of air, and if there is any special susceptibility to the gas on the part of the persons exposed it should be limited to one-half part per 10,000.

The Sayers-Yant method of determining the degrees of concentration of carbon monoxide was selected for the tests, as it was considered to offer the best combination of sensitivity, portability, and time economy. The test depends upon the persistence of the red color of carbon-monoxide hemoglobin in the presence of a bleaching reagent which destroys the normal color of blood. In making the test the carbon monoxide in a known quantity of air is absorbed in a measured amount of blood. The excess hemoglobin is bleached by a mixture of tannic acid and pyrogalllic acid, the bright red color of the carbon-monoxide hemoglobin remaining unchanged by the acid. The percentage saturation of the blood can then be determined by comparison with a set of standard blood colors and from that the concentration of carbon monoxide in the original air sample is calculated. The samples of air were obtained in bottles which were first completely filled with water and then emptied at the point where the air sample was wanted, the bottle filling with air as the water flowed out.

In the study 121 carbon-monoxide tests were made in 71 storage rooms and workrooms in which there was thought to be more or less carbon-monoxide contamination. An average of 0.9 parts per 10,000, or less than 1 part per 10,000, was shown for all the tests combined,

⁶ New York. Department of Labor. Bureau of Industrial Hygiene. Industrial Hygiene Bulletin, November, 1927.

while the average for repair shops was 1.1 parts per 10,000; for rooms in which small repairs were made incidental to the storage of automobiles, 0.6 part; and in commercial garages storing five or more cars the average was 0.9 part per 10,000.

In spite of the fact that the average for all the tests was about the maximum that should be tolerated in a room in which there is an 8-hour exposure to the gas, the amounts in several places were considerably in excess of the maximum, being as high in some cases as 3 or 4 parts of carbon monoxide per 10,000 parts of air. Twenty-seven, or 38 per cent, of the 71 workrooms had an average concentration of the gas of 1.5 parts per 10,000. The amount of exhaust smoke visible and the odor on entering the room gave a rough idea of the presence of the gas, as in nearly every case where there was an excess of the carbon monoxide the smoke and a strong odor were distinctly noticeable.

Sixty-five of the shops had no mechanical ventilation, 5 had small propeller fans installed in windows, and only 1 had an exhaust system. A few shops were equipped with flexible pipes which were slipped over the end of the exhaust pipe when a motor was running to carry the noxious gases outside the building. This system is effective in repair shops, but would not be effective in commercial garages where most of the gas comes from cars in motion.

In the 24 automobile repair shops all but 7 reported that the men suffered from gas headaches; 4 reported that much time was lost by the men owing to the effect of the gas, while the same number stated that some time was lost from this cause.

Carbon Monoxide: Hazard of Automobile Gas in Streets and Repair Shops of Large Cities

THE HIGHLY toxic nature of the exhaust gas from automobiles is well recognized and the rapid increase in the number of automobiles makes the problem presented by the inhalation of these fumes, which contain high concentrations of carbon monoxide, one of great importance. A study of this hazard, both in streets and repair shops of large cities, was published in Public Health Reports, March 30, 1928.

It has been shown by tests conducted by the United States Bureau of Mines that the amount of carbon monoxide produced by an automobile depends chiefly upon the adjustment of the carburetor. In a series of road tests on automobiles and trucks operated under all sorts of conditions, it was found that the amount of carbon monoxide ranged from 0.5 to 14 per cent of the total exhaust gases, and averaged about 7 per cent. When a car is idling, however, it may reach even higher concentrations as, for example, while waiting for the traffic control to change, drivers often use the accelerator several times to keep their engines from stalling, a practice which yields relatively high amounts of carbon monoxide. While the air we breathe is a remarkable diluent of toxic gases, it has been a question whether or not there is sufficient air to dilute the great amounts of dangerous automobile exhaust gas at congested areas in our large cities. In this study, therefore, determinations were made of the amount of carbon-monoxide gas present in very congested areas and in automo-

bile repair shops, thus showing the extent of the hazard under both indoor and outdoor conditions.

Fourteen of the largest cities of the country were visited. These cities had a combined population of over 19,000,000, and 250 samples of air were taken for analysis. As the street samples were taken under the most congested conditions at busy traffic intersections it was felt that the results of the analysis show the maximum hazard which exists to-day in our city streets. The tests showed an average contamination of 0.8 part of carbon monoxide per 10,000 parts of air and only 24 of the 141 tests gave more than 1 part of carbon monoxide in 10,000 of air, while only one location, a covered passageway, had as much as 2 parts per 10,000. The analysis of air samples taken inside autobuses showed even lower amounts of carbon monoxide. Previous studies have shown that exposure to 2 parts of carbon monoxide for 6 hours with the subject at rest caused only very mild subjective symptoms with no noticeable aftereffects, but exposure to 4 parts for 2 hours produced moderate to marked aftereffects. With the subject exercising strenuously for one hour in exposures with from $2\frac{1}{2}$ to 4 parts of carbon monoxide the immediate symptoms were moderate and the aftereffects "mild to moderate." The concentrations present in the streets and autobuses are not large enough, therefore, particularly in view of the short exposure of individuals, to constitute a health hazard. It is possible, however, that there is a hazard for the traffic officer, but this potential hazard may be minimized by shortening the duration of exposure at the more congested points.

The carbon-monoxide content of the air of 27 garages was shown by the 102 tests made to average 2.1 parts in 10,000, 59 per cent of the samples containing over 1 part of carbon monoxide and 18 per cent over 4 parts in 10,000 parts of air. The highest average amount of carbon-monoxide gas found in any repair shop was 11 parts per 10,000 and the minimum average was 0.1 part. Practically all the shops visited depended on natural ventilation to remove the toxic gases produced by the automobiles. The amounts of gas present in these repair shops indicate that the condition is a dangerous one. The hazard may be reduced, however, to a minimum by restricting the running of any automobile motor in a garage or shop to 30 seconds unless the exhaust is connected to the outside air by a direct airtight outlet or unless the car is in necessary motion. These samples were all taken in garages of considerable size, but the small private garage also presents a very great danger to life. In general, it is said that under any circumstances the discharge of an automobile exhaust into a roofed inclosure should be regarded as a hazardous act.

Carbon-Monoxide Poisoning

See also Carbon-monoxide poisoning: physiological effects of low concentrations; diagnosis; and treatment. Former handbook (Bul. No. 439), pp. 272-276.

Carbon Paper: Poisoning

A CASE of septic poisoning resulting in death which was believed to have been caused by carbon paper was reported to the Bureau of Labor Statistics in 1927. The fatal case was that of a man working

in a Government office in Washington, and at the time the case was reported his successor was in a very serious condition in the hospital from the same cause. It was believed that the carbon paper had acted as a skin irritant and had provided the portal of entry for the infection.

Cases of dermatitis from printing inks are not unusual and it appears that although the carbon paper does not become smeared on the hands and arms to the same extent as printing inks, it does rub off considerably and typists have a good deal of difficulty in removing the stain from their hands. One case of poisoning from carbon paper is recorded in a recent report on occupational diseases in Ohio,⁷ and it seems that, while cases of poisoning from this source are so infrequent that the danger has not been recognized by writers on occupational diseases, it does present a definite hazard.

Castor-Bean Dust

See Asthma: caused by castor-bean dust.

Cement Industry: Dust Hazard⁸

THE EFFECTS of different types of dust upon industrial workers are being studied by the United States Public Health Service, which has issued the first of a series of bulletins on this subject.

The procedure adopted in making these studies involved the observation of from 500 to 1,000 persons exposed to the dust, this group being augmented wherever possible by a control group of persons in the same industry who sustained little or no exposure to the dust. In general, the period of observation was two years, but in the cement industry, the period was extended to three years on account of the small size of the group under observation.

The investigation included an examination to determine the general physical condition of the workers under observation and one or more reexaminations of those showing any physical abnormality or evidence of lung pathology, with special reference to specific diseases of the respiratory system, which might result from exposure to the particular dust hazard. An analysis of the occupations was also made in each industry and records were kept which showed all absences from work lasting two days or longer, whether resulting from sickness or other causes. The most important point in the job analysis was the determination of the dust exposure, and dust samples were collected, therefore, at sufficiently frequent intervals to show the dustiness of the occupation. The dust counts showed the number of particles over 10 microns⁹ and those under 10 microns in diameter and both chemical and petrographic analyses of the dusts were made.

Calcium is the largest single constituent in Portland cement but there is also a considerable amount of silica, of which about 1 per cent is in the free state. In the manufacture of cement the workers are generally subjected to exposure to large amounts of dust and the plant which was chosen for study was one in which the dust hazard

⁷ See Labor Review, September, 1925, p. 134.

⁸ U. S. Public Health Service. Bulletin No. 176: The Health of Workers in Dusty Trades. I. Health of Workers in a Portland Cement Plant. Washington, 1923.

⁹ 1 micron = $\frac{1}{25,400}$ of an inch.

appeared to be sufficiently great to be representative of the hazards found generally in the industry. An average of 254 persons was employed in the three years during which the workers were under observation.

The cement is manufactured by combining limestone or marl which contains a large amount of lime with clay or shale in which silica, alumina, and iron oxide are the chief constituents. These materials are mixed after being ground very fine, and at various points in the different processes very large amounts of dust are produced. The greatest concentration of dust was found at the Fuller-Lehigh mills in the raw mill, where there was an average of 92,000,000 particles under 10 microns per cubic foot of air, while other dusty locations showed counts which ranged from 22,000,000 to 63,000,000 particles.

Chemical analysis of Portland cement shows that lime forms about 62 per cent of the total; silica, 22 per cent; alumina, 7.5 per cent; iron oxide and magnesia, each 2.5 per cent; sulphur trioxide, 1.5 per cent; and loss on ignition, 2 per cent. The chemical composition is not fixed, however, and the percentages of the different constituents vary at different stages in the manufacture of the cement.

Disability Rates from Respiratory Diseases

A COMPARISON of the frequency rates for absence on account of respiratory diseases between workers in the cement plant and 11 factories in other industries shows that cases of respiratory disease serious enough to disable for two consecutive working-days or longer occurred more than twice as often among the cement workers. As all the workers about the cement plant were subjected to more or less dust it was not possible to select a control group from among them, and the records of the men on the factory pay roll of a rubber company were therefore used for comparison. The age distribution of the men on the two pay rolls was practically the same, so that differences in the disability rate in the two industries can not be regarded as due to differences in age or physical condition. The group of cement workers was found to have two and eight-tenths times as many absences from colds, bronchitis, influenza, and grippe, while skin diseases caused five times as much disability, and diseases of the eyes and ears, of the pharynx and tonsils, and rheumatism each occurred three times as often. Diseases of the digestive system caused approximately twice as many absences among the cement workers as among the rubber workers.

Among diseases of the eyes and ears, conjunctivitis was the most frequent, but the full effect of the cement dust upon these organs is not shown by the disability rate because certain conditions such as deafness, for which a high rate is shown in the physical examinations, and chronic or mild conjunctivitis do not keep the men from working.

There was found to be a tendency to self-elimination from the industry of those workers who were more susceptible to respiratory diseases and who showed the harmful effects of the dust, as the respiratory incidence among the men who quit during the period of the study was 68 per cent higher than that of those who remained in the industry. Among those who did remain, the rate for respiratory diseases was low during the first few years, but after eight years' employment there was a tendency for the rate to increase. This fact

is considered to indicate that as the seasoned workers were really a selected group, this increase in the respiratory rate occurred in spite of an inherent ability to resist disease. That this tendency was not influenced by age is shown by the fact that the trend was practically the same for the men under 45 years of age as for those above this age.

Chronic Respiratory Diseases

ABOUT one-third of the employees, as represented by the years of life under observation, had one or more respiratory defect or chronic respiratory disease, and these diseases were found to be most frequent in the departments in which there was the most dust. X rays of the chests of 37 employees who had been employed in the industry more than three years showed that 15 had pneumoconiosis, 3 of these workers also having tuberculosis, while of the remaining 22, 8 gave evidence of arrested tuberculosis, 4 were negative for either disease, and 10 were considered doubtful.

From the study it appears that the specific problem in the cement industry is the control of the dust. Since the study was started in 1922, it is stated in the report, a number of companies have installed medical service, modern wash and change houses, and efficient dust-collecting systems. It is considered that through efficient medical care the high rate of defective hearing, conjunctivitis, and nasal pharyngitis could be reduced, while provision for suitable clothing and proper hygienic control would reduce the frequency of disabling attacks of rheumatism and of disability from certain of the respiratory diseases. It is considered that a standard for the amount of air dustiness could be fixed, as has been done in the South African gold mines and in the granite industry at Barre, Vt., as an aid in controlling the prevalence of respiratory disease. A tentative standard, which further study might show to be either too low or too high, is fixed by the investigators at a maximum of 10,000,000 to 20,000,000 particles of dust, under 10 microns in longest dimension, per cubic foot of air.

Chemical Poisoning

See Chemical poisoning: effects and treatment. Former handbook (Bul. No. 439), pages 276-280.

Chromium Plating: Health Hazards

AN INVESTIGATION of the hazards of chromium plating by chemists of the Public Health Service and the Bureau of Standards¹⁰ shows that the risk of poisoning is in direct proportion to the amount of chromic acid in the air. The number of cases of chrome poisoning have increased as a result of the increased use of this process, although it has been generally recognized that the spray of chromic acid produced during the process may be injurious to the workers, and as a result in most plants local exhaust ventilation has been employed. The investigation was made for the purpose of determining the extent of the hazard involved in chromium plating and the measures which have been or might be taken to safeguard the process.

¹⁰ U. S. Public Health Service. Public Health Reports, Sept. 7, 1928, pp. 2330-2347; Health Hazards in Chromium Plating, by J. J. Bloomfield and William Blum.

Chromic acid is the principal constituent of practically all the chromium-plating baths now used and may be present in concentrations ranging from 27 to 67 ounces per gallon. There are also small amounts of other chemicals in the solution, and there are small amounts of lead chromate and lead peroxide produced on the surface of the bath by the lead anodes which are generally used. Both oxygen and hydrogen are liberated in the electrolytic process and tend to carry into the air a fine mist or spray of the liquid in the tank. A preliminary study seemed to show that the only constituent of the spray which was likely to be injurious was the chromic acid, and the investigation was limited therefore to the amount of chromic acid in the air above the tanks and its effects upon the health of the operators.

The study covered six plants employing 27 workers as chromium platers, although more than 70 other workers were engaged in the process and were more or less exposed to the acid spray. Twenty-three workers, four of whom were controls, were given a physical examination, and their previous occupational history was taken in order to determine what bearing the former employment had on their present physical condition. Earlier studies have shown that the most common site of injury is the nasal septum, although ulceration of other parts of the body occurs if the chromic acid comes in contact with the broken skin. The nose and exposed parts of the body were especially observed therefore, and examinations were made of the throat and lungs for possible injury to the upper respiratory tract.

The approximate daily exposure to the acid mist of each person examined was found to vary from less than 1 milligram to 56 milligrams of chromic acid per 10 cubic meters of air and the time spent daily over the plating tanks varied from zero to seven hours. Of the 19 persons employed in the plating rooms, 3, or 16 per cent, had a perforated nasal septum, the holes varying from 1 to 4 centimeters in diameter. One of the three was not engaged as a plater but was employed as a helper about 10 feet away from the tanks. Four workers had an ulcerated septum and the majority of the workers had ulcerated mucosa. More than half of the total number of persons working in the plating rooms suffered from frequent nose-bleeds and the mucous membrane bled easily on touch. Of 14 workers actually engaged in plating, 6 had chrome holes on the hands, the number of holes varying from one to five. The chrome holes are not caused by exposure to the mist but by contact of the broken skin with the acid solution. There were only two platers who did not show any effects of the exposure, one of whom had been employed a short time each day for only 20 days, while the other had taken the precaution to use vaseline in his nasal passages and to wash his hands frequently. It was of interest to note that all those not actually engaged in plating but at work not far from the tanks and exposed to only a small amount of the acid mist for only a week or two already showed damage to the nasal passage from the chromic acid. The four workers examined as controls who did not come in contact with the chromic acid mist or solution failed to show any nasal damage or ulceration of any of the exposed parts of the body.

Practically all of the plating rooms had ventilation systems in which the acid mist was removed by drawing air laterally across the

tanks, but either the air velocity was not great enough or there was some other defect in the system which operated against complete removal of the spray.

The conclusions drawn from the study were that hygienic precautions reduce the hazard and that operators should guard against injury to the nasal tissues by applying vaseline or mentholatum salve to these tissues daily. Rubber boots, gloves, and aprons should be used when possible, and if gloves are not used the hands should be washed frequently and all cuts or abrasions greased with a mixture of three parts vaseline and one part lanolin. All floors near the plating tanks should be frequently washed. Operators should have periodic medical examinations, with prompt treatment of the slightest skin or nose infections, which should include washing with bisulphite, ammonium polysulphide, or thiosulphate solution, application of an ointment, and a waterproof covering. Continuous daily exposure to more than 1 milligram of chromic acid in 10 cubic meters of air is regarded as likely to cause definite injury to the nasal tissues of the operators.

It was found that natural ventilation is seldom, if ever, adequate to remove the chromic acid spray but that a properly designed system of transverse ventilation with an adequate air velocity will reduce the content of the air to less than 1 milligram in 10 cubic meters. The level of the plating mixture should be at least 8 inches below the top of the tank and the ducts, which should not be required to draw the air a lateral distance of more than 18 inches, should be from 1 to 2 inches wide and should extend fully along one or more sides of the tank. For effective ventilation it is necessary to have an air velocity at the duct of about 2,000 feet per minute.

Chromium Plating: Poisoning from Chromium Compounds

A SERIES of cases of poisoning from chromium compounds reported by Dr. Jackson Blair in the Journal of the American Medical Association, June 16, 1928, included 12 treated by the writer which occurred in two separate plants among workers engaged in the process of electroplating automobile accessories. The electrolytic solution used contained chromic acid which was given off over the tank in a spray so fine as to appear almost as a gas. The workers inhaling these fine particles developed symptoms similar to those of a severe cold, with sneezing, watery discharge from the eyes and nose, and itching and burning of the nose, the last symptom being particularly marked when the workmen came in contact with the fresh air outdoors. Four of the twelve patients presented these symptoms; two of these had marked congestion of the mucous membrane of the nose with small ulcers, one had a large ulcer on the septum, and the fourth had a perforated septum.

The other eight patients who were engaged in removing the plated parts from the tanks did not present the nasal symptoms, but all had ulcerative lesions of the hands—the so-called “chrome holes” or “chrome ulcers.” Other symptoms present were discoloration of the skin and finger nails. The ulcers which had developed only where there had been a preceding scratch, cut, or break in the skin were deep and painful, with sloughing of the entire layers of the skin.

The measures taken to correct the condition included the installation of an efficient ventilating system with hoods over the tanks,

the provision of long-sleeved rubber gloves for those workers whose hands came in contact with the solution, and the use of petrolatum inside the noses of workers who might come in contact with the fumes. Respirators were used for a short time, but the ventilating system proved to give efficient protection from the development of the nasal symptoms. A 5 per cent solution of sodium hyposulphite was found completely to neutralize the chromic acid on the hands of workers not using gloves.

Cosmetic Manufacturing: Sickness Among Workers

AN ACCOUNT of a study of occupational diseases among workers in cosmetic factories, made by the New York Bureau of Women in Industry, is given in the August number of the Industrial Bulletin, published by the State department of labor.

In view of the fact that the injurious effects of the use of cosmetics are well recognized in medical literature it was considered probable that workers in this industry might be subject to specific occupational diseases and a survey covering 18 factories manufacturing cosmetics was accordingly made. Three of these factories which employed the largest number of women kept medical records and a special study was made, therefore, of these plants, as it seemed probable that the conditions shown by the records were representative of the hazards of the industry generally.

The three factories, which are designated in the report as A, B, and C, employed 661, 388, and 708 women, respectively. In factory "A," which manufactures a few very high-grade products such as powder, rouge, cold cream, and perfumes, the working conditions are good. The medical department has a graduate nurse on duty during working hours and a physician daily for two hours. All applicants for employment are given a physical examination, and the women are encouraged to visit the medical department for any illness, however slight, so that their records constitute a fair representation of health conditions among them.

Factory "B" manufactures a miscellaneous line of cosmetics, the workers frequently being shifted according to the daily order requirements, but chiefly from the packing of one product to another. There is a well-equipped dispensary with a trained nurse in charge and a doctor in attendance twice a week, and oftener when necessary. All applicants for employment receive a physical examination.

In factory "C" a full line of cosmetics was manufactured, the women being employed in practically every operation except the manufacture of the powder. The plant has a medical room with a nurse in attendance, but no doctor is employed and there is no physical examination on entrance and no welfare provisions.

Records were kept in each factory of the cases of sickness—but only one showed the departments in which the workers were employed.

As might be expected in factories handling materials producing fine dusts, infections of the upper respiratory tract held first place in the causes of sickness. In factory "C" there was a total of 2,441 cases of illness, 34.4 per cent of which were caused by upper respiratory infections; in factory "B," with a total of 554 cases, 46 per cent were due to this cause; and in factory "A," with 526 cases, 26.2 per cent. This excess of diseases from this cause can not be ascribed altogether to the products manufactured, as the period represented in the

data—October to April—is the period during which colds are most prevalent. There is very little doubt, however, the report states, that the constant irritation of the nasal mucosa by powder particles and the vapors from alcohol and essential oils increases the number of such cases. Headache and indigestion were also important causes of sickness and there were an unusually large number of eye affections, including foreign bodies in the eye, conjunctivitis, and styes, many of these cases probably being caused by the irritating substances handled.

The incidence of skin diseases was slightly greater than among a group of candy workers, formerly studied, and greater than most of the figures on occupational dermatitis in general clinic records. In factory "C" there was an unusually large number of skin infections. Most of these were boils on the face, hands, and neck, over 90 per cent being on the hands, showing, it is thought, that the constant handling of powder and perfume leads to an increase in this type of infection.

A comparison of the records of the three factories brings out the value of the entrance examination as where employment is given only on the condition that correctable defects are eliminated, the incidence of avoidable sickness is greatly curtailed, and it also showed the importance of good working conditions, as factory "C," which had the poorest conditions, had an average of 3.45 cases per employee during the six months' period while factory "A," in which the greatest care was shown, had an average of less than one case per employee.

Dermatitis: Linseed Oil Dermatitis

AN ARTICLE in the *Journal of the American Medical Association*, July 2, 1927 (pp. 20, 21), by Dr. F. J. Vokoun, gives the results of a study of the incidence of linseed oil dermatitis in linseed-oil mills. The occurrence of three severe cases in the oil mill of a large paint manufacturing company shortly after the writer was appointed as industrial physician for the company prompted him to investigate the extent of this affection in his own and other establishments.

He found that dermatitis had been prevalent among the workers of the mill for many years, but the cases usually had been mild and had not caused incapacity for work. Study of the sickness records of the mill for the past three years did not show that any men had been treated primarily for dermatitis, but the superintendent of the mill stated that minor attacks were very common and that although the condition was rarely severe enough to cause the men to stop work, occasionally they would stay away until their condition had cleared up.

Questionnaires were sent by the writer to the large linseed-oil mills of the country. In replying to the questionnaire the welfare director of a company having mills in five cities reported that although he could not give the exact number of cases occurring in the last five years, taking all the mills together, they had run up into the hundreds. The eruption occurred usually on the hands and forearms but occasionally on the chest or back if a man had an unusually tender or sensitive skin. Stopping work for three of four days usually was sufficient to effect a cure. In these plants Indian seed was considered to give the most trouble and South American seed was regarded as more irritating than seed from the United States or Canada.

A physician who has been taking care of the men for eight years in another plant believed that the dermatitis was not caused by the oil but by the flaxseed dust, which was present either in the ground flaxseed or in the seed. During the past five years, he stated, he had treated approximately 400 cases of the dermatitis. He found that persons with fair skins were more subject to the dermatitis than were persons with dark skins.

In the writer's experience the lesions occurred principally upon the backs of the hands and arms, and on other parts of the body if they came in contact with the oil. The lesions were symmetrical, separate, deep, and thickly scattered and were accompanied with intolerable itching and burning, particularly after bathing or retiring for the night. In the diagnosis of these cases the possibility of other skin infections must be considered but if the diagnosis is difficult the question can be settled by having the men stay away from work for a few days as the dermatitis will improve if it is due to the oil.

As the cases occurred in all the reporting plants more frequently when Indian or South American seed was being pressed than when Canadian or American seed was used it can be assumed that the irritating substance is present in larger proportion in the former seeds. The exact nature of the irritating substance, however, is at present undetermined.

Various ointments and lotions were used by the different physicians, but they often fail to give relief in severe cases, in which case the only thing to do for these sufferers is to grant them a "vacation" until the skin has had a chance to heal.

Dusts

See Cement industry: dust hazard; Cosmetics manufacturing: sickness among workers; Hatter's furriers trade: effect of noise and dust upon the health of woman employees; Silicosis and tuberculosis: cases among granite workers in Barre, Vt.; pulmonary conditions among mine employees, Western Australia; Silicosis: cause and extent in South African gold mines; incidence in the pottery industry in Great Britain; Storage battery industry: working conditions and health hazards.

Dye Industry

See Fur-dyeing industry: health hazards in the use of intermediate dyes. Former handbook (Bul. No. 439), pages 287, 288.

Ethylene Dibromide: Toxic Effects

THE RESULTS of experiments showing the toxic effects of ethylene dibromide, a constituent of ethyl gasoline, are published in a recent issue of Public Health Reports.¹¹ The experiments, which indicate that ethylene dibromide is very poisonous, were carried out on guinea pigs and rats and the results show that precaution is necessary to prevent poisoning in its manufacture.

¹¹ U. S. Public Health Service. Public Health Reports, Feb. 11, 1927, pp. 370-375: Toxic Effects of Ethylene Dibromide, by B. G. H. Thomas and W. P. Yant.

Ethylene dibromide is a colorless, volatile, emulsifiable liquid with an odor similar to chloroform. It is insoluble in water but soluble in alcohol, ether, and gasoline.

The animal experiments consisted of inhalation tests on guinea pigs and painting the skin of rats. Nine guinea pigs subjected to vapor concentrations of commercial ethylene dibromide by single exposures varying from 30 minutes for 0.8 per cent in air to 150 minutes for 0.2 per cent, died within 6 to 18 hours; while from 0.25 cubic centimeter to 1 cubic centimeter of commercial and purified ethylene dibromide painted on the skin of six rats over an area of 2 square centimeters produced death in a period varying from 6 to 18 hours.

No attempt was made to determine the lethal dose of ethyl dibromide either as a result of inhalation or by skin absorption, but when the results were compared with those obtained in experiments with lead tetraethyl it appeared that the two compounds were of nearly equal toxicity. Ethylene dibromide is not an accumulative type of poison as is lead tetraethyl and its use does not, therefore, present as great a health hazard. The principal hazards as regards the use of ethylene dibromide in ethyl gasoline are in connection with its manufacture.

The substance causes irritation of the skin and mucous membranes, and its action on the cells of the various organs and on the vascular system is that of a general poison. The experiments indicate that it is a distinct industrial health hazard.

Eye Diseases

See Eye diseases: symptomatology in occupational diseases. Former handbook (Bul. No. 439), pages 280-284.

Fireworks Manufacture

See Fireworks manufacture: phosphorus necrosis. Former handbook (Bul. No. 439), pages 284, 285.

Fur Cutting and Felt-Hat Manufacture

See Fur cutting and felt-hat manufacture: occupational hazards. Former handbook (Bul. No. 439), pages 286, 287.

Gases and Fumes

See Benzol poisoning: hazards from the industrial use of benzol; chronic benzol poisoning among women; Carbon monoxide: a common peril; hazard in commercial garages and automobile repair shops; hazard of automobile gas in streets and repair shops of large cities; Chromium plating: health hazards; poisoning from chromium compounds; Lacquer solvents: effects of inhalation; Lead: a new test for industrial lead poisoning; Spray painting: study of hazards of spray coating; results of two studies of spray painting hazards.

Hatter's Furriers Trade: Effect of Noise and Dust Upon the Health of Women Employees¹²

THE EFFECT of their employment on the health of women employed in the hatter's furriers trade was the subject of a study by the New York Bureau of Women in Industry in three establishments in New York City. There have been many studies of this industry in the past because of the mercury hazard, but the present study was made not so much to ascertain the presence of chronic mercurialism, since improved conditions have decreased its occurrence, as to determine the effect upon the health of the workers of other unfavorable conditions, especially noise and dust.

In preparing rabbit fur for use by the hatters, the skins are first cleansed by rotation with sawdust in revolving drums, and then trimmed, sorted according to size and quality, and sheared of the long hairs in shearing machines. The skins are then caroted with a solution of mercury nitrate to promote the felting of the fibers, after which the fur is cut from the skin and sorted and mounted for delivery to the hatter.

All but a few of the women in these plants are employed in the sorting and mounting rooms. They work at tables close to the cutting machines, the fur as it is cut from the skin being carried first to the sorters who pick out the poor pieces of fur, shreds of skin, etc., and then to the mounters who give it a final inspection, shape the fur into a mound and place it in a paper bag.

The cutting machines produce a high-pitched, buzzing noise so loud that conversation is possible only by shouting, and in addition to the noise the cutting rooms are very dusty. Suction devices are impracticable since the material handled is loose fur and any device for drawing off that which blows about the room would only succeed in blowing up more. Ventilation is also a difficult matter as drafts blow the fur, and the rooms, therefore, tend to be warmer than is desirable.

While no air analyses were made, tests with selenium test paper—a yellow paper which turns black when exposed to mercury vapor—showed that mercury vapor was present in all the departments, although there was less in the cutting room than in the drying and storage rooms.

No cases were discovered which were definite enough to justify a diagnosis of mercury poisoning, although seven cases were found in which it was thought the condition of the gums gave evidence of mild mercurialism. Abnormal conditions of the nose and throat were found in a large proportion of cases, but it was impossible to determine to what extent the fur dust was responsible for these conditions, although it seemed certain that if not the cause of them it did tend to prolong the inflammations. Irritation due to the fur dust was also believed to be the cause of the mild conjunctivitis found among more than one-fourth of those examined. Over 40 per cent of the women were found to have some impairment of hearing or complained of noises in their ears and it was believed that this was the result of the excessive noise in the cutting rooms.

¹² New York. Office of the Industrial Commissioner. The Industrial Bulletin, Albany, June, 1927, pp. 266, 267.

The most common complaints found among these workers were colds, headaches, ringing in the ears, coughs, and effects of the sedentary type of work, such as constipation, while the most frequent physical defects were overweight, impaired hearing, inflammation of the naso-pharynx and gums, tonsilitis, mild anemia, slight tremors, poor posture, and weak feet.

The report concludes:

Although no dramatic connection between work and health of workers was found in this study, it is apparent that elimination or lessening of the undesirable features in the trade would undoubtedly result in marked improvement in the health of the women employed. It can be said, in general, that improvement in industrial environments is occurring slowly, but any investigation of specific conditions, such as this, reveals the need for continued effort in this direction.

Heart Disease

See Heart disease: industrial aspects. Former handbook (Bul. No. 439), page 289.

Heat and Humidity

See Steam laundries: effect of working conditions upon health of workers. Former handbook (Bul. No. 439), pages 316-319.

Hydrofluoric Acid

See Hydrofluoric acid: effect of fumes. Former handbook (Bul. No. 439), pages 289, 290.

Hydrogen Sulphide Gas

See Hydrogen sulphide gas: poisoning. Former handbook (Bul. No. 439), pages 290, 291.

Infections: Moisture as a Causative Factor

THE IMPORTANCE of moisture in the production of infections has been demonstrated by a study of several groups of operatives in a silk mill, the results of which are reported by Dr. C. W. Goff in the *Journal of Industrial Hygiene*, January, 1927 (pp. 18-21). The operatives studied consisted of three groups who handled the raw silk in different processes. The silk is received in the mill in the form of split cocoons and waste silk from the winding processes, which is in a more or less dirty condition. This material is dumped into a large vat where it is boiled with soap and olive oil for a short time, after which it is dried in large steam ovens. In the next process it is put through a series of combings at which time it is sprayed and handled in a slightly dampened state, while in the third process, which is another series of combings and cardings, more moisture is necessary and the hands of the operatives are continually damp or actually wet.

There were six operatives in the first group, two of whom developed infections of the hands or forearms, which followed lacerations sustained during work. Among the 44 workers in the second group there were 60 injuries with 31 infections. Twenty-five workers in this group had no demonstrable infections. In the third group of 41 workers there was a total of 151 injuries to the hands or forearms,

with 117 infections of varying degrees of severity, and there were only 5 of this group of workers who did not sustain any infection.

The incidence of infection, therefore, is shown to be the highest in the last group, whose hands and forearms were subjected to a continual softening from the wet material. The proportion of infections of injuries to hands and arms varied from 78 per cent in the third group to 50 per cent in the second group and 33 per cent in the first group, the amount of infections being in direct relation to the degree of moisture of the material and the hands of the workers which was the only variable factor of any practical importance. It has been shown that there is an order of micrococcus always present in the lowest layers of the skin and that they become much more active and produce all types of infections when moisture is present in quantities sufficient to soften the hands.

As a result of the severity of the infections found in the groups of operatives studied, the writer concludes that moisture must play a greater part than is generally realized in the production of industrial infections.

Infective Jaundice Among Scotch Coal Miners

A REPORT¹³ issued by the British Medical Research Council on cases of spirochætal jaundice among coal miners in Scotland gives the result of the researches carried out for the purpose of identifying the infective organism and the medium of infection.

The cases occurred among miners in "wet" mines and were similar to cases first reported among mine workers in Japan where the spirochætal origin of the disease was demonstrated by Japanese investigators in 1915. The disease occurred among soldiers during the war, especially among men in the trenches, and has been reported from countries in all parts of the world. An epidemic form of jaundice was first reported in the United States during the war of 1812, and there have been reports of repeated outbreaks in this country since 1857. It is considered probable, however, that not all of the epidemics reported at different times and places have been the same disease, but that two distinct types—epidemic jaundice and catarrhal jaundice—have been confused.

In the epidemic form which has been reported among coal miners and in other persons working near rat-infested areas, as well as among the soldiers in the trenches, the infective organism has been proved to be a genus of bacteria characterized by the presence of fine spirals throughout its length and incurved ends, which causes a form of jaundice accompanied by hemorrhages into the organs and tissues of the body. In 1916 an antispiochætal serum was developed which was used successfully to treat cases occurring among the soldiers in the trenches. The cases which form the subject of this report were first reported in the Scottish mines in 1923, and after several fatal cases had occurred some of this serum was used. It proved to be effective in spite of the fact that it was seven years old. A fresh supply of serum was produced through the immunization of horses against the spirochætes, and this serum has since been obtainable.

¹³ Great Britain. Medical Research Council. Spirochætal Jaundice, by G. Buchanan, M. D. London, 1927.

Since 1923, 17 cases of spirochætal jaundice, with 5 deaths, have occurred among coal miners and in all of Scotland 31 cases with 8 deaths, giving a mortality of 25 per cent, have been recorded. In the fatal cases death occurred in from 10 to 15 days after the onset of the disease.

The experimental investigations included the examination of rats caught in the area in which the cases occurred and experimental inoculation of guinea pigs with the infective material obtained from these animals. Thirty-six per cent of the rats caught in this region were found to be harboring this organism. It seemed probable, therefore, that the rats infesting the mines were the source of the infection, and the occurrence of the disease in persons working in such rat-infested areas as refuse dumps, piggeries, or breweries corroborated to some extent this conclusion. A strain of the organism capable of producing the disease was also found in the roof slime of one of the mines in which cases of the infectious jaundice had occurred.

Autopsies were performed in six of the fatal cases occurring in persons. There was present in these cases a generalized intense yellow color of the skin, effusions of blood into the skin, and hemorrhages were widely distributed throughout the body and were particularly evident in the stomach. The kidneys showed marked degenerative changes and areas of necrosis were present in some instances, and the liver showed these changes but in lesser degree. In experimental animals death occurred in from 5 to 12 days after inoculation, and the signs of the disease were similar to those observed in the persons dying of the disease, but the blood infection was demonstrated more readily in animals than in man.

Experimental modes of infection were observed in the guinea pig, and it appeared that from the working conditions in coal mines and the condition of the workers, human infection occurs as a result of the organism gaining entrance through abrasions of the skin or by way of the eye or the nasal mucosa, from contaminated hands, while infection by ingestion seems to be a less likely mode of infection.

Measures of prevention advocated are immunization through inoculation with a vaccine made from cultures of the organism. This method was successfully employed on a large scale in Japan. In agricultural regions where the disease is endemic the use of calcium cyanamide or lime nitrogen on the soil is advocated, and in coal mines the extermination of rats so far as possible and the drainage of mines are considered the most important preventive measures.

Irritant Gases

See Irritant Gases: action on respiratory tract. Former handbook, (Bul. No. 439), pages 291-295.

Lacquer Solvents: Effects of Inhalation

AN ACCOUNT of inhalation experiments with certain lacquer solvents showing the degree of toxicity of several of the more commonly used solvents or diluents, is given in the October, 1928, issue of the *Journal of Industrial Hygiene*.¹⁴

¹⁴ *Journal of Industrial Hygiene*, October, 1928, pp. 261-271: Inhalation Experiments With Certain Lacquer Solvents, by Henry Field Smyth, M. D., and Henry Field Smyth, jr.

The composition of nitrocellulose lacquers is in general quite complex, and even the simplest of them contain several solvents. In connection with the spray painting investigation carried out by the authors in 1925 for the Pennsylvania Department of Labor and Industry, replies to questionnaires were received from 17 lacquer makers who listed from 2 to 11 different volatile materials in each of their lacquers. These included butyl acetate in 11 lacquers; benzol, ethyl acetate, butyl alcohol, and toluol in 9; xylol and amyl acetate in 8; ethyl alcohol or denatured alcohol in 7; some form of petroleum distillate, as gasoline, etc., in 4; and acetone, amyl alcohol, and other substances in others. While the hazards of benzol when used as a solvent in spraying lacquers have been shown by various studies, the effect of others of the volatile solvents or diluents on the health of the sprayers is not so well understood. The tests described in this report were made, accordingly, with those chemicals which were found to be most often used in the lacquers, as well as one type of turpentine which is used as a solvent in the newer, less rapidly drying brushing lacquers.

The tests which were carried out on animals involved exposure to fumes at the maximum concentrations which had been found in factories where little or no exhaust ventilation was available and at concentrations which were likely to prevail where reasonable and usual exhaust ventilation was provided. The animals subjected to the tests were kept under observation for at least two weeks before gassing was commenced, in order to insure their being in proper condition for the experiments and there were two groups of control animals for each experiment, one of which was kept in a gassing chamber supplied with fresh air and the other with the colony, receiving the same food and attention but not being exposed to any unusual conditions.

The solvents tested included toluol, xylol, gasoline, ethyl acetate, butyl acetate, amyl acetate, ethyl alcohol (formula 2b), butyl alcohol, steam-distilled turpentine, and spraying lacquer distillate and brushing lacquer distillate.

The conclusions reached from the experiments are summed up in the report as follows:

As the result of the series of tests here reported the authors would divide the solvents tested into three groups:

1. Those usable with safety in concentrations usually employed or possibly in somewhat higher concentrations as ingredients of brushing or spraying lacquers. Ethyl acetate and amyl acetate, and possibly butyl acetate, would be placed in this class.

2. Those usable with safety in present concentrations but to be increased with caution as possibly harmful if increased materially. Here would be listed gasoline, turpentine, and xylol.

3. Those for which the present practice probably represents nearly the upper limit of safety in use as spraying lacquer constituents. In this group are toluol and butyl alcohol.

Provided reasonable exhaust ventilation is assured, however, all these limits may be appreciably raised with impunity.

The entire investigation furnishes a strong argument for the insistence on exhaust ventilation wherever lacquers of any type are being sprayed.

The materials listed and tested here do not nearly exhaust the list of those used as lacquer materials and the fact that practice in this respect is still frequently changing and new ingredients continually being introduced, about which there is available no information as to their effect on the health, is another argument for the protection of the sprayer in all cases. The removal of benzol from lacquers will undoubtedly remove the greatest single hazard from either acute or chronic poisoning in lacquer work but it does not warrant the discarding of precautionary measures.

Lead: A New Test for Industrial Lead Poisoning

A SIMPLE laboratory method by which absorption of lead by workers exposed to lead in its various forms may be demonstrated before actual clinical lead poisoning takes place, through the detection of immature red cells in the blood stream, is proposed by Dr. Carey P. McCord in a report published by the Bureau of Labor Statistics as Bulletin No. 460. The report gives results of the examination of more than a thousand persons, some of whom were exposed to lead, while others were used as controls in checking the results of the tests, together with a technical description of the production of immature red blood cells and of the technique followed in making the blood counts, and an account of the clinical and laboratory materials utilized by Doctor McCord and his assistants.

The danger of lead poisoning is so widespread in industry and the action of lead as an intoxicant is so insidious that any method by which the early effects following lead exposure may be detected prior to any disability should be of the greatest worth wherever lead is a hazard. In the past the diagnosis of lead poisoning has generally depended upon the presence of definite and easily recognizable symptoms, as there has been lacking heretofore any suitable index of lead absorption among workers who are exposed to the hazard but who have not developed obvious manifestations of the disease. The incidence of lead poisoning, therefore, remains high notwithstanding the fact that the mode of entrance of this toxic substance into the body is well known, that the distribution of lead after absorption is well established, and that the factors influencing the absorption, deposit, and excretion of lead are fairly well understood.

The principal conclusions reached as a result of the study are in brief as follows:

The number of immature red cells in the blood which contain basophilic substance—that is, substance which is stainable by certain dyes—is increased above normal limits in various pathologic states, including lead intoxication, benzol and arsenic poisoning, certain types of anemias, at times in acute infections, and in many other conditions; but in a person exposed to lead and in the absence of other conditions presenting high basophilic red-cell counts such a condition may be accepted as indicative of lead absorption or lead poisoning.

Cases of definite lead poisoning ordinarily present basophilic red-cell counts ranging from 7,000 to 50,000 per cubic millimeter of blood, although the counts rarely may fall below 7,000 or may exceed 100,000. It is possible that very high basophilic red-cell counts—that is, in excess of 50,000—may be present without symptoms of clinical lead poisoning, but cases of poisoning are prone to develop among a group presenting such high basophilic red-cell counts.

Workers exposed to lead who present basophilic red-cell counts in excess of 6,000 to 7,000 should be regarded, in the absence of other conditions productive of such increased counts, as potential lead-poisoning cases and as such should be subjected to treatment.

The use of this test has revealed not only an extensive absorption of lead among workers in those industries and those departments with a known lead hazard, but also among office workers, clerks, etc., in these industries who in the past have commonly been considered as unexposed. This is especially true if the lead hazard is present in the form of lead dust.

The basophilic red-cell counts do not, however, stand in any constant relation to the hemoglobin percentage, to the total red or white count, or to the late effects of lead poisoning, such as wrist drop.

Lead: Poisoning in an Enameling Plant¹⁵

A RECENT study of the health problems of Nashville, Tenn., included a survey of the health measures and the medical service provided in industries of the city. Thirty-five industrial and commercial establishments were visited and processes which involved the use of dangerous substances were found in four instances. In only one case, however (that of a stove enameling plant), was the protection by inclosure or by exhaust ventilation considered inadequate.

A case which was diagnosed as lead poisoning in one of the local hospitals, occurring shortly after this factory was first visited, it was decided to make a thorough investigation of the health conditions among employees and of working conditions in this plant. It was found that 45 men were engaged in the different operations under practically the same conditions of exposure to the lead hazard, and that both men and management were in ignorance of the dangerous conditions.

The men were advised of the danger under which they were working, with the approval of the management, and arrangements were made for them to come voluntarily to the out-patient department of the Vanderbilt University School of Medicine for examination. All but six of the employees reported for examination at the time specified.

The physical examinations, which included all the routine laboratory tests and such other special tests as were indicated by the symptoms, showed a very high incidence of poisoning. Fifteen, or 39 per cent, of the men were found to be suffering from lead poisoning in various stages; 11, or 28 per cent, were diagnosed as "probable lead poisoning"; and only 13 failed to show any evidence of the disease.

The average age of the men having unquestionable cases of lead poisoning was 27.6 years, the range being from 18 to 45 years; and the minimum time of employment was two and one-half months and the maximum time about four years.

The symptoms presented by those having definite cases of poisoning were: Colic and constipation, 13 cases; secondary anemia, 11; motor disturbance, 8; lead line, 5; weakness of the extensors of fingers or of both wrists and fingers, 4; diffuse arteriosclerosis, 3; inequality of diameter of the pupils, 2; and diminished knee jerk, cardiac dilation and hypertrophy, and sclerosis of the retinal arteries, one case each. Examination of the blood showed stippling of the red blood cells in all of the 15 men.

A point of interest brought out by the examination and one showing the great need for physical examinations generally in industry was the fact that not one of the 39 men could be given a "clean bill of health." A total of 60 defects, many of them serious, were found, although, with the exception of those suffering from lead poisoning, the men generally considered themselves in good health.

¹⁵ Journal of the American Medical Association, Oct. 1, 1927, pp. 1107-1112: The Study of Lead Poisoning in an Enameling Plant, by W. S. Leathers, M. D., and Hugh J. Morgan, M. D.

The paint used in spraying the stoves was a mixture of ground glass and lead with some cadmium applied under a pressure of 80 pounds. It was so heavy that the exhaust equipment provided for the booths was entirely inadequate to remove it. In addition to the poor ventilating and exhaust systems there was general disregard of the most elementary sanitary precautions. The men smoked while at work and ate their lunches in the workroom, and the washing and locker facilities were insufficient. As a result of the findings of the investigators the various unhygienic conditions of the plant were corrected—a new exhaust system was installed with its efficiency increased from 2,200 cubic feet of air removed per minute to about 7,300 cubic feet; the workers were instructed in personal hygiene; and adequate medical supervision was instituted.

This report is of interest not only because of the shocking conditions described in this one plant but because the situation might be duplicated in almost any industrial center. Dr. A. J. Lanza, in his discussion of the paper which was read before the section on preventive and industrial medicine and public health of the 1927 session of the American Medical Association, said that although statistics indicate that deaths from lead poisoning have decreased about one-half in the last 10 years there has not been a corresponding drop in the incidence of lead poisoning. These cases do not develop so much in places where lead is manufactured, such as lead or paint works where the lead hazard is recognized and guarded against, but in plants where lead is used incidentally in only one process in a general manufacturing plant.

Doctor Lanza says:

A great many employers take on a lead process in their plant without any realization at all of its dangers. In other plants, the risk of lead poisoning is not sufficiently brought to the attention of the industrial workers who are continually exposed without being aware of the fact. It is not unusual to see lead handled as if it were a perfectly innocuous substance. I had occasion recently to visit an establishment in which there was a very pronounced lead hazard. Two hundred men were engaged in lead soldering in one room. The fumes from the solder came through the room and leaded the other workers who were near them. The amount of sickness from gastro-intestinal diseases in this group was four times that of respiratory disease, whereas in the ordinary population that ratio is transposed. Workers frequently consulted their own physicians in this small town; yet there has not been a single case of lead poisoning certified to the State authorities or diagnosed on an insurance disability certificate. Nevertheless, lead poisoning had been occurring there for a number of years to my certain knowledge. This indicates a failure to appreciate how widespread lead poisoning is in many an industrial community. Physicians who treat industrial workers complaining of gastro-intestinal symptoms, combined with anemia, without apparently any definite surgical condition, should keep the possibility of lead poisoning in mind and make blood smears to determine the presence of stippled cells.

Lead Poisoning

See also Spray painting: study of hazards of spray coating; results of two studies of spray painting hazards; Storage-battery industry: working conditions and health hazards.

See also Lead: excretion by normal persons; Lead poisoning: deaths; report of cases among motor-car painters in New South Wales. Former handbook, (Bul. No. 439), pages 295-298.

Malaria: Infection Among Mexican Cotton Pickers in Mississippi¹⁶

A STUDY of the extent of malaria among a group of Mexican laborers imported into Mississippi for the cotton-picking season, made by the United States Public Health Service, shows the danger of the spread of this disease through the use of migratory workers who are insufficiently guarded against infection.

The first considerable importation of these laborers into the Mississippi Delta took place in the fall of 1925 when the cotton crop was large and the supply of available labor was scarce. Approximately 500 of these laborers were employed in five counties of the delta, usually in groups of 50 or fewer on a plantation. Practically all of them came from a few localities in Texas where many of them had resided for some time. Nearly all were men, but a few brought their families with them. They lived in bunk houses or renters' cabins and were furnished with firewood but supplied their own food and bedding, and the places in which they lived were usually unscreened.

On one plantation where there were many cases of malaria reported in 1925, an examination of the blood of 47 laborers showed that 21.3 per cent had malaria parasites. Eighteen of those examined gave a history of illness after their arrival in Mississippi, in most cases the symptoms being those of malaria, while there had been one death. There had been no evidence of malaria among these workers until two weeks or more after their arrival and most of them stated that they had not suffered from malaria in Texas. Examinations of the members of five groups in other localities failed to show that the disease was present among them, and as many of them had come from the same localities as the group affected it seemed certain that the disease had been contracted after the workers reached Mississippi.

A similar examination in the fall of 1926 confirmed the fact that of those harboring the parasites shortly after arrival, the form was of the benign type while later examinations of the same group showed that they were suffering from the epidemic form of the disease, the type most prevalent in this region during the late summer and autumn.

From the examinations it appeared that on most of the plantations where the Mexicans were employed the amount of transmissible malaria was not great, indicating that generally throughout this region conditions were much improved over former years when immigrants to the Delta had suffered severely.

It was considered, however, that although the survey showed that the number of cases varied greatly with localities and seasons, enough was present to indicate that there was a real danger in the use of these migratory workers, both to them and to the public, unless measures were taken to protect them. Screening of bunk houses would reduce the danger and it should be the duty of employers to furnish this protection and provide medical supervision to guard against possible epidemics. The Mexican laborers remain in Mississippi but a short time, but they are there at the season of the year when the danger of malaria is greatest and it is pointed out that migratory workers are an efficient means of transmitting disease and that a

¹⁶ U. S. Public Health Service. Public Health Reports, May 20, 1927, pp. 1368-1370: Malaria Among Mexican Cotton Pickers Imported into Mississippi, by M. A. Barber and C. P. Coogle.

group of such workers infected in one locality may carry the disease into other sections previously exempt and disseminate it there.

Manganese Poisoning

See Manganese poisoning: report of six cases. Former handbook (Bul. No. 439), pages 298-300.

Mercury Poisoning

See Mercury poisoning. Former handbook (Bul. No. 439), pages 300, 301.

Mercury Vapor: New Method of Determining Amount in the Air

A DEVICE developed in the research laboratory of the General Electric Co., by which as small a proportion as one part of mercury in 20,000,000 parts of the atmosphere can be detected, was described in the Boston Medical and Surgical Journal, July 28, 1927 (pp. 151, 152).

The increased industrial use of mercury in heating operations, in various chemical processes, and in the newly developed mercury turbine makes it important to have a method by which leaks in apparatus and traces of mercury vapor in the air can be detected quickly, as the effects of exposure to mercury are accumulative and continued exposure to slight amounts is dangerous. The new method is accurate and quick and does not require chemical training to carry out. Former methods of determining the amount of mercury vapor in the air required considerable time and could be made only by an expert chemist. Even then they were often far from accurate, especially when very small amounts of mercury were involved.

The test is based on the principle of a reaction between a solid substance, selenium sulphide, and the mercury vapor, which produces a colored substance easily discernible with the eye. The yellow selenium sulphide is applied as a coating on paper. Upon exposure to air containing mercury vapor the paper is blackened, the degree of blackening depending upon the amount of mercury, the length of exposure, and various other factors which can be definitely controlled. It seems that the smallest trace of mercury can be detected in this way.

When it is desirable to secure continuous and automatic registration of the mercury vapor a system has been devised by which a continuous strip of the paper is drawn slowly over an opening through which the air flows, the paper being moved at a uniform rate by means of a small clock motor. The paper can be compared, shortly after the exposure, with a standard scale showing the different shades from yellow to black in terms of mercury concentration.

A further development of the method is as follows:

If an incandescent lamp is placed in front of the strip of paper and a photoelectric cell behind it, the amount of light reaching the cell will depend on the amount of blackening of the paper. The light can regulate the readings of an ammeter, so that the concentration of the mercury vapor can be determined either by observing the color of the paper or by reading the ammeter. It is also possible to so arrange the photoelectric cell circuit that, should the mercury concentration become dangerously high, a warning gong will be sounded. The apparatus is then an automatic chemist.

Mining Industry

See Mining industry: engineering-hygienic aspects of dust elimination in mines; health hazards. Former handbook (Bul. No. 439), pages 301-307.

Nickel Refining

See Nickel refining: control and treatment of "nickel rash." Former handbook (Bul. No. 439), pages 307, 308.

Occupation Neurosis: Telegraphers' Cramp in Great Britain

TELEGRAPHERS' cramp has been the subject of considerable study in Great Britain. The departmental committee on compensation for industrial diseases took up the matter at some length in 1908¹⁷ to determine whether the disease should be added to the list of compensable diseases, with the result that by order of the Secretary of State, dated December 2, 1908, the provisions of the workmen's compensation act were extended to cover it. A committee was next appointed to inquire into the prevalence and causes of the disease and to report what means might be adopted for its prevention. A detailed report of its findings was published in 1911.¹⁸

According to this report, the ailment had been variously regarded by the authorities as a muscular disorder, as a disease of the peripheral nervous system, and as a disease of the central nervous system. After careful consideration of these antagonistic theories, the committee accepted the view that telegraphers' cramp "is a disease of the central nervous system, and is the result of a weakening or breakdown of the cerebral controlling mechanism in consequence of strain upon a given set of muscles." The statement was also made that although telegraphers' cramp in Great Britain had been associated mainly with the use of the Morse instrument, "any instrument which calls for repeated fine muscular movements of the same kind may involve a relative 'occupation spasm' or 'craft neurosis.' Thus, while we have associated the term 'telegraphists' cramp' with the disease which brings about a difficulty in making the specific coordinated movements needed for a proper manipulation of the particular instrument known as the Morse key, the manipulation of the Baudot or Hughes keyboards may similarly bring about a relative form of cramp (analogous to pianists' cramp); and all these forms of cramp are on parallel lines with writers' cramp."

Recently, the Industrial Fatigue Research Board has published the results of a study¹⁹ made at the suggestion of the Union of Post Office Clerks. This investigation did not deal with the medical aspects of the ailment which had already been considered by the departmental committee in 1911, but with the question, arising from the work of that committee, as to the specific susceptibility to the disease among persons engaged or about to engage in telegraphy. Attention was devoted to a group of operators certified

¹⁷ Great Britain. [Home Department.] Committee on Compensation for Industrial Diseases. Second report. London, 1908. Cmd. 4387.

¹⁸ Great Britain. [Post Office.] Committee on Telegraphists' Cramp. Report. London, 1911. Cd. 5968.

¹⁹ Great Britain. Industrial Fatigue Research Board. Report No. 43: A Study of Telegraphists' Cramp. London, 1927.

as suffering from cramp and to another group apparently free from it. These groups were intensively studied, in order to find whether those suffering from cramp possessed in common any other characteristic not possessed in the same degree by those who had been exposed to an equal risk but had not contracted the disability. Selected psychological tests involving speed and accuracy of movement were applied individually, and a medical study of each subject was made, with special reference to the presence or absence of psychoneurotic symptoms. The results of this part of the investigation showed that the cramp subjects possessed greater susceptibility to muscular fatigue (as measured by the ergograph), less ability to perform quick and accurate movements (as measured by the dotting machine), less complete control over the muscles when sending a message, and a greater prevalence of psychoneurotic symptoms than the normal subjects. However, the two groups were not completely differentiated by any of these tests, so there was no assurance that liability to cramp could be detected with certainty in individual cases. Reference is made to the fact that previous research had shown that there was no one condition of the work and no specific organic state that could be regarded as the invariable antecedent of cramp.

Various objective factors, such as types of keys, length of service, hours of work, bad style, were reviewed and found not to be a necessary antecedent. Even the physiological signs of cramp were shown to be indeterminate, as there might, or might not, be a visible spasm, and the disability in its objective manifestations could be specific to one letter, or be selective for certain muscular activities, or be associated with general muscular weakness. Details of six cases specially examined from the medical point of view were appended. In each case the organic condition was reported to be normal.

The type of disability varies with the individual. The following were some of the types met with in the study of the Industrial Fatigue Research Board:

(1) There are those suffering from a general disability to use the arm after many years of sending; not only is the use of the telegraphic key or a pencil interfered with, but also most other actions which demand the use of the arm. The holding of a cup, or of a needle for sewing or knitting, is difficult or impossible; a glass if taken up may be dropped; even the handle of a spade can not be grasped. This disability may or may not be accompanied by pain, which may be localized in the wrist or may be general.

(2) There are those who can neither send nor write, but who can use the arm for other occupations, e. g., they can play the piano, use a spade, and are quite efficient if the larger muscles are brought into action. This group comprises very many individual variants from ability to use the arm for anything except telegraphic work, through various grades of inability, to total disability as described in the previous section.

(3) Others again are all right, having no pain, and no muscular disability except for the sending of a particular letter or group of letters. Particular combinations of dots and dashes prove stumblingblocks. Some have difficulty in letters involving a sequence of dots, particularly at the end of a word; others find that having got the key down they can not get it up again quickly enough for the formation of dots in other words, the key seems "sticky."

Pellagra: Endemic Pellagra in Cotton-Mill Villages of South Carolina

SOME of the conclusions reached from a study of pellagra by the United States Public Health Service which extended over a period of about five and a half years were published in Public Health Reports of October 12, 1928.

The study, which began in the spring of 1916 and ended in October, 1921, covered several textile-mill communities in South Carolina, the number studied varying at different periods from 1 to 24 villages. Only one of the villages was under observation throughout the entire period and it is the findings of this study, much delayed for various reasons, which are now summarized. The study is regarded as important from the fact that it shows the fluctuations in the incidence of the disease from year to year and also because it brought out the more important factors in these fluctuations. During 1917, the period when the largest number of persons were under observation, in an aggregate population of 22,653 individuals there were 1,147 cases of pellagra reported, giving an incidence rate of 50.6 cases per 1,000.

It was shown by the study that pellagra in an endemic locality is from two to six times more prevalent than the experience of the local physicians would seem to indicate, and that the fatality rate when definitely marked cases of all grades of severity are considered does not appear to exceed 3 per cent.

The data show that endemic pellagra is preponderatingly a disease of children, from 2 to 15 years of age, a fact which does not seem to have been recognized before. It was found, also, that the single women, as compared with the married, widowed, or divorced, were relatively exempt from the disease. This was explained by the fact that in the population group under consideration, the single woman was usually a wage earner which would, in general, place her in a somewhat more advantageous position in regard to diet than the women who had other responsibilities. The incidence of the disease was found to be markedly seasonal, from 80 to 90 per cent of the cases beginning within the period from April to July, inclusive.

In view of the fact that diet has been proved to be an important factor in the incidence of the disease, the reason for seasonal variation in the development of cases is found in the variation in the diet brought about by the seasonal modification of the food supply. It was found that the disease had a marked and very sharply limited season of prevalence, the curve of which, with a slight lag, paralleled that of incidence. As marked seasonal variations in the food supply were shown in the village longest under observation, the relation of this variation in food supply to the striking seasonal incidence and prevalence of the disease is suggested.

No consistent correlation between sanitary conditions and pellagra incidence was demonstrated by the study, but such association as was at times observed was regarded as accidental and due to the intimate relation of the endemic disease to economic status, of which the sanitary condition is often an index.

There was a striking inverse correlation shown between the incidence of the disease and family income, the study of the selected village for nearly six years demonstrating that income shortage was a fundamental, though indirect, controlling factor in the year-to-year fluctuation in the occurrence of the disease. It seems evident, therefore, that the fluctuations from year to year are largely the effect of economic conditions that influence the ability of a certain section of the population to procure an adequate diet.

Phosphorus Necrosis: Cases Reported by Johns Hopkins Hospital

THE HAZARD of phosphorus poisoning in the manufacture of fireworks²⁰ was the subject of an investigation by the Bureau of Labor Statistics in 1925. Of the 57 establishments manufacturing fireworks in the United States at that time, only 3 were found to be using white (yellow) phosphorus. These three plants were covered in the investigation, therefore, and a total of 18 cases of phosphorus necrosis among workers in these plants and in a phosphorus preparation plant were discovered. As a result of the findings of this investigation an agreement²¹ was reached between the manufacturers and the Department of Labor that the manufacture of all types of fireworks containing white phosphorus should cease on or before August 15, 1926.

In spite of this fact, cases of phosphorus necrosis continue to be reported among workers who were exposed to the poison prior to the time the agreement went into effect. Two such cases were treated in Johns Hopkins Hospital during 1927. Both patients were colored girls, one of whom had a history of employment in a factory manufacturing fireworks before her first admission to the hospital in February, 1927, and whose case was diagnosed as phosphorus poisoning, and the other, without a definite history of exposure, was regarded as a possible case of phosphorus necrosis.

The hospital record of the first case shows that the girl was first seen in the out-patient department February 11, 1927, where a diagnosis of osteomyelitis of the jaw, with abscess, was made. The right jaw had been swollen for three months before she applied for treatment, and part of that time the abscess had been open and draining. The X-ray report showed extensive involvement of the right lower jaw. The patient was under treatment, either in the hospital or in the out-patient department, practically continuously from February 11 to November 7, 1927, and during that time she was operated on four times. The operations included removal of all the teeth on the lower right jaw, removal of part of the infected bone and sequestrum, and finally removal of the entire left lower jaw. At the time she was last seen the sinus, which had formed at the angle of the jaw, was not healed but was draining freely.

A claim for compensation under the workmen's compensation act by this worker on the ground that the disease was contracted as a result of trying to alleviate toothache by rubbing her gums while handling white phosphorus was decided adversely by the Virginia Supreme Court of Appeals in January, 1928. The court held that this was an occupational disease, and the condition, therefore, could not be attributed to an accident.

Phosphorus Necrosis

See also Fireworks manufacture: phosphorus necrosis. Former handbook (Bul. No. 439), pages 284, 285.

²⁰ U. S. Bureau of Labor Statistics Bul. No. 405: Phosphorus Necrosis in the Manufacture of Fireworks and in the Preparation of Phosphorus.

²¹ See Labor Review, September, 1926, p. 37.

Photo-Engraving Industry

See Photo-engraving industry: health survey. Former handbook (Bul. No. 439), pages 308, 309.

Pneumonia: High Death Rate Among Iron-Foundry Workers

THE EFFECTS of occupation in the causation of certain diseases are shown by a study,²² by the Metropolitan Life Insurance Co., of the causes of death among the white industrial policyholders of the company. The analysis, covering the years 1922 to 1924, has shown many striking differences in the distribution of deaths by causes among the occupational classes investigated, the death rate from pneumonia and other diseases of the respiratory system particularly being so much higher than the average in certain occupations that it seems there can be little doubt that the high incidence of the disease is a direct result of the occupation.

A particularly high percentage of deaths from pneumonia was found among ironworkers, 15.9 per cent of all deaths among these workers being due to pneumonia, while only 7.7 per cent of the deaths among all occupied males were caused by this disease. The percentage of deaths from this cause in this group was also above the average at every age of the main working period of life, 15 to 64 years, while between the ages 25 to 34 it was over three times the average. The lowest relative percentage occurred in the age period 35 to 44, but even there it was 86 per cent above the average. In addition to the fact that ironworkers had such a high percentage of deaths from pneumonia as compared with other occupational groups, this disease was also the principal cause of death among them, although this was not the case in any other occupational group included in the study.

A death rate above the average from pneumonia was also shown by a number of other occupational groups. Fifteen of the 74 occupational classes had a higher death rate from this cause than the average of 7.7 per cent. The three distinct types of hazards which are associated with a high pneumonia death rate—dust, extreme heat, and exposure to sudden variations in temperature or to the weather—are found among these occupations, although some occupations which offer exposure to one or more of these hazards, such as cutters and grinders, brass-foundry workers, and pottery workers, had a low death rate from all causes as well as from pneumonia. Their low percentages are believed to be due, however, to chance variation.

²² Metropolitan Life Insurance Co. Statistical Bulletin, March, 1928: Iron-foundry Workers Show Highest Percentage of Deaths from Pneumonia.

The following table shows the number and per cent of deaths from pneumonia among 15 occupational groups for ages 15 and over:

PERCENTAGE OF DEATHS DUE TO PNEUMONIA AMONG WHITE MALE INDUSTRIAL POLICYHOLDERS, 15 YEARS AND OLDER, IN SPECIFIED OCCUPATIONS, 1922 TO 1924

Occupation or industry	Deaths		Per cent of deaths from pneumonia
	All causes	Pneumonia	
All occupations combined.....	105, 467	8, 138	7.7
Iron and steel molders and foundry workers.....	1, 234	196	15.9
Cordage and hemp mill operatives.....	79	9	11.4
Polishers, iron and steel products.....	105	12	11.4
Coal miners (underground).....	1, 960	241	12.3
Iron and steel mill workers.....	1, 587	167	10.5
Rubber-factory operatives.....	439	45	10.3
Hucksters and peddlers.....	932	93	10.0
Roofers.....	179	20	11.2
Longshoremen and stevedores.....	594	63	10.6
Brick, tile, and terra-cotta workers.....	199	18	9.0
Boiler makers.....	367	32	8.7
Glass workers.....	323	31	9.6
Laborers.....	10, 240	934	9.1
Blacksmiths.....	876	75	8.6
Miners (underground, except coal).....	225	20	8.9

Pneumonoconiosis: A Case Caused by Asbestos Dust

A NOTE from London in the *Journal of the American Medical Association* of July 23, 1927 (p. 304), states that a case of pneumonoconiosis due to asbestos dust—the second known to have occurred in England from this cause—was reported at a conference of the Royal Microscopical Society.

The particles found in the lungs, which represented the brittle iron-containing part of the asbestos fibers, were generally large, and some measured as much as 360 microns. Analysis of the asbestos dust showed that it contained 18 per cent of iron as ferrous oxide and the microscopic appearances of the dust were identical with those of the particles found in the lungs.

Printing Trades

See *Printing trades: health survey, 1922 to 1925; hygienic conditions. Former handbook* (Bul. No. 439), pages 309–311.

Radioactive Substances: Industrial Poisoning Cases Among Watch-Dial Painters

THE EFFECT of the use of radioactive substances on the health of workers employed in painting the dials of watches and clocks with luminous paint has been the subject of investigation by physicians and scientists, and the cases of poisoning among these workers have also received a considerable amount of publicity since the first death from this cause was reported in 1924.

The subject has recently been brought to the fore again through the suit brought against the United States Radium Corporation, Orange, N. J., by five young women who are in a more or less serious condition as a result of their work with the radioactive paint. Ten girls who had been employed at various times since 1917 in the plant in Orange, N. J., have died as a result of the absorption of radium through the

practice of pointing the brushes in their mouths. There have been four deaths reported among woman watch-dial painters in a plant in Waterbury, Conn., and woman painters of radium-dial watches employed either now or formerly by this firm are under observation by radium experts for evidences of radium poisoning.

The daily papers carried accounts of these cases, and the settlement of the case against the United States Radium Corporation was announced on June 5, 1928. The case was settled out of court, the agreement providing that each of the victims of the radium poisoning is to receive an immediate cash payment of \$10,000, past legal and medical expenses and costs of medical and hospital care, and an annuity of \$600 for the remainder of their lives or as long as they are affected by the radium.

Radioactive Substances: Anemia Occurring Among Workers Handling Radioactive Substances

AN ACCOUNT by Dr. Harrison S. Martland and Dr. George S. Reitter of a case of leucopenic anemia of the regenerative type which occurred in a chemist employed in a dial-painting plant in New Jersey as a result of exposure to radium and mesothorium was given in the *American Journal of Roentgenology and Radium Therapy*, August, 1926. The death of the chemist occurred in June, 1925.

Search of the literature, the report states, shows but six cases of aplastic pernicious anemia from exposure to mesothorium and radium. Three of these cases occurred among workers in the London Radium Institute and were caused by exposure to radium alone. Two other cases were those of French chemists who had been exposed to both radium and mesothorium. They had been employed at one time in the Curie Laboratories but for three years before their deaths in 1925 they had been engaged in the commercial separation of thorium X from mesothorium, the exposure being mainly to emanation. Although the immediate cause of death in one of the five cases was acute pneumonia and in another infective endocarditis, all showed profound blood changes. It appears that no attempt was made to determine the amount of radioactivity in the organs of any of these individuals, but in the sixth case, reported by Martland, Conlon, and Knep in 1925, qualitative tests were made which showed radioactive substances present in the liver, bones, and spleen.

Although much experimental work has been done on both man and animals to determine the changes that occur in irradiated tissues the case here reported is believed to be the first one recorded where a complete quantitative examination for the radioactivity of post-mortem tissues has been made.

The chemist whose case was the subject of special study had been engaged for 14 years in research work as well as in the commercial production of radium and mesothorium and had been exposed at times in the course of his work to varying quantities of these radioactive substances in both the sealed and unsealed forms. This exposure subjected him to alpha, beta, and gamma rays from the emanation, the microscopic dust particles in the atmosphere, and the unsealed preparations, and to gamma rays from the hermetically sealed preparations. About one year before his death the patient had begun to feel unduly tired and became fatigued easily. This condition increased gradually and was accompanied by an increasing

loss of strength but not by loss of weight. While at work and still in apparently good health he collapsed suddenly and died one month later of an acute leucopenic ²³ anemia of the regenerative type.

The organs tested for the presence of radioactive material were the lungs, spleen, liver, gastrointestinal tract, heart, kidneys, and the bones. These organs were treated by drying and slow heat so that most of the organic matter was driven off, and the residue which was placed in sealed bottles was used for the electroscopic determinations. It was established by the test that the equivalent of 14 micrograms of radioactive element was distributed through the bony structure of the body, only about 5 per cent of which was due to radium itself, the balance being made up of the alpha radiation from mesothorium and the decay products of radium and mesothorium. The quantity of radioactive material in the lungs was estimated to be 1 microgram. The liver, gastrointestinal tract, heart, and kidneys showed no activity whatever, and the spleen was only feebly active. The electroscopic experiments showed, therefore, that practically no radioactive material was ingested by way of the gastrointestinal tract.

It was impossible either to estimate the amount of radiation the patient received from external exposure or the quantity of emanation he inhaled, but he had been exposed to radiation from the very penetrating gamma rays as well as the less penetrating alpha and beta rays four or five days a week over a period of 14 years. The results of this exposure are cumulative and must be considered as one of the factors in producing his anemia. In considering the question of the quantity of the emanation the patient inhaled, it was necessary to take into consideration the fact that although most of the emanation inhaled at any one time is eliminated from the body in five or six days, there was a considerable amount in his system most of the time, since he was probably inhaling it almost daily. With the decay of the emanation (radon has a half decay period of 3.85 days and thorium emanation of 54 seconds) there is finally produced an active deposit of slow change in the bone which emits beta and alpha rays. The fact that in the bones tested this was what caused the radioactivity shows there was a permanent deposit of the intense beta and alpha radiation set up in the blood-forming centers. It is considered that the portal of entry of the radium and mesothorium found in the bone was the lungs, the microscopic dust particles being carried from the walls of the lung tissue where it was probably deposited as sulphates or carbonates by the blood to the bony tissue where it was finally deposited.

The results of the study are summed up by the writers as follows:

1. It is definitely proven that radioactive substances can get into the body by way of the lungs alone.
2. We believe that this is the first case to be reported in which complete quantitative tests for the radioactivity in human post-mortem tissues have been made.
3. It is definitely established that, by way of the lungs, both radium, mesothorium and the active deposit from emanation are deposited and stored in the organs of the hematopoietic system. From their constant irradiation, marked effects are produced directly in the leucoblastic and erythroblastic centers.
4. From a study of this case, it would seem that the introduction into the body, in any manner, of long-lived radioactive products is a somewhat hazardous procedure. From the inhalation of emanation, active deposit of slow change is deposited in the bones. The late harmful effects on the blood-forming organs

²³ A decrease below normal in the number of white blood corpuscles.

therefore must be kept in mind. Further investigations along these lines should be made to establish just how much of these substances can safely be given.

5. Complete protective measures must be installed in all manufacturing plants, laboratories, hospitals, and private offices where radioactive substances are handled.

Radioactive Substances: French Experience Regarding Occupational Diseases Caused by X rays and Radioactive Substances²⁴

THE EFFECTS of occupational exposure to X rays, radium, and the various radioactive substances and the recent decision of the French Superior Commission on Occupational Diseases to include among the reportable diseases those resulting from exposure to radiations from these elements are discussed in an article in a recent issue of the *Paris Médical*.

The early and late effects of radioactive substances or emanations are said by the writer to be now sufficiently well established to constitute a symptom-complex or syndrome the cause of which is certain, so that it can be said positively that radiations from these substances cause a typical occupational disease.

The first signs of exposure to the radiations are blood changes, affecting first the white blood corpuscles and then the red. There is a reduction of the leucocytes in the peripheral blood below the normal standard or more rarely either a myeloid or lymphatic leucæmia, that is, a condition of the blood and the blood-making organs characterized by a permanent increase in the large white blood corpuscles and by enlargement of the spleen, the lymphatic glands, and the marrow of the bones, together or separately. There is also a deficiency in the number of red blood corpuscles, with abnormal inequality or irregularity in their size. Blood changes occur very early and have been demonstrated following a single exposure to the gamma rays of radium, while there is also lowering of the arterial pressure but with a maintenance of the cardiovascular equilibrium. Radiations have a direct effect on the reproduction cells, causing sterility and disordered menstruation and they cause troubles of nutrition, characterized by more or less marked loss of weight and showing various depressive symptoms, such as fatigue, drowsiness, headache, etc. However, the latter symptoms are purely subjective and consequently susceptible of considerable individual variation and there is reason to question whether there is not some correlation between these symptoms and the blood changes. In addition to these pathologic conditions the radiations have a traumatic effect resulting in radiodermatitis, burns, lesions of the skin and underlying tissues, and malignant growths, while the special action of the ultra-violet rays should not be forgotten.

The methods of protecting workers subject to the hazards from radioactive substances have been considered in France by different interested organizations. In a report to the industrial hygiene commission the radioactive substances which are actually used in greater or less quantity were given as radium, radium emanation, radioactivity induced by radium or radon, polonium, actinium, thorium, mesothorium, and radiothorium, thorium X, emanation of

²⁴ *Paris Médical* (Paris, France), November, 1923, pp. 422-424: Les Accidents Causés par les Diverses Radiations, par le Dr. F. Dervieux.

thorium or thoron, and radioactivity induced by thorium. These elements act in three different ways: Through the direct rays which penetrate into the organs of the body, through the inhalation of radioactive emanations (radon or thoron), and through the absorption of solid or dissolved radioactive substances.

The protective measures recommended by the French Academy of Medicine are adequate ventilation of workplaces, use of rubber gloves and of forceps for handling materials, protection from the rays by the use of lead plates of adequate thickness, and periodic medical examination and blood examinations of all workers exposed to the radiations. There should also be similar protection against X rays, the industries or industrial operations which expose the workers to ultra-violet rays including the manufacture of mercury quartz lamps, taking moving pictures with electric arc lights, electric welding, autogenous welding, and numerous others.

A report upon the occupational diseases due to radiation presented to the Superior Commission of Occupational Diseases at a recent meeting listed uranium, and its salts, uranium X, and ionium among the elements presenting an industrial hazard in addition to those enumerated above. In this report it was recommended that the diseases which should be included among the reportable industrial diseases were skin affections, either acute or chronic, cancer, anemia with leucopenia, pernicious anemia and leucæmia, and radium necrosis, all of which were the direct effects of radiation, while certain other diseases such as degeneration of the bone marrow, atrophy of the spleen, and troubles of gestation were not included as it is not always possible to determine positively that they are solely the result of exposure to radiation.

The commission decided that the following types of industrial or commercial enterprises were potential sources of poisoning from these substances: Plants for the extraction of radioactive elements from minerals, manufacture of derivative radioactive substances; plants making medical appliances for radium therapy, or X-ray appliances; laboratories for research or measurement of radioactive substances and X rays; plants making radioactive chemical or pharmaceutical products, and factories making radioactive luminous products or workshops in which these paints are applied; clinics and sanitariums, centers for the treatment of cancer; enterprises for the sale of radium and radioactive substances; and manufacturing establishments using X rays.

The commission fixed the limit of responsibility for the development of these diseases at one year with the exception of cancer, which it was considered might develop at any time within five years.

Radium Poisoning: Death of Industrial Chemist

A NEWSPAPER report of November 15, 1928, records the death of Dr. S. A. von Sochocky who was formerly an official of the United States Radium Corporation, and who is said to have originated the formula used in the New Jersey plant of that company in painting watch and clock dials. It was reported earlier in the year that Doctor von Sochocky was a victim of radium poisoning. Radium necrosis was reported at that time to have attacked his jaws and fingers and he was also suffering from the aplastic anemia which was the eventual cause of his death.

Radium Poisoning

See also Radium: effects of use of radioactive substances on health of workers. Former handbook (Bul. No. 439), pages 311-313.

Respiratory Diseases

See Asthma: caused by castor-bean dust; Cement industry: dust hazard; Cosmetic manufacturing: sickness among workers; Pneumonia: high death rate among iron-foundry workers; Pneumonoconiosis: a case caused by asbestos dust; Silicosis and tuberculosis: cases among granite workers in Barre, Vt.; pulmonary conditions among mine employees, Western Australia; Silicosis: cause and extent in South African gold mines; incidence in the pottery industry in Great Britain.

Silicosis and Tuberculosis: Cases Among Granite Workers in Barre, Vt.

SILICOSIS is prevalent in the various granite-cutting centers of Vermont and is of great importance as the production of granite is one of the leading industries of the State. Granite is quarried in 17 localities besides Barre and it is also manufactured in other places than the producing centers.

An account of the silicosis problem as it exists in Barre, Vt., was given by Dr. William McFarland in *The Journal of Industrial Hygiene*, August, 1927 (pp. 315-330).

Granite is usually said to contain 70 per cent of silica, but this includes certain of the silicates and by petrographic analysis the "dark Barre" granite has been found to contain 26.578 per cent of quartz (free silica). There is general agreement among investigators of the effects of inhalation of inorganic dusts that those having a high free silica content are the most harmful because of the chronic fibrotic changes in the lungs produced by the dust and the abnormal susceptibility to pulmonary tuberculosis among silicotic individuals. The chemical state of the silica is said to be the main factor in its harmfulness. Although some persons seem to be more susceptible to its effects than others, race does not appear to be a factor, as there are several races represented in the industry in Barre, and all alike seem to be affected.

An investigation of the extent of atmospheric pollution in five granite-cutting plants in Barre which were considered representative of the industry as a whole showed that the average dustiness was 2,397 particles per cubic centimeter, and that with such a rate of dust in the air workers would inhale nearly 2,000,000 microscopic dust particles with each breath.

In simple silicosis the principal symptoms are labored breathing, diminished chest expansion, generally diminished resonance and diminished chest vibration, and lowered blood pressure and lowered vital capacity. The disease results in massive fibrosis of the lungs, and the writer states that he has seen the fibrous induration so marked that the lungs would not collapse when removed from the chest at autopsy, and the imprint of the ribs remained on them. There were also dense pleural adhesions which made it difficult to

remove the lungs from the thoracic cavity. In these cases the lymph glands around the hilum were very firm and when cut produced a grating sound as though cutting through a bag of wet sand.

Tuberculosis is the most frequent complication of silicosis, and as the years of exposure to granite dust increase there is an increase also in the prevalence of tuberculosis. In addition to the symptoms present in silicosis, when complications occur there are further changes characteristic of the infection. Chronic bronchitis is not a frequent complication, nor are silicotic individuals especially liable to pneumonia, although there may be a slight excess of cases among them. When it does occur the severity of the pneumonia depends on the virulence of the organism rather than on the condition of the lungs. When tuberculosis does develop, the patients have in addition the usual symptoms of tuberculosis such as increased difficulty in breathing, pleurisy pains, cough, expectoration, and loss of weight and strength and they show a special tendency to pulmonary hemorrhages. This is frequently the first noticeable symptom and many of these patients die from hemorrhage of the lungs.

The effect of long exposure to the granite dust is shown in the history of eight cases cited by the writer. In three cases of simple silicosis the ages were 34, 39, and 42, while the duration of exposure was 14 years in the first case and 23 in the other two. In five cases of silicosis with tuberculosis the ages were 50, 56, 57, 59, and 63, and the years of exposure 35, 42, 34, 38, and 50, respectively.

The course of the disease after it is established is said to be almost invariably very rapid, and the prognosis is grave. Periods when the disease seems to be at a standstill or subsiding do not occur, as in ordinary pulmonary tuberculosis, and tuberculous complications are much less frequent, owing to the rapid course of the disease.

Simple silicosis, being a nonbacterial condition is not contagious but when it is complicated with tuberculosis it is as great a menace to others as any ordinary case of tuberculosis, and often it is more dangerous owing to the general impression that it is not contagious and that it is not necessary to take the usual precautions against transmitting it to others.

There is a somewhat lower rate of tuberculosis among the families of granite cutters than in the general population outside the granite industry, although there seems to be an undue prevalence of tuberculous meningitis in families where there are small children. The lower rate is accounted for by the fact that granite cutters do not usually develop pulmonary tuberculosis until they are past the age of 45 when their children are older and less susceptible to infection, while outside the granite industry the disease usually develops in early adult life when the children are small and personal contact is greater. The granite cutters make good wages and live well and are said to be above the average industrial worker intellectually, which should make for a low incidence of the disease both among themselves and among members of their families.

Silicosis is a preventable disease and the present incidence of silicosis and tuberculosis among granite workers is sufficient evidence that the exhaust and ventilating systems in use in their work places are inadequate and that sufficient attention has not been given to correcting the conditions which are the cause of the disease.

Silicosis and Tuberculosis: Pulmonary Conditions Among Mine Employees, Western Australia

THE EXTENT of the silicosis and tuberculosis hazard among employees in the metalliferous mines of Western Australia was the subject of a special investigation²⁵ by the division of Industrial Hygiene of the Commonwealth Department of Health in 1925-26.

The miners' phthisis act, passed in Western Australia in February, 1923, provided for the removal from the mining industry of persons suffering from pulmonary tuberculosis and the payment of compensation to such persons until suitable employment was found for them. The application of the act was deferred, however, pending a complete medical survey of persons engaged in the metal mines of that part of the country, and in the meantime the Western Australia workers' compensation act was amended to provide compensation for certain mining diseases. The medical survey which was undertaken in September, 1925, was intended to provide a correct valuation of the cost of compensation to sufferers from silicosis.

The miners examined were nearly all employed in gold mines in which analysis of the air samples showed that the amount of free quartz or silica of 10 microns and under present in the dust averaged 19 per cent. It is considered that it is inadvisable for men to work in air in which the dust counts exceed 300 particles per cubic centimeter, but the analysis of the dust content in the air in many of the mining operations both above ground and underground showed that in numerous instances the number of particles were considerably in excess of this amount.

Physical examinations were given 4,067 men, all of whom were employed in gold mines, with the exception of 108 who were working in lead mines, and 48 who at the time of the examination were engaged in road making but had shortly before been employed as lead miners.

The different conditions shown by the medical and the X-ray examinations were classified as silicosis, silicosis and tuberculosis, and tuberculosis. The number of surface workers examined totaled 1,759, of whom 117 or 6.6 per cent were suffering from silicosis, 27 or 1.5 per cent from silicosis and tuberculosis, and 6 or 0.3 per cent from tuberculosis only. Of the 2,308 underground workers examined, 538 or 23.3 per cent were silicotic, 116 or 5 per cent had silicosis and tuberculosis, and 6 or 0.3 per cent were suffering from tuberculosis alone. Of the total number of men examined therefore, 798 or 19.6 per cent presented definite evidence of pulmonary silicosis and 155 or 3.8 per cent of tuberculosis, only 12 of the latter having tuberculosis without silicosis.

The incidence of silicosis shows a steady increase with age and with length of service. Thus, no case of silicosis was found either among the surface or underground workers before the age of 30, but after that age there was a steady increase, the largest proportion of cases occurring after the age of 45. Of the 116 cases of silicosis with tuberculosis occurring among the underground workers, 66 per cent occurred between the ages of 46 and 60.

²⁵ Australia. Department of Health. Report on an Investigation of the Pulmonary Conditions of Mine Employees, Western Australia, During the Years 1925-26, by W. T. Nelson, M. D. Canberra (n. d.).

The effect of length of employment is shown both among the underground and surface workers. Among surface workers the highest percentage affected, 16.7 per cent, was found in the group having worked 41 to 50 years, but among the underground workers who had a much more severe exposure to silica dust the effect of the exposure became marked after 20 years' employment underground, more than 50 per cent of such workers suffering from silicosis, while 73 per cent of those having worked from 36 to 40 years were silicotic.

In summing up the results of the physical findings of the examinations the report states that the condition of generalized fibrosis of the lungs found in silicosis gives a characteristic mottled appearance to the X-ray pictures of the lungs; high blood pressure and albuminuria are common among the miners affected, and silicosis causes a marked reduction in the vital capacity of the persons affected. Unlike tuberculosis, silicosis does not have an appreciable effect on the body weight.

Silicosis: Cause and Extent in South African Gold Mines ²⁶

AN ACCOUNT of the cause and extent of silicosis in the South African gold mines and of the results of legislative and administrative efforts to control the disease was given in the April issue of the *Journal of Industrial Hygiene*.

Miners working in the gold mines of the Rand are exposed to large quantities of free silica, as in order to reach the reefs or bands of gold conglomerate they have to mine through quartzite which contains 90 to 96 per cent of silica, while the gold conglomerate, consisting of quartz pebbles embedded in a silicified matrix, contains about 86 per cent of free silica. The same quartzite forms the common surface rock in many parts of the Transvaal, and repeated exposures to the dust storms of the dry season have resulted in cases of silicosis among persons who have had no industrial exposure.

During the period 1916 to 1924, the average number of European miners was 15,000 and of native laborers 175,000, and there has been an average of 300 cases of the disease among the European miners, and 380 among the native laborers for each year of the period.

Probably no industrial disease in any country has received so much legislative attention from the compensation aspect in such a short space of time as silicosis, nine acts having been passed between the years 1911 and 1925. Legislation was passed in 1911 covering measures for the protection of the workers from dust, and in 1916 a medical bureau was established by the Government. It is the duty of this bureau to give all applicants a physical examination, to examine all working miners at 6-month intervals for pulmonary tuberculosis or silicosis, to examine all ex-miners claiming to be silicotic, to supervise the examinations of the native laborers, and to report on the presence of silicosis and whether it was the cause or a contributory cause of death in any mine worker. Since 1916 the medical bureau has made, on the average, 34,890 examinations, has prepared and examined 24,568 radiographs of the chest, and has carried out 342 post-mortem examinations of the lungs of deceased mine workers on the average each year.

²⁶ The *Journal of Industrial Hygiene*, Baltimore, April, 1927, pp. 109-139. The Silicosis of the South African Gold Mines and the Changes Produced in it by Legislative and Administrative Efforts, by W. Watkins-Pitchford, M. D.

The silicosis of the South African gold miner is due to the same cause (that of absorption into the lymph channels of the lung of excessive quantities of particles of silica) as the diseases called tin miner's phthisis, stonecutter's phthisis, potter's rot, and grinder's disease. Silica particles above 0.25 micron or below 10 microns are conveyed into the lymph spaces of the lung and if inhaled in sufficient quantities give rise to the condition known as silicosis. A secondary factor which is of great importance is the activity of the tuberculosis bacillus which may be already present in the lung, may enter almost simultaneously with the silica dust, or, as is commonly the case, may attack the lungs later. The lungs of residents of the Transvaal who had not followed any dusty trade and who were not silicotic have been found in numerous cases to contain as many as 100,000,000,000 particles of silica dust, so that the quantity in the lungs of a silicotic miner must be reckoned in millions of millions of particles. In the great majority of cases of silicosis among the Rand miners a tuberculous infection has marked the appearance of the disease rather than the accumulation of a quantity of particles beyond the capacity of the lungs to throw off.

The proportion of those exposed who develop the disease is relatively small, as in the year 1924, of 2,302 European miners who had worked underground on the Rand for 10 years or longer, only 176, or 7.6 per cent, developed silicosis during the year. The reasons given that so large a proportion of the men exposed to the dust do not contract the disease are that they have escaped the tuberculous infection which is the final excitant of the disease or that for some reason the amounts of dust inhaled have been relatively smaller so that the lungs have been able to prevent the accumulation of a sufficient amount of particles to cause silicosis. Observations on animals have shown that if exposure to silica dust is sufficiently intense there is no escape from the development of a nodular pulmonary fibrosis.

Simple silicosis is nonprogressive and ordinarily produces little effect on health, although if the fibrous condition caused by the dust is very general throughout the lungs there may be shortness of breath and some tendency to obesity. Cough, expectoration, pleuritic pains, loss of weight, and impaired vigor usually indicate tuberculous complication. When the nodules of dense fibrous tissue caused by the silica are few and widely separated, their presence can hardly be called a disease. Tuberculosis with silicosis, consisting of nodules of somewhat larger size distributed through the lungs and often masses of such nodules in which the *Bacillus tuberculosis* is harbored, is a progressive and serious disease. Among the European miners silicosis usually appears as simple silicosis, while among the native laborers in most cases it originates as tuberculosis with silicosis, the reason for this being the much greater susceptibility of the negro to tuberculous infection.

The liability of simple silicosis to pass into tuberculo-silicosis is shown by the records for seven years. The figures show that of 1,000 original cases of simple silicosis, at the end of seven years 246 were living but were tuberculo-silicotic, while 294 were dead, so that 540, or more than half of the cases of simple silicosis, had either developed clear-cut cases of tuberculo-silicosis or had died as the result of the tuberculous changes

The records show that the length of time between employment and the development of silicosis has increased fairly steadily since 1917. The shortest time in which a miner on the Rand contracted silicosis in 1924 was $4\frac{1}{4}$ years as contrasted with less than 2 years in 1917, while the average time in which a miner may contract the disease is now about $10\frac{1}{4}$ years. At the present time only about 7 per cent of the miners who have worked 10 years or longer will become silicotic, while only about 3 per cent of the total working force will contract the disease in any one year. The reason for the improvement is attributed to the greatly improved conditions underground with regard to dust.

It has been difficult to determine the relative hazard in the different occupations underground owing to the fact that only a very small proportion of the miners have always followed one class of occupation. There is no question, however, that machine drilling is especially hazardous, as the machine driller not only produces much dust and works nearer to its site of production than any one else, but if he is engaged in "development" he is usually placed in those places which are most difficult to ventilate effectively.

The measures which have been taken to prevent the occurrence of silicosis and tuberculosis include various mechanical precautions, such as wet drilling, blasting only at the end of the shift, adequate ventilation, and reduction of dust by wetting down work places and wetting rock before removing, and medical precautions, such as physical examinations before employment, including radiographs of the chest so that no one may become a miner who has not been certified as free from disease of the lungs, periodic examination at least every six months, and in doubtful cases the carrying out of certain tests. All examinations made by the medical bureau are carried out free of cost to the employee, and when a miner is called for this periodical examination his day's wage is guaranteed by his employer.

Silicosis: Incidence in the Pottery Industry in Great Britain

IN CONNECTION with a movement among trade-union members in Great Britain to have "potter's asthma" or silicosis included as an occupational disease under the workmen's compensation act an investigation²⁷ was carried out by the Home Office regarding the facts as to the incidence of the disease in the pottery industry.

The study included medical examinations of 344 male and 224 female workers, together with radiographic examinations of the lungs of many of these workers.

When the study was undertaken there was already evidence that silicosis was produced among workers exposed to the inhalation of dry flint dust in the manufacture of china, but there was doubt as to the production of silicosis in similar processes in the manufacture of earthenware, in which sand or crushed siliceous material replaces flint.

The occupations which are of the greatest importance from the standpoint of the dust hazards were found to be those in which the raw materials are handled, as in flint milling; the manipulation of

²⁷ Great Britain. Home Office. Report on the Incidence of Silicosis in the Pottery Industry, by Dr. C. L. Sutherland and Dr. S. Bryson. London, 1926. 52 pp.

the composite body of the ware; the placing of flint or sand used in firing biscuit ware and the removal of the sand adhering to the ware; and occupations involving exposure to other dusts, as in mold and sagger making and glaze dipping.

The frequency with which fibrosis of the lungs was diagnosed in the medical examinations, at a period of employment earlier than that at which silicosis was found by radiological examination in the same occupational groups, was regarded as one of the significant features of the report. Fibrosis of the lungs may be caused by the inhalation of dusts other than silica, but the fibrosis caused by inhalation of silica has certain characteristics which make it easily demonstrable by a skilled observer by means of radiological examination. It is considered that fibrosis of the lungs may take a shorter time to develop or may require a lower concentration of dust than silicosis, but there are other factors, such as a number of occupations being followed by the same subjects, which may possibly modify the significance of the sequence.

The cases of silicosis revealed by the examinations numbered 87 and were grouped as follows, according to period of employment:

	Num- ber		Num- ber
Under 5 years-----	1	25 to 30 years-----	15
5 to 10 years-----	2	30 to 35 years-----	15
10 to 15 years-----	8	35 to 40 years-----	8
15 to 20 years-----	7	Over 40 years-----	17
20 to 25 years-----	14		

It will be seen that the great majority of cases occur after 20 years' employment in the industry, although in the occupations where the incidence of silicosis is high the study showed that it appears at an earlier stage in the occupational history of the workers.

Among workers exposed to unmixed flint dust, 112 clinical and 71 radiographic examinations were made and 59 cases were diagnosed as fibrosis and 28 as silicosis, 23 of the cases of silicosis occurring in the occupations of biscuit placers, biscuit oddmen, and biscuit warehousemen, 3 in flint milling, and 1 each among glost placers and polishers. Of the workers exposed to dust from composite body, 345 received clinical and 136 radiographic examinations, and there were 125 cases of fibrosis and 53 cases of silicosis found. Twenty-nine of the 53 cases of silicosis occurred in general earthenware manufacturing—from slip house to lookers to ware; 9 among the same classes of workers in china; 5 in the manufacture of tiles, including slip-house workers and pressers; 6 in sanitary earthenware, including casters and pressers; and 4 in electrical earthenware, from slip house to fettlers. In the occupations in which the dust hazard is from placing sand on ground siliceous material, 1 case of silicosis was found out of a total of 37 clinical and 14 radiographic examinations, and in occupations in which the dust hazard is indefinite but is liable to contain flint there were 37 clinical and 14 radiographic examinations made and 5 cases were diagnosed as silicosis.

In summing up the results of the examination it is stated that in the opinion of the investigators it had been demonstrated that silicosis exists among workers in the pottery industry to a very considerable degree and that the evidence tends to emphasize the

danger which arises from processes which have been regarded as comparatively safe because of the materials being damp or wet.

The improvements recommended for the protection of the workers are the provision of impervious floors and benches, frequent cleansing of work places, including walls, prohibiting the deposit in workrooms or yards of any material not necessary for the purposes of the work which is dry, or liable to become dry and produce dust, and the provision and frequent washing of overalls for all persons employed in handling any clay body which contains over 10 per cent of flint.

British Report on Silicosis in the Pottery Industry

A COMMITTEE was appointed in June, 1927, by the British Home Office to study the proposed scheme of compensation for silicosis in the pottery industry and also the question of additional measures for the prevention of the disease among pottery workers. The committee in its report accepts the principle of the payment of compensation and makes important recommendations for preventive regulations.²⁸

Figures are cited in the report showing the excessive mortality among potters. The latest occupational mortality figures published for the country as a whole are for the years 1921-1923. These figures, which were published in the decennial supplement of the registrar general for 1921 show that the mortality of potters' mill-workers, slip makers, and potters is 64 per cent above the average, and that of earthenware and china kiln and oven men 83 per cent more than the average. Workers in this latter group, which shows the greater excess mortality, are subject both to lead risk from glaze and silica risk from the flint dust with which the ware is packed in the saggars which these men handle and fire. Pottery workers are sixth from the top on the list showing comparative occupational mortality rates, the excessive mortality appearing after the age of 35. A large proportion of the cases of respiratory tuberculosis in both groups occurred at the later periods of life. Of 111 deaths from respiratory tuberculosis among potters' millers, slip makers, and potters, 90 occurred in persons over 35 years of age while of 51 deaths from this cause among kiln and oven men, 42 were of persons over the age of 35. In addition to these deaths there were five from chronic interstitial pneumonia, a term used to denote fibrosis of the lungs, including silicosis, when nontuberculous. The high incidence of tuberculosis after the age of 35 is regarded as evidence that the occupation is related to the increased occurrence of the disease. It is certain, it is said, that "a considerable proportion, if not all, of the deaths from respiratory tuberculosis in excess of those occurring in the general population must be accounted for by injury to the lungs resulting from the inhalation of dust."

The employers' representatives on the committee contended that under the present factory regulations in force in the industry the risk of silicosis had been considerably diminished, but the committee decided that from the facts available there was no evidence that so far there has not been any appreciable reduction in the incidence of the disease. Since the fact was established that silicosis was a

²⁸ Great Britain. Home Office. Workmen's Compensation (Silicosis) Committee. Report on Compensation for Silicosis Dealing with the Pottery Industry. London, 1928, 41 pp.

serious hazard among potters, the committee agreed that these workers and their dependents were entitled to compensation for death, total disablement, or partial disablement, which unfits the worker to continue at work when the disease was contracted as a result of employment in the pottery industry.

The employers rejected the proposal of the committee for the establishment of a compensation fund for the industry and a scheme was drafted, therefore, making each employer personally responsible for the liability in respect of the workers he employs. The compensation scheme proposed by the committee would cover workers in all processes in which there is exposure to silica dust. The payment of compensation under the proposed plan would be dependent upon employment in processes offering exposure to silica within three years of the application for compensation, and employment in these processes for not less than five years. Although it was considered desirable that there should be a medical board to act upon compensation claims, the report does not recommend the appointment of such a board unless some arrangement can be devised for spreading the cost over the whole industry. Failing this, the most satisfactory arrangement would appear to be that all of the examinations, including the periodic examinations, which the committee recommends, should be made and certificates given by medical officers, specially appointed by the Secretary of State, whose decisions would be final, subject to the right of appeal to a medical referee who would also be specially appointed for the purpose.

The British workmen's compensation act provides for the appointment of committees representative of employers and workmen with power to settle questions arising under the act and to exercise certain powers conferred by the act in county courts. These committees have been found to work satisfactorily in other industries and the committee favored this method in dealing with silicosis in the pottery industry, although its adoption would depend upon its acceptance by both parties.

Skin Diseases

See Carbon paper: poisoning; Cosmetic manufacturing: sickness among workers; Dermatitis: linseed oil dermatitis; Infections: moisture as a causative factor; Woodworking industries: health hazards in Australia woodworking industries.

See also Fruit canneries: skin disease among employees, former handbook (Bul. No. 439), pages 285, 286; Skin diseases: defects caused by various substances; lime dermatitis, former handbook (Bul. No. 439), pages 313-316.

Spray Painting: Study of Hazards of Spray Coating²⁹

A STUDY of the health hazard of spray coating was undertaken by a committee appointed by the Chemical Section of the National Safety Council in 1926. The committee which had general direction of the investigation was made up of representatives appointed by interested Federal and State bureaus, universities, insurance bureaus, labor organizations, associations of manufacturers of materials and

²⁹ National Safety Council. Chemical Section. Final Report of the Committee on Spray Coating. Chicago, 108 East Ohio Street, September, 1927.

equipment used in spray coating, and users of the spray-coating process. The actual conduct of the investigation was under the direction of Dr. H. F. Smyth and his associates, who had just completed a similar study in Pennsylvania. The United States Bureau of Mines was, at the same time, requested to make a special study of the efficiency of respirators to be used in the spray-coating process. The final report of the committee was adopted at a meeting of the whole committee in June, 1927, and was approved by the executive committee of the National Safety Council in September. A minority report was filed by two members of the committee who believed that some of the conclusions, particularly those relating to the air velocity required for satisfactory ventilation, were not justified by the data submitted.

As the value and importance of spray coating is generally recognized, the study was made with the hope that if serious hazards were revealed, methods of eliminating the danger without unnecessary interference with the industry would be developed.

The spraying of paint and lacquer by the use of compressed air was introduced in this country about 1890, but it was not until 1917 that it came into general use, and the recognition of the several hazards of the process dates from about that time. Great improvements in the equipment and materials used have been made and at the present time the method is in general use for finishing and refinishing all kinds of painted surfaces. The process is adapted to the finishing of interiors and exteriors of buildings and other structures and to painting industrial products such as automobile bodies, furniture, leather, and many small articles.

It is pointed out in the report that the introduction of a new process which is widespread in its application is always subject to a period of readjustment during which defects and dangers not recognized at first will become apparent, and that there is a danger in seeking a remedy for the situation that correction will be sought through prohibitive legislation rather than through voluntary efforts to find out and improve conditions. This is particularly true in connection with spray painting, since there was no question from the first that its use involved both accident and health hazards. While these hazards were understood in a measure, there has been a good deal of controversy regarding their extent, especially the danger of poisoning from benzol. The report of the special committee on benzol poisoning appointed by the National Safety Council established the seriousness of this hazard, and as a result of its findings the paint and varnish manufacturers carried on an educational campaign to discourage its use.

Regulations were adopted by the Wisconsin Industrial Commission in 1924 and revised in 1925 to control the hazards of the occupation in that State. The regulations fix a maximum distance between the spray gun and the object being treated in the painting of buildings, ships, and other structures, and provide that respirators or other devices of an approved design must be worn and a non-drying oil, grease, or cream used on exposed parts of the body. Booths provided with exhaust ventilation are required in the spray coating of other objects, although the exact velocity of the air current is not fixed by the regulations.

Scope of the Investigation

OWING to limitations of time and money, it was felt at the outset of the study that it must be restricted to investigation of the chief hazards—benzol, lead, and silica. Benzol is a constituent of the lacquers used in automobile finishing, while lead is present in the undercoats used on automobile bodies. The enamel used in the manufacture of such products as sanitary ware, refrigerator linings, stove parts, etc., contains both lead and silica. These two industries were studied, therefore, as they presented a maximum degree of exposure to these hazards. Statistical information as to the extent of poisoning from these substances in spray painting was entirely lacking, and it was felt that it was impossible to secure information which would allow any comparison between this and other industries as to the relative severity of these hazards. The study, therefore, was concerned mainly with the examination of exposed workers and study of working conditions, including tests to determine the degree of atmospheric pollution in the air breathed by the operators.

The study was carried out mainly in Detroit and Toledo. In Detroit employees in four automobile-body plants, two automobile factories, and three vitreous-enameling plants were examined and in Toledo employees in a large automobile plant, a vitreous-enamel plant, and a plant making spray-painting equipment. Examinations were also made of employees of a number of contracting painters in the two cities and of workers in enameling plants in Mansfield and Cleveland. In the air tests the findings as to air pollution were correlated, as far as possible, with the condition of the employees as shown by the clinical examination and the blood tests. The study included 354 physical examinations and 349 blood tests of workers in 29 plants, and 86 air tests were made for benzol, 27 for lead, and 33 for silica.

Constituents of Spray Paints

IN THE spray painting of the interior of buildings, lead-free prepared paints are in quite general use. The solid ingredients of these paints are lithopone, zinc oxide, titanium oxide pigments, calcium carbonate, barium sulphate, china clay, and other siliceous earth pigments; the liquid constituents are chiefly vegetable drying oils, such as linseed oil and chinawood oils; and the thinners are mineral spirits (a high boiling point distillate from petroleum) and, to a very limited extent, turpentine.

The pigments used for exterior painting where white and light colors are desired include, ordinarily, basic carbonate white lead, basic sulphate white lead, zinc oxide, leaded zinc oxide, titanium oxide, lithopone, china clay, and other siliceous earth pigments. Colors used in tinting these white paints include Prussian blue, chrome green, carbon black, chrome yellow, iron oxides, ocher, sienna, etc., but these colors are usually in very minor proportions. These paints are mainly solid pigments and liquid drying oils, and there is usually not over 10 per cent by weight of volatile materials. The thinners are in many cases entirely mineral spirits, although in some cases there may be from 2 to 7 per cent of turpentine. In painting freight cars, coal carriers, structural steel, etc., the paints are usually made with carbon black or mineral earth pigments ground in raw linseed oil or other oils. Lead is also used as a primer on struc-

tural steel. The volatile part of these paints, consisting of straight mineral spirits, averages from 10 to 20 per cent. No benzol or other aromatic hydrocarbons are used.

Benzol was formerly in general use in nitrocellulose lacquers, but its use has been given up by practically every manufacturer, and toluol has been substituted for it. The solvents used in these lacquers are amyl acetate, butyl acetate, ethyl acetate, butyl propionate, acetone, and ethyl and butyl alcohol. If ethyl alcohol is used, it is denatured and may contain up to 5 per cent wood alcohol or 0.5 per cent of benzol, although the finished lacquers probably never contain as much as 1 per cent of wood alcohol. The amount of volatile material ranges from 40 to 70 per cent. A great variety of pigments is used in the nitrocellulose lacquers, and for some colors it is necessary to use lead compounds, of which there may be as much as 10 per cent by weight. Materials such as tricresyl phosphate and dibutyl, diamyl, and diethyl phthalate are used as so-called plasticising mediums. These substances have a very high boiling point and therefore do not evaporate readily.

Benzol Poisoning

ONE HUNDRED and sixty men employed in spraying lacquer in seven different automobile or automobile-body plants were examined for evidences of benzol poisoning. In two of the plants there was little or no benzol in the lacquer, in one the men had been on strike and therefore were not subjected to recent exposure, in another the composition of the lacquer varied, and in the three remaining there was 1.5, 5, and 9 per cent of benzol present, respectively. The booths or tunnels where the spraying was done were fitted with local exhaust systems, but the average air velocities were low in all but one plant, the average for the six being 45 to 73 linear feet per minute, while in the seventh plant the average was 147 feet per minute. The amount of benzol in the air from tests made in five plants ranged from 375 to 1,880 parts of benzol per million parts of air. In the four high-exposure plants the number of subjective complaints among the men (especially constipation, dizziness, and dyspnea) were more than twice as many as in the plants in which there was slight or no exposure to benzol, and the proportions of these complaints showed a general increase with length of service. A low white blood cell count is the earliest index of chronic benzol poisoning, and 19 of the 91 men examined in the high-exposure plants showed a disturbed blood picture, while only 1 in the low-exposure plants was below the standard. Combining the blood picture with the subjective symptoms of the individual workers, it appears that only 1 of the 69 examined in the low-exposure plants had symptoms suggestive of benzol poisoning, while 7 of the 91 men in the high-exposure plants were affected, indicating, the committee considered, that the spraying of benzol lacquers presents a real health hazard.

Lead Poisoning

EXAMINATIONS were made of 170 men for evidence of lead poisoning. Those examined included 97 working in six automobile or automobile-body plants spraying paints and undercoats, 38 house painters using the spray gun on inside or outside work, and 35 men

spraying vitreous enamel on castings. The amount of lead in paints ranged from 10 to 19 per cent in spraying undercoats, less than 1 per cent on inside work, 19 per cent on outside work, and from 0.4 to 20 per cent in the vitreous enamel plants. With only one or two exceptions the air velocities were low in the booths used for spraying these paints. In several of the plants the amount of lead in the air was high, ranging in these places from 32 to 164 mg. per cubic meter of air. Chemical examination of feces for lead showed that 17 per cent of the group of 65 painters were eliminating more than 0.03 mg. of lead per gram of feces. Medical examination of the 170 workers exposed more or less to the lead hazard showed that there was a large percentage of suggestive symptoms, such as digestive disturbances, loss of weight, constipation, loss of appetite, and gastric pain, and 5 per cent showed a lead line on the gums. Of the 170 men examined, 25, or 14 per cent, showed a much lowered red blood cell count and 5, or 3 per cent, had a total white count below the normal. Analysis of these findings by length of service showed that the percentage of men affected increased with an increase in the period of employment. Examination of the blood of a group of 16 men working with vitreous enamels containing a large amount of lead showed that 7 of the 16 had a count of over 100 stippled cells per 100,000 total cells. As a result of the examinations and tests it was concluded that there was a distinct lead-poisoning hazard in spray coating as at present conducted in the industrial plants studied.

Silicosis as a Spray-Coating Hazard

THE GROUP studied for this hazard included 35 workers spraying vitreous enamel on castings and 26 workers spraying enamel on sheet metal. There were 2 women in the first group and 19 in the second. The enamel used on the castings contained from 0.4 to 20 per cent soluble lead and from 21 to 37 per cent silica, while that used on sheet metal contained practically no lead but had from 43 to 47 per cent of silica.

Dust counts at the working face of these spray booths gave average counts ranging from 5,000,000 to 24,000,000 particles per cubic foot when exhaust velocity was between 123 and 130 linear feet per minute, while in a plant with an air velocity of 212 linear feet per minute there was an average dust count of only 400,000 particles per cubic foot. The physical complaints were more numerous among both the men and women spraying vitreous enamels than among the other groups, and included dizziness, loss of weight, and difficult breathing. Radiographs were taken of a number of these workers, and of nine who had been employed for more than three years two were diagnosed as cases of silicosis and one as probable silicosis.

Measures of Protection

THE MEASURES advocated in the report for the protection of workers employed in spray coating include exhaust ventilation of sufficient velocity to remove the dangerous fumes or dust, the use of masks or respirators for indoor spraying without a booth or equivalent ventilation, and systematic medical examination for the detection of early symptoms of poisoning or silicosis.

Although no study was made of fire and possible explosion hazards, it is pointed out that these hazards can be eliminated by proper storage and handling of materials, properly designed and located noncombustible spray booths, safeguarding of electrical hazards and the elimination of open fires and, most important of all, adequate ventilation and good housekeeping.

The following conclusions were reached as a result of the study:

It is safe in indoor work to spray materials containing appreciable amounts of lead (over 2 per cent), benzol (over 1 per cent), or of free silica when the worker is protected in one of the two following ways:

(a) By local ventilation producing an exhaust of 200 linear feet per minute in the breathing zone of the worker. This standard is not based on sufficient evidence to warrant its formulation as a legal requirement and subsequent study may show that a lower velocity may suffice with improved operating conditions.

(b) By an efficient mask or respirator of the positive-pressure type.

In the case of all the three hazards considered there may often be a far simpler way out of the difficulty—to eliminate the substances in question from the materials used for spray coating.

Free silica.—The possibility of controlling the hazard of silicosis in vitreous enameling by the use of a properly balanced and completely fritted mixture free from all soluble lead or free silica in substantial proportion should be given careful study.

Benzol.—In the case of benzol the conclusion seems clear that the presence of this substance in spray paints is entirely unnecessary. We have ourselves noted two plants using lacquer materials containing little or no benzol and entirely avoiding any suspicion of benzol poisoning. That relatively pure materials can be obtained is indicated by the fact that two samples of pure toluol obtained on the open market actually proved to be practically free from benzol. As a matter of fact, we have been informed that many lacquer manufacturers have seen the wisdom of discontinuing the use of benzol and of replacing it with nonpoisonous toluol as the hydrocarbon thinner for nitrocellulose lacquers.

Lead in interior spray paints.—In so far as the spraying of interior surfaces with paints is concerned, it would appear that there is no necessity for using lead-base spray paints for such purposes, as other materials are available which are entirely satisfactory in white and many light tints. In booth spraying of automobiles and similar fabricated articles, lead-base paints could be eliminated in many instances but not entirely in automobile primers containing a moderate percentage of lead, or of certain automobile chromate colors for which satisfactory substitutes are not yet available. It is suggested that manufacturers experiment to find suitable colors to replace the lead pigments used in automobile undercoats.

Final conclusion.—We would then urge as our most important and fundamental recommendation that manufacturers of paints, lacquers, shellacs, varnishes, and vitreous enamels to be used in spray coating should so far as possible eliminate benzol, lead, and free silica from their products; and where this has been done should clearly label such products as containing less than a certain maximum amount of lead or benzol or free silica as the case may be, and that employers using the spray gun for indoor and booth work should so far as possible insist on obtaining and using only materials so labeled.

Spray Painting: Results of Two Studies of Spray Painting Hazards

THE Journal of Industrial Hygiene, June, 1928, contains an article by Dr. Henry F. Smyth (pp. 163-214) which brings together the results of the surveys of the hazards of spray coating made by Doctor Smyth and his assistants for the Pennsylvania Department of Labor and Industry and the National Safety Council. The findings of both surveys are considered from the standpoint of the hazards presented by the different types of materials used; that is, lacquers and similar materials containing highly volatile and possibly toxic solvents; paints and enamels containing lead, turpentine, and mineral

spirits; and vitreous enamels which contain more or less lead or toxic pigments and often a large proportion of siliceous matter.

The field surveys included study of plant conditions and of the types of spray booths, air velocity measurements, and collection of air samples for chemical determinations, and the medical studies covered the medical and working histories of sprayers, physical examinations, blood-pressure readings, and urine and blood tests.

The types of industries in which the spraying was carried on differed in the two surveys. In Pennsylvania the majority of the objects sprayed were small articles such as furniture and small metal parts or machines, while in Detroit and Toledo, the cities covered in the second survey, much of the spraying was on larger objects such as automobile bodies, and as a result the air pressure on the spray gun was in general considerably higher. The time exposure was also greater in the latter group of plants as the work was of a more nearly continuous nature.

Lacquer Spraying and the Benzol Hazard

THE BENZOL content of the lacquers used in Pennsylvania varied from a negligible quantity to 50 per cent, but in the lacquers used in the automotive industry high benzol contents were rare, although tests for the amount of benzol in the air in the latter industry showed that there was much greater air contamination as a result of the methods of using the lacquers. The danger limit for benzol concentration in the air has been fixed at 100 parts per million for continuous exposure. The results of both the studies indicate that benzol can not be sprayed even in low percentages without accumulating in the air beyond this point and creating a hazard to the health of the sprayer unless he is protected. The exhaust systems in use in the plants were generally ineffective either because they were badly designed, not kept clean, not properly adjusted, or not supplied with enough air. It was decided as a result of the tests that ventilation should have a minimum air movement past the sprayer toward the spray gun of from 150 to 200 feet per minute according to the type of spraying being done in order to reduce the benzol concentration to a safe limit. But even this is not considered to give complete protection, and the report states that air masks or helmets offer the only complete protection where the exposure is high or continuous. It is further stated that protection against the benzol hazard will be best secured by discontinuing the use of paints which contain more than the minimum amounts of benzol that may be present in the best commercial toluol and in the denatured alcohol—not over 0.5 per cent in all.

The Lead Hazard

IN THE spray painting which involved the hazard of lead poisoning the materials used included paints and enamels, automobile undercoats, and vitreous enamels sprayed on metal castings. The combined studies show that there is always a possible hazard when materials containing appreciable amounts of lead are used. It was found that materials containing less than 1 per cent of lead may be fairly safe if reasonable care is taken and exhaust ventilation is adequate, but when materials containing more than this amount are used the opera-

tor should be provided with an efficient respirator or air mask. In the automobile and vitreous enamel industries it was found many workers are at present being leaded through lack of proper safeguards. It is recommended, therefore, that the use of paints or lacquers containing over 1 per cent of lead should be discontinued.

Hazard From Vitreous Enamels

THE SPRAY gun is used in the spraying of vitreous enamels on metal parts of stoves, signs, scales, and other metal objects. The enamel used is a glaze composed of silicates and pigments which may contain more or less lead salts. In addition to the hazard from lead which is present in these paints there is a very definite danger from the inhalation of the spray containing very finely divided siliceous matter. The silica in these glazes is present in the form of combined silicates and as free silica. The examinations and tests carried out in both studies showed there was a definite silicosis hazard, especially from the material used in coating sheet metal, and it was recommended, therefore, that these glazes should be carefully balanced so as not to contain any free silica. Exhaust ventilation of from 150 to 200 feet per minute is regarded as sufficient to control the hazard fairly well. In the absence of exhaust ventilation the worker should always be protected by hose masks or respirators. In the spraying of metal the silicosis hazard was found to predominate where sheet metal is sprayed and the lead hazard where castings are sprayed.

Physical Examination of Workers

PERIODIC physical examinations are regarded as essential for all workers employed in spray painting with all types of materials within buildings, booths, or other indoor or inclosed spaces, whether with or without exhaust ventilation or the use of respirators or masks. It is considered that persons spraying compounds containing lead or benzol should be reexamined at least once every six months and that these examinations should include the various blood cell counts, while persons using siliceous materials should be examined and have X rays of their chests made at least every two years.

No one should be employed on interior spray painting with paints containing lead or benzol if the physical examination shows that there is any condition present which would be aggravated by exposure to lead or benzol or if there is evidence of absorption of either of these poisons as shown by the presence of more than 20 stippled cells per 100,000 red blood cells; a certain degree of anemia shown by hemoglobin under 70 per cent or a reduction in the number of red cells below 4,000,000 per cubic millimeter for men and 3,800,000 for women; or a reduction in the number of white blood cells below 5,600 per cubic millimeter. No person should be employed in spraying vitreous enamel or other siliceous material if the presence of fibrosis of the lungs or active tuberculosis is revealed by the X-ray examination of the chest. The occupation should be changed if upon reexamination there is any evidence of developing fibrosis or of progressive lead absorption as indicated by an increase in stippled red blood cells.

Methods of Avoiding Spray-Coating Hazards

FROM his observations in these two studies, Doctor Smyth has reached certain conclusions regarding the measures to be taken which will render this method of painting reasonably free from danger.³⁰ The spray gun as an industrial tool, he believes, has come to stay, and any attempt to forbid its use would simply arrest the wheels of progress. But while the process has introduced new health hazards and exaggerated some of the old ones in the painting industry, on the other hand, when the spray gun is properly used it is said to have lessened the hazards of certain processes, and Doctor Smyth believes that most of the materials in common use can be sprayed with a reasonable degree of safety if proper precautions are taken.

It was his purpose in writing the article under review to indicate the faults he observed in the spray painting installations in the different plants he visited, and to show that in most cases they could be remedied with comparative ease and at a small expense. From the standpoint of health alone the principal faults in the commercial spray installations in use were found to be in the location of the spray booth or the method of use of the equipment, the lack of cleanliness, poor design, and inadequate air supply. In general the user and not the designer or manufacturer of the equipment was said to be to blame for the failure to secure satisfactory protection for the worker.

Types of Booths Used

The first point to be considered in the spray painting installation is the location of the spraying equipment. It is essential that all indoor spraying should be done in a properly constructed booth, and the difference in size of the articles sprayed necessitates the use of different types of booths. The best type is automatic with a small opening for the placement and removal of objects, which are carried by track or wheel to the automatically controlled spray gun, which should be placed as far as possible from the feed opening. In one installation seen the articles being sprayed traveled past the operator in front of a glass window, the operator reaching through a hole in a curtain under the window to grasp the gun. Such an installation as this could be used only with a light spray as a heavy one would cloud the window.

The three-sided booth which is large enough to completely cover the article being coated is considered the best type for nonautomatic spraying. The exhaust ventilation should be from the rear or from slit exhausts on the sides and tops. The face area of the booth should be from four to eight times the area of the object being sprayed, and wide booths should have multiple fan installations or a large exhaust fan. The booth should be cleaned periodically, and walls and ceiling should be greased or papered or both. Open windows near the face of a booth often materially disturb the air currents, or they may even reverse the air flow and actually increase the worker's exposure. Fans should be located at the rear or sides of the booth and preferably low as most of the harmful substances

³⁰ National Safety News, July, 1928, pp. 25, 26: Spray Coating Hazards can be avoided, by Henry F. Smyth, M. D.

in the paints either give off heavy vapors or are heavy solids. Indirect ventilation, if efficient, makes for cleaner fans and ducts and lessens the fire hazard.

Air Supply

It is essential that the air to supply the fan pull should be fresh, and it should be supplied, therefore, from special ducts rather than drawn from a room already full of fumes from other processes. Cases have been observed where most of the supposedly fresh air came through the drying room which was already heavily charged with lacquer fumes, and one case of severe benzol poisoning is reported which was caused by the fumes created in another operation being drawn past the worker by his own exhaust fan.

Exhaust ducts are most efficient if they are short and straight or at least avoid sharp angles, and it is most important that they should be kept clean and the fan properly adjusted. If solids in suspension are used, as with vitreous enamel, ducts should not be horizontal, or if this can not be avoided they should be large and should be frequently cleaned as otherwise they are liable to become so clogged that they are practically useless. The exhaust fumes should be discharged at a point where they will not reenter the room or endanger others and the discharge openings should be protected from back pressure from the wind. A case is cited of ducts so placed in an angle of the building that the discharged air was carried into the next room through the open windows.

The one essential of satisfactory exhaust ventilation is said to be air movement, of at least 150 feet per minute, past the sprayer's face toward the exhaust fans, regardless of booth area or cubic contents. If the conditions enumerated above are maintained they materially assist in obtaining a satisfactory flow of air. If the fan power is sufficiently great, however, rates decidedly above these levels may be secured even though the other conditions are not so favorable. Thus in one case where a powerful fan was used a rate of over 350 feet per minute was noted at a booth which had a duct 50 feet long with three bends leading to an exhaust fan near the ceiling.

The data secured in the Pennsylvania survey show that these requirements are not extreme, as 14 per cent of the air measurements in the factories using lacquer and paint were over 150 feet per minute, 7 per cent were over 200 feet, and one was over 500 feet. Thirty-seven per cent of the vitreous enamel plants had an air velocity exceeding 150 feet and 24 per cent exceeded 200 feet per minute. In the National Safety Council study 11 per cent of the plants spraying vitreous enamel had an air measurement in excess of 150 feet.

Other Requirements for Safe Spraying

The location in the booth of the object being sprayed is also important, and in general the spray should be directed down rather than up. The pressure in the gun should be as low as is consistent with good workmanship, as with high pressure the amount of the toxic substances in the air is increased materially.

In interior decorating portable exhaust fans should be installed in windows, etc., and air masks should be worn where paints containing benzol or lead are used. No benzol or lead paints or lacquers should be used except in automatic booths or where the sprayer is equipped

with a positive pressure air mask or helmet, and the same safeguards should be employed where quick-drying paints containing benzine, mineral spirits, turpentine, etc., are used.

Storage Battery Industry: Working Conditions and Health Hazards

AN ACCOUNT of present working conditions and hazards in the storage-battery industry by Dr. Alice Hamilton in *The Journal of Industrial Hygiene*, August, 1927 (pp. 346-369) contrasts conditions with those prevailing in 1914 when a general survey³¹ of the industry was made by the writer. At that time the five largest factories in the country employed approximately 900 men in lead work, while in 1926 the nine largest factories were employing about 7,500 in such work, this increase in manufacture being due to the enormous increase in automobiles and to the introduction of the radio.

There are two types of batteries manufactured, those made with Planté positive plates and pasted negative plates (used for stationary engines) and those (used for vehicles and radios) which are made with pasted plates for both positive and negative. The pasted plate is a molded leaden grid in which the interstices are filled with a paste of lead oxides. Both types of plates are charged with electric current which changes the metallic lead and the litharge red lead of the positive plates to a higher oxide, while the litharge of the negative plate is changed to spongy metallic lead.

Litharge paste usually with a little red lead is used for the negative plates, and for the positive plates a larger proportion of red lead is used, but owing to the fact that litharge is cheaper the proportion of litharge is continually increasing.

The materials and processes which present the greatest hazard are the dry lead oxides, the oxide paste, the dry pasted plates which must be handled, the lead burning of pasted plates, and the molding or casting of the grids. In processes in which metallic lead is used there is relatively little danger, but handling of the oxides in the mixing, pasting, and finishing departments is extremely hazardous unless the strictest cleanliness and care are exercised.

In the earlier study it was shown that the work with the oxides was much more dangerous than the work with metallic lead, the rate of lead poisoning in two plants employing 619 men being 1.7 per hundred employees for molding and 59.4 for mixing and pasting. At that time the working conditions were never more than fair and in some cases were very bad. In the present survey very great improvement was found to have taken place. Of the nine plants visited, four it was considered would come in Class A and two in Class B, although one of these plants had plans for improvements which would bring it into the first class. The other three plants still had certain departments which were below the standard.

In the molding rooms it is essential to prevent lead fumes, lead dust, escape of gas, and excessive soapstone dust. Only one of the plants was found to use gas for heating the kettles, the others using either oil or electricity. In some cases the dross was not always carefully handled and the hoods over the kettles were sometimes too

³¹ U. S. Bureau of Labor Statistics Bul. No. 165: *Lead Poisoning in the Manufacture of Storage Batteries*, by Dr. Alice Hamilton.

narrow to catch the fumes. The soapstone dust used for greasing the molds was excessive in some molding rooms and although this is a comparatively inert dust and there is a question as to how serious a menace it is, still it is regarded as desirable to do away with large quantities of this dust. One company did not use any soapstone but used acetylene smoke instead for greasing the molds.

There is considerable danger from dust in removing red lead or litharge from wooden barrels or steel containers and in most plants there is an impression that only very expensive and complicated apparatus can be depended upon to prevent dust in dumping and blending. However, some plants were found to have solved the problem with comparatively simple apparatus. There is less danger of dust in those plants which buy their oxides in steel containers, as wooden barrels are never dust proof and the powder leaks out and is scattered wherever the barrels are handled.

Paste is no longer mixed by hand on a large scale and is never done by the individual paster. It is possible to mix the paste in closed mixers with no escape of dust, but this is not always done, and if the mixing and dumping and blending departments are not separate there is usually a dangerous amount of dust present.

The pasting of plates may be highly dangerous if not done under proper conditions. It is desirable to keep everything as wet as possible and frequent washing of floors, pasting benches, and all surfaces in the pasting room is essential. Several companies, in addition to these precautions, have devices which prevent paste falling to the floor.

Transportation of the pasted plates to the drying room, to the pickling or forming room, or to the storage departments may be productive of much dust, but it is possible to avoid this by carrying the pasted plates, while still wet, on traveling belts and not on trucks which require unnecessary handling of the plates. In every process it is necessary to prevent the production of dust, as this is a far greater hazard than the fumes.

The physical care of the workers in these plants should include proper washing facilities and enforcement of their use, clean lunch rooms with wholesome hot food, and a well-equipped medical department with careful medical supervision, including periodic examinations. Most of these requirements were met in eight of the nine plants visited. All of the plants provide medical service which was apparently adequate in most cases and in two plants was exceptionally good. Physicians are generally given the authority to order a change of work for any man who appears to be in danger of developing lead poisoning and it is the general aim to detect cases of poisoning at a very early stage.

The improvement which has taken place in the number of cases of poisoning is shown by the records of some of the plants. One company which had an average of 8 cases per month with 1,000 employees on the pay roll in 1918 had, during the first nine months of 1926, an average of 1 case per month with 1,350 on the pay roll. Another company which had a rate of 15 per hundred in 1924 had a rate of only 2.4 in the first 4½ months of 1926. In this plant nearly all the cases are of the acute or gastric type and only 2 per cent are cases of palsy. The younger men from 18 to 24 years are more susceptible to the poisoning. The physician at this plant regarded the operation

of pasting and mixing as the most hazardous, followed by plate inspection, finishing and salvaging, assembling and lead burning, plate stock, and molding, in the order named.

In addition to these nine large factories there are said to be about 290 smaller plants in this country in which storage batteries are made. These without doubt present far greater hazards than the large plants as adequate precautions are less likely to be taken and medical supervision is generally lacking. The danger extends beyond the factory, also, for wherever old storage battery plates are collected or stored there is the hazard of lead poisoning. In one junk shop where scrap is simply collected, not treated, four severe cases of lead poisoning occurred as a result of handling old battery plates.

A comparison of conditions in this country with those in England and Germany is made, the writer having visited several plants in those two countries in the fall of 1925. The advantages on the side of the foreign countries are said to be the higher standard of governmental sanitary control and more rigid enforcement of safety regulations, together with the fact that there is a greater proportion of stationary batteries manufactured, with a consequent reduced exposure to lead oxides, while the advantages on the side of the United States are the more extensive use of mechanical devices to displace handwork, the general use of oil or electric heat in place of gas or coal, and the very small number of women and boys employed.

Tanning Industry

See Tanning industry: occupation disease hazards. Former handbook (Bul. No. 439), pages 319-321.

Tetraethyl Lead Gasoline

See Tetraethyl lead gasoline: report of Columbia University Laboratory; report of committee appointed by United States Public Health Service. Former handbook (Bul. No. 439), pages 321-325.

Woodworking Industries: Health Hazards in Australian Woodworking Industries³²

AT THE REQUEST of the Australian Timber Workers' Union an investigation of the health hazard from sawdust in the various woodworking industries using both Australian and imported timbers was made in 1926 by the division of industrial hygiene of the Commonwealth department of health.

The investigation included the examination of 208 men employed in joinery and furniture factories in Melbourne for evidence of nasal irritation, asthma, and dermatitis, and of 10 other woodworking employees with special reference to skin irritation from the wood dusts.

It was found that 78 employees, or 37 per cent, of those examined had some affection of the nose or throat. In a number of cases the abnormal condition preceded employment in the woodworking industry but in general it was considered that the percentage of workers

³² Australia. Department of Health. Service publication (Division of Industrial Hygiene) No. 4: An Investigation of Certain Health Aspects in Persons Engaged in the Woodworking Industries, by D. G. Robertson, M. D. Melbourne, 1927.

found to be affected was considerably greater than would be found among the population at large. Wood machinists showed a larger percentage affected than the other occupational groups. Among persons working on machines fitted with efficient exhaust there was less nasal trouble although this difference was not so marked as might have been expected. Two cases of the five giving a history of asthmatic attacks were considered to be probably caused by the timber dust, and there were 10 cases of dermatitis and one case of urticaria (hives). Hardwood appeared to be the most irritating, most of the nasal cases being caused by the dust from such wood, while blackwood caused nine cases of dermatitis, mountain ash and pear trees one case, and the case of urticaria was due to working with jarrah, red pine, and white pine.

As a result of the investigation it was recommended that efficient exhaust systems should be installed wherever woodworkers are subjected to the inhalation of wood dust, but in the case of dermatitis it was shown that comparatively few persons have skins which are hypersensitive to the dusts and in such cases a cure can hardly be expected without removal from exposure.

Morbidity and Mortality Statistics

Sickness Studies Showing Effect of Low Income Upon Health

SICKNESS is, of course, not limited to the poor, but numerous studies indicate clearly that both sickness and death are much more frequent among those with low incomes than among those with incomes adequate to comfortable living. The present article brings together the substance of these studies, the data being taken from the convenient summary and analysis recently published by the United States Public Health Service.³³

Sickness Studies by Various Agencies

AMONG public agencies which have made studies bearing on this question are the United States Public Health Service and the Bureau of Labor Statistics and the Children's Bureau of the United States Department of Labor, while the mortality statistics of different countries and various other studies deal with one or another of the phases of this problem.

Sickness surveys have been made by the Public Health Service in several communities. In a study carried out in Hagerstown, Md., in November, 1921, data were secured as to the sickness prevalence in 1,751 households. The family income was not ascertained, but the economic status of the family was estimated by the agent from appearances and from the occupation of the household head, and the families were classed as well-to-do and comfortable, moderate, and poor and very poor. The cases of sickness per 1,000 persons were 40.1 for the lowest economic group, 37.6 for those in moderate circumstances, and 32.2 for the highest group.

³³ U. S. Public Health Service. Public Health Bulletin No. 165: Economic Status and Health. Washington, 1927.

Even more striking differences were shown by a study of the prevalence of disabling sickness in seven cotton-mill villages in the South, which was made in 1916. The case rate per 1,000 persons canvassed was 70.1 for families in which the half-month income per adult male unit was less than \$6, decreasing with increased income to 18.5 per 1,000 for those having an income for each adult of \$10 and over. This study was extended the following year to cover about 10,000 persons in 24 villages. The rates for sickness prevalence and the percentage of workdays lost, adjusted according to age, showed that both decrease as income increases.

A study by Emmet of the disability among members of a sick-benefit association, published in the *Labor Review*, November, 1919, and March, 1920, shows the disability by occupation of the members of the fund. Disability from accidents which accounted for 28 per cent of the total number of cases and 24 per cent of the disability is included in the data. A comparison of the rates by three principal occupation groups—professional, trade, and clerical, skilled, and unskilled—shows that the annual average number of disabled persons between the ages of 25 and 59, per 1,000 members, was 158 for the first group, 221 for the second group, and 278 for the third. These figures were adjusted to the age distribution of the male white population of the United States in 1910.

Several studies of mortality rates in different places and for different periods show consistently higher death rates among the lower income groups. These studies include one by Chapin of the mortality in Providence, R. I., in 1865, among those families paying income tax and those whose incomes were not high enough to be taxed; a study of class mortality statistics in Dublin, Ireland, for the year 1911, in which the professional and independent class, the trade and commercial class, and wage earners were compared, and a comparison of the mortality among the families of the British peerage and the British population in general during the first half of the nineteenth century.

Causes of Adult Mortality According to Economic Status

THE DISEASES which occur more frequently as a cause of death among the unskilled laboring classes than among the higher paid classes, as shown by an analysis of the mortality statistics for England and Wales, which are published decennially, are the respiratory diseases, including phthisis, nonpulmonary tuberculosis, valvular disease of the heart, aneurysm, cerebral hemorrhage, and hernia. On the other hand, diabetes, gout, the digestive diseases, angina pectoris and arteriosclerosis occur with greater frequency among the professional and salaried class than among either the skilled or unskilled groups. Thus it is seen that nearly all the major causes of death vary inversely to economic status. While the importance of constitutional or hereditary factors as compared with the environmental factors can not be determined from these statistics, it does not seem reasonable to assume that the poor are so constituted that they are especially susceptible to some diseases while they offer exceptional resistance to others, but it would seem to be rather the environmental factor which is the more important.

Relation of Child Sickness and Mortality to Economic Status

A study by the Public Health Service of absence from school in certain cities in Missouri in 1919-20 showed a consistently higher sickness rate among the children of the lower paid workers in all age groups between the ages of 6 and 16. A similar study of sickness among school children in Florida in 1921-22 showed the same general tendency for absence on account of sickness to increase with the decrease in economic well-being.

Comparison of child mortality rates among specific occupational groups and in various cities and counties shows that there is a constant tendency for the mortality to increase among the children of the lower paid groups of workers, although in some cases this tendency was not quite so marked in rural communities. In regard to specific diseases it appeared that diphtheria and scarlet fever vary less in the different classes than measles and whooping cough, both of which occur more frequently among the poorer children.

A study of infant mortality in five cities, made by the United States Children's Bureau, which gives the mortality rates by earnings of the father and nativity of the mother, shows that there is a general decrease in mortality as the earnings of the family increase and that this holds true for children of native, foreign, and colored workers.

Comparison of the deaths among children in England and Wales, by cause, shows that the greatest difference as between classes is found in the common infectious diseases, these being 107 per cent greater among the working class as a whole than in the professional and salaried class, followed by diarrhea and enteritis, while the developmental and wasting diseases show the least variation as between the different economic classes.

Important factors in the death rate of infants which are associated with income are congestion of the household, sanitation, and other conditions which are very closely associated with poverty. The education of the mother is also an important factor, as comparison of the rates for literate and illiterate mothers shows a much higher rate among children of the latter.

An important point brought out by these studies is that while there is no great difference between the death rates for the different economic classes among infants under 1 month of age, for infants over that age the rate in the United States in the lowest income group is ten times the rate in the highest income group, suggesting that the difference lies not so much in the inherited make-up of these children as in the environmental conditions.

Although these data are scattering and are for varying periods the practical uniformity in the results in showing a higher sickness incidence and mortality rate for both children and adults among the lower paid income groups indicates that sufficient income to insure reasonable physical comfort, proper nourishment, and care in the event of sickness is of the utmost importance.

A Historical Retrospect on Expectation of Life ³⁴

THE STATISTICAL BUREAU [of the Metropolitan Life Insurance Co.] has received so many inquiries regarding the trend of the expectation of life (mean length of life) in both the recent and more remote past that we may infer this to be a subject of considerable public interest. We have, therefore, decided to publish herein a synopsis of some of the principal data available on this subject.

Many of the inquiries call for information regarding the increase in the length of life in the last fifty or a hundred years. Now, the extreme span of life has probably changed very little in historical times. There have always been some men who lived to a great age—80 years, 90 years, and an occasional century. What has changed very materially is the proportion of all the persons born who attain higher ages, and, contrariwise, the proportion that die in adolescence and infancy. The customary measure of the longevity characteristic of different times and places is the average length of life, as computed for a group or cohort of 100,000 persons who start out upon life together and are diminished in numbers gradually by deaths, in accordance with the observed rates of mortality. Instead of considering a cohort of 100,000 persons starting out on life together, it is often convenient to fix our attention upon 100,000 persons of a given age, as, for example, age 40, and to compute their average after-life time. According to the 1920 United States Life Table, for example, this comes out as 29.6 years for white males 40 years old, meaning that, on an average, white men 40 years of age will live 29.6 years longer, or reach age 69.6, according to mortality conditions of 1920. Or, in other words, a man 40 years of age may reasonably expect to live 29.6 years more. This is commonly expressed by saying that his expectation of life at age 40 is 29.6 years. The expectation of life at a given age is the same thing as the mean after-life time or the average number of years lived after attaining that age; and the expectation of life at birth is evidently the same thing as the mean or average length of life. If the words "expectation of life" are used without specifying any particular age, it is commonly understood that the expectation of life at birth is meant—that is, the average total length of life.

But to return to our main topic, namely, the increase in the length of life in past decades. It should be remarked, first of all, that the preparation of official life tables relating to any large section of the United States is a comparatively recent institution; the first life table of this kind, based on the mortality figures for the 10 States which first practiced regular official registration of deaths (the so-called "original registration States") relates to the first year of the present century, 1901. Similar life tables have been issued by the Census Bureau relating to the years 1910 and 1919–20. This last table shows an expectation of life at birth of 55.33 years for white males and 57.52 years for white females.

³⁴ Reprinted from the Statistical Bulletin, November, 1927, published by the Metropolitan Life Insurance Co., New York.

The State of Massachusetts has been particularly progressive in matters of vital statistics. The regular series of life tables for this State dates back 10 years earlier than the first table of the Federal series, i. e., it represents the mortality of 1890. But there are some isolated life tables reaching farther back than this and here again Massachusetts is in the lead, with the Wigglesworth Life Table published in 1789, on the basis of mortality statistics gathered in certain parishes of the States of Massachusetts and New Hampshire. This table showed an expectation of life at birth of 28.1 years. But the method by which it was constructed is faulty and gives too low a figure. Wigglesworth, himself, was aware of this and suggested a correction by which the expectation of life at birth would be raised from 28.1 to 35.5 years.

The earliest of all life tables (except one or two very primitive efforts in the third century) is one for the city of Breslau, Germany, prepared by Halley and relating to the year 1693. This gives the expectation of life at birth as 33.5 years. A number of other early life tables of historical interest will be found listed in the accompanying table, which shows the corresponding expectation of life at birth. The table also presents modern American and English data.

Quite naturally, in such a historical review as has been presented of the principal American and English figures for the expectation of life, the question arises: What have been the gains achieved in past years? An exact answer, applying to the entire period of the records, can not be given, partly because of the uncertainty of the data, but more particularly because the areas to which they apply differ from case to case. For this reason only a roughly approximate statement can be made, especially where the earlier figures are involved. Making due allowance for this we may say, in round numbers, that in the 120 years from 1800 to 1920 there has been, in the United States, a gain of some 25 years in the expectation of life. It is pleasing to observe that the last two decades for which we have official data—namely, from 1900 to 1920—show relatively greater gains than the earlier periods. From 1900 to 1920 the original registration States show a gain of more than five years for white persons—that is, a rate of gain of over two and one-half years per decade. In contrast with this, if we adopt the figure of about 40 years as about representative of the expectation of life in 1850 (being guided in this by the data shown for Massachusetts and Maryland), we see that for the half century from 1850 to 1900 there was a gain of only about eight years—that is, a gain at a rate of only about one and a half years per decade. Moreover, judging by the figures for Massachusetts, 1878–1882, it is seen that most of the gain between 1850 and 1900 took place during the last two decades of the century. While this contrast in favor of the most recent years is very gratifying, it may be well to remind our readers of a point to which we drew attention recently—namely, that it will no doubt become increasingly difficult to add further to the expectation of life as we approach the limits of what can reasonably be expected with human possibilities. Perhaps we are beginning to feel now the operation of the law of diminishing returns, for the last year or two have not shown material gains in expectation of life. It is not necessary here to rehearse once more our remarks regarding this point. Only this should be added, to prevent misunderstanding, that a slight setback in any one particular

year is in itself of no great significance, since fluctuations up and down must necessarily be expected. Furthermore, all indications are that the present year will be a record health year and accordingly show a high figure for the expectation of life.

So far we have reviewed only expectation of life at birth, or mean length of life. A complete historical discussion of the expectation of life at all ages would lead us beyond the scope of an article adapted for these pages. But to one question, which is often asked, it is appropriate to give attention here—namely, as to the ages of life at which the gains have mainly taken place. It is a matter of common knowledge that the chief gain has taken place through the saving of infant and child lives. It is sometimes stated that there has been no gain in adult life, or even that there has been a loss. This however, overstates the case. In the decade 1910–1920 the only part of life at which the life tables show a decrease in expectation of life, for the original registration States, is age 83 and over for males, and age 92 and over for females. Only for the previous decade, 1900–1910, do the figures show slight decreases in the expectation of life over an extended age period, from age 32 to the end of life for males, and from age 47 to the end of life for females. Whatever occasion there may have been at that time for solicitude seems to be eliminated in the present state of affairs.

EXTRACTS FROM SOME HISTORICAL LIFE TABLES

Authority	Territory	Date	Expectation of life at birth (in years)		
			Males	Females	All persons
Halley.....	Breslau (Germany).....	1687-1691	-----	-----	33.5
Price.....	Northampton (England).....	1735-1780	-----	-----	30.0
Milne.....	Carlisle (England).....	1779-1787	-----	-----	38.7
Wigglesworth.....	Massachusetts and New Hampshire.....	1789	-----	-----	35.5
Pennsylvania Co. for Assurance Upon Lives.	Philadelphia.....	1814	-----	-----	26.0
Do.....	Episcopal Church, United States.	1814	-----	-----	31.0
Official English life table No. 1.....	England and Wales.....	1841	40.2	42.2	-----
Kennedy.....	Massachusetts.....	1850	38.3	40.5	-----
Do.....	Maryland.....	1850	41.8	44.9	-----
Elliott.....	Massachusetts.....	1855	-----	-----	39.8
Meech.....	United States, white.....	1860	41.01	-----	-----
Billings.....	Massachusetts.....	1878-1882	41.74	43.50	-----
United States life tables (Glover).....	do.....	1890	42.50	44.46	-----
Abbott.....	do.....	1893-1897	44.09	46.61	-----
United States life tables (Glover).....	do.....	1901	46.07	49.42	-----
Do.....	do.....	1910	49.33	53.06	-----
Do.....	United States Original Registration States, white.	1901	48.23	51.08	-----
Do.....	do.....	1909-1911	50.23	53.62	-----
Do.....	do.....	1919-1920	54.05	56.41	-----
Do.....	United States Registration States, white.	1919-1920	55.33	57.52	-----
Official English life tables:					
No. 3.....	England and Wales.....	1838-1854	39.91	41.85	-----
No. 4.....	do.....	1871-1880	41.35	44.62	-----
No. 5.....	do.....	1881-1890	43.66	47.18	45.39
No. 6.....	do.....	1891-1900	44.13	47.77	45.92
No. 7.....	do.....	1906	48.53	52.38	-----
No. 8.....	do.....	1911	51.50	55.35	-----
No. 9.....	do.....	1921	55.62	59.58	-----

A Health Study of Ten Thousand Male Industrial Workers³⁵

A STATISTICAL analysis of the results of the physical examinations of approximately 10,000 male workers which have been made at different times during the past decade by the United States Public Health Service covers employees in the pottery, post office, glass, gas, foundry, steel, chemical, cement, cigar, and garment industries. The studies varied in certain fundamental respects, as each was made with the specific hazards of the particular industry in view and the examinations were made by several groups of physicians—a factor of especial importance in connection with the determination of defects and diseases.

Another factor which affected the conclusions drawn from the examinations was that, with the exception of the cement industry, all the examinations were voluntary. The type of worker appearing for examination would be influenced to some extent by this fact, as some workers suffering from the effects of the industrial hazards might avoid examination for fear of being discharged, others who believed themselves well might not consider an examination necessary, and still others who believed themselves ill from any cause whatever might wish to be examined to determine their physical condition. Comparisons between the industries were made difficult also by racial differences, by transfer of the weaker individuals to easier processes or industries and by the difficulty of obtaining information regarding the hazard or the degree of hazard to which a worker had been exposed.

In addition to such industrial comparisons as were possible, the study deals with certain physiological characteristics of industrial workers as shown by the examinations and with the importance of the racial factor in industry. In all the conclusions drawn in the study, however, the authors warn of the danger of accepting them without due regard to the modifying factors.

The actual number of male workers examined was 10,143 and the average age in the different industries varied from 32.1 years in the steel industry to 39.1 years in the pottery industry.

The study of the racial composition of the industries brought out the fact that the great change in the races migrating to the United States in the past 30 or 40 years had had a definite effect on the type of personnel in the different industries; that is, industries which were well established, such as pottery, post office, and glass, and therefore drawing from the older immigration group, showed an older group of workers, a longer length of service or employment, and lower percentages of foreign born and of unskilled than did the industries drawing on the newer immigration group, such as chemical and steel.

The records showed, in the opinion of the writers, that occupations producing excessive fatigue may not result in a specific adverse physical condition but more often cause a general high rate for many different kinds of illness. People are susceptible to certain diseases in a widely different degree, so that the same industrial hazard may, for example, cause a respiratory disease in one person and a gastrointestinal disease in another.

³⁵ U. S. Public Health Service. Bulletin No. 162: A Health Study of 10,000 Male Workers. by Rollo H. Britten and L. R. Thompson. Washington, 1926.

In regard to specific diseases, particularly high rates from respiratory diseases were found in the garment, foundry, and cigar industries. Bronchitis was high in all three, and tuberculosis in the garment and cigar industries. In all these industries, dusts, either vegetable or mineral, are regarded as the most important cause of the respiratory conditions, although the group of workers in the cigar industry, which showed particularly high rates for tuberculosis and bronchitis, seemed to have been selected from persons of inferior physical condition.

Diseases of the digestive system—the second in importance as the cause of industrial morbidity—showed particularly high rates in the garment, glass, pottery, post office, and cigar industries.

Excessive rates for inflamed eyes were found among the workers in the foundry, post office, glass, and gas industries; the garment and post office industries gave the lowest rates for good vision; and the rate from cataract was highest among glass blowers. In all these industries poor illumination appeared to be an important cause of certain eye defects and diseases, and in the garment and post office industries intensive eye work under conditions of poor illumination appeared to be the most important cause of poor vision.

Diseases of the ear were found in excess in the glass, foundry, and cement industries, the physical characteristics of the dust being of greatest importance in producing affections of the ear, although in foundries excessive noise was also a factor. Nose and throat diseases had high rates in the foundry, post office, and cigar industries, excessive heat seeming to be the cause in foundries, while chronic disease of the nasopharynx was high in the dust group of the glass industry.

Among diseases of the circulatory system, organic heart defects were highest in the foundry and post office; enlarged heart in glass, steel, and gas; irregular heart in cigar and gas; and arteriosclerosis in the foundry, post office, steel, cigar, and glass industries. Heavy physical work seemed to be the principal cause of diseases of the circulatory system with the exception of irregular heart; in the cigar industry this disease has been generally ascribed to nicotine. Among other diseases, hernia, varicose veins, and flat feet stand out in industries and occupations where the greatest physical exertion was required.

The age curves in diseases as developed from the study throw some light on the trend of certain diseases throughout the life of the industrial worker. Diseases of the digestive system show a steady increase in the more active period of life—that is, between 17 and 45—and remain stationary after that period. Diseases of the circulatory system, including organic heart disease, arteriosclerosis, and enlarged heart, rise consistently with age, while irregular heart shows a drop between 20 and 40 years, but a definite rise after that age.

Of the respiratory diseases, tuberculosis shows the same trend as shown by mortality statistics and reaches its peak near 40 years, declining with advancing age, while bronchitis increases steadily with a tendency to decrease after age 55, and the prevalence of emphysema increases throughout life. Diseases of the nose and throat decrease regularly with advancing age, and this is especially true of enlarged tonsils.

The information in regard to heart defects was considered to be especially reliable because of the slight variation between industries. Enlarged heart was found to be associated with increased systolic

blood pressure and pulse rate and a somewhat lower vital capacity. It also appeared more frequently among those having other heart defects and arteriosclerosis, and there seemed to be a slight increase in the rate among persons with chronic diseases of the nasopharynx and enlarged tonsils. There was also a definite relationship between enlarged heart and pyorrhea.

In studying tuberculosis an effort was made to see if there was marked susceptibility evidenced by any race, but the numbers were too small for reliable conclusions. The rate for the colored race in the two industries in which they appeared was the highest, however, of all the races observed in those industries.

Health of Office Workers

HEALTH CONDITIONS among office workers showing the extent of absenteeism on account of sickness and also some of the more important diseases which cause absence from work among this class of workers was the subject of a study³⁶ by Dr. Wade Wright of the Metropolitan Life Insurance Co.

The fact that the number of clerical workers in this country is approximately 3,700,000, or nearly half the number of industrial wage earners, is sufficient reason for consideration of health conditions among them, since the health problem of such a large body of workers is of great importance both in its relation to public health and to the successful operation of commerce and industry.

The high morbidity and mortality rates among clerks have been a matter of observation among persons interested in industrial medicine for many years, gastrointestinal disorders, writers' cramp or palsy, and headache being among the diseases noted by earlier writers on industrial diseases. Interest in the health of clerks was rather crowded out, however, some years ago when attention was fixed on the more spectacular industrial poisons, but within the past few years the development of medical services in large commercial and mercantile organizations has resulted in renewed interest being taken in the health of office workers.

There are certain factors which are common to most clerical groups. Thus, office workers are predominantly feminine and unmarried and young rather than middle-aged or aged, they are largely city or town dwellers, and they may present a selection of persons many of whom are physically substandard. According to the 1920 census, over 51 per cent of the more than two and one-half million clerks other than those in stores were females, while of the Metropolitan headquarters office clerical force almost 80 per cent are females.

The preponderance of youthful workers is shown by the fact that nearly half of all persons in selected clerical occupations according to the last census were between the ages of 15 and 24 years. Of females alone, 57.9 per cent were in the age group 15 to 24 years, and many of the next age group in the census classification 25 to 44 years, were without doubt still in the twenties. Of all persons in two large classes in the census report, "other clerks," and "stenographers and typewriters," over 51 per cent of both sexes and 61 per cent of the females were in the age group 15 to 24 years.

³⁶ Wright, Wade, M. D.: *The Health of Office Workers*. New York, Metropolitan Life Insurance Co. [1927]. [Reprinted from *Proceedings of Convention of the Life Office Management Association*, Atlantic City, Oct. 6-8, 1927.]

A study of causes of death by occupation³⁷ among white industrial policyholders insured by the Metropolitan Life Insurance Co. for the period 1911 to 1913 showed that among both male and female clerks the mortality was much greater between the ages 15 to 44 than for all the occupational groups combined. Tuberculosis of the lungs was the most important single cause of death among both men and women, the rate being highest for this disease in the age group 15 to 24. A study of similar experience among male clerks for the years 1922 to 1924, as yet unpublished, shows that the mortality rate for the age group 15 to 44 was 62.1 per cent as compared with 70 per cent 11 years earlier. A corresponding reduction in the percentage of deaths from tuberculosis of the lungs took place in the different age groups. Pulmonary tuberculosis is still the chief cause of death before the age of 45, however, causing 23.9 per cent of the total number of deaths against 14.5 per cent from heart disease. The principal causes of death in the order of their importance were found to be tuberculosis of the lungs, heart disease, influenza, pneumonia, Bright's disease, and accidental violence, the relative importance being practically the same as in earlier years with the exception of influenza and pneumonia, which in the later study occupied third and fourth place, respectively. A high incidence of typhoid fever, which caused 1.3 per cent of all deaths, was the most striking feature of this period, the rate being more than twice that for all occupations combined. The average age at death was 39 years, a gain of 2.5 years over that shown in the previous study. Comparison of crude proportionate mortality figures shows that the rates for tuberculosis among clerks are exceeded only by soldiers, miners (other than coal), pottery workers, and sailors, but if the rates are corrected for age the rates among the occupational group are exceeded by at least 10 other occupational groups, all of which, however, are recognized as suffering very high tuberculosis death rates.

Although similar data for female clerks for the period 1922-1924 are not available, the mortality from tuberculosis among young women generally has not declined in proportion to the general reduction in the mortality from this cause among all age groups for both sexes. The reduction has been much more marked among males, the peak of the death rate shifting to later in life, but while the female rate for all ages has improved it is notably higher among young women, particularly in the group aged 20-24.

Morbidity Rates

THE MORBIDITY data for office employees of the company relate to absences on account of sickness of one day and more and cover more than 10,000 employees. As in similar studies, the records showed that there was more frequent sickness among women but that the average loss of time per absence was greater among men. In 1925, the year for which the data are shown, males lost 8.82 working days per clerk-year exposed and females 12.44 working days, 141 per cent of the male rate. The absences among men, however, average 7.08 days per case and among women 4.41 days. The cases of absence per clerk-year amount to 1.246 among males, while among females there were 2.824 or 226 per cent of the male rate.

³⁷ Bureau of Labor Statistics Bul. No. 207, Washington, 1917.

One and two day absences constitute a large proportion of the sickness absences both in offices and in industrial plants. Among the group studied they remain relatively constant from year to year at about 70 per cent for men and nearly 80 per cent for women. Such absences are naturally higher in establishments where no loss of pay is entailed through the absence. Although the time lost through short absences is not negligible, it is much less in the aggregate than that due to the longer absences. The days lost per clerk-year, excluding the one and two day absences, amounted to 7.77 for males and 9.82 for females, the rate for the women being 126 per cent of the male rate instead of 141 per cent when the total number of absences is considered.

The study afforded evidence that absence on account of sickness varies quite directly with age. Thus, only 20 per cent of the girls under 20 were absent more than three times as compared with 34 per cent of those 20 to 24 and 30 per cent of those 25 to 29.

The diseases causing the greatest amount of lost time among males were respiratory diseases (including tuberculosis), which caused about 50 per cent of the lost time, followed by diseases of the digestive system and of the circulatory system. Among females about 40 per cent of the time lost was due to respiratory diseases, 20 per cent to digestive diseases, slightly more than 10 per cent to diseases of the nervous system, and a little less than 10 per cent to diseases of the genito-urinary tract.

In addition to the sickness among the force which resulted in lost time, a large amount of medical attention was furnished by the company. In 1925 and 1926 the dispensary visits totaled more than 150,000. The most important cause of disability was the acute respiratory diseases, including such conditions as colds, grippe, tonsillitis, laryngitis, etc., while dysmenorrhea was second in importance followed by gastro-intestinal disease, surgical conditions, headaches, skin diseases, and a great variety of other conditions. The company clinic is attended by both sexes and is used by between 85 and 90 per cent of the personnel during the year. There is little change from year to year in the proportionate distribution of the various maladies.

Conditions frequently met with in offices which are conducive to ill health are poor ventilation, poor illumination, and bad seating, which, together with bad habits and fashions, and lack of proper exercise is responsible for the generally poor posture of office workers. Most of these conditions can be remedied. "Employers of clerical workers," the writer says, "can not ignore the importance of the problem of time and efficiency lost through disease, and it is almost inevitable that they share with their employees the burden of maintaining some mechanism for the relief and control of the situation. The problem is not so much the reduction of sick absenteeism to the lowest possible limit as it is the maintenance of the healthiest possible group of workers."

Health of Working Boys in New York City

THE RELATION of health and environmental conditions to the development of tuberculosis was the subject of a study³⁸ among a group of 2,000 working boys in New York City, made under the direction of Dr. Iago Galdston, secretary of the New York Tuberculosis and Health Association.

It is well recognized that high morbidity and mortality rates from tuberculosis in any particular group are generally associated with a high general death rate and with a relatively low-grade physical condition, and in studying this particular adolescent group, therefore, the purpose was to find out the number and types of physical and functional deformities of the individuals and evaluate these on their possible causative or contributory relation to tuberculosis. The group of boys selected for study was chosen from the East Side Continuation School in New York City and comprised boys who were past 14 but under 17 years of age and who had not completed the eighth grade in school. These boys were all employed but were required to attend school one morning or afternoon each week.

Each boy was measured and weighed and if the weight in relation to height and age suggested malnutrition a red mark was placed on his record card indicating to the examining physician that the boy should be given additional attention. In the physical examination a definite diagnosis was requested on each given condition and if the diagnosis was not established on the first examination, the boy was reexamined until his condition was defined and agreed upon, conferences being held in doubtful cases by the examining staff. For each boy a summary of the outstanding points was made and of the recommendations of the physician for follow-up work, as in addition to securing the facts relative to the physical condition of the boys it was the aim to correct the defects found so far as possible. Arrangements were made with various hospitals providing for special attention for the boys sent to them for confirmatory diagnosis and treatment.

The examinations covered a period of 11 weeks, five 2-hour sessions being held five days in each week. Four physicians were in attendance, and one assistant was present to take the histories. There was a total of 2,076 boys examined, and 433 reexaminations were made, but the statistical data have been calculated on a basis of 2,000 examinations. In addition, industrial histories were taken in 220 cases and 141 of these boys were given vocational guidance. This group of 220 boys was given special consideration both because of the serious physical handicaps among the members and because the examining physician believed, in numerous cases, that the boys' work affected his health.

The boys examined were predominantly foreign in extraction, 27 nationalities being represented. Of the 2,000 boys, 264 were 15 years of age; 978, 16 years; and 758, 17 years; and the average height ranged from 5 feet 4 inches to 5 feet 7 inches. The fact that a large number of the boys were excessively tall for their age was considered to account for a good many leaving school and entering industry, as such boys

³⁸ The Health of the Working Boy. A Survey of the Health of 2,000 Working Boys in the East Side Continuation School, by Iago Galdston, M. D., New York City. This article is a summary of the original study loaned to the bureau in manuscript form.

frequently feel embarrassed by their size and do not like to remain in school.

Judged by the weight in relation to the height and by inspection of the individuals' mucous membranes, muscle tone, posture, and general appearance, it was found that more than a third of the boys were in the undernourished class, 661 being found from 6 to 18 per cent and over underweight, while 54 were considerably overweight.

Five hundred and forty boys, or 27 per cent, were found to have impaired vision and 60 boys were found to be suffering from various diseases of the eye. There were 67 cases of diseases of the ear, including 4 cases of impaired hearing. About 45 per cent of the boys were found to have decayed teeth which were in need of repair work. Heart defects of various kinds were present in 154 cases. The tonsils were very carefully examined and more than half of the boys were found to have diseased tonsils, the majority of which were considered to require surgical treatment. Nasal obstructions and infections of the upper respiratory tract were present in 187 cases, and there were many cases of skin disease, glandular disease, and orthopedic defects of various kinds.

Special attention was given to the condition of the lungs and suspicious cases were sent to a tuberculosis clinic for X rays and special tests. Six cases of active tuberculosis were discovered, 31 boys were listed as tuberculosis suspects, and 10 had chronic, inactive tuberculosis.

Of the 2,000 boys, only 225 were found to be normal, while 620 had one defect, 645 had two, 374 had three, 135 had from four to six defects, and 1 had 10.

Industrial histories were taken of 220 boys who were more or less seriously handicapped by their physical condition. The 220 boys worked at 55 different occupations, most of these being unskilled, and less than half of them were receiving any training for advancement. The hours of work per week varied from 40 to 70 hours and over, but for the majority of the boys the working week was 48 hours or under. The average weekly earnings of the group were \$11.50, but it is not possible on this basis to estimate the yearly income, as the average boy does not hold his job very long and between jobs there may be long periods of idleness.

In interpreting the findings of the study, attention is drawn to the fact that, under modern conditions of living, few persons escape invasion by the tubercle bacillus and that by the fourteenth year the percentage of unaffected individuals is very small. The reason, however, that so large a proportion of the population fail to develop the disease is found in the development of an acquired immunity and in the general resistance of the individual. The natural resistance of the body is increased by maintaining the best anatomic and physiologic condition possible, while, conversely, anything that lowers the health and vitality of the individual weakens the resistance. The sickness curve of tuberculosis runs very closely with overstrain, exposure, unhygienic living conditions, and improper food, and it is of the greatest importance to increase the resistance of the individual during the adolescent period, when the physical and psychologic instability are greatest and the reserve margin is probably at its lowest point.

The extent of malnutrition among these boys, the large number of cases of diseased tonsils and of diseases of the nose and upper respiratory tract, all of which are indirectly concerned in the development of tuberculosis, and the excessive number of other pathological conditions which contribute to lowered vitality and resistance are probably representative of the conditions among similar groups of working boys. The writer of the report believes that such facts show the need for more extensive and detailed instruction of the school child in the elements of personal hygiene and for strict supervision of his physical development and that when the child leaves home and goes to work there should be consideration in the issuance of his work papers not of his age alone but also of his physical condition and of the probable tax upon his strength.

To the objection that the present group is not representative of the general population, Doctor Galdston states that neither are the tuberculosis deaths representative. To lump our 110,000,000 and say that the mortality from tuberculosis is so many per 100,000 does not give a true picture of the situation, as in Manhattan, for example, the Riverside section has a death rate from this disease of 50 per 100,000 and the Battery a rate of 1,117. Tuberculosis takes its most numerous victims from the ranks of the overworked, underpaid, undernourished, and ignorant masses, and the group studied, therefore, is representative of the classes from whom we get the bulk of our tuberculosis deaths.

Special Aspects of the Declining Tuberculosis Death Rate in the United States

THE CAMPAIGN against tuberculosis in this country has resulted in an immense decline in the crude death rate from this disease, but as this reduction might have taken place in certain sections of the country or among certain population or age groups it is of interest to determine just how successful the campaign has been in reaching the different economic classes. A study by Louis I. Dublin and George H. Van Buren, reprinted from *Tubercle*, of October, 1927, deals with the extent to which this decline touches different classes of the population. Until recently only 20 States have had a satisfactory registration system, so that in considering the question of the reduction in mortality from tuberculosis it is necessary to confine the study to these States.

The following table shows the death rates from tuberculosis among the rural and urban population for 20 States, 1910 and 1925, and the percentage of reduction in 1925:

DEATH RATES FROM TUBERCULOSIS (ALL FORMS) PER 100,000 POPULATION, RURAL AND URBAN, 1910 AND 1925, AND PER CENT OF REDUCTION IN 1925

State	Death rates per 100,000				Per cent of reduction in 1925 compared with 1910	
	1910		1925			
	Urban	Rural	Urban	Rural	Urban	Rural
California.....	225.9	180.9	125.7	163.3	44.4	9.7
Colorado.....	319.9	168.6	198.9	124.7	37.8	26.0
Connecticut.....	159.4	130.5	67.5	91.7	57.7	29.7
Indiana.....	195.1	165.1	81.3	82.9	58.3	49.8
Maine.....	180.4	140.7	60.9	64.1	66.2	54.4
Maryland.....	246.2	154.4	114.2	129.5	53.6	16.1
Massachusetts.....	158.6	177.2	74.0	120.7	53.3	31.9
Michigan.....	113.0	88.4	74.2	57.2	34.3	35.3
Minnesota.....	137.0	96.3	63.1	58.7	53.9	39.0
Montana.....	155.3	66.5	65.0	57.5	58.1	13.5
New Hampshire.....	154.1	123.3	55.1	74.5	64.2	39.6
New Jersey.....	193.6	160.1	64.3	107.8	66.8	32.7
New York.....	194.8	138.4	88.3	104.5	54.7	24.5
Ohio.....	173.8	131.9	78.4	69.2	54.9	47.5
Pennsylvania.....	160.8	109.0	82.3	71.6	48.8	34.3
Rhode Island.....	196.6	121.5	68.8	149.0	65.0	22.6
Utah.....	83.0	26.2	46.4	20.3	44.1	22.5
Vermont.....	160.4	106.6	129.3	61.8	19.4	42.0
Washington.....	123.4	94.3	68.6	88.3	44.4	6.4
Wisconsin.....	128.2	96.5	60.3	62.4	53.0	35.3

¹ Increase.

All of the States had decreased death rates over the 15-year period with the exception of rural Rhode Island, where there was an increase of 22.6 per cent in the rate. In several of the States, it will be noticed, the tuberculosis death rate was reduced more than half. It also appears from the figures that while there has been improvement in both the rural and the urban areas this improvement has been much greater in the cities. These figures are, however, crude and noncorrected rates which do not take into consideration non-resident deaths. The establishment of many tuberculosis sanitariums during the period, practically all of which are in the country, and the occurrence of many deaths of city dwellers in these institutions has made for a higher rural death rate. But in spite of this fact the improvement shown by the cities is so great that there can be little doubt that the improvement in the tuberculosis situation has been greater among the urban population. Although lacking complete data on which to base a comparison, it seems true, also, that there has been a similar decline in the death rate from tuberculosis among the colored population.

Data as to tuberculosis mortality within the various occupations depend upon a comparison of the ratios of death from tuberculosis to the total number of deaths from all causes. On this basis a general decline in practically all occupations is shown. The rate for tuberculosis of the lungs in the years 1911 to 1913 was 20.5 per cent of the mortality from all causes among gainfully occupied white males aged 15 and over, and in 1922-1924 the rate had been reduced to 13.4 per cent. The occupations showing the highest proportion of deaths were as follows, in the order named: Miners, underground (other

than coal miners); pottery workers; marble and stone cutters; cooks, waiters, and hotel servants; cutlers and grinders; cigar makers and tobacco workers; laundry workers; compositors, printers, and pressmen; brass-foundry workers; barbers and hair dressers; the clerical occupations; and glass workers. Among these occupations, metal miners are the only ones which do not show a decline in the percentage of deaths and in fact the ratio is slightly higher than 10 years ago. This increase is so slight, however, that it is thought that a general reduction in deaths from other causes and from mining accidents may account for the apparent increase in deaths from tuberculosis.

A comparison of the death rate among the industrial population with that for the general population shows that the improvement has been greater among the wage-earning group, so that the mortality reduction has been greatest, among white persons at least, in the economic section of the population where the tuberculosis problem has always been most acute. To verify this point a comparison was made between the mortality experience of the millions of white persons insured in the industrial department of the Metropolitan Life Insurance Co. and the total population of the United States registration States. The industrial policyholders covered live almost altogether in the cities of the United States and Canada, where they form nearly one-third of the total industrial population. The comparison is made of persons between the ages 1 and 74. The death rate from tuberculosis among white males in the insured group was 230.9 per 100,000 in 1911, and in 1920, 120.8, a reduction of 47.7 per cent, while the death rate among males in the registration area for 1910 was 166.6 per 100,000 and in 1920, 121.1, a reduction of only 27.3 per cent. From 1920 to 1925 the tuberculosis mortality of males in these two groups continued a practically steady decline, the rate for the wage-earning group being 84.3 in 1925, or a reduction of 63.5 per cent since 1911, and that of the general population group being 92.4, a decline of only 44.5 per cent from the 1910 figure. A similar improvement is shown among white females, the rate for the industrial group in 1925 being 76.6 per 100,000, or a reduction of 53.7 per cent, and that of women in the general population 76, a reduction of 45.2 per cent. On this basis there were 21,500 fewer deaths from tuberculosis in 1926 among industrial policyholders than might have been expected if the 1911 rate had continued to prevail, and in the year 1925 there were 9,058 fewer deaths among members of this group than would have occurred if the improvement had been at the rate which prevailed among the general population.

These figures do not hold good for all age periods, however, and higher rates prevail among the industrial group between the ages 20 and 54. Between the ages 35 to 44 and 45 to 54 the death rates for males from tuberculosis are 39.6 per cent and 46 per cent greater than among males in the general population, and among females the rates are higher between these ages (20 to 54), although the greatest difference is between the ages 20 to 24, the age period at which the maximum death rate from tuberculosis among woman workers occurs. After age 55 the rates continue higher among the male workers, while the women in the general population after this age have a higher rate than the women in the industrial group.

Considering the industrial population alone, there has been a great decline in the past 15 years in the rates for males during the most active period of their working lives and also when they have the largest number of children dependent upon them, this decline during the ages 35 to 44 amounting to 69.1 per cent. In view of the effect upon the home this is considered a social gain of the first order.

In summing up the causes for the great improvement in the tuberculosis situation shown by these figures, the writers state that the effectiveness of the organized campaign which the public health movement has conducted against this disease has been demonstrated. The people have been taught that tuberculosis can never be prevented, or cured by the use of drugs, but that sunshine, fresh air, rest, and cleanliness are the great preventives. The improvement is due, also, to higher incomes, with resultant better home conditions among the wage-earning population. In spite of the great gains, however, the writers say that "the fact stands out that where the most has been done the most is still to be accomplished. More than one-half of all the deaths from tuberculosis occur between 20 and 45 years, and in this age range the mortality from the disease is still high among American wage earners. This is the age range, and this is the economic stratum of the population where the greatest reduction is still to be made."

Respiratory Diseases as a Cause of Industrial Disability

Importance of respiratory affections as a cause of disabling sickness is shown in a study³⁹ by the United States Public Health Service of records of disability among industrial workers. The groups covered by the study include the employees of a large electric light and power company and the members of a group of industrial sick-benefit associations which report regularly to the office of industrial hygiene and sanitation of the Public Health Service. The records of the first group include all disabling sickness lasting one working-day or longer over a period of 10 years and of the second group the cases of illness lasting eight consecutive days or longer during a 6-year period. In the latter group the number of men included averaged nearly 100,000 annually.

The absences on account of respiratory diseases accounted for 54 per cent of all the absences among the employees of the public utility company and for 47 per cent among the members of the benefit associations. The respiratory diseases are seen, therefore, to constitute approximately one-half of the cases whether all cases of disabling sickness are considered or only those which last for a period longer than a week. The sickness records of the electric light and power company showed, also, that the average loss of time on account of sickness amounted to 6.92 days a year per man on the pay roll and that 3.23 days, or 47 per cent of the lost time, was caused by the respiratory diseases.

Among the employees of this group, the common cold was the most frequent cause of sickness, causing 71 per cent of the total number of cases of respiratory diseases, with diseases of the pharynx and tonsils occupying second place as a cause of disability, influenza

³⁹ U. S. Public Health Service. Public Health Reports, Mar. 16, 1923: Importance of Respiratory Diseases as a Cause of Disability Among Industrial Workers, by Dean K. Brundage, pp. 603-610.

and grippe third, and bronchitis fourth. When the cases lasting more than a week are considered, however, the common cold ceases to be a principal cause of disability and is replaced by influenza and grippe, followed by diseases of the pharynx and tonsils, bronchitis, and pneumonia, in the order named.

There is marked seasonal variation in the incidence of respiratory diseases. According to the records for both groups of employees, the rate for these diseases reached its maximum in the month of February and its minimum in July, a tremendous increase taking place between September and February, with an equally marked decline occurring during the spring. The greatest seasonal variation was shown by the common cold, which was twelve times as frequent in midwinter as in midsummer. The more serious respiratory cases did not show such a decided seasonal incidence, with the exception of influenza and grippe, the number of cases of which rise abruptly in the winter months.

The seasonal variations revealed by the two sets of data show that for the group of cases lasting longer than one week there was a tendency for the attacks of respiratory sickness beginning in the late winter and early spring to be more prolonged than those which begin earlier in the winter, from which it appears that industrial workers possess less resistance to respiratory infection at the close of winter.

There were 26 industrial sick-benefit associations reporting the number of cases for which benefits were paid during the three years ending December 31, 1926. The rate of respiratory sickness was found to vary from 17 cases a year per 1,000 men in the plant having the lowest rate to 85 cases per thousand in the establishment having the highest rate. These differences in the incidence of the various respiratory diseases are typical of the variations in the number of cases found in different communities and localities and are evidence, it is stated in the report, that the causes of such wide variations in the frequency and severity of these diseases must be investigated and thoroughly understood before much progress can be made in their prevention and control. In view of the serious amount of disability from these diseases, it is said, that "even a small degree of success in their prevention would contribute enormously to the sum total of physical and mental energy, to the number of days that the industrial population is physically able to work, and, accordingly, to an enhanced national prosperity."

Acute Respiratory Diseases Among Office Workers

THE Statistical Bulletin for October, 1928, issued by the Metropolitan Life Insurance Co., contains a summary of a study of the number of cases of acute respiratory diseases occurring among the more than 9,200 clerical workers employed in the New York office of that company. The report covers the sickness experience in 1926, in which year there were 12,378 absences lasting one day or more which were caused by the common cold, influenza, bronchitis, and tonsillitis. These causes accounted for 1,345 absences for each 1,000 men and women on the pay roll, and the number of absences from all other types of disability amounted to 1,632 per 1,000, the

acute respiratory diseases and tonsillitis accounting, therefore, for 45.2 per cent of all disabilities reported during the year.

From the standpoint of time lost on account of illness these diseases are likewise equally important. During 1926 there were 45,254 days lost on account of respiratory conditions, including tonsillitis, out of a total of 115,324 days lost. This is equivalent to 4.9 working days lost by each clerk annually from this cause as compared with an average of 7.6 days lost because of other disabilities. The average case of respiratory disease lasted 3.7 days, while the average for all other diseases was 4.7 days. The sickness rate among female clerical employees generally is much higher than among male employees and in the present study the rate for females exceeded that for males by 78 per cent, the rate for respiratory diseases alone being 54 per cent higher than among the males.

The following table shows the absences due to sickness, the days of disability, and the working days lost per absence in the clerical force referred to, by sex:

ABSENCES AND DAYS OF DISABILITY AMONG A GROUP OF OFFICE WORKERS IN 1926, BY SEX

Sex and cause of absence	Number of employees	Absences		Days of disability		Working days lost per absence
		Number	Per 1,000 on pay roll	Number	Per person on pay roll	
Males:						
Respiratory diseases.....		1,668	936	6,258	3.5	3.8
Other diseases and conditions.....		1,594	894	8,805	4.9	5.5
Total.....	1,783	3,262	1,830	15,063	8.4	4.6
Females:						
Respiratory diseases.....		10,710	1,443	38,996	5.3	3.6
Other diseases and conditions.....		13,430	1,810	61,265	8.2	4.6
Total.....	7,421	24,140	3,253	100,261	13.5	4.2

These data agree with other investigations among clerical and industrial personnel in showing the importance of the common cold as a cause of disability and absenteeism. There is no single cause of colds and there is therefore no single line of attack. The report states that "some are probably induced by primary acidemia; some seem to be allergic phenomena; others may be infections and would occur regardless of any marked change in systemic conditions; some may be induced by flagrant violation of the simpler hygienic rules; and still others may be induced by indoor and outdoor atmospheric conditions. Prevention, therefore, for the mass of workers may result from dietary practices which reduce acidemia, from the isolation of persons suffering from colds, from habits of dress suited to the weather, and from the production of comfortable indoor air conditions."

Sick Leave Among Employees in the Department of Commerce During 1926

STATISTICAL information as to the amount of sickness occurring among any large group of workers is of interest, since the effort in the majority of industrial and commercial establishments at the present time is in the direction of prevention, and any information

as to the extent of the problem is therefore of value in carrying out sickness-prevention work.

The report of the Secretary of Commerce for the year 1927 gives the amount of annual and sick leave taken by the employees of the department in the District of Columbia. The figures cover a total of 3,469 employees. The average sick leave reported for the entire group—6.36 days—is somewhat below the commonly accepted estimate of eight days lost per person per year, although many individual companies which have stressed the preventive feature in their medical work have been able to reduce the time lost on account of sickness much below that reported in this instance.

The following table shows the average amount of sick leave in the different offices of the Department of Commerce during the year 1926, by sex:

SICK LEAVE REPORTED IN THE DEPARTMENT OF COMMERCE DURING THE YEAR 1926, BY SEX

[In the count of leave all periods of one-half day or over were counted as a whole day; periods of less than one-half day were omitted]

Bureau	Number of employees	Male		Female		Total	
		Number of days	Average per employee	Number of days	Average per employee	Number of days	Average per employee
Office of the Secretary.....	105	214	3.45	339	7.88	553	5.27
Bureau of the Census.....	736	1,085	3.83	3,812	8.42	4,897	6.65
Bureau of Foreign and Domestic Commerce.....	481	1,430	5.67	2,446	10.68	3,876	8.06
Bureau of Standards.....	667	2,197	3.73	748	9.47	2,945	4.42
Bureau of Fisheries.....	67	205	4.77	233	9.71	438	6.54
Bureau of Lighthouses.....	34	131	5.46	117	11.70	248	7.29
Coast and Geodetic Survey.....	176	1,016	6.35	110	6.87	1,126	6.40
Bureau of Navigation.....	48	122	6.10	319	11.39	441	9.18
Steamboat Inspection Service.....	13	30	5.00	62	8.86	92	7.08
Patent Office.....	954	3,747	5.63	2,412	8.35	6,159	6.46
Bureau of Mines.....	188	496	4.68	806	9.83	1,302	6.93
Total and average.....	3,469	10,673	4.83	11,404	9.05	22,077	6.36

Mortality Experience of International Typographical Union, 1927

IN CONTINUATION of the health survey of the printing trades (1922 to 1925) which was published in bulletin form (Bul. No. 427), figures were compiled for 1927 which are of interest to those concerned with health conditions in American industries. The data show the principal causes of death among members of the International Typographical Union. Comparison of the causes of death for the three years 1925 to 1927 based on the mortality from all causes shows a very decided reduction in the proportionate mortality from tuberculosis, an increase in the cancer rate, and practically no change in the rates for pneumonia and Bright's disease. There were only two deaths from chronic lead poisoning in 1927, showing that chronic lead poisoning in fatal form is now of decidedly minor importance in the printing industry, although it is a potential source of danger in many of the processes and consequently demands that the utmost care be taken to secure the protection of the workers.

The annual report of the secretary-treasurer of the International Typographical Union for the year ending May 31, 1928, contains a

statement showing the number of deaths occurring among members of the union each year from 1900 to 1928 and the average age at death.⁴⁰ A remarkable improvement in the life span of these workers is shown by these figures, the average age at death having increased from 41.25 years in 1900 to 58.62 years in 1928. The improvement is ascribed to shorter hours, increased wages, and generally improved working conditions. Diseases of the respiratory system were the leading cause of death in 1928, resulting in 164 deaths, while nervous diseases, including apoplexy, cerebral hemorrhage, and paralysis, caused 134 deaths; heart disease, 131; cancer, 82; genito-urinary 52; accidents, 37; and suicides, 6; and the remaining deaths, 341 in number, were due to a great variety of causes.

The following table shows the number of deaths, the average age at death, the average membership, and the death rate per 1,000 among members of the International Typographical Union for the years 1900 to 1928:

NUMBER OF DEATHS, AVERAGE MEMBERSHIP, AVERAGE AGE AT DEATH, AND NUMBER OF DEATHS PER 1,000 AMONG MEMBERS OF THE INTERNATIONAL TYPOGRAPHICAL UNION, 1900 TO 1928

Year	Average membership	Number of deaths	Average age at death	Death rate per 1,000	Year	Average membership	Number of deaths	Average age at death	Death rate per 1,000
1900.....	32,105	419	41.25	13.00	1915.....	59,571	696	50.84	11.70
1901.....	34,948	403	41.94	11.60	1916.....	60,231	755	51.73	12.50
1902.....	¹ 38,354	474	42.94	12.35	1917.....	61,350	825	51.42	13.44
1903.....	42,436	473	42.62	11.21	1918.....	62,661	849	50.82	13.54
1904.....	² 46,165	578	45.50	12.52	1919.....	65,203	1,142	45.12	17.50
1905.....	46,734	537	45.23	12.13	1920.....	70,945	733	53.17	11.00
1906.....	44,080	512	44.02	11.40	1921.....	74,355	730	54.32	9.80
1907.....	42,357	531	46.07	13.20	1922.....	68,746	818	54.40	11.90
1908.....	43,740	538	45.05	12.30	1923.....	68,144	804	54.40	11.80
1909.....	44,921	509	46.09	11.30	1924.....	68,944	831	54.40	12.00
1910.....	47,548	574	46.07	12.00	1925.....	70,372	856	57.68	12.16
1911.....	51,035	639	49.12	12.50	1926.....	72,704	895	58.05	12.30
1912.....	53,807	655	48.09	12.50	1927.....	74,829	952	57.94	12.70
1913.....	55,614	687	49.21	12.39	1928.....	75,738	947	58.62	12.50
1914.....	58,537	713	48.70	12.18					

¹ Including stereotypers and electrotypers, 7 months.

² Including photo-engravers, 7 months.

Occupational Disease Claims in Ohio, 1921 to 1926

A REPORT ON occupational diseases for which compensation was paid in Ohio, from July 1, 1921, to January 1, 1927, based on claims filed with the industrial commission of that State, which was prepared by the division of safety and hygiene of the commission shows that during the five and one-half years covered by the report, 4,443 claims were filed and 336 were disallowed. The tabular matter relating to the distribution of these cases by industry, cause, etc., pertains to the total number filed, while the statement as to compensation cost necessarily relates to the number of claims allowed, which according to the report appears to be 2,093 as this number when added to the number of claims disallowed (336), that of claims in which there was no time loss (1,380), and that of claims with time loss of seven days and under (634) makes the total of 4,443 claims filed.

A time loss of 760,069 days is noted, including the time lost by 101 fatal cases and 6 permanent disability cases. Temporary disability of more than seven days occurred in 2,322 cases (52.3 per cent), the

⁴⁰ Typographical Journal, August, 1928, Supplement, p. 66.

total time loss being 134,471 days, or 17.7 per cent of the total time loss. About 3,000 of these occupational disease claims involved affections of the skin, dermatitis being responsible for 2,890, or 65 per cent, of the total claims, with a time loss amounting to 11 per cent of the total time lost in all occupational disease cases. These cases of dermatitis were due to the action of various industrial elements or compounds upon the skin, including oils, cutting compounds, gases, dust, liquids, fumes, or vapors. Industrial poisoning, including that by brass, zinc, lead, mercury, phosphorus, arsenic, anilin, wood alcohol, etc., accounted for 1,092 claims (24.6 per cent) and was responsible for a time loss of 345,519 days, or 45.5 per cent of the total time loss. Metal-goods manufacturing caused 25.7 per cent of the cases of occupational disease and 23.9 per cent of the total time loss.

The industrial commission awarded a total of \$369,942 in settlement of compensation claims. Of this amount, \$178,743 was paid in death claims, \$2,890 in permanent disability claims, and \$188,309 (51 per cent) in claims where the temporary disability lasted beyond the statutory period of seven days. Nearly 76 per cent of the total compensation amount was paid for industrial poisoning, with lead poisoning taking the largest amount, \$241,760, or 86.3 per cent of the compensation for industrial poisoning cases. Of the total compensation awarded, those working in metal-goods manufacturing received a larger sum than any other industry, the amount being \$65,117, or 17.6 per cent; and here again lead poisoning was the cause resulting in the largest compensation, requiring \$44,990, or 12.1 per cent of the total allowed and 69.1 per cent of the amount awarded to this particular industry group.

Health Record of American and Canadian Industrial Populations in 1927

HEALTH CONDITIONS among the industrial populations of the United States and Canada were better in 1927 than in any previous year, according to a report of the Metropolitan Life Insurance Co., on the mortality rates among the more than 18,000,000 policyholders of that company.⁴¹ As the number of industrial policyholders is so large, comprising more than one-seventh of the total population and more than one-quarter of the urban population of the two countries, the figures for this group are regarded as an accurate index of health conditions in both countries.

The actual number of deaths occurring in 1927 among the industrial holders of policies at ages 1 year and over was 147,520 and the death rate was 8.4 per 1,000. The corresponding death rate for 1926 was 8.9 and for the years 1924 and 1925 it was 8.5, which represented the former minimum. When translated into actual savings of lives it is seen that this fractional reduction in the death rate stands for a great improvement, as there would have been 8,808 more deaths in 1927 than did actually occur if the 1926 rate had prevailed in that year. If the 1924 and 1925 rates had prevailed—a difference of only one-tenth of one point—the saving in lives would still have amounted to 1,782. In 1911 the death rate for the policyholders in both countries was 12.5 per 1,000 and the rate of 8.4 in

⁴¹ Metropolitan Life Insurance Co. Statistical Bulletin, January, 1928, pp. 1-9: A New Health Record in American and Canadian Industrial Populations.

1927 amounts, therefore, to a reduction of 33 per cent in the 16-year period.

The latest comparable mortality data for the general population are for the year 1926. The death rate for persons in the same age range (1 to 74 years, inclusive) declined only 11.7 per cent from 1911 to 1926, while that for industrial policyholders for the same period was reduced 29.3 per cent. According to these figures there were 278,395 fewer deaths in the industrial group during the period than would have occurred had the mortality among them declined at the same rate that prevailed in the general population of the United States.

The expectation of life has increased considerably as a result of the improvement in the mortality figures. Among wage earners and their families the increase in the expectation of life amounts to 8.39 years over the average for the years 1911 and 1912, and for the general population there is an average increase in the expectation of life for the same period of 4.70 years.

The most important feature of the public health situation for 1927 was the great reduction in the mortality from tuberculosis to a new minimum for all time. The death rate from this disease in 1927 was 93.5 per 100,000, which was 4.8 per cent lower than the previous minimum of 98.2 established in 1925. Since 1911 the death rate has declined 58.4 per cent, the mortality rate in that year being 224.6 per 100,000. The improvement in the tuberculosis situation has been shown to have applied to all sections of the country and to all classes, but the greatest improvement has taken place among the industrial workers and their families in the cities where the tuberculosis situation has always been the worst. The gains which have been made in controlling the ravages of this disease indicate that in a relatively short period of years this scourge of early adult life and middle age should be placed among the minor causes of death.

In addition to the improvement in the death rate from tuberculosis there was marked improvement with respect to measles, scarlet fever, and whooping cough, and there was an unprecedentedly low mortality rate from pneumonia, an important factor in establishing the new minimum for pneumonia being a decided drop in the mortality from influenza. There was a slight increase in the mortality from diphtheria, due to the fact that during the year there was a marked increase in the prevalence of this disease which was quite general over the United States as well as in various other parts of the world. There was also an unusual prevalence of poliomyelitis in the United States which resulted in an above-average death rate for this disease.

In contrast to the great improvement shown in the tuberculosis situation, the cancer rate continues to rise, and while the rate for 1927 was only fractionally higher than for 1926 it sets a new maximum figure for this disease. Diabetes also shows no improvement in the mortality rate, particularly among the colored policyholders, but the effect of the use of insulin is believed to be shown by the fact that the average age at death of diabetics has increased in recent years. Heart disease in 1927 was again the leading single cause of death among these insured wage earners, as it has been each year since 1922.

While there is marked improvement on the whole shown in the public health during the year, particularly in the preventable dis-

eases, there has been no improvement in the field of public safety. The death rates for accidental burns, drownings, falls, and accidents on steam railroads have all been reduced but accidents on the streets and highways have increased. In 1927 there were 3,266 deaths from automobile accidents among the industrial policyholders, an increase of 9.4 per cent over the accidents from this cause in the preceding year. The toll is heaviest among the children, who for the most part are killed while at play in the streets or when crossing the streets. From 35 to 40 per cent of the automobile fatalities occur among children under 15 years of age and almost as many wage earners' children lost their lives from this cause in 1927 as from measles, scarlet fever, and whooping cough combined.

Effect of Artificial Humidification Upon Sickness Rates in the Cotton-Weaving Industry⁴²

EFFECTS of artificial humidification on the health of operatives in cotton mills was made the subject of a study by the British Industrial Research Board because of the contention by the workers' organizations that work in the relatively hot and humid atmosphere of the mills which were artificially humidified was harmful to the workers.

A relatively high percentage of moisture in the air has long been considered essential for good weaving, and in England the localization of the industry in Lancashire was the result of the relatively moist air in that section. In weaving certain classes of cloth, however, the natural humidity was not considered to be sufficient to insure a satisfactory product, and it has been the practice to increase the humidity by injecting steam or atomized water into the air. This practice has been the subject of protests on the part of the workers since about 1870, and various official inquiries have been held. The present regulations have been in force since 1911, but the question of the harmfulness of the practice has never been settled to the satisfaction of the workers, and the present inquiry was instituted to determine whether the conditions in the humid cotton-weaving sheds, besides causing discomfort, do actually contribute to the amount of ill health suffered by the workers.

The study was carried out in five towns. The mills studied were agreed upon by representatives of the employers and employees, the employers cooperating by furnishing the names of their employees, the facts as to absences because of sickness, and the name of the approved society (under the national health insurance acts) to which each employee belonged. At the end of the year the cards containing the employees' records were submitted to the various insurance societies, which supplied for each weaver details of the sickness experienced during the year. Seventy-four firms, operating 128 sheds, cooperated in the study, which covered the year from August 1, 1925, to July 31, 1926. The number of workers employed by these companies on August 1, was 20,133, and the sickness experience of all these workers was secured for the entire year or for the part of the year that they remained in the employ of the company.

Comparison was made of all the sickness records which had been secured from the employers and the insurance societies. The mills

⁴² Great Britain. Industrial Fatigue Research Board. Report No. 48: Artificial Humidification in the Cotton-weaving Industry—Its Effect Upon the Sickness Rates of Weaving Operatives, by A. Bradford Hill. London, 1927.

were classified according to their temperature readings and the sickness experience of the employees correlated with these temperatures, and the sickness in the two types of sheds was analyzed by cause. The sickness experience of these weavers did not show any decided difference between humid and nonhumid sheds. In the nonhumid sheds the average number of days lost from sickness by males per year of exposure was 8.18 days and in the humid sheds 7.24 days; the rate for single or widowed females was 9.38 days in the nonhumid and 7.92 in the humid sheds; and for married females was 20.77 days in the nonhumid sheds and 19.96 in the humid sheds. In regard to specific diseases the humid environment did not seem to exert any adverse influence except in the group of respiratory diseases, and in this group it was only the males who were affected, the women showing no difference in sickness rates from respiratory causes in the humid and nonhumid groups. Although there was a slight excess of sickness in the nonhumid sheds and the number of days of sickness per claimant was longer, this difference was due to a few more very long claims in this group. Analysis of the sickness, town by town, also gave the same result—that is, the humid sheds were not found to possess a higher sickness incidence than the nonhumid sheds.

Industrial Diseases and Poisoning in British Factories, 1927

THE REPORT of the chief inspector of factories and workshops in Great Britain for the year 1927 contains the report of Dr. John C. Bridge, senior medical inspector of factories, showing the causes and extent of industrial diseases and poisoning among workers in British factories.

An increase in the number of reported cases of industrial diseases occurred in some industries during the year but this was believed to be due to greater employment in these industries, which increased the number exposed to the risk. In general it was considered that health conditions among factory workers, and particularly the younger ones, have improved during the past few years, and, although there are different factors contributing to the improvement, among the more important, it is stated, is the increase in healthful exercise through the use of recreational facilities provided by individual firms or by municipalities.

Among preventive measures which came into effect during the year may be mentioned the lead paint (protection against poisoning) act, 1926, which became effective January 1, 1927. This act made compulsory, for the first time, the reporting of lead poisoning among workers employed in the painting of buildings, and empowered the Secretary of State to make regulations governing working conditions in the industry.

Several special inquiries were made by the medical inspectors during the year, particular attention being given to the effect of dust inhalation in different industries. Other studies included one on lead poisoning among female workers in potteries using low solubility glaze, and investigations of cases of epitheliomatous ulceration of the skin among mule spinners and gas workers, cases being followed up wherever there was reason to believe that the occupation of the person entailed contact with pitch, tar, or mineral oil and that the cause of the disease was, therefore, an occupational one.

Table 1 shows the number of cases of disease resulting from the use of some of the more important industrial poisons for certain years from 1900 to 1927:

TABLE 1.—NUMBER OF CASES OF POISONING AND OF INDUSTRIAL DISEASES AMONG FACTORY WORKERS IN GREAT BRITAIN FOR SPECIFIED YEARS, 1900 TO 1927

Disease	1900	1910	1920	1924	1925	1926	1927
Lead poisoning:							
Cases.....	1,058	505	289	561	414	322	347
Deaths.....	38	38	44	41	22	46	35
Mercury poisoning:							
Cases.....	9	10	5	5	5	4	3
Deaths.....		1				1	2
Arsenic poisoning:							
Cases.....	22	7	3	6	6	5	3
Deaths.....	3			1		3	1
Carbon disulphide poisoning: Cases					3		
Aniline poisoning:							
Cases.....					31	33	38
Deaths.....					1		1
Chronic benzene poisoning: Cases						1	
Toxic jaundice:							
Cases.....			6	3	2	2	3
Deaths.....			3		1		
Epitheliomatous ulceration:							
Cases.....			45	123	160	187	174
Deaths.....			1	24	55	49	49
Chromic ulcerations: Cases			126	45	54	55	65
Anthrax:							
Cases.....	37	51	48	43	45	38	31
Deaths.....	7	9	11	4	9	3	2

Mercury.—There were three cases of mercurial poisoning in 1927, two of which were fatal. The immediate cause of death in one case was edema of the lungs and bronchitis and of the other heart disease and nephritis, but in both cases the primary cause was considered to be mercurial poisoning.

Poisoning from gases and fumes.—The number of cases of poisoning from carbon monoxide was 88 with 4 deaths, a decrease of 13 cases from those reported the preceding year. There were 13 cases caused by blast-furnace gas, 19 cases with 1 death were due to producer gas, 38 with 2 deaths to coal gas, and 18 cases with 1 death were due to various causes such as fumes from rivet fires in confined spaces either in construction or repairing of ships, exhaust gases of motors, and cleaning boiler flues.

Table 2 shows the number of cases of poisoning from gases and fumes for the years 1921 to 1927:

TABLE 2.—NUMBER OF CASES OF INDUSTRIAL POISONING FROM GASES AND FUMES, 1921 TO 1927, BY YEARS

Gas or fume	1921	1922	1923	1924	1925	1926	1927
Carbon monoxide:							
Cases.....	77	111	134	107	118	101	88
Deaths.....	14	14	7	10	10	6	4
Carbon dioxide:							
Cases.....	5	1	10	5	10	4	8
Deaths.....	4		2	2	2		
Sulphuretted hydrogen:							
Cases.....	3	12	8	11	4	3	9
Deaths.....		3		4			
Sulphur dioxide:							
Cases.....	5	7	10	10	3	2	5
Deaths.....					1		1
Chlorine: Cases	3	11	16	20	12	13	14
Nitrous fumes:							
Cases.....		8	7	10	10	5	7
Deaths.....				1	2	1	
Ammonia:							
Cases.....	9	8	5	1	5	5	5
Deaths.....	1	1	1			1	
Benzol, benzine, naphtha, petrol:							
Cases.....	10	25	55	26	3	4	7
Deaths.....		1	3	3	1	1	2
Arsenuretted hydrogen:							
Cases.....	1	1	4	3	2	1	3
Deaths.....	1		2		1		
Miscellaneous:							
Cases.....	3	10	35	28	35	17	23
Deaths.....		1	2	4	3	1	2

Occupational Fertility and Infant Mortality in England and Wales

AS PART of the English census studies the Registrar General publishes a decennial report dealing with occupational mortality, fertility, and infant mortality in England and Wales. The latest of these reports, which has recently been issued, shows some striking differences between 1911 and 1921 in the matters of fertility and infant mortality. The comparative figures are given as follows:

COMPARISON OF LEGITIMATE FERTILITY AND INFANT MORTALITY, BY SOCIAL CLASSES, 1911 AND 1921

Social class	Legitimate births per 1,000 married males under 55 years of age			Infant mortality per 1,000 births		
	Rate in 1911	Rate in 1921	Per cent 1921 rate forms of 1911 rate	Rate in 1911	Rate in 1921	Per cent 1921 rate forms of 1911 rate
Upper and middle.....	119	98	82	76	38	50
Intermediate.....	132	104	79	106	55	52
Skilled workers.....	153	141	92	113	77	68
Intermediate.....	158	162	103	122	89	73
Unskilled workers.....	213	178	84	153	97	63
All classes.....	162	141	89	125	79	63

It is apparent that the fertility in both periods increased progressively as the social status declined and that for the population as a whole and, with one exception, for each of the five classes, fertility was less in 1921 than in 1911, "notwithstanding the fact that the postwar wave of fertility, which reached its highest point in 1920, had not spent itself in 1921."

The infant mortality rate shows the same progressive increase from the highest to the lowest of the social classes, and also a marked decrease in the second period. The rate of decrease is greatest in the upper classes, but is marked throughout.

Owing, however, to the changes in the scheme of social grading, as well as in the occupational tabulation on which it is based, only the major features of the table can be relied upon. It is inserted only with a view to showing the broad tendency of the rapid changes in progress.

Legislation

Labor Laws as a Means of Preventing Diseases of Occupation

THE EXTENT to which labor laws prevent diseases of occupation was discussed by John Roach, deputy commissioner of labor of New Jersey, at the fourteenth annual convention of the Association of Governmental Labor Officials.

There is no doubt, Mr. Roach said, that a large percentage of the ill health among workers is due to improper working conditions, exposures to poisonous trade substances, devitalizing fatigue, and sustained effort beyond the strength of the individual, and that these are among the causes which send 4,000,000 people to the hospitals

each year. When, on the other hand, industry operates carefully so that poisonous substances are handled by trained men; when dusts, gases, and fumes are collected at their point of origin; and when workmen in general are given health protection there is no doubt that there is a most favorable effect on the health of the working groups.

Attention to proper sanitation and ventilation of workshops is comparatively recent. A law passed in New Jersey in 1911 gave the commissioner of labor authority to order the installation of exhaust fans for gases, fumes, and dusts, and, owing to the extremely liberal construction that has been placed on the act, it has been extended to cover almost all the health work that has been done in the industries of the State.

For many years attempts were made in New Jersey to extend the workmen's compensation act to include occupational diseases and, after a thorough investigation had been made by a commission appointed by the governor, the law was extended to cover a specified group of occupational causes. Nearly all the substances which by reason of their cumulative effects could be classed as causing occupational diseases are included. Under this act, if a workman, for example, enters a nitrating vessel in which benzol has been used and is overcome by the vapors and dies as a result of the exposure, this is classed as an industrial accident and not an industrial disease, while if a workman becomes seriously ill or dies as a result of the cumulative effect of daily exposure to benzol vapors, the case is classed as an industrial disease.

Although it would not be possible to establish minimum standards of safety without the enactment of laws, it is only when such laws represent the will of the community, safeguard the best interests of the people, and definitely establish the legal rights and responsibilities of the citizens that they become effective in promoting social welfare. The establishment of workmen's compensation was a distinct step forward, but there may be the temptation to exaggerate the social value of the sums expended in settlements for occupational injuries, while the measures for prevention which resulted from the enactment of such legislation are immeasurably more important. The same is true of occupational disease legislation. The effect of laws requiring safeguards such as exhaust systems for the removal of dust and fumes has been to remove processes involving such hazards from their former dark and insanitary surroundings to well-lighted workrooms, with the result that a better product is obtained, the health of the workers is conserved, and their comfort is greatly increased. Health statistics have proved that these changed conditions have an important bearing on the health of the workmen. There has been the same result in the trades in which poisonous substances are used, the health statistics having shown that careless operating practices bring physical disaster, while careful methods attract a better class of workmen, make them more contented in their work, and at the same time reduce the compensation claims that otherwise might accrue from poisoning and ill health.

For several years in New Jersey it has been a requirement that every industrial disease should be carefully investigated, and the services of an expert consultant in industrial chemistry are available in cases which involve complicated and difficult problems in chemical manufacture, while a skilled technician is employed for the purpose

of making atmospheric tests where operations involve exposures to subtle trade poisons in gaseous form.

OCCUPATIONAL-DISEASE COMPENSATION CASES OCCURRING AND CLOSED
DURING 1926

Occupational disease	Total number of compensable cases	Deaths	Total days' time lost	Total indemnity paid
Amido derivatives of benzol (anilins).....	2		60	\$57
Anthrax.....	11		358	661
Arsenic.....	1		230	383
Heat and light (including heat from asphalt—not burns).....	1		22	36
Lead poisoning.....	32	1	7,816	9,478
Mercury.....	2		616	1,239
Nitro derivatives of benzol (diartinitrobenzol).....	8		365	808
Occupational activity (cellulitis, etc.).....	23		696	1,126
Not otherwise classified.....	1		32	61
Total.....	81	1	10,185	13,879

¹ Painter, 51 years of age.

The preceding table shows the number of cases of occupational disease occurring during the past year, the time lost, and the total amount of indemnity paid. It is considered that, in addition to the 81 cases which are included because they were entitled to compensation, at least three times as many occurred that did not cause disability beyond the waiting time required by the occupational-disease act.

Physical Examination for Occupational Diseases in the United States

INDEPENDENT of workmen's compensation legislation the labor legislation of the several States contains two general types of laws concerning the physical examination of individuals suffering from occupational diseases. The most numerous type is that which makes it the duty of retained physicians having knowledge of persons whom he believes to be suffering from certain occupational diseases contracted as a result of the nature of the employment of such persons, to report the same to the department of labor or the department of health. Laws of this nature exist in Connecticut, Illinois, Maine, Maryland, Massachusetts, Michigan, Minnesota, Missouri, New Hampshire, New Jersey, New York, Ohio, Pennsylvania, Rhode Island, and Wisconsin. These laws are very similar in their general nature and differ only in minor respects, except possibly the Massachusetts law which provides that the "department may require every physician," etc., to report the occupational disease.

The second type of law is found in five States and is aimed at the prevention of occupational diseases. These laws include, among several others, a provision which requires the monthly physical examination of certain employees engaged in occupations in which the hazard of occupational disease is great. The Ohio, Pennsylvania, and New Jersey acts are aimed principally at the "lead hazard," while the Illinois and Missouri laws cover a greater number of diseases.

Great Britain: Lead Paint Act

THE PROVISIONS of the British law regulating the use of lead in the painting of buildings, which became effective January 1, 1927, provide that the Secretary of State may make regulations prohibiting the use of any lead compound except in the form of paste or of ready-mixed paint, regulate the application of lead paint in the form of spray, and prohibit dry rubbing down and scraping. Regulations may also be issued providing for the periodical examination of persons employed in or in connection with painting with lead paint and for their suspension from such employment if their health is injuriously affected thereby; for the provision of proper washing facilities; for the use of protective clothing; and for the distribution of instructions regarding hygienic measures to be taken by persons using such paints.

The law also provides that on and after November 19, 1927, it shall not be lawful to employ any woman or young person in painting any part of a building with lead paint, with the exception of apprentices employed under arrangements approved by an order of the Secretary of State, made after consultation with the organizations representative of the employers and workers in the trades. Excepted from this provision are women or young persons in special decorative or other work which is not of an industrial character and who are exempted from the provisions of this section by an order of the Secretary of State, or women who are employed in any trade which involves such painting as part of their occupation.

The law requires that all persons employing other persons in painting buildings shall report to the inspector of factories and shall keep a register of those employed on such work, which shall be available for inspection by the inspector of factories, and shall make such returns to the district inspector as may be prescribed.

In this act the term "lead paint" means any paint, paste, spray, stopping, filling, or other material used in painting which yields to an aqueous solution of hydrochloric acid, a quantity of soluble lead compound exceeding, when calculated as lead monoxide, 5 per cent of the portion taken for analysis. The term "building" includes fixtures.

Poland: Prohibition of the Use of White Lead⁴³

A LEGISLATIVE decree dated January 30, 1927, promulgated by the President of the Polish Republic, provides for the regulation of the production, importation, and use of white lead and other lead products. By the terms of the decree no new white lead factories may be set up, nor may white lead, lead sulphate, and other lead products be imported without special governmental authorization. The use of white lead, lead sulphate, and other products containing these pigments is forbidden in painting the interior of buildings with the exception of railway stations and industrial establishments where the factory inspector has specially authorized their use. Pigments which contain not more than 2 per cent of metallic lead may be used, and the use of white lead is permitted in artistic and decorative painting. White lead and other lead products may not be used in painting except in the form of prepared paste or paint. Spraying may be

⁴³ International Labor Office. Industrial and Labor Information, Geneva, Sept. 19, 1927, p. 365.

carried on only in establishments having special equipment, and dry rubbing down of surfaces painted with lead products is prohibited. The employment of minors and of women in work involving the use of lead products is also prohibited. Penalties are provided for infringement of the decree.

France: Application of Law Relating to Occupational Diseases ⁴⁴

THE FRENCH DECREE of May 4, 1921, which provided for the compulsory reporting of cases of poisoning from lead and mercury under the law of October 25, 1919, was replaced by a decree of February 19, 1927, providing for the compulsory reporting of diseases arising from the use of various other poisons. These substances include the hydrocarbons and their chlor and nitro derivatives, notably benzene, tetrachlorethane, carbon tetrachloride, chloroform, the nitrobenzenes, etc.; aniline and its derivatives; carbon bisulphide; nitrous vapors, chlorine, bromine, hydrofluoric acid, sulphurous acid, hydrogen, sulphide and the sulphohydrate of ammonia, hydrocyanic acid, carbon monoxide, phosgene, formaldehyde; white phosphorus and phosphuretted hydrogen; arseniuretted hydrogen and other arsenic compounds; tar, oils, cement, and other caustic products, chromic acid, and the alkaline chromates; and X rays and radioactive substances.

According to the provisions of the law, applications for compensation must be made to the mayor of the commune by the worker within 15 days after giving up work, and this declaration must be accompanied by a physician's certificate. A certified copy is sent immediately by the mayor to the manager of the enterprise and to the departmental labor inspector.

The new law does not extend the compensation features of the former law but provides for the compulsory reporting of these diseases for the purpose of contributing to the study of the prevention of occupational diseases and the ultimate extension of the law.

For the first time since 1919 the number of cases of lead poisoning have shown a decrease compared with those reported in the preceding year. In 1927 there were 1,040 cases reported as compared with 1,505 in 1926. This decrease is ascribed in part to a slowing down of industrial activity, but it was also reported by a number of factory inspectors that the improvement was in some cases due to better working conditions.

The largest number of cases of lead poisoning, 335, occurred in enameling, while there were 322 in the manufacture and repair of storage batteries, 129 in the smelting and refining of lead, 42 in various kinds of painting, 38 in printing establishments, 37 in factories manufacturing white lead and minium, 34 in metal foundries, and the remainder were scattered among a variety of industries and occupations.

Lead colic was the symptom reported in 686 cases of lead poisoning and lead colic with anemia in 28 cases, while the others involved a variety of symptoms. There were 2 deaths, 3 cases of permanent partial disability, 1 case carried the right to a pension, and 1 case in which there was probably permanent partial disability. In 7 cases there was no interruption of work, 18 resulted in disability of less than

⁴⁴ Bulletin du Ministère du Travail, Paris, April-June, 1923, pp. 158-165.

8 days, 693 in disability of 8 to 15 days, 76 in disability of 16 to 30 days, 9 in disability of more than 30 days, while the period of disability was not reported in 230 cases. Seventy-seven of the cases of lead poisoning occurred among women.

There were 4 cases of mercury poisoning, 3 of which occurred in cutting fur for felt hats and 1 in a storage battery establishment. These cases, all of which occurred among men, involved 1 case of mercurial stomatitis and tremor, 1 of mercurial tremor, and there was 1 case listed as acute poisoning and 1 as chronic poisoning. The period of disability was one month in 1 case, 42 days in another, and in 2 cases the length of disability was not reported.

There were 36 cases of poisoning reported as due to various chemical substances. These included 3 cases of phosphorus necrosis, 1 of them fatal, 1 case of tar cancer, and 1 case of pulmonary tuberculosis caused by chlorine.

Italy: Compulsory Insurance Against Tuberculosis

ON JULY 1, 1928, regulations for the purpose of administering the law instituting compulsory insurance against tuberculosis in Italy went into effect.

The new law applies automatically to all persons liable to compulsory insurance against invalidity and old age. It applies to workers in industries, commerce, and agriculture, and also to those who are beneficiaries of the mercantile marine invalidity fund. A number of institutions cooperate in administering this insurance, among them the National Social Insurance Fund (*Cassa Nazionale per le Assicurazioni Sociali*), a special committee, and the provincial societies for combating tuberculosis. Below are given some of the important regulations, as digested from the decree issued on October 27, 1928, published in the *Bolletino del Lavoro* of July 31, 1928.

Collection of contributions.—The National Social Insurance Fund is charged with the financial management of the insurance against tuberculosis. Contributions are collected at the same time as the contributions for old-age, invalidity, and unemployment insurance. For agricultural workers employed by the day the contributions are fixed at 0.10 lira (0.526 cent) daily, 0.50 lira (2.63 cents) weekly, or 1 lira (5.26 cents) biweekly.

The National Insurance Fund, within the limits and conditions established for compulsory insurance, is authorized to permit voluntary insurance under conditions to be determined by a special committee and to be approved by the Minister of Economic Affairs.

Benefits.—Applications must be submitted to the fund by registered letter by the insured, his family, or his legal adviser, or by the local authority of his place of residence.

Medical examination is made at the hospitals connected with the fund or at dispensaries operated by the provincial antituberculosis societies with the aid of a physician of the fund. If the condition of the patient does not permit of an examination at these places, the examination is made by the traveling dispensary of the provincial antituberculosis society with the collaboration of a physician of the national fund. Papers and documents relating to benefits must be transmitted by the provincial societies to the national fund within 10 days. Where a favorable decision has been made, the insured is

so advised by the fund by registered mail, indicating the day and place the insured is to present himself for treatment.

Treatment at home is provided by the National Social Insurance Fund only in case there is no room in any of the tuberculosis hospitals, or when the condition of the patient makes this necessary. Home treatment, however, must cease as soon as space is available in one of the tuberculosis hospitals and in any case the cost of medical treatment administered in the home must not exceed the cost of hospital treatment.

In each Province medical assistance is rendered by a committee consisting of the president of the antituberculosis society or his delegate, a physician of the fund, and a member of the provincial secretaryship of the Fascist Medical Association. A list of the names of physicians authorized to minister to patients in their homes must be posted in the prefectures and in each provincial community. In cases in which home treatment can be replaced by treatment at a dispensary, the patient may be directed to one of these dispensaries by the National Social Insurance Fund. The provincial antituberculosis societies, besides attending to the patient, are authorized to take prophylactic steps for the protection of the patients' family. The fund is required to inform the National Federation for the Protection of Mothers and Children whenever the patient is a child under 16 years of age or a pregnant or nursing woman. Cash benefits are payable at the end of each week and are limited to a period of six months. In exceptional and serious cases cash benefits may be prolonged by decision of the special committee. Professional secrecy is maintained in the proceedings of the various bodies concerned in the administration of insurance against tuberculosis.

Financial management.—The management of the insurance against tuberculosis is kept distinct from that of other branches of insurance in the national fund. The national fund is instructed to compile statistics of morbidity and mortality due to tuberculosis; the data must be submitted annually, together with the balance sheet, to the Minister of Economic Affairs and the Minister of the Interior.

Ontario, Canada: Silicosis, Pneumoconiosis, and Caisson Disease Made Compensable

THE REPORT of the Workmen's Compensation Board of Ontario for 1926 states that during the year the list of industrial diseases covered by the workmen's compensation act had been enlarged to include silicosis in mining communities; pneumoconiosis in quarrying, crushing, and grinding of stone and metals; and caisson disease in deep sewer work.

The most important of these diseases in Ontario from the standpoint of the numbers involved is silicosis, a very considerable number of miners suffering from the disease having been found in some of the mining camps. In a conference of the representative mine owners, the department of industrial hygiene, and the workmen's compensation board, it was agreed that three distinct stages of the disease should be recognized in awarding compensation. These are the ante-primary, the primary, and the secondary stages. In the first stage in which silicosis is present but has not progressed far enough to cause physical impairment if the man is removed from further exposure to

silica dust, compensation to the amount of \$500 is allowed to cover the cost of rehabilitation in another industry. In the primary stage, in which some degree of impairment is present, the compensation was fixed at \$1,000 to cover permanent disability and rehabilitation in another industry; and in secondary silicosis, which is usually complicated with tuberculosis, when total disability is reached the compensation for permanent total disability is awarded. Early in 1927 a silicosis board, consisting of four doctors, three from the department of public health and the reporting physician, was established. The decisions of this board as to whether the claimant is suffering from the disease and, if so, as to what stage he is in must be unanimous, and the decisions of the board are final.

In connection with several deaths from caisson disease in Toronto in sewer work which was being carried on in compressed air it was decided that such deaths could not be regarded as of an accidental nature, but that they are incidental to the carrying on of the work in compressed air, and therefore in order to be compensated would have to be added to the industrial-diseases section of the act. The disease was accordingly added to the provisions of the act by regulation of the board, to take effect from January 1, 1926.

Ontario, Canada: Legislation as to Physical Examinations for Occupational Diseases

AT THE 1928 session of the Ontario Legislature an act was passed to amend the mining act of the Province by adding thereto a section requiring every workman employed underground in any mine or in any ore or rock crushing operation to submit to an examination by a medical officer, appointed under the provisions of the workmen's compensation act relating to silicosis, at least once in every 12 months and to obtain a certificate from such medical officer certifying that the workman is free from tuberculosis of the respiratory organs. The section also provides that no workman shall be employed in underground work or in certain ore or rock crushing operations unless he has such a certificate. As this type of law does not exist in the United States and as it approaches the occupational disease problem from a different angle (requiring adult work permits), it is believed that the act is of sufficient importance and interest to be reprinted in full. Section 3 of the act, assented to April 3, 1928, provides as follows:

3. "The mining act" is amended by adding thereto the following section: 157a. (1) Every workman employed underground in any mine shall be examined by a medical officer appointed under the provisions of the workmen's compensation act relating to silicosis at least once in every 12 months, and every applicant for underground work to whom the certificate mentioned in subsection 2 has not been issued shall be so examined.

(2) If the medical officer finds upon examination that the workman is free from tuberculosis of the respiratory organs, he shall certify in the prescribed form that such is the case and shall deliver the certificate to the workman.

(3) Every such certificate shall remain in force for not more than 12 months from the date of issue, and if so required by the manager or superintendent of the mine in which the workman is employed, it shall be delivered to and remain in the custody of such manager or superintendent during the period of the workman's employment and shall be returned to him on his being discharged from or leaving the same.

(4) A like certificate shall be required in the case of a workman engaged in any ore or rock crushing operation at the surface of the mine except where the

ore or rock is crushed in water or a chemical solution and is kept constantly in a moistened or wet condition.

(5) Except as provided in subsection 4, a workman as to whom such a certificate is not in force shall not be employed in underground work in any mine or in ore or rock crushing operations at the surface of any mine.

(6) The chief inspector of mines may exempt from the foregoing provisions of this section such mines as do not contain silica in quantity likely to produce silicosis or which for any other good and sufficient reason the said chief inspector deems should be exempt nor shall such provisions apply to workmen employed underground for a less period than 50 hours in any one calendar month.

(7) The lieutenant governor in council may make regulations prescribing the nature of the medical examination to be made and the form of certificate to be issued under the foregoing provisions of this section and generally for the better carrying out of the requirements of this section.

Health and Working Conditions

Health Promotion by Employees' Benefit Associations

THE GROWING realization that the loss to industry through preventable sickness is far greater than the loss through accidents is responsible for a renewed interest in recent months in the work of mutual benefit associations, since these organizations are well adapted to carry on effective health work in industrial or commercial establishments. The extent of the health problem which industry is facing and the best methods of meeting it were discussed in a paper ⁴⁵ read by Harold A. Ley, president of the Life Extension Institute, New York City, before the Seventeenth Annual Congress of the National Safety Council.

The tendency of legislation at the present time is to broaden the workmen's compensation laws to include occupational diseases—a purpose the justice of which no one can dispute—but even though it is admitted that it is right and proper that industry should compensate its workers for diseases incurred as a result of their employment, the fact remains that in many instances it is impossible to differentiate between occupational diseases and ordinary diseases. Hernia, for example, is certainly not an occupational disease, but when a man lifts a heavy box and suffers from strangulation, he claims compensation and receives it. This is true of various other ailments such as heart disease, vertigo, infections, etc., and it follows therefore that medical work directed toward the discovery and prevention of disabling conditions will reduce this drain both upon the workers and upon industry.

Studies by the Life Extension Institute and the United States Public Health Service seem to have established the fact that among the 42,000,000 gainfully employed persons in the country the time lost from illness and nonoccupational accidents amounts to as much as 350,000,000 days annually and that at present there is from seven to nine times as much time lost through sickness as through accidents. The annual economic cost to this country from preventable diseases and death was placed by the Life Extension Institute in its report to the Hoover Committee on the Elimination of Waste in Industry at more than \$3,000,000,000, \$1,800,000,000 of which is among the

⁴⁵ Hospital Management, Nov. 15, 1923, pp. 60-62: Benefit Associations Can Do Much to Promote Employee Welfare, by Harold A. Ley.

gainfully employed. It was stated in that report, and has since been amply confirmed, that 25,000,000 in the working classes have defective vision requiring correction, that more than 1,000,000 have some form of tuberculosis, more than 8,000,000 have flat feet, more than 6,000,000 have organic diseases resulting mostly from infection, that there are more than 1,500,000 with venereal infection, and 500,000 working people die annually. At least one-half of this loss from death and disability is said to be preventable and postponable through proper medical supervision, periodic medical examination, health education, and community hygiene. In other words, an effective health program would result in saving \$1,000,000,000 in industry every year. Much of this saving in ill-health the writer believes, could be obtained through the periodic health examination. The experience of life insurance companies shows the effects of a program of periodic examination. The Metropolitan Life Insurance Co. reports that there has been a 50 per cent reduction in mortality among its policyholders examined between the ages of 50 and 60 and of 18 per cent in the entire group examined, while the Guardian Life Insurance Co. reports 23 per cent reduction in mortality among policyholders examined by the Life Extension Institute, this reduction in mortality, in both instances, having taken place in the last 10 years.

Although the improvement of the health of the workers is a national problem, it is also a very personal problem and is one therefore in which every employer and worker should be interested. Aside from humanitarian reasons the employer is vitally interested from the standpoint of the efficiency of his employees and it is well worth his while to contribute to the health program in his own plant. The writer considers that the health promotion work can be carried on most effectively through the mutual benefit association and that a contribution amounting to 3 per cent of the pay roll, divided equally between employer and employees, will provide adequate health service. The mutual benefit association managed by the employees is favored as it is preferable, in order to avoid mistrust on the part of the employees, that this medical work should be handled by the employees and not by the employer. This will not interfere with the maintenance of a medical department by the employer for the treatment of accidents and sickness nor with the physical examination of applicants for employment which is necessary for the protection of the employer and of the benefit association as well. Before health conditions among any group of employees can be improved it is necessary to find out their physical condition and the conditions under which they live. The first requisite then is a thorough physical examination with instructions as to the necessary medical treatment and the correction of errors in diet and hygiene which are often directly responsible for ill health. It is difficult, however, to interest most people in a physical examination, as they either think themselves perfectly well, or if they know they are not they fear the information disclosed by the examination will be used against them. The majority of people measure their health by pain, which is a very poor method of measurement since there is no pain in the early stages of many of the most serious diseases, such as tuberculosis, Bright's disease, heart disease, cancer, or anemia, and if nothing is done before pain appears it is often too late in these cases to do anything.

The important thing, therefore, is to convince the employees of the importance of annual examinations and to inspire them to take steps to correct the impairments that are found. The writer believes that the most effective way of securing the cooperation of employees is through the mutual benefit association, which assures them adequate health supervision and medical attention, life insurance equal to one and one-half times the annual salary, payable in case of death or total disability, and two-thirds pay for 26 weeks in case of sickness or accidents not covered by the workmen's compensation laws. Such an association lays a foundation for an interest in preventive work and employer and employees will work together in it for a common purpose.

Lunch Rooms in Industrial Establishments

LUNCH ROOMS, like emergency hospitals, are among the more important features of personnel work since they contribute directly to the health and general well-being of the employees. In certain industries lunch rooms may be taken for granted, since the nature of the business is such that the provision of a place for the employees to eat is a necessity. There are other special considerations, also, which determine an employer to install lunch-room service but frequently it is done because of a desire to give employees better and more nourishing food than they would be likely to get in outside restaurants since there is a tendency on the part of many workers to economize on food to the detriment of their health and efficiency. The provision of appetizing and nourishing food is regarded by most firms as an important factor in maintaining the health of the working force particularly as it is the best meal of the day for many of the workers. A number of the firms reporting on their lunch-room service, in a study by the Bureau of Labor Statistics of the personnel activities carried on by employers, stated that an increase in production had followed the installation of a plant lunch room.

In the survey, schedules were secured from a total of 430 firms with approximately 1,977,000 employees. Of these companies, 303 with 1,175,507 employees, provided some form of lunch-room service for their employees, and in the 262 establishments which reported the number of employees using the lunch rooms it was found that an average of about 30 per cent patronized them daily, although, of course, individual establishments showed very much larger percentages.

In certain industries lunch rooms may be taken for granted, since the nature of the business is such that the provision of a place for the employees to eat is a necessity. This is true in department stores and large offices where employees manifestly could not be allowed to eat at counters or desks, and in certain industries or processes where the materials used are of such a nature that eating in the work places constitutes a serious health hazard or where it might result in spoilage of work. Aside from such special considerations as this, however, the determining factors seem to be the lack of proper eating places in the immediate vicinity, the desire to keep the employees in the establishment during the lunch hour, and frequently the wish to give employees better and more nourishing food than they would be likely to get outside, since there is a tendency on the part of many workers to economize on food to the detriment of their health and efficiency.

The provision of appetizing and nourishing food is regarded by most firms as an important factor in maintaining the health and efficiency of the working force, particularly as it is the best meal of the day for many of the workers. A number of the firms stated that an increase in production had followed the installation of lunch-room service.

There is a decided increase in the number of plant lunch rooms as compared with the number in operation 10 years ago when a similar study was made by the bureau. About the same number of firms were scheduled in the previous study, but at that time only a little more than half of the companies visited maintained lunch rooms while about 70 per cent of the firms scheduled provided them at the time of the later survey. Despite the fact that there was an increase in the total number of lunch rooms, 16 of the firms visited had discontinued serving lunch to employees, the reason given in 13 cases being that the majority of the employees lived near the plant and patronage was not sufficient to warrant continuing the service; one was closed for financial reasons; another, serving a free lunch, gave the employees an opportunity to vote on the matter with the result that they chose an increase in their pay instead of the free lunch; and in the remaining case no reason was given for discontinuing the service.

Establishments Having General Restaurant Service

MANY companies go to great expense in providing lunch-room service, since frequently many hundreds of workers must be seated at one time and in addition to the very considerable amount of space required for the lunch room there must be added the space needed for the kitchen, the refrigerating system, and the storage of supplies. In old plants usually such space as is available is adapted for these purposes or the plan, later described, of serving from booths or counters in the plant is utilized, while in newer plants if circumstances warrant maintaining a restaurant this is included in the construction plans. In some cases a separate building houses the lunch room and recreation rooms, and sometimes a limited number of employees are served in the clubhouse if it is near enough to the plant. Mining districts have their mess halls, and occasionally there are boarding houses and hotels run by the companies for the benefit of the workers.

It is obvious that the amount of space devoted to the plant lunch rooms represents an outlay from which little or no tangible return is received, and this seems especially true in industries in which but one meal a day is served, although these rooms are frequently used for social affairs outside of plant hours. In many instances also, in addition to up to date furniture and serving equipment, much attention is paid to making the lunch room an attractive place in which to spend the lunch period, and the rooms are almost uniformly clean and well kept. The cafeterias all have equipment for keeping the food hot or cold, as the case may be, and in many cases the kitchens are models with their many types of labor-saving equipment.

In industries where large numbers of men and women are employed it is usual to provide a separate lunch room for the women.

Provision is made in the majority of cases for those employees who wish to bring all or part of their lunch from home. In 206 establishments employees are free to take their home lunches to the cafeterias

and eat them there whether they purchase anything or not, but they sometimes hesitate to do this and in some respects a separate room is more desirable. A few companies stated that lack of room in the cafeteria made it unwise to divide the space with those bringing lunches from home even though there was otherwise no objection.

Thirty-nine of the companies visited furnish separate rooms for those bringing lunches from home, and in most of these rooms there is some provision for cooking. There are always separate rooms for men and girls and quite frequently separate rooms for office and factory girls. Occasionally there is complete kitchenette equipment including an ice box, but more often only a gas plate or an electric plate and tables and chairs. One company having two such rooms, one for men and one for women, reports that about 300 people take advantage of them daily. In some instances the matron in charge of the rest room makes coffee in the rest room or lunch room and has it ready for the girls.

Kinds of Service

VARIOUS FACTORS have to be taken into consideration in the adoption of a plan of service for lunch rooms in industrial plants, such as the length of the lunch period, the number to be served in a given length of time, and the amount of space available for this purpose. In the very large plants the distance from work to the lunch rooms is also a matter to be considered.

The cafeteria is by far the most popular form of service, since of the 303 companies maintaining lunch rooms, 259 have cafeterias; 26 have restaurants, and 18 have both. As a rule the restaurant is maintained for the benefit of the office employees and the cafeteria for other workers, this form of service being preferable for factory workers because of the larger numbers to be served. A number of firms have in connection with the cafeteria a smaller room where service can be had for a small extra charge or where a regular meal is served with the charge for service included. These rooms are not largely used as a rule, the majority preferring the quicker service and greater variety in the cafeteria. It is interesting to note the great increase in cafeterias during the past 10 years. At the time of the previous survey in 1916 there were 112 cafeterias and 128 restaurants in 223 plants as compared with 277 cafeterias and 44 restaurants in 303 establishments at the present time.

In some of the larger plants the distance is too great to use one central dining room and lunch rooms have been installed at convenient places throughout the plant. These lunch rooms are equipped with steam tables and facilities for serving, the food, as a rule, being prepared in a central kitchen and brought to the steam tables in wagons. In this way large numbers can be served in a short time. It would seem that the system of scattered lunch rooms is preferable to any of the various methods for serving in the work-rooms—a practice which is generally conceded to be undesirable, particularly from the standpoint of health. A number of firms have stations throughout the plant where coffee and milk are served.

Character of Management, the Prices and Menus

IN THE MAJORITY of cases the lunch rooms are managed by the company and if an outsider has charge, as in a few cases, the company still has supervision as to prices and the quality of the food. A number of firms manage the office restaurant themselves while the cafeteria for factory workers is run by an outsider, but in almost every case the company furnishes heat, light, space, and equipment. The prices charged in the industrial lunch rooms vary according to the efficiency in management, the quality of the service rendered, and the loss which the employer expects to meet. In general the prices are reasonable, as there is no disposition to make any money on the lunch room except in the few cases where it is turned over to an outside manager or where an association of employees operates it and expects to make a small surplus for the organization.

As the cafeteria has come to be the accepted method of serving employees, there is usually a sufficiently wide range of choice offered in the menus. There is an opportunity, also, to educate the employees in the elements of a well-balanced meal and a number of companies have a dietitian who has general supervision of the food and the lunch room. In other cases the nurses or doctors interest themselves in the quality of the food served and advise employees as to the kinds of food they should eat. In several of the places visited, the nurse sees that a special diet is prepared for individuals needing it.

Establishments Serving Free Meals

IN COMPARATIVELY few instances are meals served free to employees, although a number of companies provide the tea and coffee either in connection with the regular cafeteria service or in those instances where some provision is made for those bringing lunch from home. Seven firms, however, serve a free lunch to everyone in their employ, the number of employees ranging from 200 to 8,500. This is not regarded by these companies as a gift but as a supplement to the salary, and it is felt that it adds greatly to the efficiency of the workers, since many would not have a substantial lunch if it were not provided in this way. The lunch furnished by these establishments usually consists of soup, meat, two vegetables, bread and butter, coffee, tea, or milk, and dessert.

Financial Results of Operating Restaurants

OF THE 217 lunch rooms managed entirely by the company, 134 reported a deficit, 79 are self-supporting, and 4 reported a surplus. Of the 4 companies having a surplus, 2 had, in addition to their cafeterias, lunch counters and lunch carts. One of the four reporting a surplus served more than 5,000 people a day, bought supplies through the worker's cooperative store in large quantities, and did all the baking for the workers' store. Many firms stated that the aim was to make the lunch room self-supporting, at least to make returns cover cost of food and labor, but they seemed to be unable to do this and serve a wholesome meal at a moderate price. In a number of instances deficits of many thousands of dollars were reported.

Family Damage When a Wage Earner Dies

THE EXTENT to which a family is disrupted upon the death of the breadwinner of the family depends to a large extent upon the number of children under the wage-earning age. The Statistical Bulletin, September, 1928, published by the Metropolitan Life Insurance Co., stated that each year 400,000 widows and 200,000 children under 16 are deprived of the support of the head of the family through death.

The ages at which this loss is greatest lie between 35 and 45 years when the wage earners who die leave on the average 2.7 young children who not only can not contribute to the family budget but are a drain upon it since they must be cared for out of whatever resources the widows can command. The number of dependent children left by wage earners dying between the ages of 25 and 35 average 2.1, while those under 25 leave only 1.4 such dependents. The foregoing figures are based on conditions existing among wage earners insured in the Metropolitan Life Insurance Co., but in view of the large number insured they are believed to be generally applicable to the entire population of the United States.

Seventy per cent of the fathers between the ages of 35 and 44 who died with dependent issue left 2 or more children under 16 and of this number nearly one-fifth left 4 children and practically the same number left 5 or more children. Two or more dependent children were left by approximately 60 per cent of the fathers dying between 25 and 35 and by about one-third of those dying under the age of 25. The number of dependents in the families of foreign-born fathers is larger on the average than in those of the native born, but there is practically no difference between the number left by colored men and by white men.

The largest part of this family damage is due to relatively few causes, as nearly 6 deaths out of every 10 between the ages of 25 and 44 are caused by tuberculosis, influenza-pneumonia, heart disease, and accidents, these conditions causing, respectively, 22.7 per cent, 12.6 per cent, 11.5 per cent, and 14.2 per cent of the mortality. It is said to be particularly significant that these causes are, for the most part, preventable. The situation as regards tuberculosis has improved greatly within the past two decades, although there is still much to be done to safeguard families from this disease, but heart disease has become the outstanding public health problem. Heart disease is preventable in many cases, especially before the age of 45, and heart clinics are now devoting much attention to its prevalence in childhood since, while cardiac diseases cause death for the most part in later life, they are often acquired in childhood, infectious diseases such as diphtheria, scarlet fever, pneumonia, or acute rheumatic fever often resulting in heart impairment. Preventive care of children should, therefore, in time, be followed by a reduction in the heart disease death rate for adults.

Economic Losses Due to Physical and Mental Impairments

SOCIETY ACCEPTS without much question, apparently, the economic burden entailed in caring for the great number of handicapped or wholly incapacitated wage earners, as well as the loss resulting from the reduction or the complete destruction of their earning

power. Something of the extent of this loss is shown in an article entitled "The Burden of the Handicapped" in the May, 1927, issue of the Statistical Bulletin published by the Metropolitan Life Insurance Co., in which it is stated that at a conservative estimate there are considerably more than a million persons in the United States who by reason of their physical or mental impairments represent a social burden. Exclusive of cases of ordinary sickness there are, according to recent statistics, about 75,000 blind, 45,000 deaf and dumb, and, counting only those confined in institutions, about 320,000 who are feeble-minded, epileptics, or mentally diseased, as well as 78,000 paupers, the majority of whom, however, are old people. In addition, it has been estimated, there are about 700,000 persons who are crippled to an extent interfering more or less seriously with their earning capacity.

It would not be possible to estimate the cost to the community of all these impairments, as there is no way to arrive at the losses involved in the case of cripples since the extent and character of their disabilities vary so greatly. In the case of the blind and of the deaf-mutes, however, some data are available. The average annual earnings of blind persons answering a questionnaire on this point were found to be \$560 for males above 10 years of age and \$300 for females, which would indicate that blindness reduces a man's earning capacity at least two-thirds, if, indeed, he is able to find employment at all.

On the basis of a cost of \$500 a year per person for the maintenance of the blind, the total annual cost of maintaining them must be over \$37,000,000, of which probably not more than one-fifth is earned by the blind themselves. Deaf-mutes as a class do not represent so great an economic loss, as about 60 per cent of the men and 18 per cent of the women are employed. The average annual earnings of those employed are about \$1,000 for males and \$500 for females, so that the deaf-mutes as a class come nearer to supporting themselves than do the blind. The maintenance of the blind and deaf and dumb, however, must cost over \$30,000,000 a year more than their earnings, which represents only part of the economic loss, as the same persons, if normal, would have a much greater earning capacity.

It is possible to form a somewhat better idea of the burden placed on the general population through the care of the mental defectives and the insane. In 1923, 50 State institutions, out of a total of 54, reported 36,713 feeble-minded persons under their immediate care. A staff of over 5,500 physicians, nurses, and attendants, or an average of 1 employee per 6.6 of these patients, was required for their care. The property tied up in these institutions represented a capital of more than \$41,000,000, and the cost of maintenance was over \$10,000,000, or about \$310 per patient. Care of 7,755 epileptics at 9 of the 10 State institutions represented about the same rate of expenditure as for the feeble-minded, and the value of the capital tied up in these institutions was approximately \$10,500,000. Added to these, the care of the more than 267,000 insane, it is estimated, brings the economic loss resulting from mental diseases to at least \$300,000,000 a year. Counting only the mentally incompetent who are in institutions there is about 1 person out of every 300 of the total population who is dependent upon those having a normal wage-earning capacity,

Another set of substandard persons from the standpoint of economics are the delinquents and criminals who cost the taxpayers of the country large sums annually.

Only an approximation of the total loss to the country through these various classes of defectives can be made, as much additional information is necessary to give definite form to the total figures, but there can be no doubt, the report states, that the totals run into the billions annually even if the loss of more than two billion dollars a year from ordinary cases of sickness is not included. It is probable that a certain amount of handicapping is inevitable in a highly organized State, but the burden upon the productive members of society from this source should be recognized with a view to greater efforts for its prevention and control.

Campaign for the Prevention of Blindness Among Industrial Workers

A NATION-WIDE educational campaign for the prevention of blindness and the conservation of vision among the industrial workers of America and among their families will be launched immediately as a joint effort of the American Federation of Labor and the National Society for the Prevention of Blindness, according to a recent announcement by the latter organization.

The Society for the Prevention of Blindness has for some 20 years led the fight for conservation of vision; the Federation of Labor is now joining hands with this society for an intensive campaign within the membership of the federation because of requests for assistance in health education which have come to the Washington headquarters of the American Federation of Labor from various State and local labor bodies and because of the growing seriousness of the eye hazards of industrial occupations.

In announcing the campaign, Lewis H. Carris, managing director of the National Society for the Prevention of Blindness, declared:

The campaign is being undertaken because of our conviction that the eye hazards of industrial occupations—that is, accidents, diseases affecting the eye, and eyestrain—now constitute probably the most serious cause of blindness and impairment of vision among workmen in America. It is the belief of the officers of both organizations that a very large percentage of industrial blindness is preventable and that many of the eye hazards in the home, on the street, and in other places outside of industry, which at present threaten the sight of the wives and children of our workmen, also are avoidable.

The campaign for the prevention of blindness will be carried on through the various publications of the American Federation of Labor and of local labor bodies, through radio broadcasting exhibits in the meeting places of labor organizations, and other avenues of health education. The announcement of the campaign by the American Federation of Labor and the Society for the Prevention of Blindness says:

The seriousness of the situation which this campaign seeks to correct may be appreciated when one thinks of the following few facts: The industries of this country are at present paying approximately \$10,000,000 a year compensation to workmen who have been totally or permanently blinded while at work. This expense is inevitably reflected in the cost of commodities and thereby in the cost of living. The direct loss to the working men and women of America through lowered efficiency or earning capacity following blindness or serious impairment of vision is probably much more than \$10,000,000 a year. There is a further loss, intangible, but probably even more serious than the foregoing, in the tragedy

which enters every home in which a person has been blinded or has lost part of his sight permanently—a tragedy which often spells disaster.

Close students of industrial conditions are now convinced that 98 per cent of all industrial accidents are preventable. If this applies also to the eye hazards of industry, this joint effort of the American Federation of Labor and the Society for the Prevention of Blindness and the society's program within the industries themselves and among employer groups should result in the saving of many men's and women's eyes.

Effect of Eyestrain on Output in the Hosiery Industry

THE SECOND of a series of studies being made in England to determine the relation between illumination and output on fine work, published by the Industrial Fatigue Research Board,⁴⁶ dealt with the process of "linking" in the making of hosiery. This process is necessary in order to complete the work of the circular knitting machine. The hose as it comes from this machine contains a gap across the toe portion, which must be closed by linking together two rows of stitches or loops. The machine used for linking consists of a dial, rotating at a speed usually of from 16 to 18 revolutions per hour and provided with a number of radial needles about five-sixteenths of an inch in length, on which the loops of the hose have to be placed. Machines of the American pattern, having 20 or 22 needles to the inch and a diameter over the needle points of $14\frac{1}{2}$ inches, were used in the experiment. The operative sits on a low stool opposite the machine, her eyes being usually from 5 to 8 inches from the needle points, which she regards at an angle of approximately 20° above the horizontal.

It was believed that in this work high illumination without visual aids was not sufficient to secure the maximum output without eyestrain in the workers. Accordingly the use of magnifying spectacles was tried out. No attempt was made at minute refinement in the fitting of these spectacles. The refraction was approximately determined, any required correction placed in the trial frame, the distance at which the operative habitually worked was ascertained, and the worker allowed to choose the glass which gave her most distinct vision. The natural and artificial lighting provided was pronounced excellent by the workers. The output of three operatives—two experienced and one learner—was recorded for a period of four weeks in order to determine the normal rate of working under existing conditions. They were then examined and fitted with suitable glasses and their output recorded during a second period of four weeks. The results of the tests showed that a considerable increase in the rate of working, accompanied by a reduction of fatigue, was effected by the use of the spectacles. However, the report states that only the eyestrain due to extreme accommodation was relieved, and that greater benefit might possibly be obtained by the use of spectacles which would also reduce the degree of convergence required.

Research is being extended to other very fine processes, it is said, a standardized method of prescribing the necessary spectacles being employed.

⁴⁶ Great Britain. Industrial Fatigue Research Board. Report No. 40: The Effect of Eyestrain on the Output of Linkers in the Hosiery Industry, by H. C. Weston and S. Adams. London, 1927.

Relation of Illumination to Efficiency on Fine Work

A JOINT REPORT by the British Industrial Fatigue Research Board and the Illumination Research Committee⁴⁷ presents the results of a continuing investigation of the relation of illumination to the efficiency of workers engaged on fine processes, typesetting by hand having been selected for the particular experiments described in this study. The direct method of lighting was employed, direct glare being avoided. The copy chosen was of a uniform character for which 6-point type was used, and the work was done entirely by artificial light. In order to avoid week-end effects, all the tests, with the exception of the first, were made on Tuesday and Wednesday from 9 a. m. to 12.30 p. m. and from 1.30 to 5 p. m. The output was measured at half-hourly intervals and accounts of the errors made.

The results show that generally the output was greater on the second day of the test than on the first, although the report states that there may be doubt as to whether the rate attained on the second day could have been maintained if continuous work by artificial light had been prolonged for more than two days. The data gathered indicated that the optimum value of illumination for hand composing is of the order of 20 foot-candles,⁴⁸ the subjects used for the experiment complaining that the glare was uncomfortable when the illumination was as high as 24.5 foot-candles, although all direct glare in lighting was avoided, as already mentioned. On the other hand, it was found that "if the illumination is less than 2 foot-candles nearly one-quarter of the possible output is lost, while the number of mistakes is more than doubled and the fatigue experienced by the compositors is materially increased. Even when the illumination is as much as 7 foot-candles—a value which is probably higher than the present general practice—over 10 per cent of the possible output is lost and there is an unnecessarily high percentage of errors. * * * If work is done in artificial light only for a few hours a day, there is no evidence that any undue ocular fatigue is likely to result, providing the illumination is uniform and of the order of 10 foot-candles."

Physical and Mental Effects of Noise

IT HAS BEEN recognized for a long time that the human body consumes an increased amount of energy when there is considerable noise present and that accuracy is also affected. A series of tests carried out by Dr. Donald A. Laird at the Colgate University Psychological Laboratory⁴⁹ were designed to measure both the energy consumption and the loss of efficiency as accurately as is humanly possible.

Typewriting was the activity chosen for the tests, as it can be performed under closely controlled conditions, since it requires a constant position of the body and can be continued for several hours.

⁴⁷ Great Britain. Industrial Fatigue Research Board and the Illumination Research Committee. *The Relation Between Illumination and Efficiency in Fine Work (Typesetting by Hand)*. London, 1926.

⁴⁸ The "foot-candle" is the unit of illumination used in Great Britain and the United States. A surface 1 foot square, situated 1 foot away from a light source of 1 candlepower, and normal to it, will have an illumination of 1 foot-candle. The amount of illumination, however, varies inversely as the square of the distance between the light source and the surface to be illuminated, so that a source of 1 candlepower situated 2 feet away will provide an illumination of only one-quarter of a foot-candle.

⁴⁹ *The Trained Nurse and Hospital Review*, New York, March, 1927, pp. 253-255. Psychology studies noise, by Ronald F. Dixon.

But while the subjects of the tests are typists, the results are by no means limited to this class in their application.

The tests were carried out in a room about the size of the usual small office, with the usual office equipment, with indirect lighting, and electric fans to keep atmospheric temperature and humidity constant. As it was necessary for the subjects of the experiment to work as much as six hours at a time, the walls were painted a restful color and an attempt was made to make the room as attractive as possible.

A noise-making machine was constructed which simulates many of the sounds heard ordinarily in offices—both the noises created within an office and those coming from the street. In addition to the machine, which was placed in a cupboard, the walls were furnished with demountable panels of a sound-absorbing material. In the experiment these panels were placed on the wall one week and then removed for a week. With the noise machine in operation but without the panels being in place the typist had to work in a veritable clamor, but when the panels were on the walls the noise of the device became only a soothing hum to the typist, although she was within 4 feet of it, as the material used in the panels absorbs, it is estimated, 55 per cent of all sound. The experiment, therefore, consisted of work performed under three sets of conditions: One in which the panels were down and the machine was operating; one in which the panels were on the walls and the machine was operating; and the third in which everything was hushed.

During the test the typist breathed through a mask placed over her nose and mouth and the exhaled air was tested six times per hour for the carbon dioxide content, from which the laboratory worker can compute the energy consumption in calories. Every effort was made to secure accuracy in the experiments, as the amount of sleep secured by the subjects was regulated and their diet was carefully supervised. Special timing and calculating devices were used for measuring the output of the typists and the results were checked to avoid error.

It was found that one subject, who was regarded as representative, burned 0.82 calorie per minute while resting, 1 calorie while working with the panels in place, and 1.33 calories while working without the panels, the better conditions for working resulting in a saving of more than one-half of the added energy required by the work of typing. The time saving on each letter written amounted to 20 seconds, or 12 per cent of the time required in typing, time lost in inserting paper into the carriage was one-third less, and there were fewer mistakes in the work.

The average room is said to be noisy because the walls will repeat a sound hundreds of times before it dies, and this is particularly true of modern office buildings and hospitals which are constructed of hard, fireproof materials. Doctor Laird says, "Build a room with sound-proof walls and enough sound will come through the keyhole and reflect back and forth upon those walls to create a din. What modern buildings need is something upon those walls to absorb sound. Then people can leave the windows open even if riveters are working across the avenue."

In a discussion of the reduction of office noise, at an office executives' conference of the American Management Association held

in Chicago in February, 1926, the reasons given for noise becoming such a problem in the modern business office were overcrowding due to the cost of modern buildings; the tendency toward centralization resulting in bringing together large groups of employees doing the same kind of work; the increasing use of mechanical appliances in offices; the frequent location of offices on noisy streets; and the construction of offices of hard fire-resisting materials which are very poor sound absorbers.

The principal reasons for the failure to take steps to eliminate noise are said to be the expense of acoustical treatments, the fact that while such treatments are very efficient for the absorption of sound the treatment is frequently not permanent or the finished appearance is different from that of plaster, or because it is not absolutely necessary to install quieting treatment, as work can be turned out under the most noisy office conditions. The improvement, however, in the health of employees, in morale, and in the ease with which the work can be performed is held far to outweigh any of the disadvantages.

For the prevention of office noise, it is recommended that a soft type of floor covering be used, quiet typewriters provided, any special source of noise, such as a slamming entrance gate or door corrected, and in cases where the noise is excessive that special office-quieting treatments, of which there are several types on the market, should be installed.

For some years the American Society of Safety Engineers has had a committee⁵⁰ on the elimination of harmful noise. The increasing noise of industrial processes and of street activity have emphasized the importance of this subject, and the committee has been reorganized and it has been decided that an intensive study covering the following phases of the general subject should be made:

1. Public noises, such as bells and whistles used for warning purposes.

2. Traffic noises such as arise in connection with the operation of electric transportation.

3. Noise generated by power-transmission apparatus; for example, shafts, belts, pulleys, gears, etc. The committee calls attention to the fact that noisy transmission gear is an indication of poor design and should be remedied to favor production as well as to eliminate the noise.

4. Under the high speeds now common working machines may have vibrations which produce noise to an undesirable degree. This may be helped by the introduction of material that absorbs vibrations.

5. The effect of noise on the human nervous system.

On this latter point the committee quotes from Mr. Edward S. Morse the statement made in a paper presented in 1912 to the following effect: "The emphatic judgment of our most distinguished men in medical science * * * is that noise affects the nerve centers in a disastrous way, leading to neurasthenia and even insanity, and often marks the beginning of the end of one balanced between death and recovery."

⁵⁰ Transactions of National Safety Council, 1926, vol. 1, p. 307.

The Toll of Industrial Noise

THE EFFECTS on the human system of various kinds of noise met with in industrial employment and some of the methods by which noise and vibration may be eliminated are discussed by C. Fenno Faulkner in the June, 1927, issue of *Factory*.

Noise is more than an unpleasant condition of industry; it is a cause of shattered nerves and impaired hearing, and accidents, lowered morale, and similar occupational disturbances may also be attributed in part to its effects. We have tried to make a virtue of necessity by regarding the senseless clamor and roar of industry as an indication of its vigorous activity, the writer says, while in reality noise is often only a sign of wasted energy, of poor design, or of hurried ignorance. The reason that the bad effects of loud and continuous noise have not been more generally recognized, he believes, is because the effects are both insidious and cumulative in their action. Also, even though noise and other vibration may be responsible for an accident, sickness, or reduced efficiency, it is very difficult to fix the responsibility.

Various writers on industrial diseases are cited to show the rôle of noise in producing fatigue, deafness, and functional nervous disorders. In disease of the middle ear caused by excessive noise, vertigo is a common symptom, sometimes with nausea and faintness. Since dizziness as an accompanying symptom is found more frequently among mill and factory operatives whose work subjects them to vibrations from the machinery in addition to the noise, there seems to be no doubt that noise and vibration contribute their share to accidents in such industries. "It has been proved that loud and continuous noise lessens the ability to concentrate, to follow a consistent line of thought, or to meet emergencies where quick, coherent thinking is required. Aggravate this condition with exposure to direct vibration and you have a possible explanation of some of those seemingly needless accidents that one encounters so frequently."

Since there is no question that noise is both offensive and injurious, it is evident that to minimize its harmful effects it is necessary to reduce, isolate, or absorb the undesirable vibrations or to alter the tone of certain noises so as to render them less objectionable. Vibrations are transmitted in the following ways: Direct to the air from the vibrating bodies, through the part of the structure to which the vibrating bodies are attached, from the structure to the air, by direct contact of the operative with the vibrating body, and by direct contact of the operative with the floor.

There are various ways of absorbing sound and vibrations. Where heavy machinery is used much of the vibration can be absorbed by the use of thick resilient mats between the base of the engine or machine and its foundation, cork having proved to be the best material for this purpose. Spring mountings of the self-aligning type are successful particularly in the case of high-frequency vibrations, and there are various silencing devices for use on different types of machinery, although, in general, manufacturers of machinery have yet to learn the importance of quiet operation of their products.

Continuous noises that are of high pitch but not necessarily loud are the ones most likely to cause chronic ear troubles, and the lessening of such noises lies in better design and the use, wherever possible,

of shock-absorbing materials. It is considered possible also that much relief would result from a small periodic change in the speed of rotating parts, as a periodic change in pitch would relieve the ear.

Sound-absorbing materials include compressed cork, which at a thickness of $1\frac{1}{2}$ inches absorbs sound fourteen times as rapidly as bricks, plaster, or glass; a new material made out of sugar-cane fiber which is much in use in offices, salesrooms, radiobroadcasting stations, and other places where a minimum of sound reverberation is desired; felt; and a special type of plaster which has been developed for this purpose.

In conclusion the writer says:

This problem of noise prevention can be solved only by scientific research. We must learn what types and conditions of men are physically unfitted to withstand continuous noise. We must have more definite standards for measuring different noise effects on human fatigue and health and how to offset or eliminate them. The duty of removing this nuisance rests on industry. Since it has been found that noise has a direct relation to human fatigue any activity directed to this end should prove very profitable.

Industrial Posture and Seating

NEED OF GOOD seating arrangements among industrial workers is stressed in a report by the Pennsylvania Department of Labor and Industry which contains a description of the principal points to be followed in the construction and use of a chair which will insure good working posture.⁵¹

The necessity for providing workers with chairs which will support the body so that the best working position can be maintained with the expenditure of a minimum of energy is becoming more generally recognized with the increasing realization of the harmful effects of fatigue.

It is generally understood that a good work chair must provide support for the back; a seat shaped to the body; and foot support (either the floor or a foot rest); and that the height must be adjustable. The measurements, however, vary according to the individual and the type of operation to be performed. Following is a summary of the principles to be followed in the construction of seats as given in the report:

The back rest should support the small of the back, which is the weakest part of the spine, and must be low enough not to interfere with the freedom of arm movement. In size it may vary from 3 to 7 inches in width and from 8 to 12 inches in breadth. The back rest should be adjustable both vertically and horizontally in order to make it fit different sized workers and also to make it more adaptable to different operations. The rest should be made of wood, as it is more comfortable than metal, and the edges should be rounded. The supporting rods should be flexible to give with the movements of the body and should curve outward so as not to touch the body when the rest is used. The back rest should be hinged to the supporting rods so that its slant will be variable, conforming to the slant of the worker's back with his change in position.

The seat should be constructed to distribute the weight of the body and the front edge should be rounded so that there will not be pressure on the blood vessels under the knees. A saddle-shaped seat is

⁵¹ Pennsylvania. Department of Labor and Industry. A Good Chair for the Industrial Worker, by Elizabeth S. Johnson. Harrisburg, August, 1928.

good. The seat, which should not have a rim around it, should be at least as wide as the fleshy part of the body and should be shallow enough so that the back rest can be used when the worker sits erect. The seat should slant toward the back and should be from one-half to 1 inch lower in the back. Wood is the best material for the seat as it does not have the hardness of metal and does not conduct heat or cold.

The height of the chair should be adjustable so that it may be adapted to the size of the individual using it.

In all cases where the worker's feet do not rest squarely and easily on the floor, a foot rest should be provided. The height of this should also be adjustable and it should be large enough for the entire soles of both feet. The foot rest should slant toward the chair. It should be at least 2 inches lower on the side toward the chair and a cleat should be placed at the lower edge to brace the heels. The rest should be attached to the work bench or machine, as it is cumbersome if attached to the chair.

The provision of a chair which meets the foregoing requirements does not, however, solve the question of good working posture, as the chair must be carefully adjusted to the work place for height and also adjusted to the individual worker. The relative height of the worker to the working level varies in different operations so that in order to make the correct adjustment it is necessary to analyze each operation. As an example, in bench work the worker's elbows should be from 1 to 3 inches above the level of the object worked on, while for machine work the elbows should generally be below the point of operation.

An arrangement which permits the worker to vary his position is the sitting-standing arrangement, where the height of the work bench is correct for standing and the chair and the foot rest are high enough to enable the worker to keep the same relative position when he is sitting. This arrangement is adaptable to many operations and affords the worker relief from constant sitting or constant standing, either of which is fatiguing.

Failure to meet any one of the requirements of good use either in the adjustment of chair and work or on the part of the user of the chair will often result in destroying the value of the equipment.

In conclusion the writer says, "Since the adjustment of the chair to the individual worker and to the work place is a matter neglected so easily and at such cost, it is advisable that some one person in the plant, thoroughly familiar with the operations, learn the principles of good seating and be made responsible for seeing that every new worker has his chair and work place correctly adjusted. One person specializing in the posture problems of a plant acquires skill and experience which inevitably means better results than where individual workers or busy foremen handle the seating problems in a haphazard way."

Physique of Women in Industry

A BRITISH study⁵² on the physique of women in industry was carried out for the purpose of determining the actual load that can be lifted or carried by women or young workers under industrial conditions without injury or discomfort. As a part of the study,

⁵² Great Britain. Industrial Fatigue Research Board. Report No. 44: The Physique of Women in Industry. London, 1927.

anthropometric data of 4,366 women engaged in different occupations were secured, these data covering weight, height, length of arm, distance of finger tips from ground (standing) and three physical-strength tests, two of which involved the use of muscles ordinarily employed in industrial practice. The other features of the problem studied were the physiological cost of the various methods of load carrying to the individual worker and the determination of the loads actually carried by women in industrial operations.

The groups of women examined included workers employed in 26 factories between Glasgow and London, a small group of unemployed women, and a control group made up of 460 Scottish woman students in a teachers' training college in Glasgow.

Among the women studied who were employed on very heavy work were 40 girls working as navvies in a chemical works for 10 hours a day and about 60 women employed in a brick works in brick molding and on the very heavy work of filling and emptying the ovens. In the chemical works, the report states, all the women worked with ease and were barefooted. The carriage and physique of these women were remarkable, in spite of the fact that they were drawn from the district immediately surrounding the factory, one of the worst in Glasgow. An example of the astonishing amount of work of which these workers were capable is that of a woman who shoveled 20 to 25 tons of crude borite a day, lifting it to a height of two and one-half feet. Five girls, shoveling crystals from evaporating pans into trucks which they wheeled for a considerable distance along very imperfect rails, had an average output for the group of 6 tons per day. In the brick works, girls carried loads of bricks weighing nearly a hundred pounds for a distance of 70 to 80 yards. The strength of the girls in these two industries was very much greater than in any of the other trades, showing that the heavier and more strenuous occupations tend to attract the stronger women.

One of the surprising results of the study was the generally superior physical development found among the group of college women who were selected as representatives of sedentary workers. These young women formed a selected group in that more than half of them were born and brought up in country districts, they were required to pass a strict physical examination for admittance to the college, they were required to do a certain amount of gymnastic work a week, and in addition all played outdoor games such as tennis and hockey. On the other hand, while they were from good sound stock, they were not in affluent circumstances. The college women were superior to the group of employed women in weight and height and they excelled in all three of the tests of muscular strength, while the group of employed women in their turn had a considerably higher average in all these points, except weight, than the group of unemployed women. The comparison of the physical development of members of these groups on the basis of environment shows, the report says, that generally speaking, there is no doubt that the physique of the town dweller is inferior to that of the country dweller.

In connection with the question of weight carrying, about 550 observations were made in the different industries as to the loads actually carried or lifted, the subjects tested being placed in three groups—14 to 16, 16 to 18, and over 18 years of age. In industries in which the weight of the load is definitely fixed, it seemed that

women were not generally required to lift and carry a load heavier than that for which they were adapted, but in industries in which the weight of the load was left to the choice of the operative, it was found that young persons, especially males, were inclined to attempt to lift loads beyond their capacity.

The special study of the physiological effects of the different methods of lifting and carrying loads resulted in the conclusion by the investigators that the weight of the individual load when well adjusted should not exceed 40 per cent of the body weight for continuous and 50 per cent for intermittent or occasional carrying, which was equivalent on the basis of the average body weight to about 45 and 55 pounds respectively. It was considered, however, that this amount might be increased as much as 20 per cent when the load is compact and easily handled so that it does not interfere materially with the gait and balance of the worker. In the case of adolescents, however, it was concluded, on account of the plastic condition of the body with the consequent dangers from overstrain, that the load for young girls from 14 to 16 years of age should not exceed a limit of 25 to 30 pounds, and for girls aged 16 to 18 years the limit should be 40 pounds.

INDUSTRIAL HOME WORK

Survey of Industrial Home Work in the United States

IN 1925 the Association of Governmental Labor Officials of the United States and Canada decided at its annual meeting to appoint a committee to look into the subject of industrial home work, the extent to which it was carried on in the United States, and the methods being taken to deal with the situation. The committee, which was not appointed till February, 1926, made only a brief report in that year, and was continued for further study of the subject. At the annual convention held in June, 1927, the committee presented a further report, and prefaced it by a statement of the minimum standards for regulation of industrial home work, upon which they had agreed unanimously. This statement, and the summary of the information secured on the subject by the committee, are taken from the report of the proceedings of the fourteenth annual convention, published by the United States Department of Labor as Bulletin No. 455 (pp. 76-96).

Recommended Minimum Standards for the Regulation of Industrial Home Work

1. **ABSOLUTE** prohibition of the manufacture of certain kinds of articles in the homes should be required where necessary for sanitary or safety reasons, either for the protection of the consumer, as in the case of certain foodstuffs, certain articles of clothing, etc., or for the protection of the worker in cases where explosives or poisonous or otherwise injurious materials are used in manufacture of the goods concerned.

2. All labor laws of a State, including legislation regulating child labor and the hours of labor of women, workmen's compensation or employer's liability laws, minimum-wage legislation, and the legal standards for safety, sanitation, and working conditions, should apply to industrial work of all kinds done in the home as well as to that done in the factory.

3. Responsibility for full compliance with such laws and with any special regulations applicable to home work should be placed upon the manufacturer for whom the work is done, irrespective of whether the work is given out by him directly or through another person. He should be required to keep on file a register containing the names, addresses, and ages of all home workers employed on work for him, the kind and amount of work done, rate of pay and actual wages paid, together with such additional information as the department of labor may require, accessible to inspectors of the department, and should send a copy of this register periodically to the labor department. No employer or contractor should be permitted to give out home work until licensed to do so by the State department of labor, and no employer should be licensed to give out home work unless he enforces compliance with all the require-

ments of the labor law applicable to home work in the homes in which work is done for him.

4. Adequate authority for the enforcement of all laws applying to factory work done in homes should be given by law to the State labor department, and an adequate inspection staff should be provided for this work. Periodic inspections of places where home work is done should be made. It is believed that in States where the industrial home-work problem is an extensive one the appointment of a special staff of inspectors who will devote their entire time to the enforcement of the regulations applicable to home work will result in greater efficiency of administration than when the work is handled by regular factory inspectors assigned also to other duties.

5. Local boards of health should notify the State labor department daily of all cases of communicable disease occurring in the locality over which they have jurisdiction, giving the name and address of the person suffering from the disease, and the State labor department should report immediately to employers the names and addresses of all home workers registered as employed by them in whose homes such disease exists.

6. A tag or label giving the name and address of the manufacturer, the nature and quantity of the goods, and the name and address of the worker or workers to whom the goods are given out to be worked on should be placed upon each unit of delivery or shipment to a home worker and this label should not be removed until the work has been completed and returned to the employer.

7. The members of the committee did not feel sufficiently certain of the effectiveness of the different systems now in operation in a number of States, whereby individual families or residences are licensed for home work by the State labor department, to recommend the adoption of a specific method of regulation of this type. The committee is, however, of the opinion that this machinery should certainly be retained by the States in which it is now operating until such time as more effective methods of enforcement have been worked out by these States.

Summary of Information on Home Work Obtained by the Committee

Alabama

No PREVIOUS study reported. In the spring of 1926 the chief child labor inspector of the State child welfare department wrote the committee as follows: "As far as I know there is practically no industrial home work carried on in this State."

In response to the committee's request in the fall of 1926 that further inquiry be made, the State child labor inspector visited the attendance officers of the three largest cities in the State and requested that they report to the department all cases of industrial home work which came to their attention. They later reported that they had not found any evidence of home work in connection with any industry in their cities. In addition, the State inspectors made it a point to find out whether home work was being given out in any of the garment factories visited, and up to the time of their last report to the committee they had found none. The director of the child welfare department writes as follows (May 13, 1927): "I think a

real investigation might reveal certain phases of home work being given out by the tailors, perhaps, and others, but I honestly believe the amount is very small in this State and would hardly justify the time which would be required of us to make this study."

No legal regulation.

Arizona

No INFORMATION available; no legal regulation.

Arkansas

No INFORMATION available; no legal regulation.

California

PREVIOUS studies:

An investigation was made during the summer of 1922 of all establishments employing women or minors in the Chinese quarters of San Francisco and Oakland. In addition to enforcement of the [industrial welfare] commission's orders for wages and hours of labor, the investigation was pursued with special reference to the home work in these districts.

The bulk of the work done at home was garment making, with the use of both foot and power machines. Products included aprons, coveralls, men's coats (whole garment), house dresses, pajamas, and nightshirts. In addition, such work as sewing buttons on shirts made elsewhere, putting buttonholes in men's coats, and finishing trousers was done at home. There was also beading and embroidery and making of lamp shades.

Thirty-one women were visited in San Francisco in their homes and 26 women in Oakland. As these numbers represented every woman whose name was obtained from a large number of sources, it was felt that the majority of the women doing home work in these quarters had been reached. Compared with the number of all women employed in factories, even if one limits the comparison to the needle trades, the home workers here are relatively negligible. [Fifth Report of the Industrial Welfare Commission of the State of California for the biennial periods July 1, 1922, to June 30, 1924, and July 1, 1924, to June 30, 1926, pp. 28, 29.]

Information furnished to committee.—(Letter from executive commissioner, Industrial Welfare Commission of California, May 17, 1927:)

In answer to your first question "What kinds of industrial home work are carried on in your State?" home work in southern California and northern California is very different. In the north it is largely concentrated in the Chinese and Japanese quarters. The Japanese do a great deal of embroidery, and, I have no doubt, also make kimonos, pillows, etc., but we have never been able to make an investigation in the Japanese district.

One of the largest home-work industries, both in the north and south, is the lamp-shade industry.

Handkerchiefs—the silk and georgette kind trimmed in lace, etc.—are made in large numbers; neckties are finished at home; pillows and a small amount of ribbon flowers are also made at home.

We have some knowledge of certain factories that give bundles of either children's clothing or simple aprons or house dresses to housewives who make these on their own electric-power machines, but there is only a small number of women engaged in this kind of home work. I have no knowledge of the amount of tailored work that is done in the home. I can give you no idea of the number of women or the number of homes in which this work is done. We have never followed into the homes as we never had the staff to do this kind of work. I think there is some home work sent into our State.

Legal regulations.—There is no law specifically applying to industrial home work, but under its power to regulate the wages and conditions of employment of women and minors the industrial welfare commission has issued certain orders affecting work for factories

done in homes. Concerning these the executive commissioner stated as follows (May, 1927):

We had started to make some home-work regulations when in 1923 our budget was so cut that we were obliged to do only the most pressing work for the proper enforcement of our minimum wage legislation, as it left us with practically no staff to do any outside investigation of any kind. However, in section 11 of our manufacturing order, issued May, 1923, we do try to get some information in reference to where home work is being done and the rates paid. We try to prevent any woman from doing home work after factory hours, and I think for the power we had in 1923, 1924, 1925, and 1926 this was practically all we could have done

Colorado

No PREVIOUS study reported. In the spring of 1926 the chief factory inspector of Colorado wrote that industrial home work in Colorado was "so slight as not to become a problem," and that his office had "no means to pursue a specific survey."

No legal regulation.

Connecticut

Previous studies.—In 1919 the Department of Labor of Connecticut made an investigation in which they found that 73 employers in the State had given out home work to 2,600 families. A special inquiry was made as to conditions in 1,316 families, of which 569, or over 43 per cent, had from 3 to 8 children, the total number of children in the families investigated being 3,418. (Home Work in Bridgeport, Conn.: Bulletin No. 9, Women's Bureau, U. S. Department of Labor, p. 18.)

The biennial reports of the State factory inspection department contain statistics regarding home work in the State. A large number of different types of home work are reported, among the more important being carding safety pins, hooks and eyes, etc., work on hose supporters, making and assembling sectional parts for paper boxes, hand and machine sewing processes, and crochet beading. (Reports of factory inspection department for the two years ending September 30, 1918, p. 33; and for the two years ending September 30, 1922, pp. 35, 36.)

In a survey of industrial home work in Bridgeport, made by the Women's Bureau of the United States Department of Labor in 1919, 100 home-working families were visited, the majority of whom were employed in work connected with the making of garters. Information was obtained as to the rates of pay and family earnings from home work, the employment of children, and the conditions under which the work was done. These families include 300 children, of whom 268 were under 16 years. Of these, 110 assisted regularly in the home work and probably others helped also. Instances were found of very young children working hard at home work. (Home work in Bridgeport, Conn., December, 1919: Bulletin No. 9, Women's Bureau, United States Department of Labor.)

Information furnished to committee.—A survey was made by the State department of labor, in response to the committee's inquiry, the findings of which were reported as follows by the deputy commissioner (May 11, 1927):

About 1,400 workers were employed during the past year. The materials given out included clothing, shirtwaists, pants, garters, hosiery, buttons, gloves, children's dresses, handkerchiefs, lace (pulling threads), pins, hooks and eyes,

snaps on cards, crocheting shade pulls, covering baseballs, bundling leather, lining silver novelties, dolls, stuffed toys, metal goods, elastic webbing, auto trimmings, pasting fur.

The largest number engaged by any one plant was 300, employed covering baseballs; the next largest number, 200, engaged in work on garters. There has been a reduction in the number of home workers within the past few years, due partly to a slackening of industry in general. Another factor is the ability of the manufacturers to get work done in the factory, thus eliminating the bother of sending it out and the extra record work in the office. One firm reported that when it was learned that workers were receiving assistance in the home by the children, home work was discontinued at once and had not been resumed. The chief difficulty seems to be to find out whether the home work is being done by the younger members of the families. Unless school authorities report cases of listlessness on the part of pupils, due to being kept up at night working, the department has no means of getting the information. Several cases were so reported during the past year, the work being pasting fur pieces on paper. This work was given out for a short time only, and was called in as soon as it was learned that children were doing the work in the homes.

As this State has no law permitting the inspectors to enter individual homes, our reports must depend largely on what is obtained from the manufacturers. At the present time we know of no firms outside the State who are sending work into the State. One inquiry came to the office as to whether this State required a license for such outside work. The reply was in the negative.

Legal regulations.—The law applies only to tenements or dwelling houses used by others than the immediate members of the family living therein for the manufacture of articles of wearing apparel, artificial flowers, purses, cigars, and cigarettes, requiring that persons engaging in such work shall notify the labor commissioner and that the work shall be done in clean, sanitary rooms properly lighted and ventilated. No license is required.

Delaware

No PREVIOUS study reported. In response to the committee's inquiry the State 10-hour law inspector made an inquiry in the spring of 1926, the findings of which were reported as follows (May 15, 1926):

I have made careful inquiry into the question of home work for women in the State of Delaware. There is no establishment in the State that is giving out home work at the present time. There never has been any amount of it, but there were from time to time a few firms who did this to some extent. Most of the employers with whom I talked told me that it was not as satisfactory as having the work done at the plants under supervision. The territory is so small that it is very easy to get workers who live very near the plants. I have asked other agencies to help in the matter, such as the mothers' pension secretary, etc. These people are in closer touch with homes than I would be. We are glad to report that there is no home work.

No legal regulation.

Florida

No INFORMATION available; no legal regulation.

Georgia

No PREVIOUS study reported. The commissioner of commerce and labor wrote as follows (May 10, 1927):

I beg to advise that there is no industrial home work being carried on in Georgia, unless individual sewing should be considered industrial home work. It may be possible that in some instances work is taken home from some shop,

but if this is true, it amounts to very little. I do not believe that any manufacturers in the State farm out such work.

No legal regulation.

Idaho

No INFORMATION available; no legal regulation.

Illinois

No PREVIOUS study reported. In response to the committee's inquiry the bureau of industrial accident and labor research of the State department of labor reported as follows for Chicago only (April 24, 1926):

With the limited time and staff at our disposal we have tried to gather some information on the subject of home work. Unfortunately, it will at this time be impossible for us to undertake a real survey of the situation.

Taking up the points raised in your letter, we find as follows: The chief work done at home seems to be embroidering, beading, and sewing silk flowers on women's apparel. An official of the joint board of sanitary control of the International Ladies' Garment Workers roughly estimates that about 3,000 workers are employed in this industry in Chicago, and that about 85 per cent of the work is done in homes. Approximately 100 shops do embroidering, only a few of which employ more than 15 people. Most of the home workers are women and children in the Polish, Jewish, Italian and negro districts. Some women contractors give out embroidery to be done in the home. There is no union organization in the above trades in Chicago.

Without further study it is impossible to say in what order of importance the other kinds of home work rank. In late years home work is known to have existed in Chicago in the following kinds of work: Making artificial flowers and feathers; making lamp shades; wiring shipping tags; making parts of toys; shelling and picking nuts; peeling onions; addressing envelopes; assembling garters and suspenders; sewing powder puffs (one firm employed 100 families on this work); assembling toys; knotting fringe on draperies; decorating cards; beading shoes; making bead bags, etc.; millinery; putting strips of paper into holes in punch boards which are used for gambling purposes; embroidering clocks on hosiery; coloring prints; possibly carding of snaps and buttons to a limited extent.

We are unable to give the number of families doing home work or the number of employers giving it out. The above information applies only to Chicago, since we have had no facilities for ascertaining the kinds and amount of home work done in the rest of the State. It is probable that artificial flowers, embroidery, beading, lamp shades, tags, and toys are the principal products of home work in Chicago.

Legal regulations.—The following information as to legal regulation was received from the bureau of industrial accident and labor research of the State department of labor (April 24, 1926):

The only State laws governing home work in Illinois are the child labor law and the garment law. Under the former no child under 16 is allowed to do work at home under any conditions different from those imposed on factory work. However, the enforcement usually is confined to warning those who give out home work that they must see that the child labor law is observed.

The employer or contractor is required to keep a list of the families who have children under 16 years of age.

The garment law applies also to the manufacture at home of purses, feathers; artificial flowers, and cigars, but it is a health and sanitary measure. [It requires that the persons doing such work notify the board of health within 14 days after commencing work, and that the premises be kept in a clean and sanitary condition. No license is required.]

Very little authority is given to the factory inspection division under this law, and for this reason cases which might arise are dealt with under the child labor law and the health, safety, and comfort act. Except in child labor cases there are practically no regulations for home work in Illinois.

Indiana

No PREVIOUS study reported. In response to the committee's inquiry, the director of the Department of Women and Children of the Industrial Board of Indiana reported as follows (April 26, 1926):

To our knowledge, the only industrial home work carried on in Indiana is the manufacture of chair bottoms in Perry County, located on the Ohio River. At the time of our last inspection there—two years ago—we found two firms supplying families with work of this kind. One sent out work to about 125 families, and the figures on the other plant were not secured. Unless there is home work being done of which we do not have information, you can see that there is no problem of this kind in Indiana.

Legal regulations.—The law prohibits the use, except by the immediate members of the family living therein, of any rooms in any tenement or dwelling house for the manufacture of specified articles of clothing, purses, feathers, artificial flowers, or cigars, and regulates this work when done by the members of the family by requiring the employer to obtain a license from the chief labor inspector, conditioned upon the observance of certain requirements as to lighting, ventilation, air space, etc.

Iowa

No PREVIOUS study reported. In response to the committee's inquiry, the following information was given by the labor commissioner of the State (April 27, 1926):

The State of Iowa has very little industrial home work, except, of course, that of dressmaking and a few similar industries that are carried on by the women of the home direct. In fact, there is only one industry in the State that sends into the home a considerable quantity of work to be done; this is in the button industry, which is quite extensively carried on in about four of the Mississippi River cities, but I doubt whether even this work is carried on to any extent outside of the city of Muscatine alone and there it is limited to the carding of buttons. I am unable to give the extent of this industry even there, but a considerable number of children can be found going to the factories in the morning, usually with large-sized lunch baskets in which are carried away the buttons to the homes, where the spare time of the women and children, in fact, of the entire family, is put in in carding at so much per gross. This work is even carried on by some of the church societies at their weekly or biweekly meetings, the proceeds of their work going into church activities. I know of no other industry in the State in which this is the case.

No legal regulation.

Kansas

No PREVIOUS study reported. In May, 1926, the director of women's work and factory inspector of the public-service commission wrote as follows:

In our inspections over the State we have not found any industrial home work. Kansas is an agricultural State rather than a manufacturing, and there is no problem in industrial home work in this State.

In response to the committee's suggestion in the fall of 1926 that further inquiry be made, the following was reported (May 12, 1927):

In answer to your letter in regard to suggestions about industrial home work, I have made inquiry at factories visited and find practically no home work being done. In one place where Kaw Indian curio work is being done, ladies call for moccasins, etc., to be beaded. This is the only place that I have been able to find. Of course, I would have no record of home work sent in from other States.

No legal regulation.

Kentucky

No PREVIOUS study reported. In April, 1926, the chief labor inspector of the State department of labor wrote:

I have made investigation and inquiries of a number of organizations who are in a position, more or less, to have knowledge of this practice carried on, and with what information I have to date, I report that we are practically free from all classes of industrial home work.

No legal regulation.

Louisiana

THE ONLY information reported as previously collected is contained in a survey of conditions of women's labor in Louisiana, made by the women in industry committee, Council of National Defense, New Orleans division and Louisiana State division, New Orleans, 1919, which touched very slightly upon industrial home work (p. 21):

In Louisiana the consensus of opinion seems to be that sewing work given out to be done in homes is relatively harmless, and as a matter of fact goes into homes of comparative refinement and cleanliness. The facts on this ought, however, to be investigated. One case came to the survey's notice where pecans were taken home for shelling by a crippled member of a family. Whether home work with foods is common or not should be known. Wages for home work should also be studied. In the few cases which came to the survey's knowledge wages were excessively low, so as to justify the common title of "sweatshop" work.

In response to the committee's inquiry the following information was furnished by the factories inspector of the Parish of Orleans (May, 1926):

I am unable to find any of the manufacturers here who give out home work. In regard to pecan shelling, there are two large pecan-shelling factories here that employ 300 colored women in each factory. These factories are equipped with the latest machinery and I can not conceive of anyone working by hand in competition with them. These factories work only a part of the year and they buy the entire pecan crop. In regard to artificial-flower making, I am sure there must be some few individuals who do this work, but they do not work for any manufacturer and it is impossible for me to find these isolated cases.

Further inquiry was made by the factories inspector last winter, with the following results:

After making a canvass of the city I have found only four concerns that give out home work. All declare that no children are employed in this work. [One of these concerns, manufacturing shirts, overalls, and pants, reported that it gave out home work to from 25 to 30 women; one pants company furnished work to 7 women; and a shirt manufacturer to 2 women. The fourth, a manufacturer of infants' wear, gave out work to about 250 home workers.]

No legal regulation.

Maine

No PREVIOUS study reported. In May, 1926, the State commissioner of labor reported to the committee as follows:

I have been unable to find any instances of home employment of minors in this State. By this, of course, I mean where work is carried into the home to be done for manufacturing establishments.

In response to the committee's request in the fall of 1926 that further inquiry be made, the commissioner reported as follows (May 13, 1927):

Since writing you on this subject I have had the inspectors sent out by this department make as much of a survey as possible of home-work conditions in the State of Maine, and I find but three localities that are affected. In the

extreme eastern part of the State there are a number of families who are employed as fish skimmers. This work is connected with the preparing of smoked alewives. It is estimated that perhaps 200 adults are employed in this work during the winter months.

In another section of the State, there are several clothing factories, and we find some home work done, but to a very small degree, probably not more than 50 in all being engaged in home work. This work would be entirely adult labor.

An investigation was also made of a concern [a handkerchief manufacturing project] located in the central part of the State, which advertises in the papers for help to do home work. The information that we secured is that practically all of the work sent out is sent to other States.

No legal regulation.

Maryland

No PREVIOUS study reported. In response to the committee's inquiry, the following information was furnished by the State commission of labor and statistics in April, 1926:

Home work in Maryland is confined to the clothing industry. We have no way of knowing what other kinds of home work, outside of the clothing industry, are carried on in Baltimore, as manufacturers of other kinds of work are not required to register their home workers with the department of labor. Nor do we know the number of firms outside of the State sending work into the homes of Maryland. We know of no agency in Maryland that has collected this information.

Our report for 1926 shows that 1,547 clothing places were inspected (including manufacturers, contractors, custom tailors, cleaning and repairing) and that 123 of these places gave out home work. Our records at the present time show that there are 424 homes in Baltimore where home work is being done—total number of home workers, 440. No children were found working when our inspectors called. The children are generally used by their parents to carry the clothing back and forth from the factory before and after school hours.

As to legal regulation, the commissioner stated:

The law provides that "every employer or manufacturer, whether a person, firm, or corporation, contracting for the manufacture, in whole or in part, altering, repairing, or finishing of any articles in a tenement or dwelling house, or any room or workshop outside of his, their, or its own establishment, or giving out of materials from which they or any part of them are to be manufactured, altered, repaired, or finished, in a tenement or dwelling house, or in any room or workshop outside of his, their, or its own establishment, shall keep a register of the names and addresses, plainly written in English, of the persons to whom such articles or materials are given to be so manufactured, altered, repaired, or finished or with whom such employer or manufacturer has contracted to do same, and shall issue with all such articles or materials a label bearing the name and place of business of such employer or manufacturer legibly written or printed in English."

These homes are then visited by our inspectors and turned over to the local health department for further inspection. If no infectious, contagious, or communicable disease is found, and the house is in proper sanitary condition, the license is granted. [Licenses must be obtained from the commissioner of labor and statistics.] Of course, if any unfavorable condition should arise after the health department has made its inspection, the bureau has no way of finding this out unless the condition is existent when our inspector visits again. You can see here the possibility of infection existing without the manufacturer or department of labor being cognizant of the fact.

Massachusetts

Previous studies.—The Massachusetts Child Labor Committee in 1912 made an investigation of child labor in tenement industries in this State. The result of this investigation was published in the annual report of the committee, January 1, 1913. (Child Labor in Massachusetts Tenements, published in Annual Report of Massachusetts Child Labor Committee, January 1, 1913.)

Two other studies were made by the research department of the Women's Educational and Industrial Union of Boston. The first, in 1913, was in cooperation with the Massachusetts Bureau of Statistics. It was published by the bureau in 1914 under the title "Industrial Home Work in Massachusetts." (Commonwealth of Massachusetts, bureau of statistics, Labor Bulletin No. 101: Industrial Home Work in Massachusetts.) The second study was made in cooperation with the State board of labor and industries, and was published by that board in 1915 as "Licensed Workers in Industrial Home Work in Massachusetts." (Commonwealth of Massachusetts, State board of labor and industries, Industrial Bulletin No. 4.)

Information furnished to committee.—(Report from the assistant commissioner of the Massachusetts Department of Labor and Industries, June 29, 1927:)

Industrial home work in Massachusetts has been regulated by statute since 1891. The enforcement of the regulations was at first under the district police. In 1907 this work was transferred to the State board of health. In 1912 it was assigned to the State board of labor and industries established by act of the legislature that year, organized August of the following year, 1913.

The work was conducted under the home work division of the board until August, 1914, when it was discontinued on instruction from the attorney general. Since that time there has been no separate provision for this work. In December, 1919, when the former State board of labor was abolished this work with the other functions of the board was assigned to the present department of labor and industries.

In connection with the work of the committee on industrial home work of the Association of Governmental Labor Officials, returns were secured from the industrial safety inspectors of the department of labor and industries in the spring of 1926 regarding conditions in their districts. These returns were not based on an actual investigation, but merely on the personal opinion of the inspectors. The reports indicated that for the State as a whole there is comparatively little of this work carried on in the homes. The major part of the work noted was on men's clothing, knit goods, infants' wear, hosiery, paper goods, tags, baseballs, etc.

Information secured by agents of the minimum wage commission in connection with investigations and inspections indicated that home work in certain lines is more extensive than might be inferred from the reports of the industrial inspectors. This was particularly the case in connection with jewelry.

Legal regulations.—The existing regulations regarding industrial home work in Massachusetts apply to work on wearing apparel in tenement or dwelling houses, and include the following provisions:

1. Prohibition of the use of a tenement or dwelling house for this purpose by any except members of the family.

2. Requirement for a license from the department of labor and industries for families engaged in this work.

3. Requirement that persons giving out home work on wearing apparel shall keep a register of the names and addresses of the persons hired, employed, or contracted with, and forward a copy of the register monthly to the department of labor and industries.

4. Requirement that the rooms where the work is done shall be kept in sanitary condition, subject to the inspection of the department of labor and industries.

5. Requirement for prompt reporting of cases of contagious disease, and authority of department to revoke or suspend licenses.

6. Requirement for tags for articles made in unlicensed houses.

7. Penalty for violation, fine of not less than \$50 nor more than \$500.

Industrial home work on wearing apparel includes work on men's clothing (coats, vests, and pants); children's and infants' clothing and underwear; embroidery on dresses, blouses, and underwear; sweaters; knitted novelties; straw and felt hats; felt slippers; corset accessories, and similar lines. According to an opinion of the attorney general, beading, rosettes, and ornaments for shoes do not constitute wearing apparel; and a license is, therefore, not required for such work if carried on in the home.

Michigan

No INFORMATION available.

Legal regulations.—Law covering the manufacture in homes of specified articles of wearing apparel, purses, feathers, artificial flowers, cigars, and cigarettes requires that a permit be obtained by the person desiring to do the work from the factory inspector, issuance of permit conditioned upon certain requirements as to light, ventilation, sanitary conditions, etc. The employer must keep a register of the persons employed on home work.

Minnesota

No PREVIOUS study reported. In a letter to the committee dated April 8, 1926, the superintendent of the division of women and children stated as follows:

The industrial home work problem in Minnesota is not extensive at all in so far as we are aware of it. The only cases of home work that have come to our attention are as follows: [The names of 10 establishments are given. Of these 2 give out embroidery on dresses or underwear, 2 embroidery and beading on slippers, 1 aprons, 1 tags, 1 hats, 1 pennants and lodge insignia; the tenth, a manufacturer of punch boards, gives out work done chiefly by women and children on inserting and folding rows of numbers in punch boards. This factory gives out work to at least 100 families.]

In response to the committee's suggestion in the fall of 1926, that further inquiry be made, the division of women and children made a survey of industrial home workers in Minneapolis concerning which it reported (June, 1927): "The investigators interviewed 25 families whose work consisted of stringing tags for a tag factory; 8 families who were beading moccasins, slippers, or bags for a firm manufacturing felt and leather goods; 4 families performing certain work on children's waists for a knitting mill; 2 families where the women were making bags for a shampoo bag company."

The families to whom home work was given by the tag factory—the only work on which children were found engaged—were visited and a report blank was filled out with reference to the work done by the children. Sixteen children under 16 years of age in 8 families were reported engaged in stringing tags.

No legal regulation.

Mississippi

No INFORMATION available; no legal regulation.

Missouri

No PREVIOUS study reported. In response to the committee's inquiry the State industrial inspector wrote on May 12, 1926:

The industrial work furnished to persons in homes or residences is negligible in Missouri. There is none in St. Joseph, practically none in Kansas City, and a very small amount of it in St. Louis, our three largest cities.

The principal types of home work in the State were reported to be as follows: "Making women's hats, men's neckwear, women's aprons and house dresses, women's shoe ornaments."

In answer to the committee's request for further information the following information was received May 7, 1927:

We have found the amount of industrial home work in the cities of our State to be negligible. Some finishing work has been done in homes on women's silk dresses, but I have found that this work was done under sanitary conditions and by respectable, clean persons, and that the amount of it was limited. It is handwork. Also I know of a neckwear company that occasionally sends bow ties to country women. The work is done under the most sanitary, pure-air surroundings and is negligible as to amount. These women live within the State of Missouri. The work is handwork.

Legal regulations.—The law requires the employer giving out home work in the manufacture of wearing apparel, purses, feathers, and artificial flowers to keep a register of the persons employed. No license is required.

Montana

No PREVIOUS study reported. In response to the committee's inquiry, the chief of the division of labor of the department of agriculture, labor, and industry reported (December, 1926) that while he had no specific information on the subject he believed that the amount of home work in Montana was negligible. In May, 1927, he reported that he had discussed the matter with the factory inspectors of the industrial accident board and that they were of the same opinion.

No legal regulation.

Nebraska

No PREVIOUS study reported. In response to the committee's inquiry, the following information was furnished by the State department of labor (May, 1926):

In so far as this department is able to learn, there is very little, if any, industrial home work carried on in Nebraska. The only instance of this kind that ever came to the attention of the writer was in the city of Omaha a few years ago, when a company farmed out some very small percentage of their manufacture of women's house dresses. This manufacturing institution has since gone into bankruptcy. So far as we know, no information on this subject has been collected by any other agency, and we can not see how it would be possible for this department to make a survey of the situation with the means at its command.

No legal regulation.

Nevada

No PREVIOUS study reported. In response to the committee's inquiry, the office of the labor commissioner reported in April, 1926, that while they had no specific information on the subject they were of the opinion that there was no industrial home work in Nevada.

No legal regulation.

New Hampshire

No PREVIOUS study reported. In response to the committee's inquiry, the State labor commissioner stated in April, 1926:

We have very little home work, so called, in New Hampshire. There is some chair work done in and around Keene—not enough, however, to make it a serious problem.

After receiving the committee's suggestion that further information be obtained, the commissioner wrote that he would instruct the inspectors of his department to inquire whether any home work was being done for the plants they inspected. In his final report (May 7, 1927) the commissioner stated that "outside of some chair work done around Keene there is very little home work done in New Hampshire."

No legal regulation.

New Jersey

Previous studies.—In 1923 a study was made by the State department of labor and other interested agencies which called the attention of the public for the first time to the extent to which this type of manufacture prevailed throughout the State.

An account of this study and of the succeeding efforts to enforce the law is to be found in the following mimeographed publications issued by the State department of labor: Report of the Investigation and Survey of the General Home Work Situation in the State of New Jersey, conducted under the supervision of Charles H. Weeks, deputy commissioner of labor, in accordance with instructions from Lewis T. Bryant, commissioner of labor (June 1, 1923); Report to Andrew F. McBride, commissioner of labor, in Connection with the Enforcement of the Home Work and Sweat Shop Laws in the State of New Jersey from June 1 to December 1, 1923, by Charles H. Weeks, deputy commissioner of labor.

According to the latter report, 8,742 licenses had been issued up to December 1, 1923. These licenses were distributed among 243 cities and towns throughout the State, among which were many small communities.

In 1925, as one of a series of studies of child welfare in New Jersey, the Children's Bureau of the United States Department of Labor made an inquiry relative to the employment of children in industrial home work in Newark and six other communities in which home work was reported by the State authorities. The families were located through a canvass of children under 16 attending the public schools. The homes of all those who reported some form of factory home work were visited and such children and their parents interviewed as had been engaged in industrial home work for one month or more during the year preceding the interview. In Newark 459 families, in which there were 849 children under 16 who had done industrial home work, were interviewed, and in the other six communities 169 families doing home work, in which there were 282 children under 16 who had done industrial home work.

The children were doing many kinds of work, chief among which were "finishing men's clothing," embroidery and beading women's dresses, sewing powder puffs, stringing tags, embroidering and scalloping handkerchiefs, cutting lace, making artificial flowers,

and making dolls' clothes. Almost one-fourth of the children who had done industrial home work in these families were under 10 years of age and almost four-fifths were under 14.

Information furnished to committee.—(Letter from the deputy labor commissioner of the State, April 16, 1926:)

Our records show that we have approximately 650 employers who give out home work in New Jersey and that during the year 1925 this home work was distributed to 4,147 homes. Fifty-four applications were rejected during this period. [The principal industries for which licenses were issued were as follows, in the order of their importance: Embroidery and laces; infants' and children's clothing; bead work; men's and boys' clothing; flowers; safety pins; powder puffs; dolls and dolls' clothing; dresses and suits; silk and silk picking; shirts; tags; hulling fruit; badges, buttons, emblems, etc.; Christmas cards, seals, etc.; neckwear; underwear; crochet and knit wear, sweaters.]

The records on file in this department show that 13 New York concerns are listed in our files as distributing work in New Jersey. We find that 209 home work licenses have been issued to workers in New Jersey employed by these firms. Four Philadelphia concerns are also listed as distributing work in New Jersey and 133 licenses have been issued to their workers. The period taken is from January 1, 1925, to December 31, 1925. Most of this work is distributed in small towns, rural sections, and the seaside resorts during the quiet season. There is practically no work from New York distributed in the larger towns, the home workers in cities where considerable manufacturing is done depending on their supply from local manufacturing establishments. The largest amount of this work from outside the State appears to be knitted booties and infants' wear; work on dolls and dolls' clothing is next, and underwear, hat ornaments, sanitary goods, and paper novelties account for the remainder of the licenses issued.

More recent information reported for New Jersey by the deputy commissioner of labor is as follows (May, 1927):

Present indications are that our records for this year will show a decrease in the total number of home work licenses issued. At the present time 2,400 have been issued. During the fiscal year 1925-26, 3,599 home-work licenses were issued. I presume that this decrease is due in large part to the rather general industrial depression in New Jersey and not to any change of policy on the part of the manufacturers giving out home work or to any marked improvement in the circumstances of those doing the work.

Legal regulations.—Before the use of any rooms in a tenement or dwelling house for the manufacturing, altering, or repairing of any articles, a license, the granting of which is conditioned upon compliance with certain standards as to light, air space, sanitation, etc., must be obtained from the commissioner of labor either by the family wishing to engage in the work or the employer wishing to distribute it. The manufacture of certain articles—food, dolls, and dolls' clothing, and children's and infants' wearing apparel—is entirely prohibited in a tenement house any part of which is used for living purposes, but licenses may be issued for such work in 1-family or 2-family houses.

New Mexico

NO INFORMATION available; no legal regulation.

New York

Previous studies.—A report on manufacturing in tenements, submitted in 1924 by the New York State Industrial Commissioner to the State commission to examine the laws relating to child welfare, states as follows:

In 1913 the factory commission [the factory investigating commission established by the legislature in 1911] made a study of manufacturing in tenements, and as a result of its findings a law was passed prohibiting the manufacture, alteration, or repair of any article of food, dolls or dolls' clothing, or infants' or children's wearing apparel in any portion of an apartment used for living purposes. There was also passed an amendment to the labor law prohibiting the employment in tenement houses of a child under 14 years of age in any work for a factory, whether directly or indirectly, through the instrumentality of one or more contractors or third persons.

The factory commission also considered the question of complete prohibition of manufacturing in tenements. The commission in its report said: We realize that manufacturing in tenement houses is a serious evil; that it is, in fact, a blot on our industrial system. It is to be condemned because it is injurious to the health of the women and children directly engaged in this work and because it unjustifiably invades their homes. Moreover, the health of the public using such products is endangered. From an economic point of view its continuance is unjustified; it undermines the wage scale of the factory workers; it is wasteful both of human labor and of material.

The commission stated, however, that it did not feel justified in recommending that the whole system be rooted out at once and suggested that the industrial board make investigations from time to time to ascertain the conditions under which manufacturing in tenement houses was carried on. It suggested that the list of prohibited articles be added to periodically and stated that if further investigation showed after a few years that the evils could not be corrected, tenement house manufacturing should be abolished in the interests of the home workers of the dwellers in tenement houses, and of the public at large.

As the result of the factory commission's report, considerable improvement was made in the administrative machinery dealing with this subject in the labor department. It is regrettable, however, that the factory commission's advice about the necessity of continuous investigation and study of this subject was not followed. An unsuccessful attempt was made in 1917, at the suggestion of various labor and social organizations, to add to the list of prohibited employments. The bill did not pass the legislature. [Report on Manufacturing in Tenements Submitted to the Commission to Examine the Laws Relating to Child Welfare, by Bernard L. Shientag, State industrial commissioner, March, 1924, pp. 4, 5.]

In 1923-24, at the recommendation of the industrial commissioner, an investigation of manufacturing in tenements was made by the commission to examine the laws relating to child welfare, created by the legislature in 1920 (Third Annual Report of the New York State Commission to Examine Laws Relating to Child Welfare, pp. 10-13, 33-80). The commissioner states in his summary¹ of this report:

Two thousand one hundred and sixty-nine families were investigated, of whom 273 were in 13 communities outside of New York City. Over 60 different kinds of articles were found manufactured in tenement homes. Certain of the articles such as men's clothing, artificial flowers, and the carding of buttons, are the types of work in which children are able to assist. In New York City the report shows that illegal child labor is the most serious feature of the home-work system, although it would appear that the proportion of children so employed is probably smaller than in former years. Of the 2,169 families studied there were 1,591 with children over 5 and under 16 years of age, and 563 having no children between these ages. In 359, or 22 per cent of the families, 535 children between 5 and 16 years of age were reported as working in the homes. [The report showed that 79 per cent of these children were under 14 years of age (the legal minimum age) and 35 per cent were 10 years of age or under.]

One of the commissioner's recommendations was that a bill be introduced extending the list of prohibited employments and adding to such list toilet articles, artificial flowers and feathers, and hat ornaments, and that this list of prohibited employments should be added to from time to time. (Bills of this kind have since been introduced in the New York Legislature, but have failed to pass.)

¹ This summary is included in the report cited above.

Information furnished to committee.—(Report from the director of the bureau of women in industry of the department of labor, June, 1927:)

The director of the bureau of women in industry is responsible for the enforcement of the home work law and also for the research within the department of labor that has to do with the employment of women and children. Statistics showing the extent of home work in the various industries are published from time to time in the Industrial Bulletin, the monthly magazine of the department. These figures show the number of firms giving out home work, the number of home workers employed, the industries using home workers, the number of firms sending work outside the State, and the States to which work is sent. In the annual report of the bureau figures are given showing the number of licensed tenements in the State, the number and nationality of home workers found employed by inspectors, and the number of children found at work in tenement homes. In addition, the bureau has made an intensive study of home work in the men's clothing industry in New York City and Rochester. (Special Bulletin No. 144, copies of which will be sent upon request.) This report analyzes the importance of home work in this industry by showing the ratio both of home workers to factory workers and of the home work pay roll to the factory pay roll it also traces the trend of home work employment over a 5-year period.

The policy of the bureau in making such studies has been to place the responsibility for the existence of home work upon the parties which are most concerned and also to reemphasize the extent to which home work exists under modern industrial conditions. In addition to the research work the bureau of women in industry has circularized trade-unions, schools, social agencies, and other groups with pamphlets which state in simple form and in different languages the home work law. These special leaflets are published and distributed with the idea that there are large groups of people who do not know of the existence of such a law nor of its regulations.

As far as the inspection work is concerned, the inspectors have completed for the fiscal year ending June 30, 1927, an inspection of all the licensed tenements in this State. The law requires that each tenement house be inspected twice a year, and this has been done. In addition to this, the inspectors have been taken out of their regular districts and turned into flying squadrons to inspect unlicensed tenements to see to what extent work is going on there. Out of 1,035 so visited, home work was found in 76 of them. These houses were, of course, required to secure licenses and comply with the regulations before home work could be continued. In addition to this effort, advertisements in the daily papers are watched very carefully, and if a firm that has no permit to give out home work is found to advertise for home workers, the case is immediately investigated.

There is no way in New York State of measuring the effectiveness of our law nor of our method of inspection, since it would require an inspector on the doorstep of every tenement 24 hours of the day to really know what is going on.

Legal regulations.—Every employer must secure a permit from the State department of labor before sending work into a tenement house, and the owner of a tenement house must secure a license from the State department of labor before industrial home work can be done there. The granting of a license is conditioned upon compliance with certain conditions as to sanitation, air space, etc., and tenement houses used for manufacture shall be inspected not less than once every six months. All firms sending work into tenement houses to be manufactured, altered, or repaired must register with the department of labor the names and addresses of all persons to whom such goods are given.

None of the following articles may be sent into a tenement house to be altered, repaired, or finished: Articles of food, children's and infants' wearing apparel, dolls and dolls' clothing.

Children under 14 years of age must not be employed at industrial home work, and children between 14 and 16 years of age must obtain working papers and must not work before 8 a. m. or after 5 p. m.

North Carolina

IN ANSWER to the committee's inquiry the executive officer of the State child welfare commission wrote in April, 1926:

I am pleased to inform you that sufficient investigation has been made to state that home work exists in the State and that there is a limited amount being sent into the State. Some material facts have been secured relative to this work and with the view of more completely following up the study during this year.

In sending in his final report to the committee in May, 1927, the above-mentioned official wrote:

It was my hope to extend our study on the material at hand and furnish you with more complete information as to earnings and classes of work covered by our last biennial report. I find that our appropriation, however, will prevent us from providing the additional expense at this time. It will be necessary for me to refer you to our last biennial report for the volume of information we have available for you at present, for the work in North Carolina.

This study, summarized on pages 147 to 149 of the biennial report of the commission for 1924-1926, was made in six counties of the Piedmont and mountain sections of the State. Visits were made by two registered nurses especially engaged for this purpose to 107 families engaged in the stringing and tagging of bags. It was reported by the companies manufacturing these products that only 25 per cent of the work was given out to homes, the other 75 per cent being handled by machinery in the factory.

In 28 families, or 29 per cent of the [white] homes, no children were found, and in 20 families, or 20 per cent of the homes, the children were too young to engage in work. This is approximately 50 per cent of the homes in which the work is accomplished entirely by the adults. The investigation did not disclose a home where other children were solicited to come in and help with the work. Not a single home visited was considered in such a condition as would affect the health of the family, nor was there found a single malignant disease or any evident symptoms of contagious disease.

No legal regulation.

North Dakota

No PREVIOUS study reported. In response to the committee's inquiry, the commissioner of agriculture and labor reported in December, 1926:

The questions [as to industrial home work] are hardly applicable to North Dakota. We believe there is no home work sent into the State by manufacturers of other States, nor any home work done in this State for manufacturers in the State. Our conditions are agricultural and not industrial.

No legal regulation.

Ohio

No PREVIOUS study reported. In response to the committee's inquiry the director of the State department of industrial relations requested the division of workshops and factories of the department to make an inquiry through its field representatives. The report of this inquiry submitted to the committee (May, 1926) was as follows:

Inclosed please find a report from our division of workshops and factories which I believe you will find self-explanatory. This specific line of work gives us practically no concern in Ohio, and to the best of my knowledge we have never had a complaint registered pertaining to same.

Report of division of workshops and factories

As per your request we have gathered the following information relative to home work and home workshops:

Columbus.—Very few home workers; some small tailor shops. — Co. at rush periods, approximately 30.

Central Ohio.—Found no workshops or home workers.

Zanesville.—A number of small tailor shops have one or two women doing work in their homes. Stripping of tobacco for small manufacturers of cheap stogies done in homes. At Athens manufacturer of woollen pennants has greater part of work done in homes.

Cleveland.—Small percentage of work on sweaters and embroidery for dresses done in homes, not more than 100 workers, spending possibly four hours per day.

Toledo.—One company had some knitting nets to cover atomizer bulbs. Hand-work.

Cincinnati.—Some home workers for tailor shops. Estimated at 200 working from two to four hours per day.

Springfield.—Very few home workers. Manufacturers of cotton work gloves at times have parts of work done in homes. A publishing company has about 100 (mostly former employees who have married) addressing envelopes at home.

Northeastern Ohio.—No home workshops or home workers.

Akron.—No home workshops or home workers.

In response to the committee's suggestions made in the winter of 1926-27 that further information be obtained the director wrote as follows (May, 1927):

I have again made a careful check with our lady visitors who are in the field and they advise that they find little, if any, of this form of employment existing here.

Legal regulations.—The law merely prohibits the manufacture of certain articles of wearing apparel, artificial flowers, purses, feathers, and cigars in any tenement or dwelling house except by the immediate members of the family living therein. No license is required.

Oklahoma

No PREVIOUS study reported. In response to the committee's inquiry, the commissioner of labor made a brief survey and reported as follows in April, 1926:

We have been unable to find where industrial home work is carried on in this State except in a few isolated instances. We know of a few cases during the winter months, where families took quantities of nuts home for the purpose of picking them out and thus earning additional funds. We also know of one instance where employees in a woman's shop took home articles to be made at night. However, as the above instances constituted a violation of our State laws, this department promptly put a stop to same.

In May, 1927, the commissioner reported that no further information was available for two reasons: "First, that we have no knowledge of a great deal of this class of work being done in Oklahoma, and second, our field force is so limited that we are not in a position to make a survey for the purpose of ascertaining the true situation."

Legal regulations.—As to legal regulation, the commissioner stated:

When the problem is approached properly, we have held that the woman's 9-hour-a-day and 54-hour-a-week law and the child labor law are sufficient to discourage industrial home work.

Oregon

No PREVIOUS study reported. In response to the committee's inquiry, the State labor commissioner and the secretary of the industrial welfare commission reported that there was little, if any, home work in that State. As stated by the latter official (May 17, 1926):

We have but little home work and in such intermittent periods that so far the situation has not demanded a fixed rule as to various types of industries. In one of the knitting mills several women took home sweaters to finish and the industrial welfare commission required the minimum time rate— $27\frac{1}{2}$ cents an hour—and when the custom seemed to threaten any growth the manufacturer was told that he would be compelled to estimate all home work as overtime. That stopped it. We have recently had another case of shelling almonds in connection with a candy factory. The work must average $27\frac{1}{2}$ cents an hour—minimum time rate—and overtime if the women work in the factory in the daytime the regular number of hours. It is a very small concern.

Legal regulations.—There is no law specifically regulating industrial home work. The above letter from the secretary of the industrial welfare commission states as follows:

The law creating the industrial welfare commission (minimum wage board) gives it authority through which we have control of any situation concerning women and children in industry. [This law gives the commission power to fix standard conditions of labor for minors under 18 and women.]

Pennsylvania

Previous studies.—A study of industrial home work in Pennsylvania was made in 1916–1917 through questionnaires sent to employers in those industries known to use home workers, and supplemented by a brief survey made in 1920. In 451 firms giving out home work 12,394 home workers were reported. The chief industries using home workers were men's clothing, hosiery and knit goods, tobacco, women's and children's clothing, rag rugs, silk goods, paper goods, gloves and other leather industries. Visits were made to 1,113 homes, and in 209 of these homes a total of 401 children under 14 were found engaged in home work—chiefly in stripping tobacco and in work on hosiery and knit goods, men's clothing, and rag rugs. (Industrial Home Work in Pennsylvania, by Agnes Byrnes, Ph. D., published by the department of labor and industry, pp. 18, 64–66.)

Information furnished to committee.—(Report from the director of the bureau of women and children of the department of labor and industry):

Legal regulations.—Industrial home work regulations effective in Pennsylvania since October, 1925, provide that—

1. The conditions of work in private homes shall be (a) clean and sanitary; (b) in accordance with the provisions of the women's labor law and child labor law.

2. The observance of these conditions shall be the responsibility of the owner of the goods, together with an authorized representative in the home who is appointed by the employer.

3. To insure the observance of these regulations any employer who gives out home work shall (a) secure a license from the department of labor and industry; (b) place on each package of work sent out a label bearing his name and address; (c) furnish quarterly to the department of labor and industry a list of the names and addresses of all persons to whom he gives work.

Administration.—Since the labor supply in industrial home work is essentially one of women and children, and since the effective administration of the industrial home work regulations was felt to involve continuous investigation and education rather than routine inspection, the administration of the home work regulations was turned over to the bureau of women and children when the regulations went into effect.

A special investigation staff consisting of five full-time workers has been responsible for the enforcing of the home work regulations. The procedure of the bureau of women and children in the administration of the home work regulations has been as follows:

1. To interview every home work employer in order to assist him in developing the necessary organization to bring his distribution of home work up to legal standards.
2. To investigate a representative number of homes in which the employer's work is being done to determine whether the work is carried on under legal conditions.

Scope of home work.—There have been 1,100 home-work employers licensed to give out home work. Sixty of these are out-of-State employers. There are approximately 12,000 home workers listed by these employers.

Research.—The research work of the bureau has had for its purpose the education of the employers as to the State's regulations and the gauging of the State's home-work problem.

The following is a summary of the reports on industrial home work prepared by the bureau:

1. Industrial Home Work and Child Labor, Special Bulletin No. 11, Department of Labor and Industry, 1926.

A study of the illegal employment of children on industrial-home work; 50 per cent of the families with children under 18 were in 1924 permitting children to work illegally on home work; more than three-fourths of the illegally employed children were under 14 years of age.

2. The First Year's Administration of the Industrial Home Work Regulations, Department Bulletin, March, 1927.

The results of the first year's enforcement of the home-work regulations by the bureau of women and children; an encouraging reduction in the illegal employment of children on industrial-home work was found. The proportion of families permitting their children to work illegally on home work had been reduced from 50 per cent in 1924 to 23 per cent in 1926. The encouraging drop in the proportion of illegally employed children, more outstanding in some industries than others, was as follows:

	Industry	1924	1926
Tags	-----	90.8	41.4
Women's and children's clothing	-----	50.3	27.4
Men's clothing	-----	44.3	25.8
Knit goods	-----	29.2	17.4
All industries	-----	50.0	23.5

3. Why Industrial Home Work, Department Bulletin, April, 1927.

The economic causes found to be motivating the employers to give out home work were: Reduction of overhead, lower wage rates, and the need of extra help during seasonal rush periods.

The earnings of more than three-fourths of the home workers were found to be an essential part of the family budget. In only approxi-

mately 10 per cent of the homes were home workers persons incapacitated by reason of physical disability or old age from employment at regular factory work.

4. The Labor Policies of Home Work Employers. (In preparation.)

Legal regulations.—See under "Information furnished to committee," paragraph 1, above

Rhode Island

Previous studies—Industrial Home Work of Children: A study made in Providence, Pawtucket, and Central Falls, R. I., Bureau Publication No. 100, Children's Bureau, United States Department of Labor, Washington, 1922. This study was made in 1918. From the information obtained from the various sources by the bureau's investigators it was found that at least 5,000 children under 16 years of age (or about 7.6 per cent of the total child population between 5 and 16 years of age) had been engaged in home work during the year 1918. Detailed information regarding the kind and conditions of work, rates for pay, and family earnings was obtained for the 2,338 children, representing 1,042 families, who had been engaged in home work for 30 days or more during 1918 and who had received compensation for their work. "Of these 2,338 children, for all of whom detailed information was secured, 4.1 per cent were under 6 years of age, 45.7 per cent were under 11, and 86.2 per cent were under 14" (pp. 8, 11).

The children worked on about 100 varieties of factory work, distributed by 21 industries. The principal home occupations of children, in the order of their importance, were carding snaps (dress fasteners), stringing tags, drawing threads on lace, linking and wiring beads, setting stones, working on military buttons, carding shoe buttons, finishing underwear, carding jewelry, and putting together chain fasteners. This work consisted of very simple processes constantly repeated. Ninety-one children, however, worked on machines [p. 12].

Twenty-one industries of Providence and Pawtucket used home work as a part of their system of production. Of these the jewelry industry was by far the most prominent; of the 153 firms which made a regular practice of distributing home work, 91 were jewelry establishments [pp. 13, 14].

It was reported that the standards set up by the State of Rhode Island for school children and children working in factories were violated by home working children in the following cases: Children of school age remained at home for extended periods or for a day now and then to do home work, contrary to the compulsory education law of Rhode Island; children under 14 did factory work at home, though the law prohibited them from working in factories; women and minors under 16 employed in factories did overtime work at home, contrary to the spirit of the law limiting hours of work; and children injured in the course of home work were deprived of compensation under the workmen's compensation law. It was found that almost three-tenths of the home working children between 9 and 13 years of age who reported their school grades were retarded, one-tenth of them being 2 or more years below what is commonly accepted as the standard for their ages [p. 13].

Information furnished to committee.—(Letter from the chief factory inspector of the State, April 12, 1926:)

We have no home-work problem. It does not come under our supervision. There is no law governing the matter. We have no means of knowing how extensive it is. As far as I know the principal places are jewelry and lace manufacturing establishments.

No legal regulation.

South Carolina

NO INFORMATION available; no legal regulation.

South Dakota

No PREVIOUS study reported. In response to the committee's inquiry the State industrial commissioner reported as follows (December 11, 1926):

I am sorry to say that there is no practical way to find how much home work is being done in South Dakota. As we have no factory inspectors, there is not that source to draw upon, and there is no way that I know of to secure the information you desire. There may be some such work done in the State, but the manufacturing interests are so limited along any line wherein home work could be done. * * * I think very little work of the character you inquire about will be found to exist in this State.

No legal regulation.

Tennessee

No PREVIOUS study reported. In answer to the committee's inquiry, the chief, division of factory inspection, State department of labor, reported (May, 1926):

I have taken this matter up with our district factory inspectors and have received reports from them as follows: Our inspector of Chattanooga states that he found one hosiery mill that has some work done in private homes, such as handwork and crocheting on hosiery; and one men's and boy's clothing manufacturer that let work out to be done in homes. This is about the only kind of work done in homes in this part of Tennessee. Our inspector of Memphis reports that he has made a thorough investigation and found no establishment in that territory that sends out work to the homes of people to be manufactured or repaired. He has no record of any kind of work of this kind going on in the western part of the State. Our inspector of east Tennessee claims he has no record of any kind of work being sent out from the different establishments to the homes of people to be manufactured or repaired. We have no record of any work being sent into this State by manufacturers of other States.

Legal regulations.—The above-mentioned report from the chief of the division of factory inspection, department of labor, states as follows:

Our State labor laws cover [industrial home work] * * * and also state [that] for articles to be manufactured, repaired, or finished in any room, apartment, or tenement, said apartment or tenement or room must be well lighted, and should at least contain 500 cubic feet of air space for every person working therein. [The person doing home work must notify the board of health within 14 days of the time of commencing work. No license is required by the law.]

Texas

NO INFORMATION available; no legal regulation.

Utah

No PREVIOUS study reported. In answer to the committee's inquiry, the chairman of the State industrial commission reported (April, 1926) that there was no industrial home work in Utah. However, in December, 1926, in response to the committee's suggestion that further information be obtained, the chairman instructed the chief factory inspector of the commission as follows:

Hereafter in every inspection where home work is possible make the following inquiry: 1. Is work given out by the employer to be done in the homes of the employees? 2. If so, during what seasons of the year? 3. The extent of work done annually at home: (a) In hours. (b) In cost.

No report of the results of this inquiry has as yet been received by the committee.

No legal regulation.

Vermont

No PREVIOUS study reported. In response to the committee's inquiry, the State commissioner of industries stated (April, 1926):

We have no information available on this subject, and no means at hand for obtaining the same as we lack both funds and personnel for making such survey as is suggested.

I know of one toy manufacturing concern which has put out some assembling work at times in homes in the village where it is located, and I am informed that something of this kind has been done by shirt manufacturers to a limited extent. Our factory inspectors have come in contact with very little industrial home work, and it is my opinion that there is very little in the State.

No legal regulation.

Virginia

No PREVIOUS study reported. In answer to the committee's inquiry the director of the women and children's department of the State bureau of labor and industry wrote in April, 1926:

This department has never made a study of industrial home work in the State, and I know of only two establishments within the State that put out work to be done in the home; one is a glove factory and the other is a hosiery mill. I understand that firms outside the State send in machines and yarns from which hose are made, but to what extent this is done I do not know. It may be possible within the next few weeks to investigate these two industries where home work is done, and, if so, will be glad to let you know the results of the investigation.

On May 24, 1926, letters from the two establishments mentioned above were forwarded to the committee. The knitting mill reported that at that time business being poor, no work was being sent out to the homes. The glove manufacturing concern estimated that approximately one-fourth of their sewing was done in the homes and stated that this was the only part of the work done outside the factory.

No legal regulation.

Washington

No PREVIOUS study reported. In response to the committee's inquiry the director of the State department of labor and industries requested the supervisor of women in industry of this department to make an inquiry into the matter of industrial home work in that State. Following is her report to the director (May, 1927):

At your request I made a point of asking the factory managers how much work was done and how many women were engaged in home work. I found only two garment factories in Seattle that send out work. This work consisted of embroidering patterns on house gowns, and an investigation revealed that the women kept no record of their time and have no complaint to make of the pay they received.

I have received one letter from a woman outside of the State requesting information as to where she could obtain home work. I have also received a request from a business firm outside of our State asking what form was required by this department if they placed home work in this State. We told them that we required every three months the names and addresses of the women

so employed. From time to time I have noticed advertisements in Seattle and Tacoma papers suggesting home work for women, but in answering one of these I found it to be merely an effort on the firm's part to sell material instead of offering home work.

In my opinion the amount of home work done in this State is very small.

Legal regulations.—There is no law specifically regulating industrial home work. The minimum wage law gives the industrial welfare committee of the department of labor and industries power to establish standard conditions of labor for women and minors.

West Virginia

No PREVIOUS study reported. In answer to the committee's inquiry, the commissioner of labor wrote in April, 1926, that there was no home-work problem in West Virginia. In response to the committee's suggestion that further inquiry be made, the commissioner had a closer survey made, the results of which were reported as follows (May 6, 1927):

Since our last report to you our inspector has made a survey of labor conditions in West Virginia and finds that there is no industrial home work in this State in any of the manufacturing establishments over which our department has jurisdiction.

No legal regulation.

Wisconsin

IN RESPONSE to the committee's inquiry with reference to industrial home work in Wisconsin, the following information was furnished by the field director of the bureau of woman and child labor of the industrial commission (April, 1926):

Previous to the 1921 session of the legislature, Wisconsin had a home work law similar to that of other States, which was passed primarily for the protection of the consumer. It provided that home work could be carried on in dwellings which complied with specified requirements of space, ventilation, and sanitation. The other serious evils of home work—child labor and low wage—were not touched by the old law.

The law was amended in 1921 to provide that no owner or lessee of any factory, nor any manager or agent of such owner or lessee, and no contractor doing work for any factory may contract with any person to manufacture, alter, or repair, or finish any article in homes unless there is first secured from the industrial commission a permit authorizing the factory or contractor to engage in home-work manufacture. The granting of this permit is conditional upon compliance with the minimum wage law and the child labor law.

Before a permit is granted to send out home work the commission must be assured that these laws are complied with by the factory. If the permit is granted and later a violation is found to exist, the permit may be recalled.

The greatest difficulty in administering the law is in determining whether the piece rate given for home work is adequate to yield the minimum rate prescribed by order of the commission.

The industrial commission is not opposed to home work, but insists that the rate paid should be adequate. The fact that the home worker may be satisfied with the rate does not mean that it is adequate, as the worker is often not in a position to seek out other opportunities for home work and she considers a little work better than nothing.

The reinforcement of the home work law led to the checking of several hundred firms to determine whether or not they are engaged in home-work manufacture. The result of this check showed the knitting and clothing industries to be those most commonly using home workers. Among the permits issued to Milwaukee firms, 17 were to knitting companies, 14 to clothing concerns or tailors, 5 to leather companies, 3 to hosiery, 2 to department stores, and 2 to lace-paper companies.

Legal regulations.—See paragraphs 2 and 3 of above statement. The field director also stated (May, 1926):

We do not issue permits to children under 17 years of age to engage in home work, and we make it the responsibility of the employer to see that the work given out in the homes shall not be done by children in the homes. If we do find that work is being done by children, the [employer's] permit is revoked.

Wyoming

No PREVIOUS study reported. The State labor commissioner reported (April, 1926) that Wyoming has no industrial home-work problem.

No legal regulation.

Home Work in the Men's Clothing Industry of New York

IN THE above summary reference is made, in the section devoted to New York, to a special study of home work in connection with the men's clothing industry in the cities of New York and Rochester. The study was undertaken with a double purpose: First, to learn the extent of the home-work situation from the standpoint of the numbers involved; and second, to estimate the value of this group of workers to the industry, judged by the relative number of factory and home workers involved and by the relative pay of these two groups.

The employers in New York are divided into three groups: The manufacturers, who usually confine themselves to buying the cloth, designing and cutting the garment, and selling the finished product; the inside manufacturers who, in addition, manufacture the garments in their own shops; and the contractors, who take the cut goods from the manufacturers and make up the garments. The contractor usually operates a small shop and specializes in one type of garment, making coats, pants, or vests. It has been estimated that about two-thirds of all the men's clothing in New York City is produced by the manufacturers and contract shops. Both contractors and inside manufacturers give out the garments to workers who perform certain operations upon them in their own homes. In Rochester the larger proportion of the work is done by manufacturers in their own shops, the element of contract work being subsidiary. Nevertheless, a certain part of the product is contracted out by almost all manufacturers, no matter how large their plants.

In New York City the investigation covered 89 firms, employing 7,062 factory workers; of these, 22 were inside manufacturers and 67 were contractors.

During the year July, 1924–June, 1925, an average of 966 home workers was employed by the 22 inside manufacturers and the 67 contractors investigated. This number rose to 1,207, the peak, in the month of September and fell to 740 in December, the lowest month of home-work employment. Inside manufacturers gave out work to 647 of the 966 home workers, contractors to 319. Coat contractors employed 208 persons on home work, pants contractors 74, and vest contractors 37.

The importance of these workers to the industry is indicated by the following data:

NUMBER OF FACTORY AND HOME WORKERS EMPLOYED BY INSIDE MANUFACTURERS AND CONTRACTORS

Class of worker	Employed by inside manufacturers		Employed by contractors	
	Number	Per cent	Number	Per cent
Factory workers.....	5,089	88.7	1,837	85.7
Home workers.....	647	11.3	307	14.3
Total.....	5,736	100.0	2,144	100.0

On the basis of these figures it is estimated that 13 per cent of all workers in the men's clothing industry in New York City are home workers and that their total number is approximately 5,000. The inside manufacturers pay 4.2 per cent and the contractors 5.2 per cent of their total pay roll to home workers. In Rochester the conditions were different, 2.7 per cent of the inside manufacturers' employees and 18.4 per cent of the contractors' employees being home workers, and the percentage of the two pay rolls going to them being, respectively, 1.5 and 8. It was estimated that 6 per cent of all workers in the Rochester industry were home workers.

More important than the actual number employed is the trend in regard to the use of home work as an adjunct to the garment-making industry, and in this respect the report is not reassuring.

No curtailment in the use of home workers is shown in either New York or Rochester. In New York, in fact, in inside shops, the per cent of home workers employed between 1920 and 1925 rose from an average of 8.8 per cent in the first half of the period to an average of 10.9 in the second half and from 11.5 to 12.3 between 1922 and 1925 in contract shops. Inside shops increased both factory and home workers during the period, but home workers at a faster rate than factory workers; contractors showed a bare increase in number of home workers in the face of a decline in general employment. In Rochester no real change in the relative use of home workers can be said to have taken place in inside or coat shops, the two groups studied.

This investigation did not include any study of the conditions under which home work was carried on, but the familiar features of irregular employment and small earnings were clearly brought out. Garment making, at best, is subject to marked seasonal fluctuations, and the home workers suffer from this more than the factory workers.

In New York inside shops 33 per cent of home workers employed at the peak of the fall season are laid off during the slack period which follows, in contrast to 14 per cent of factory workers. In contract shops 43 per cent of home workers are dropped, 24 per cent of factory workers. In Rochester inside shops 14 per cent of home workers employed at the height of the fall season are released during the dull period, 8 per cent of factory workers; in coat contract shops 25 per cent of home workers and 21 per cent of factory workers.

As to earnings, the following figures show the per capita earnings of the home and the factory workers in the two cities:

AVERAGE WEEKLY EARNINGS OF FACTORY WORKERS AND HOME WORKERS,
YEAR ENDING JUNE 30, 1925

Class of employer	Rochester		New York City	
	Factory workers	Home workers	Factory workers	Home workers
Inside manufacturer.....	\$25.92	\$13.76	\$34.81	\$12.11
Contractors as a unit.....	24.23	9.51	31.45	10.39
Coat contractor.....	27.15	9.14	30.71	11.23
Pants contractor.....	18.32	8.66	31.57	7.73
Vest contractor.....	23.18	9.66	32.37	11.78

With the exception of coat shops, Rochester home workers were nearer to factory workers in earnings than were New York home workers. In New York home workers tended to earn about one-third as much as factory workers, in Rochester more nearly half as much. In inside and pants shops home-work earnings were about 50 per cent of factory earning, in vest shops 42 per cent while only coat shops approximated the relationship shown in New York.

Regulation of Industrial Home Work in Pennsylvania

AS MENTIONED in the above summary, Pennsylvania has been making a systematic and sustained effort to control the conditions under which home work is done. Investigations made in 1924 revealed numerous violations of the law. As a result regulations were prepared which would, it was hoped, meet the situation, and in 1925 these were adopted by the State department of labor and industry. Since then the department has published various reports of the progress made. In March, 1927, an account was published of the first year's work in administering the new regulations.

Methods of Regulation

Two methods of regulation have been employed: First, the employer is interviewed to assist him in developing the necessary organization to bring his distribution of home work up to legal standards; and, second, agents of the Bureau of Women and Children investigate a representative number of homes to see whether the work is being carried on under legal conditions.

Of the 686 employers interviewed 470, or 68.5 per cent, agreed to work out plans of supervising their home work. The active cooperation of the employers in industries where the work is unskilled and therefore most liable to present special dangers in illegal employment of children was most gratifying. Every employer giving out home work on tags, agreed to supervise the work. A large proportion of employers giving out knit goods, tobacco, art needlework, and miscellaneous clothing, also promised to inaugurate some plan of supervision. In men's, women's, and children's clothing industries the establishing of systems of supervision was not so general. In many cases the actual owner of material distributing his work to a contractor, prefers to shift the responsibility of supervision on to the contractor. Clothing sometimes passes through two or three establishments before it finally reaches the home worker. This does not lessen the need for supervision of the homes in which the work is done, but it does highly complicate the whole problem of developing a plan of supervision.

Some employers meet the situation by putting on a full-time supervisor of home work, others have members of the firm, who have other duties as well, visit the homes and instruct the home

workers, and still others instruct the workers when they come to the factory for the work. Many have printed instructions calling attention to the regulations, and in some cases home workers have been required to sign a statement that all work would be done in accordance with these rules.

The visits of the agents of the bureau offer opportunity for a careful check upon the way in which the rules are observed, and reports are made to the employer. If the rules were not being obeyed, the employer was given a chance to correct the violations before the bureau took action. If a recheck showed that the law was being persistently violated, the employer was requested to cease sending work to that home. The effect of the supervision thus exercised is marked.

The illegal employment of children has always been the evil inherent in industrial home work. In a study made in 1924 before the present regulations went into effect, it was found that in 50 per cent of the 1,243 homes investigated which had children under 16 years of age, children were working illegally on home work. Of the 1,763 homes investigated during this first year of the administration of the home work regulations, 1,202 had children under 16 years of age. Children were found illegally employed in 23.5 per cent of these homes. Serious as this finding is, it shows a marked decrease since 1924 in the proportion of homes having violations of the child labor law. In 1924, in one-half of the homes with children, these children were permitted to work illegally; in 1926 less than one-fourth of the homes with children were permitting them to work illegally.

It is suggested that the reduction in the illegal employment of children may be even greater than is shown, since many of the visits of investigation were made at about the time the employer's plan of supervision was being inaugurated. In some cases where a group of homes was visited a second or third time, the proportion of violations was found to be materially reduced.

In conclusion, attention is called to the difficulty of enforcing regulations concerning work not done in the factory proper. Observance of the law is largely a matter of education, in which employers, workers, and the department all have their part to play. Progress is naturally slow.

One year's administration of the industrial home work regulations has not solved the problem. Many employers giving out work to be done in Pennsylvania homes unquestionably have not yet been reached and licensed. By the same token, many home-working families are yet unknown. The first year of regulation has shown an appreciable change for the better in the conditions under which home work is done and the Bureau of Women and Children believes that with the present regulations and the continued cooperation of the employers future violations of the law can be reduced to a minimum.

The Second Year's Work

IN March, 1928, the department issued a résumé of the second year's work in the enforcement of these regulations. The first year, it was explained, was devoted mainly toward the licensing of the home-work employers and toward developing with them methods for maintaining legal standards in homes where their work is done. During the second year, ending November, 1927, this was continued, but more time was devoted to inspections and educational work.

On November 1, 1927, the close of the second year's work, 1,161 home licenses were in force, an increase of 251 over the number effective a year earlier. The majority of the employers holding

licenses had rather few home workers. Nearly two-fifths (38.5 per cent) employed under 5, 19.4 per cent employed 5 and under 10, and 17.8 per cent employed 10 and under 25. The largest number of home workers was employed upon men's clothing, the next largest on knit goods, and the third on women's and children's clothing.

Of the 1,230 home-working families with children visited for the first time during the year, 308, or 25 per cent, were reported as showing violations of the child labor law. This was a slight increase over the proportion found in 1926, though owing to changing conditions the figures are not strictly comparable. The proportion of homes showing violations of the laws respecting the employment of women was noticeably smaller, only 9 per cent. A total of 2,277 visits was made to the homes, of which 173 were revisits, made necessary because of violations found at the time of the first visit.

Of the 157 cases where revisits were made because of violations of the child labor law, the violation had been corrected in 42 per cent of the cases, in 41 per cent children were still working in violation of the law, and in 17 per cent home work had been discontinued. For the violation of the woman's law the results were a little better. In two-thirds of the homes revisited the violations had been corrected.

Where the law is persistently violated after repeated warnings, a request to the employer to discontinue giving out work has seemed the only effective treatment. Between August 1, 1926, and November 1, 1927, such requests were made of 29 employers in cases of violations involving 133 homes. The discontinuance of work was not necessarily final, though it was often so; but in some instances where an agreement was made that satisfied the employer and the bureau that the law would be complied with in the future, the work was recommenced. In some cases employers withheld work on their own initiative, as a warning that the law must be respected.

In conclusion it is pointed out that the work is still largely educational, and that much remains to be done.

Two years' efforts in the administration of the industrial home-work regulations have not solved the home-work problem. The bureau of women and children is able, however, to define its task as never before. It is now known what industries and occupations, what employers, and what localities have the most acute child-labor problem and what are the more effective methods of preventing violations.

INSURANCE AND BENEFIT PLANS

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Types of Insurance and Benefit Plans

IN MANY foreign countries comprehensive insurance plans have been established or fostered by the Government for the protection of the working people against various industrial and physical hazards such as sickness, accident, unemployment, old age and death. In the United States such matters have been made a matter of legislation in any important degree only in the case of industrial accidents. The protection of the workers against the other contingencies of life and employment, if taken care of at all, is left entirely to voluntary actions, either through actual insurance or through benefit plans of various kinds. The following is a very brief summary of the present status of certain of the more important phases of this subject in the United States.

State Systems

AS ALREADY noted, the only social insurance systems established by State legislation in this country are those covering the subject of industrial accident insurance, usually referred to as workmen's compensation. Almost all of the States, as well as the Federal Government, have established comprehensive plans for compensation for injuries due to industrial accidents, including, in some cases, occupational diseases. These are described in detail in the section Workmen's Compensation, page 881.

In a few States, old-age pensions have been provided for by State legislation, this relief, however, being extended to the indigent aged without reference to industrial employment. This subject is covered in the section Old-age Pensions and Relief, page 527.

Establishment Plans

A VERY large number of industrial establishments now make provision for their employees in case of death, sickness, or other misfortune. Sometimes this provision is made on an insurance basis, sometimes through benefit associations, welfare organizations, etc.

The most interesting recent development along this line has been the extension of the group-insurance idea. At first, group insurance was limited to life insurance, but has since been extended to other forms of insurance.

The subject of establishment insurance and benefit plans including group insurance was included as part of the investigation of plant personnel activities recently made by the Bureau of Labor Statistics. A summary of the benefit features found in this survey is given below, page 442.

In a limited number of cases, industrial establishments have made provision to assure a certain regularity of employment to their employees. A discussion of these systems is given in the section, Unemployment Insurance and Relief, page 693.

Trade-Union Benefit Plans

VARIOUS trade-unions make provision for the payment of fixed benefits to their members in case of death, sickness, etc. In addition, the International Brotherhood of Electrical Workers has its own insurance organization known as the Union Cooperative Insurance

Association, and the American Federation of Labor has recently established a cooperative insurance company known as the Union Labor Life Insurance Co. Descriptions of the trade-union benefit plans and insurance companies are given on pages 448 and 454.

Collective Agreement Plans

IN A LIMITED number of cases, collective agreements between employers and trade-unions provide for certain insurance or benefit features. In the clothing trades there are several instances in which this method has been used to provide a form of unemployment insurance. This practice is closely allied to the practice of guaranteed employment and is discussed in the section entitled "Unemployment Insurance and Relief," page 693.

It is also interesting to note that certain recent street-railway agreements provide for the establishment of a sick-insurance plan. The practice is described in an article in the former handbook (Bul. No. 439).

Establishment Funds for the Benefit of Disabled Workers

A STUDY of the costs, benefits paid, and methods of management of establishment disability funds made by the Bureau of Labor Statistics covered 430 companies engaged in manufacturing or in commercial or transportation enterprises.

Mutual benefit associations are frequently maintained by the employees of an establishment without any assistance from the firm or with only the promise of financial aid by the company if a deficit should occur. These associations have been excluded from the report as being practically independent organizations. On the other hand, the associations which have been included vary greatly as to the extent of the assistance rendered by the firm. The details asked for in the study of industrial benefit associations were the amount of the firm's contributions, the amount of dues brought to a monthly basis, the amount of the weekly sick and accident benefits and of death benefits, the number of sick, accident, and death benefits, paid, and the amount paid out in benefits in the last fiscal year.

Benefit associations in which some material assistance was given by the firm were reported by 214 companies, either in the operation of the fund or in the payment of benefits. One hundred and seventy-seven of these establishments, with a total of approximately 993,000 employees, reported on the association membership. In these 177 associations, the membership was 758,067, or 76 per cent of the total number of employees. This may be considered quite a high percentage as in many cases there is a period varying from 2 weeks to a year after employment before an employee is eligible for membership.

The dues charged vary according to the proportion of the expenses paid by the employer and the amount of the weekly benefits. In nearly half of the associations, however, the dues ranged between 25 and 75 cents per month, while in 81 cases the dues vary according to wages or amount of benefits, but in general keep within these limits.

Fifty-six associations report that an initiation fee is charged. These fees vary from 25 cents to \$2, the usual fee being \$1, and in addition to

the entrance fee many of the associations charge a fee of \$1 or \$2 to cover the cost of the physical examination.

Disability benefits in most cases cover both sickness and accident but usually exclude cases of sickness or injury which entitle the employee to payments under the workmen's compensation laws of the different States. Since most of these laws do not provide for payments for the first week or the first two weeks of disability, the plans frequently provide for payments for the period intervening between the date of injury and the date of the first payment of workmen's compensation benefits. In a few cases, however, employees are paid for disability occurring as a result of employment.

Tables 1 and 2 show, by industries, the number of associations, the membership, the classified dues and benefits, and the percentage of expenses contributed by the companies.

TABLE 1.—NUMBER AND MEMBERSHIP OF BENEFIT ASSOCIATIONS AND CLASSIFIED DUES, BY INDUSTRY

Industry	Estab- lish- ments having benefit associ- ations	Establishments reporting membership in benefit associations				Number of associations whose dues per month were—					
		Num- ber	Num- ber of em- ploy- ees	Association members		25 and un- der 50 cents	50 and un- der 75 cents	75 cents and un- der \$1	\$1 and over	Vary- ing sums	
				Num- ber	Per- cent of total em- ploy- ees						
Manufacturing											
Automobile.....	8	8	46,569	42,114	90	5	-----	-----	1	-----	2
Boots and shoes.....	4	4	22,040	16,227	74	1	-----	1	-----	-----	2
Chemicals, soap, and allied products.....	6	3	6,290	5,067	80	1	1	-----	-----	-----	3
Clothing and furnishings.....	9	7	12,075	9,856	82	7	1	-----	-----	-----	1
Electrical supplies.....	11	9	100,603	66,502	66	3	3	-----	-----	-----	4
Fine machines and instru- ments.....	8	7	30,140	21,633	72	3	-----	-----	-----	-----	4
Food products.....	6	5	3,947	3,243	82	13	1	-----	-----	-----	2
Foundries and machine shops.....	32	28	102,938	72,505	70	17	7	-----	5	-----	10
Furniture.....	3	3	3,070	1,029	33	2	-----	-----	-----	-----	1
Gold and silver ware.....	2	2	3,605	2,955	82	-----	-----	1	-----	-----	1
Iron and steel.....	5	4	34,780	34,371	99	2	1	-----	1	-----	1
Oil refining.....	2	1	5,978	2,518	42	-----	1	-----	-----	-----	-----
Ore reduction.....	7	2	4,620	3,667	79	1	-----	-----	2	-----	-----
Paper.....	7	6	7,699	5,858	76	-----	4	-----	1	-----	2
Printing and publishing.....	5	5	7,725	5,231	68	1	-----	1	-----	-----	3
Rubber.....	3	3	15,919	11,304	71	-----	-----	-----	-----	-----	1
Slaughtering and meat pack- ing.....	2	2	48,500	39,956	82	-----	-----	1	-----	-----	1
Textiles.....	14	13	26,630	19,480	73	2	3	2	-----	-----	4
Miscellaneous.....	10	7	10,725	8,558	80	4	2	-----	-----	-----	2
Total.....	140	119	493,862	372,064	75	142	24	6	10	-----	44
Mining.....	10	7	11,596	9,872	85	3	2	1	1	-----	3
Offices.....	6	2	2,534	1,704	67	1	-----	-----	-----	-----	2
Public utilities:											
Steam railroads.....	3	3	276,620	233,214	84	-----	-----	-----	1	-----	2
Electric railroads.....	8	6	44,929	31,972	71	-----	1	1	5	-----	1
Gas, electricity, and telephone and telegraph.....	13	13	99,799	63,882	64	-----	2	-----	-----	-----	9
Total.....	24	22	421,348	329,068	78	-----	3	1	6	-----	12
Stores.....	31	25	60,022	42,989	71	4	6	-----	-----	-----	20
Other industries.....	3	2	3,890	2,370	61	1	1	-----	-----	-----	1
Grand total.....	214	177	993,252	758,067	76	151	36	8	19	-----	81

¹ Including 1 establishment in which the dues are under 25 cents.

² Including 2 establishments in which the dues are under 25 cents.

TABLE 2.—WEEKLY AND DEATH BENEFITS OF ESTABLISHMENT FUNDS, AND PROPORTION OF EXPENSE BORNE BY FIRM, BY INDUSTRY

Industry	Associations reporting benefits per week of—				Associations reporting death benefits of—				Firms paying toward expense of associations—					
	Under \$7	\$7 and under \$10	\$10 and over	Varying sums	Under \$100	\$100 and under \$200	\$200 and under \$300	\$300 and over	Varying sums	Under 50 %	50 and under 100 %	100 %	Flat sums	No fixed sum
Manufacturing:														
Automobiles.....	2	4	2	1	4				1	1			1	6
Boots and shoes.....	3		1	1					1	2				2
Chemicals, soap and allied products.....			5	1	2				2	1		1	1	3
Clothing and furnishings.....	4	1	1	3	3	1			2	2			1	4
Electrical supplies.....	2	2	5	1	1	5	1	1	3	1				10
Fine machines and instruments.....				3					2		2	1		5
Food products.....	1	3	1		2	2					2			4
Foundries and machine shops.....	3	10	9	9	3	12	4	4	4	5	1	3	4	19
Furniture.....	1	1		1	1					1	1			2
Gold and silver ware.....		1		1	2					1	1		1	
Iron and steel.....	1	2	1	1		2		1	1	2	2		1	
Oil refining.....				2				2				1	1	
Ore reduction.....	1		2					1	1					3
Paper.....	1		2	4	1	1			1	1	2		1	3
Printing and publishing.....	1		1	3	1				1	2			2	1
Rubber.....	1	1		1	1	1			1			1		2
Slaughtering and meat packing.....		1		1					2					2
Textiles.....		1	2	7	2	3			5	3	4	3	2	2
Miscellaneous.....			4	4		2	1		1		3	1	1	5
Total.....	16	28	32	47	18	34	11	9	26	15	25	11	16	73
Mining.....	1	1	2	1	1		1		2		3		4	3
Offices.....			1	2	1			1	2		2	3		1
Public utilities:														
Steam railroads.....			1	2				1	2					3
Electric railroads.....		4	3	1			1	3	1	1	2		1	4
Gas, electricity, and telephone and telegraph.....			2	9			2		4	1	6	3		3
Total.....		4	6	12			3	4	7	2	8	3	1	10
Stores.....	1	3	1	26	5	11	2		2		5		5	21
Other industries.....			3								2			1
Grand total.....	18	36	45	88	25	45	17	14	39	17	45	17	26	109

Employees of the large railroad systems, who are not, in general, subject to the workmen's compensation laws, have well-organized relief departments which receive substantial assistance from the companies. Compensation for disability from accidents occurring in the service varies for the different classes of membership and is paid for a period of 52 weeks and at half these rates thereafter, during the continuance of the disability.

Membership and Management of Associations

OF THE companies reporting on this point, 31 stated either that membership was compulsory or that employees were expected to join the association. In the latter case even though there is no definite rule to this effect, strong indirect pressure is brought to bear upon employees to become members. In some plants membership in the association is automatic, that is, employees become members as soon

as employed, while in a few cases employees are required to join, if eligible, after a waiting period usually of 2, 3, or 6 months.

Among the companies in which there is no pressure exerted upon employees to join the association there is very often a waiting period before becoming eligible. Fifty companies reported the length of time required before eligibility; of these 26 have a waiting period of one month after employment, 20 from two to six months, and 2 one year, while 2 companies required less than one month. In several cases, however, in which membership in the benefit association is optional with the employees they are allowed to join as soon as they are employed. A number of the associations require applicants for membership to be approved either by the membership as a whole, by the officials of the organization, or by the board of directors before they are allowed to become members.

Membership in these societies, especially in the larger ones, is frequently conditioned on passing a physical examination, in which case the examination may be given by a physician specially employed for this purpose or the employee may choose one of several designated physicians. In a number of cases the medical department of the plant works in close cooperation with the benefit association and in such cases the plant physicians examine applicants for membership, while in a few instances the medical department is turned over to the benefit association to manage.

In associations not requiring a physical examination it is customary for the prospective member to sign a statement to the effect that so far as he knows he has no disease which would debar him from membership. The penalty for making an untrue or fraudulent statement of this character is the forfeiture of membership in the association.

In the event the physical examination reveals some condition which would ordinarily debar from membership, some associations, admit such persons if they receive a majority vote of the board of directors or other officials on the condition that they exempt the association from liability for such ailments or for ailments for which such conditions may be responsible.

The management of the benefit associations is participated in largely by employees except in those cases where the funds are financed entirely by the companies. Many of the associations are managed by the employees alone while some stipulate that one or more of the offices shall be held by company officials. In large plants with many departments it is usual to divide the representation among the different departments so that there is equality of representation in the management of the association.

Length of Membership Required Before Becoming Eligible for Benefits

THE LENGTH of time which must elapse before the member is eligible for benefits is reported by 103 of the associations. In 27 of the societies members are entitled to receive benefits as soon as their application for membership is approved, while 40 have a waiting period of four weeks, 5 of two months, 11 of three months, and 2 of six months. In the remaining 18 cases the period varies from 3 to 15 days or is fixed for the first day of the month following admission to membership. In a few cases, although there is a waiting period for sick benefits, employees are eligible for accident relief at once,

and several associations require a longer period of membership before death benefits are paid than for sick and accident benefits.

The length of service required by companies which pay the entire costs of the disability funds varies for the companies reporting from 30 days to 2 years.

Time Between Beginning of Disability and Payment of Benefits

THE NECESSITY of guarding against the feigning of sickness or the making of slight illness an excuse to be absent from work is undoubtedly the reason that so large a proportion of the associations do not pay from the beginning of sickness. Many of these associations which provide for a waiting period in cases of sickness pay from the date of injury in accident cases, since the risk of malingering in cases of injury is generally not so great. Of 143 associations reporting on the number of days intervening between the beginning of the disability and the payment of benefits, 92 pay after 6 to 8 days' disability 6 pay from the first, 18 pay after the third day, 6 pay after 4 or 5 days and only one waits as long as 10 days, while a number pay from the first if the disability lasts a stated length of time.

The maximum time for which benefits are paid in any 12 months varies greatly. Twenty associations pay for 10 weeks, 45 for three months, 34 for six months, 9 for one year, and 29 for various fractions of a year, while 7 pay for various periods according to length of service. Eight associations report that benefits are paid for more than one year, in five cases the length of time being unlimited.

Forfeiture of Membership

IN THE majority of the associations membership is forfeited upon leaving the employ of the company, but in a number of cases it may be retained under certain conditions. Only one company reports that membership may be retained unconditionally, but a number allow members to remain in the association for the death benefit and several may remain several months during furlough or suspension, while it is a quite general provision that membership may not be terminated while a person is receiving benefits. One association refunds 50 per cent of the dues to any person leaving the association for any reason whatever if no sick benefits have been paid to date, or, if the sick benefits paid amount to less than 50 per cent of dues, the difference between the benefits paid and that amount is refunded.

In addition to the cash benefits which are the principal features of the benefit funds, a number of the associations do constructive work in promoting healthful conditions among employees and in furnishing medical and hospital care for them. These services include in addition to medical and surgical care, treatment by specialists including X rays and various necessary laboratory tests, and nursing service.

National Conference on Mutual Benefit Associations¹

A NATIONAL conference on mutual benefit associations was organized in the spring of 1928 by representatives of nationally known business establishments and other organizations. The conference is expected to serve as a clearing house of experience and

¹ News letter of National Conference on Mutual Benefit Associations, May-June, 1928, and article entitled, "Confer on Mutual Benefit Groups," reprinted from *Current Affairs*, July 2, 1928.

information on mutual benefit associations and to encourage the formation of these and similar organizations in order that there may be developed a keener appreciation of and interest in health promotion in industrial undertakings.

Although mutual benefit associations as first organized were designed to meet the need of the members for assistance in the event of sickness or death only, they have developed with the generally increased interest in the prolongation of life so that one of their important functions now is the promotion of better health conditions among industrial workers. The problem which is presented by the contingencies of sickness, accident, old age, and death can be met only in one of two ways—either through the personal and group initiative of employers and groups of employees or by legislation and public direction. In European countries the State has largely assumed the task of maintaining the system of insurance against these eventualities for the mass of the workers but the theory of State responsibility has been slower of acceptance in this country. It was the belief, however, of those organizing the present movement that the "encouragement of self-action and intelligent dealing with acute problems of self-protection will prove the only alternative to State control."

In the new association, which is expected to have a national scope, chambers of commerce, management associations, and employers and employees who have a history of successful cooperation in the field of industrial relations are cooperating and their discussions have served to clarify the purposes of the mutual benefit association movement and the problems the associations have to meet. A representative of the Associated Industries of Massachusetts, for example, stated that the problem is an important one to the manufacturers of that State for, as they see it, it is not a problem simply of providing for benefits in the way of aids in case of sickness, accident, or death, but it is one of securing better employees to carry forward the industries of the State. Speaking of the reasons for which benefit associations are formed, the director of an association covering from six to eight thousand employees said that the old argument that benefit associations would reduce the turnover and build up the reliability and morale of the force did not seem to him an important element but that benefit associations were a means of raising the efficiency of the working force and delaying superannuation. He urged the managers of benefit associations, therefore, to study their records to ascertain if the amount of time lost really is diminished by the workings of their associations.

The importance of the physical examination, especially the periodic examination, and of the medical work of the associations was stressed by many of the speakers. It is in the intelligent evaluation of the effects of the employment, the institution of measures to safeguard the health of employees, and the measures which may be taken as a result of the physical examination to prevent or delay the onset of disabling illness that the mutual benefit association finds its greatest field of usefulness. The opportunity offered by the study of the disabilities of large groups of employees, to correct conditions leading to disability which would be unnoticed if cases were dealt with solely on the basis of the individual, is evident. The analysis of sickness records reveals the more frequent causes of disability and enables those in charge of health activities to improve or guard against the

causes of these conditions. When a company has, therefore, by accumulated data, discovered the principal causes of disability, a point of attack is secured which often enables those in charge of the health work to clear up the causes or greatly ameliorate conditions.

In summing up the objectives of the national conference it was stated that the business cost of absences through illness amounts to at least half a billion dollars annually, and that, because of this loss, the national conference was organized to make American industry "health-conscious."

Trade-Union Benefits and Insurance

General Trade-Union Benefits

MOST UNIONS pay some kind of trade-union "benefits." The first benefit usually provided is the strike and lockout benefit, then generally are undertaken the "welfare" benefits—payment of varying amounts in case of the death of a member, in case he becomes disabled for work from injury or illness, or is temporarily debarred from working at his trade because of sickness. The death benefit is the welfare benefit most generally found; sickness and disability benefits are paid in about equal numbers of cases, and a few unions pay for tuberculosis or for special disablements common to the trade, as for instance, loss of sight, by the granite cutters. Assistance to members in time of unemployment is another function often undertaken by labor organizations.

In 1927-28 the Bureau of Labor Statistics undertook a survey of the activities of American trade-unions,² including among other things the trade-union "benefits" so called. The study was confined to the national and international unions. Of the 96 unions of nationwide scope which were known to have or to have had some form of welfare benefit, data were secured from 78. Of these, 63 pay benefits for death, 14 for disability, 12 for sickness, 13 make some provision for aged members, and 20 have some form of insurance. Eight unions pay tuberculosis benefits or provide for treatment of the tubercular. Seven organizations maintain homes for the aged and disabled, and two of these also maintain a tuberculosis sanatorium in connection with the home. The increasing popularity of group insurance is indicated by the fact that nine unions have such insurance and three are known to have substituted it for the death benefit formerly paid.

In the majority of cases all members in good standing are entitled to benefits by virtue of their membership in the organization, the cost being covered by the general trade-union dues. In some cases, as for instance where insurance is provided by the union, the member may be required to take this protection, paying an additional amount to cover the cost. In certain other cases, participation in a specified benefit is optional.

Kinds of Benefits Provided

TABLE 1 shows for each trade-union from which data were secured the kind of benefits paid, the year when each kind of benefit was established, the amount of the benefit, and in the case of weekly benefits the number of weeks for which payable.

² The results of this study have been published as Bulletin No. 465.

This table covers benefits paid for death, disability, sickness, tuberculosis, old age, etc., and any special provision made for dependents of deceased members. Trade-union pensions and homes for aged members are discussed on page 534; the health work of labor unions, including the tuberculosis sanatoriums and treatment is described on page 506.

TABLE 1.—YEAR OF ESTABLISHMENT AND AMOUNT OF EACH KIND

Union	Death benefit		Disability benefit		Sick benefit	
	When established	Amount of benefit	When established	Amount of benefit	When established	Rate of payment
Bakery and confectionery workers.....	1909	{ ¹ \$50- \$350 ² 27- 75			1895	\$10 per week
Barbers.....	(³)	100- 500			(³)	do
Blacksmiths and drop forgers.....	1919	50- 300				
Bookbinders.....	⁴ 1920	75				
Boot and shoe workers.....	1900	100- 200	1906	\$100 to \$200.	1900	\$5 per week ⁵
Bricklayers, masons, and plasterers.....	1910	50- 300				
Bridge and structural-iron workers.....	1903	100- 400	1920	\$25 per month.		
Broom and whisk makers.....	1893	75- 200				
Butcher workmen.....	(³)	300				
Carpenters and joiners.....	1882	{ ¹ 50- 300 ² 25- 75	1882	\$50 to \$400.		
Commercial telegraphers.....	1922	75- 125				
Conductors, railway.....						
Diamond workers.....	1906	400- 750				
Electrical workers.....	1922	300-1,000				
Flint-glass workers.....	(³)	300				
Foundry employees.....	(³)	100				
Fur workers.....	1913	100				
Garment workers (United).....	1922	50- 300				
Granite cutters.....			⁶ 1909	\$750, flat sum.		
Hatters.....	1907	{ ⁷ 100- 300 ⁸ 100- 150			1912	{ \$7 per week ⁷ \$5 per week ⁸
Headgear workers.....						
Hod carriers.....	1903	50- 100				
Hosiery workers.....	1922	1,000				
Hotel and restaurant employees.....	1902	75				
Iron, steel, and tin workers.....	{ ¹ 1903 ² 1909	100- 500				
Lace operatives.....	1892	{ ¹ 200-1,000 ² 25- 50				
Lathers.....	1902	50- 400				
Leather workers.....	(³)	¹⁰ 75- 200			(³)	\$7 per week ¹⁰
Lithographers.....	1883	100-1,000				
Locomotive engineers.....						
Locomotive firemen and enginem.....	1914	225	1926	{ \$50 per month during disability.		
Machinists.....	(³)	50- 300				
Maintenance-of-way employees.....	1920	50- 300				
Metal polishers.....	1910	50- 200				
Molders.....	1880	600- 700	1880	{ \$600 to \$700.	1896	{ \$5.20 per week. ¹² 7.60 per week. ¹³
Painters, decorators, and paper hang- ers.....	{ (³)	{ ¹ \$50-\$400 ² 25- 50	(³)	\$50 to \$400.		
Paper makers.....	1911	50- 300				
Pattern makers.....	1905	50- 400	1905	50 to 400.	1905	\$4 per week
Photo-engravers.....	1903	{ ¹⁴ 100 ¹⁵ 200				

¹ Members.² Wives.³ Not reported.⁴ Present rate.⁵ After first week of sickness.⁶ Pay only for disability caused by loss of sight.⁷ Men.⁸ Women.⁹ "Once in a lifetime."¹⁰ Benefit discontinued; only older members now receive it.

OF WELFARE BENEFIT PAID BY SPECIFIED TRADE-UNIONS

Sick benefit, period for which paid	Miscellaneous benefits				Union
	Kind of benefit	When established	Rate of payment	Period for which paid	
16 weeks					Bakery and confectionery workers.
do					Barbers.
					Blacksmiths and drop forgers.
					Bookbinders.
13 weeks	Old-age pension	1915	\$7 per week	Life	Boot and shoe workers.
do	do	1920	\$25 per month	do	Bricklayers, masons, and plasterers.
					Bridge and structural-iron workers.
					Broom and whisk makers.
					Butcher workmen.
	Home for aged	1928		Life	Carpenters and joiners.
	Old-age pension	1929	\$15 per month	do	
	Home for aged	1927		Life	Commercial telegraphers.
	"Relief"	(¹³)	Not to exceed \$50 per month.	Left to discretion of board.	
	Optical care	1910	\$3 every 2 years		Conductors, railway.
	Old-age pension	1927	\$40 per month	Life	
					Diamond workers.
					Electrical workers.
					Flint-glass workers.
					Foundry employees.
					Fur workers.
					Garment workers (United).
	Old-age pension	1905	\$60 per year	Life	Granite cutters.
					Hatters.
7 weeks	Tuberculosis	1917	\$75 ¹⁴		Headgear workers.
					Hod carriers.
					Hosiery workers.
					Hotel and restaurant employees.
13 weeks					Iron, steel, and tin workers.
					Lace operatives.
					Lathers.
10 weeks					Leather workers.
					Lithographers.
	Home for aged	1891		Life	Locomotive engineers.
	Old-age pension	1913	\$25 to \$65 per month.	do	
	Home for aged	1891		do	Locomotive firemen and enginemen.
	Old-age pension	1920	\$30 to \$70 per month.	do	
	Tuberculosis	1920	\$75 ¹⁵	Disability.	Machinists.
	"Benevolent"	1900	\$50 per month	Left to discretion of board.	
					Maintenance-of-way employees.
					Metal polishers.
13 weeks					Molders.
					Painters, decorators, and paper hangers.
					Paper makers.
13 weeks					Pattern makers.
	Tuberculosis	1908	\$15 per month ¹⁶		Photo-engravers.

¹¹ Per month if not in sanatorium; if in sanatorium not to exceed \$100 per month plus \$15 for personal expenses.

¹² "Honorary" members; i. e., in good standing but not working at the trade.

¹³ Regular members.

¹⁴ Apprentices.

¹⁵ Journeymen.

¹⁶ And \$10 for medical examination.

TABLE 1.—YEAR OF ESTABLISHMENT AND AMOUNT OF EACH KIND

Union	Death benefit		Disability benefit		Sick benefit	
	When established	Amount of benefit	When established	Amount of benefit	When established	Rate of payment
Plate printers and die stampers.....	1924	(¹)				
Plumbers and steam fitters.....	1902	\$150- 500			1902	\$5 per week
Pocketbook workers.....						
Post-office clerks (National Federation).					1913	\$10 per week ⁴
Potters.....	1911	50- 300				
Printers.....	1892	75- 500				
Printing pressmen.....	1906	100- 700				
Quarry workers.....	(²)	50- 125				
Railroad signalmen.....	1923	(²²)	1923	(²²)		
Railroad trainmen.....	1912	²³ 300				
Railway and steamship clerks.....	1922	100-1, 500				
Railway carmen.....	1916	50- 250	1916	(²⁵)		
Railway workers (American Federation).	1905	100				
Retail clerks.....	²⁶ 1905	²⁶ 25- 200				
Roofers and waterproof workers.....	(²)	200				
Sheet-metal workers.....	(²)	100- 500				
Shoe workers.....	1901	100				
Stereotypers and electrotypers.....	1904	200- 300				
Stove mounters.....	(²)	500				
Street and electric railway employees..	1892	50- 800	1892	50 to 800		
Switchmen.....	(²)	300				
Tailors.....	1889	20- 100	(²)	{ \$2.50 to \$4 per week ²⁵ }	1907	\$5 per week ²¹
Textile workers.....	1907	25- 25				
Train dispatchers.....	1925	³⁰ 300-1, 000				
Wall-paper crafts.....	1923	50- 300				
Window-glass cutters and flatteners....	1919	100				
Window-glass cutters and flatteners (Protective Association).	(²)	500				

¹ Not reported.² After first week of sickness.³ Left to discretion of board.⁴ Treatment in sanatorium at cost not to exceed \$18 per week.⁵ Treatment in union's sanatorium.⁶ Not yet in operation.⁷ Nominal amount; funds have not yet permitted payment of full amount.⁸ Varies according to membership; 10 cents for every participating member.⁹ Maximum.

OF WELFARE BENEFIT PAID BY SPECIFIED TRADE-UNIONS—Continued

Sick benefit, period for which paid	Miscellaneous benefits				Union
	Kind of benefit	When established	Rate of payment	Period for which paid	
13 weeks					Plate printers and die stampers.
13 weeks	"Relief"		(17)	(17)	Plumbers and steam fitters.
					Pocketbook workers.
					Post-office clerks (National Federation).
	Tuberculosis	1913	(18)	6 months	Potters.
	Home for aged	1891		Life	
	Old-age pension	1907	\$3 per week	do	Printers.
	Tuberculosis sanatorium.	1891	(18)	Disability.	
	Home for aged	(20)		Life	
	Old-age pension	1925	\$7 per week ²¹	do	Printing pressmen.
	Tuberculosis sanatorium.	1916	(18)	Disability.	
	Old-age pension	(1)	\$50, flat sum		Quarry workers.
					Railroad signalmen.
	Home for aged	1891		Life	
	Old-age and disability pension.	1925	{ \$35 to \$70 per month.	do	Railroad trainmen.
	Tuberculosis	1923	(24)	Disability.	
	"Benevolent"	1895	(17)	(17)	
					Railway and steamship clerks.
					Railway carmen.
					Railway workers (American Federation).
					Retail clerks.
					Roofers and waterproof workers.
					Sheet-metal workers.
					Shoe workers.
	Tuberculosis sanatorium, supported by locals.	1903		Disability.	Stereotypers and electrotypers.
	Old-age pension	1912	\$800, lump sum		Stove mounters.
					Street and electric railway employees.
					Switchmen.
10 weeks					Tailors.
					Textile workers.
					Train dispatchers.
					Wall-paper crafts.
					Window-glass cutters and flatteners.
					Window-glass cutters and flatteners (Protective Association).

²⁴ All expenses of treatment in sanatorium.²⁵ Full amount of death benefit payable in case of total disability.²⁶ Prior to 1905 paid a flat sum of \$100 after 1 year's membership.²⁷ In present form.²⁸ Payable for 10 weeks each year for 3 years, after having received 2 years' sick benefits; disability benefits amount to \$4 per week for first year, \$3.50 per week for second year, and \$2.50 per week for third year.²⁹ Subject to an all-time limit of \$200.³⁰ Varies according to membership of benefit association; death benefit, \$1 for each member at time of death.

Trade-Union Insurance for Members

MANY LABOR ORGANIZATIONS, instead of or in addition to the regular union benefits, have an insurance plan by which members may take out insurance covering death, accident, or sickness, or all of these. In the majority of unions from which data were secured, the insurance is written by a special insurance department of the union; in some cases, especially where group insurance is carried, this is secured from one of the two general union insurance companies—the Union Cooperative Life Insurance Co. of the electrical workers or the Union Labor Life Insurance Co. (See p. 441.) Others obtain the protection from some old-line insurance company.

In all cases the insurance is limited to members of the union who are in good standing.

Table 2, following, shows the kind of insurance offered to members of specified unions, when the plan was established, the range of benefits provided, and the premium cost:

TABLE 2.—KINDS OF INSURANCE PROVIDED BY TRADE-UNIONS AND AMOUNT AND COST OF POLICY

Union	Kind of insurance	When established	Amount of insurance policy offered		Amount of premium
			Minimum	Maximum	
Boilermakers.....	Group life and disability. ¹	1925	\$1,000	² \$3,000	\$15 per \$1,000 per year.
Brick and clay workers....	Group life.....	1927	(³)	1,000	(³).
Cigar makers.....	do.....	1927	100	350	
Conductors, dining car.....	do. ¹	1923		⁴ 500	\$8 per year.
Conductors, railway.....	Life and total disability.	1868	1,000	⁵ 1,000	\$1.50 to \$7.50 per month, according to occupational risk and amount of policy.
	Accident.....	1919	⁶ 1,500	⁷ 2,500	\$2.25 to \$3.75 per quarter, according to amount of policy; for extra-hazardous occupations, \$5.25 to \$10 per quarter.
Conductors, sleeping car....	Life and disability.	1919		1,000	Assessments as needed.
Headgear workers.....	Group life.....	1927	600	1,000	\$1 per month.
Leather workers.....	Group life ¹	1923	250	500	\$4 to \$8 per year, according to amount of policy.
Letters carriers (National Association).	Life.....	1891	500	3,000	\$0.90 to \$7.13 per \$1,000 per month according to age at entrance.
	Sickness and accident.	1911		⁸ 500	65 cents per month.
	Life and loss of limb or eye.	1867	1,500	6,000	Assessment of 50 cents for each \$1,500 of insurance.
Locomotive engineers.....	Accident.....	1906	⁹ 1,000	¹⁰ 2,000	\$2.50 to \$10 per quarter, according to amount of policy.
	Sickness and medical care.	1918	¹¹ 10	¹¹ 30	\$2.75 to \$15 per quarter, according to amount of policy.
Locomotive firemen and enginemen.	Life and loss of member.	1882	500	4,500	\$13.20 per \$1,000 per year.
	Accident.....	1917	¹² 1,000	¹³ 2,000	\$14.40 to \$50.40 per year, according to amount of policy.
Machinists.....	Life and disability.	1921	500	500	50 cents per month.
Post-office clerks (National Federation).	Group life ¹	1923	500	1,500	\$1.82 to \$11.65 per \$1,000 per year, according to age.
Post-office clerks (United National Association).	do. ¹	(³)		2,000	(³).

¹ Through an old-line company.

² With double indemnity in case of accidental death.

³ No data.

⁴ Without medical examination.

⁵ With medical examination.

⁶ And weekly indemnity of \$15 for not to exceed 52 weeks.

⁷ And weekly indemnity of \$25 for not to exceed 52 weeks.

⁸ Payable at rate of \$10 per week.

⁹ And weekly indemnity of \$10.

¹⁰ And weekly indemnity of \$30.

¹¹ Weekly indemnity.

¹² And weekly indemnity of \$7.

¹³ And weekly indemnity of \$30.

TABLE 2.—KINDS OF INSURANCE PROVIDED BY TRADE-UNIONS AND AMOUNT AND COST OF POLICY—Continued

Union	Kind of insurance	When established	Amount of insurance policy offered		Amount of premium
			Minimum	Maximum	
Railroad telegraphers.....	Life.....	1898	300	1,000	\$2.40 to \$7.20 per year, according to amount of policy.
Railroad trainmen.....	Life and disability.	1884	700	5,000	\$9 to \$64.80 per year, according to amount of policy.
Railroad yardmasters.....	Group life ¹	1925	-----	1,000	\$16.20 per year.
Railway and steamship clerks.	Nonoccupational accident.	(²)	-----	500	\$2.50 per year.
Railway mail clerks.....	Life.....	1874	-----	2,000	(³).
	do.....	1924	-----	1,000	Assessment of \$1.10 per member.
	Accident.....	1898	-----	4,000	Office and terminal employees, \$9.50 per \$1,000 per year; road service employees, \$12.50 per \$1,000 per year.
	Immediate relief.	1924	-----	1,000	\$1.10 assessment for each death.
Switchmen.....	Life and disability.	1901	425	2,550	\$1.40 to \$4.50 per month, according to size of policy.

¹ Through an old-line company.² No data.³ And also payment for certain disabilities and accidental death.

Sick and Death Benefits by Collective Agreement

A NEW departure and one which may be of significance for the future has been made in the street-railway industry. The clothing industry originated the idea of unemployment insurance for the industry; the street-railway industry is the first as far as this bureau is aware to inaugurate the establishment of death benefits and life insurance by collective agreement.

In the fall of 1926, under the terms of a decision of an arbitration board, provisions were inserted in the agreement between the Chicago Rapid Transit Co. and the Amalgamated Association of Street and Electric Railway Employees (elevated lines) by which the employer agreed to bear the whole cost of group insurance for the employees. The policies covered both sickness and death, one year's service with the company being required for eligibility to the insurance. The policy provided for sick benefits of \$20 per week for 26 weeks in any year, and life insurance of \$1,000.

Similar benefits were obtained for employees of the surface lines of the same city by an arbitration award made January 21, 1928, and an agreement was reached to incorporate the terms of this latter award in the new collective contract for the elevated lines.

By an agreement signed July 25, 1927, between the Public Service Co. of San Antonio, Tex., and Division No. 694 of the Amalgamated Association of Street and Electric Railway Employees, the company undertakes to pay \$1,000 death benefit, besides making a contribution to the union sick benefit department amounting to 35 cents per member per month.

The agreement, signed March 25, 1928, by the Amalgamated Association of Street and Electric Railway Employees and the Mitten Management (Philadelphia) provides that on all street railways taken over in the future by the Mitten Management, funeral, dis-

ability, old-age, and other benefits will be taken over by the union, and toward these the company will pay \$1 per month per man.

Industrial Group Insurance Plans

GROUP INSURANCE, although a comparatively recent development in the field of industrial relations, has each year become of increasing importance. From 1911, when group insurance was first written, up to 1916, the movement progressed fairly steadily, the amount of insurance in force December 31, 1912, being \$13,172,198 and on the same date in 1916, \$152,859,349. After 1916, the amounts of group insurance being written increased very rapidly, however, so that at the end of 1926 more than 75 companies were writing this form of insurance and it was estimated that the insurance in force amounted to about \$5,600,000,000.

As a part of a survey by the Bureau of Labor Statistics of the personnel activities carried on by employers in various types of industrial establishments, information was secured as to the number of companies which offer insurance to their employees under the group plan. A similar study was made by the bureau in 1916-17 in the course of which schedules were secured from 431 establishments in various sections of the country. In the recent survey practically the same number of companies, many of them identical, were studied. In the earlier study only 32 of the companies visited had inaugurated a group insurance plan, while in the present study 186 companies with 672,468 employees were found to have such a plan in effect.

The usual reason given by employers for taking out group insurance is the desire to show their appreciation for faithful and loyal service. It is probable, however, that one of the primary reasons with many employers, at least at first, was the idea that it would contribute to the stability of the working force. Again, it was also considered desirable to provide this protection for employees since many of them, either through carelessness, inability to pass the physical examination, or because of the expense did not carry any insurance, and in such cases when an employee died the company frequently had to assist his family or the "hat was passed" among the employees and the collection used to relieve the family's distress.

In spite of its increasing popularity it has been questioned whether group insurance has affected the labor turnover to any considerable degree, since it is in the main the older employees, who are unlikely to change their place of employment anyway, who are most interested in the plan. No data were secured on this point, but it seems to be true that life insurance generally has little appeal for young persons, and may not be of great importance, therefore, as an inducement to the younger employees to remain with a firm, although the extension of the insurance to include disability and endowment features will undoubtedly make it much more attractive to them.

Of the firms visited in connection with the survey, only 10 had discontinued group insurance after having tried the plan. The reasons given in the different cases were that it was too expensive for the results obtained, that there was a lack of interest and appreciation, and one firm after trying group insurance for six years

gave it up because the average age of the employees made the premiums too high, while another considered that the benefit association "did more good" and therefore discontinued the insurance plan. On the other hand, a large railroad gave up its mutual benefit association upon the adoption of group insurance, and one other establishment substituted a contributory plan for the free insurance because the employees wished to pay part of the cost.

A Survey of Industrial Group Insurance

GROUP INSURANCE viewed from the standpoint of its importance as a personnel problem in industry is the subject of a report issued in 1927 by the National Industrial Conference Board.⁴

Reports from 618 companies having approximately 1,235,000 employees were used as the basis of the study and more than 800,000 of the employees in these establishments were covered by the insurance, the amount of the insurance totaling over \$1,300,000,000. All but about 5 per cent of these plans were found to have been started since 1917, the increase in the number of plans being especially marked during and immediately after the close of the war, when labor was hard to obtain and difficult to hold. In many instances the desire to have a more satisfied force and thus reduce the labor turnover was the reason for starting group insurance. Thus of 430 companies reporting their reasons for the inauguration of group life insurance for their employees, 218 stated that it was to reduce the labor turnover or to secure better cooperation and loyalty on the part of their employees.

The hazards covered by the different plans were death or death and permanent total disability in 537 cases; 4 plans covered sickness and accident disability only; and 77 plans covered death, permanent total disability, and sickness and accident disability.

Although at first the group life insurance policies were paid for entirely by the employer, the contributory plan in which both employer and employees share in the cost has been steadily growing in favor. A classification of the amount of insurance according to type showed that 47.6 per cent was noncontributory, 45.8 per cent was contributory, and 6.6 per cent was additional insurance paid for entirely by the employees. As the employer pays at least 25 per cent of the cost of the contributory insurance it is evident that a very large part of the insurance held on the employees covered in this survey is paid for by the employer.

A classification of the average amount of life insurance per employee by the size of establishment showed that there was a general tendency for this to increase with the size of the plant. The average amount of insurance per employee was \$1,102 in establishments having less than 200 employees and \$2,229 in those with over 25,000. The average annual premium for each \$1,000 of group life and total disability insurance is estimated to be between \$10.50 and \$12, which would bring the total cost of carrying this insurance to between 55 and 65 millions of dollars annually, the larger part of which is borne by employers.

Group sickness and accident insurance was carried by 81 of the 618 companies and covered approximately 10 per cent of the employees

⁴ National Industrial Conference Board (Inc.). Industrial Group Insurance. New York, 1927. 44 pp.

in the companies supplying data for the investigation. This form of insurance usually covers sickness and temporary accident disability from nonoccupational causes. The average weekly benefits of employees insured for these causes in three of the largest insurance companies in the country were \$11.44, \$12.97, and \$13.37, respectively. In the majority of the companies in which this type of insurance is provided the cost is borne jointly by the employer and the insured employees, although in 17 cases the employer alone paid the premium and in 13 cases the employees alone.

Legal Status of Issuance of Group Life Insurance Policies to Labor Unions ⁵

GROUP life insurance was first written in 1912 and has had a remarkable growth. By the end of 1926, the total group life insurance in force throughout the United States was \$5,426,000,000. In Wisconsin, \$103,000,000 of group insurance was in force at the end of 1927, of which \$38,000,000 was written in the last year.

Nearly all of the group insurance outstanding has been issued to employers for the protection of their employees while continuing in employment. Quite early, however, it was proposed to extend the same form of coverage to other groups, besides the employees of a single employer. This led to the adoption of a resolution by the national convention of insurance commissioners in 1918 defining group life insurance, as follows:

Group life insurance is that form of life insurance covering not less than 50 employees with or without medical examination, written under a policy issued to the employer, the premium on which is to be paid by the employer or by the employer and employees jointly, and insuring only all of his employees, or all of any class or classes thereof determined by conditions pertaining to the employment, for amounts of insurance based upon some plan which will preclude individual selection, for the benefit of persons other than the employer: *Provided, however,* That when the premium is to be paid by the employer and employee jointly and the benefits of the policy are offered to all eligible employees not less than 75 per cent of such employees may be so insured.

It will be noted that this definition confines group life insurance to the employees of a single employer and requires that the employer must pay the premium, in whole or in part.

While relatively unimportant, some group life insurance has been written upon a broader basis than this definition of the insurance commissioners. Policies have been issued by some companies to cover National Guard and State police units, fraternal organizations, teachers and other professional associations, and, recently, labor unions.

Some group policies covering local labor unions apparently were issued by old-line companies prior to the organization in 1925 of the Union Cooperative Insurance Co., sponsored by the International Brotherhood of Electrical Workers. Only since the organization of the Union Labor Life Insurance Co., in 1927, however, has group life insurance by labor unions attracted much attention. This company was promoted by the American Federation of Labor and in less than a year had more than \$35,000,000 of insurance in force. Much of

⁵ Contributed to the Labor Review for November, 1928, by Edwin E. Witte, Wisconsin Legislative Reference Library.

this insurance is group insurance issued to international or local unions, although this company has also issued policies to individuals.

Legislation Upon Group Insurance

WHILE all, or nearly all, States now permit the writing of group insurance, this is done in a majority of the States without express statutory sanction. Only about one-fourth of the States define group insurance by statute; in fact, in most States this term does not occur in the insurance laws.⁶ In these States group insurance is governed, at least in theory, by the same laws which apply to other forms of life insurance. These laws, and particularly the so-called "antidiscrimination" laws, can be construed to prohibit any and all forms of group insurance. Hence, in States which do not have special group insurance laws, the forms of group insurance which may be written depend upon the rulings of the State insurance commissioners. As will be seen later, these rulings in a number of States have sanctioned group insurance only within the limits prescribed by the national convention of the insurance commissioners in 1918, while in other States, which also have no laws upon the subject, group policies have been allowed to be written upon groups other than the employees of a single employer.

In the States which have special group insurance laws there is the same divergence. Indiana, Iowa, Michigan, Nebraska, North Carolina, Oklahoma, Oregon, and Washington adhere to the definition of the insurance commissioners, with but minor modifications, if any. On the other hand, Arizona, California, Maine, Massachusetts, New Jersey, and New York have by statute authorized the writing of group insurance upon a broader basis.

Forms of Group Insurance Allowed to Be Written

BECAUSE the legal status of the several types of group insurance depends in most States upon departmental rulings, a questionnaire was sent to the insurance commissioners of all States. Usable replies were received from only 31 States (counting the District of Columbia as a State), but these included all important industrial States except Pennsylvania.⁷

From the replies received it appears that 10 States adhere strictly to the definition of group insurance, which was adopted by the insurance commissioners in 1918, namely, Connecticut, Florida, Indiana, Iowa, Minnesota, Nebraska, North Carolina, South Dakota, Washington, and Wisconsin. Michigan has written substantially the same definition into her statutes, but expressly authorizes the issuance of group policies to National Guard companies and by departmental rulings allows "wholesale" insurance, which is practically the same

⁶ Special statutes defining and regulating group life insurance have been enacted in the following States: California (Pol. Code, secs. 629a and 629b); Indiana (Burns' Stats., secs. 8958-8962); Iowa (Laws of 1919, ch. 197); Massachusetts (Laws of 1918, ch. 112, as amended by Laws of 1921, ch. 141, and laws of 1928, ch. 244); Michigan (Laws of 1925, Act 372); New Jersey (Laws of 1927, ch. 53); New York (Laws of 1928, ch. 129); North Carolina (Laws of 1925, ch. 58); Oregon (Laws of 1927, ch. 170); and Washington (Laws of 1927, pp. 732-735). Provisions in antidiscrimination or other general insurance laws which legalize and define group life insurance occur in: Arizona (Rev. Stats. of 1913, sec. 3449); Maine (Ins. Laws of 1925, sec. 139); Nebraska (Ins. Laws of 1925, sec. 7857); and Oklahoma (Laws of 1925, H. B. 130). Group life insurance is legalized, but not defined in: Connecticut (Laws of 1919, ch. 138); and Kansas (Laws of 1927, ch. 231, sec. 40-410).

⁷ Besides Pennsylvania, no replies were received from Alabama, Arkansas, Colorado, Delaware, Georgia, Idaho, Kansas, Louisiana, Mississippi, Montana, New Mexico, North Dakota, Rhode Island, Texas, Utah, Virginia, and Wyoming.

as group insurance, except that each individual who is insured must be given a separate policy containing the entire contract. In Missouri the department reports some group insurance policies have been written upon a broader basis than the definition of the insurance commissioners, but also expresses the opinion that these policies probably violate the antidiscrimination law of that State. In Oklahoma a group policy was issued about a year ago to a teachers' association, but this violates the statutory definition of group insurance, which differs from that of the insurance commissioners only in the minimum number of employees who may be covered by a group policy. North Carolina by statute defines group life insurance as did the insurance commissioners, but the attorney general has held that group policies may, nevertheless, be issued to National Guard companies. In all the States mentioned in this paragraph, except Michigan, group life insurance policies may not be issued to labor unions, and in Michigan such coverage may be extended only under the "wholesale" plan.

On the other hand, in 18 States group life-insurance policies may legally be issued to labor unions. These States are: Arizona, California, Illinois, Kentucky, Maine, Maryland, Massachusetts, Nevada, New Hampshire, New Jersey, New York, Ohio, Oregon, South Carolina, Tennessee, Vermont, West Virginia, and the District of Columbia. In Arizona, California, Massachusetts, New Jersey, and New York, this is expressly provided by statute, while in the remainder of these States the sanction for the issuance of group life-insurance policies to labor unions is to be found in departmental interpretations of general insurance laws.⁸

Of the five States which by statute expressly authorize the issuance of group policies to labor unions, only Arizona has extended this right to all kinds of organizations. New York allows group policies to be issued to National Guard companies and State police units, as well as to employers and to labor unions, while California, Massachusetts, and New Jersey have broadened the 1918 definition of the insurance commissioners only to sanction group policies to labor unions. Where group insurance by labor unions is not expressly authorized, on the other hand, the insurance commissioners (except in Illinois, Kentucky, Maryland, and West Virginia), hold that group policies may be issued to any kind of an organization.

Arguments Concerning Issuance to Labor Unions

IN THE questionnaire to the insurance commissioners, they were asked to express their opinion upon the advisability of legalizing the issuance of group life-insurance policies to labor unions. As was to be expected, the commissioners generally defended the position taken by their particular States and their replies are of interest only for the arguments which they present on both sides of this question.

In favor of legalization of the issuance of group life-insurance policies to labor unions, the principal argument is that since employers may take out group insurance policies, the labor unions in fairness ought to be allowed to do the same thing. Group insurance, undoubtedly, has been used by some employers to keep their em-

⁸ In Oregon a 1927 statute authorized fraternal benefit societies to write group life insurance and this has been construed by the insurance commissioner to include the Union Labor Life Insurance Co.

ployees from joining labor unions and, particularly, from going on strike or leaving their employment. Labor unions, it is argued, should be permitted to offset such tactics by resorting to the same means to win and hold the loyalty of workingmen and to give their members freedom to seek the most favorable opportunities for employment without having to give up their insurance protection.

Besides this it is argued that many members of labor unions now have no other life insurance and that a group policy relieves the unions from the necessity of "passing the hat" when a member dies. To meet this contingency many unions have established their own death-benefit funds, but many of these funds are actuarially unsound, or at least not strong financially. It is also urged that since most unions are composed of men working at the same craft, and most of their members are in the prime of life, labor unions afford a homogeneous and favorable risk—an essential for group insurance.

In opposition to the legalization of the issuance of group-insurance policies to labor unions, the principal argument is that such a step leads inevitably to throwing the doors wide open to group insurance for all kinds of organizations. This, it is feared, will hinder the development of individual life insurance. This, it is urged, would be very undesirable, since individual insurance admittedly affords more complete protection than does group insurance, which is essentially term insurance, terminable not at the choice of the assured, but of some other person or organization.

The only other argument against the extension of the definition of group insurance to include labor unions advanced by any of the commissioners, was that such a step would nullify the antidiscrimination laws, by allowing the members of labor unions to get life insurance at lower rates than are open to other people of the same age and classification. A breaking down of the antidiscrimination laws "will bring life insurance into disrepute," in the language of one commissioner.

Both of these negative arguments, of course, apply with equal force to group insurance of the recognized type, covering the employees of a single employer. It would appear, hence, that the question of the advisability of legalizing the issuance of group policies to labor unions in final analysis comes down to the desirability of group life insurance in any form.

Sickness Insurance in Various Countries

THE International Labor Conference at its seventh session, held in 1925, passed a resolution requesting the International Labor Office to continue its work of collecting information with regard to social insurance, and studies covering both the compulsory and voluntary insurance of wage earners against sickness have accordingly been made.⁹

⁹ International Labor Office. Studies and reports, series M, No. 6: Compulsory Sickness Insurance; and No. 7: Voluntary Sickness Insurance. Geneva, 1927.

Compulsory Insurance

THE POINTS covered, so far as possible, for each of the 24 countries having a compulsory sickness insurance system were: The classes and number of workers subject to the law; the nature and the amount of the benefits; the division of costs between the State, the employers, and the workers; total annual cost; methods of administration; annual expenditure; and the use of social insurance reserves for the improvement of public health.

The first country to make sickness insurance compulsory was Germany, where it was instituted by Bismarck for political reasons in 1883. Industrial workers were covered by the first plan and in 1885 it was extended to commerce and the following year to agriculture. Austria and Hungary introduced a system of compulsory sickness insurance for workers in industry, transport, and commerce in 1888 and 1891, while the principle of compulsory insurance was adopted by Luxemburg in 1901, Norway in 1909, Serbia in 1910, Great Britain and Russia in 1911, and Rumania in 1912. The systems in force in Estonia and Latvia are based upon the Russian law of 1911.

The European States created by the peace treaties have passed laws amending the insurance schemes they inherited. Thus Czechoslovakia in 1919, Poland in 1920, Austria in 1921, and Yugoslavia in 1922 made sickness insurance compulsory for all wage earners; Bulgaria in 1924 extended the 1918 law to cover all classes of workers; and Portugal in 1919 and Greece in 1922 also adopted the principle. In Soviet Russia a system of compulsory insurance was incorporated in the 1922 Labor Code, taking the place of the system of public assistance established in 1918. Lithuania passed a sickness insurance law in 1925, which has not yet been put into effect, and France, after several years of consideration of the question, has recently established a vast scheme of compulsory insurance against sickness, invalidity, old age, and death.

Countries outside of Europe which have adopted compulsory systems are Japan (1922) and Chile (1924).

Scope of Present Laws

The scope of compulsory sickness insurance laws is determined principally by the basis of the contract of employment; that is, the laws are intended to apply to wage earners as a class and not to other population groups. Only three countries—Chile, Portugal, and Switzerland (some of the Cantons)—have extended the insurance beyond the workers and made it compulsory for persons of small means working on their own account. As voluntary insurance for the latter class, which is a supplementary provision in many compulsory schemes, has had very little success, it seems probable, according to the report, that compulsory sickness insurance will long retain its character of working-class legislation.

The number covered by sickness insurance varies greatly between countries, the proportion of insured persons ranging from 3 to 35 per cent of the total population and from 15 to 86 per cent of the employed population. These differences are accounted for by the difference in importance of the wage-earning class in each country and by the insurance being limited to certain groups in some of the countries. The present tendency is toward the removal of restric-

tions, and in 18 countries the insurance now applies to all wage earners in industry and commerce, and restrictions based on the size of undertakings and degree of risk have, except in Japan and Estonia, altogether disappeared.

The inclusion of agricultural workers in these schemes has been slower, owing to the difficulty in administering benefits, but experience has shown that these difficulties can be overcome, and as these workers are organizing into trade-unions and demanding social legislation the situation is rapidly changing. Compulsory insurance has been extended, as a result, to agricultural workers in 11 countries, in 10 of which the system has been adopted during the past 15 years. The movement is also being extended to include occupational groups, such as domestic servants and home workers, whose status is more difficult to define. The system of deducting the workers' contributions from wages has solved the difficulty presented in the case of persons who work for several employers, and this system also makes it possible to extend the protection to temporary workers and to seasonal workers.

On the other hand, there is a decided tendency to restrict the application of insurance so that nonmanual workers whose earnings exceed a certain amount shall not be included, and in certain important schemes recently proposed such a limit would be imposed even upon manual workers.

Benefits

The usefulness of compulsory insurance depends not only upon its scope but also upon the nature of the benefits. During the evolution of the system tendencies have developed toward broadening the benefits so that not only the immediate needs of the sick person unable to work will be covered but the amount of preventable sickness will be reduced. There are two ideas in regard to the amount of the sickness benefit—one that the benefit should provide for a strict minimum of existence during the period of inactivity, and the other that the sick person should be maintained at his standard of living and should therefore receive a benefit proportionate to the living standard. This variable benefit based on the standard of living of the insured person was universally adopted in continental Europe before the war and has been a feature of all the compulsory insurance laws which have been passed since that time. In several countries, too, the benefit rate is increased in cases of prolonged sickness where the resources of the patient have been exhausted, while in a growing number of countries family responsibilities are considered in deciding the benefit rate. Such family allowances are provided in the German mining insurance law and in the general insurance laws of Bulgaria, Chile, Estonia, Lithuania, and Rumania, and they are optional and may be added to the basic rate of benefit in Austria, Czechoslovakia, France (Alsace-Lorraine), Germany, Great Britain, Latvia, Poland, and Yugoslavia. The idea that restoration of the patient rather than the payment of compensation alone is desirable has resulted in the provision of medical aid and drugs, and in all the more recent laws treatment by specialists and convalescent care are also provided for. In most schemes the cost of these benefits is quite as high as the cost of cash allowances and in some cases is even greater.

Sickness insurance is also being extended to cover the worker's family, maternity benefit and medical and drug service for the entire

family being included. Such service is provided in the insurance systems of Czechoslovakia, Hungary, Latvia, Norway, Poland, Rumania, Yugoslavia, Austria, Lithuania, and Portugal, while in Germany and Luxemburg insurance institutions have taken advantage on a large scale of the right to provide medical care for the families of the insured workers. As a result, tens of millions of workers' households in European countries are entitled to free medical treatment, and sickness insurance has thus become the means of carrying on a consistent health program for the masses of the population.

Division of Insurance Costs

In apportioning the costs of sickness insurance among the State, the employers, and the workers, it is much more difficult to arrive at a fair proportion than in the case of workmen's compensation, where the employer's responsibility is more clearly defined. In the case of sickness it is hardly possible to fix the degree of responsibility for each group, although it is clear that the workers, the employers, and the State are all vitally interested in the effects of the insurance. In view of the fact that these three groups all have an interest in the success of the insurance the costs are met in many cases by these groups. Soviet Russia is the only country which has not accepted the principle of the workers' contribution, and Rumania and five Swiss Cantons do not require contributions from employers. The question of participation by the State in the insurance costs is still a subject of controversy, however, and in only about half of the compulsory sickness insurance schemes does the State contribute.

In the different systems the contribution of the insured person is rarely less, and almost always equal to or greater, than half the total contribution, while the employers' contribution varies from a third to a half of the total contribution and the State's contribution varies widely both in character and amount. The States' share may take the form of a fraction of the total contribution, a specific allowance for each person insured, a share in the total cost of all the benefits, or it may cover the special benefits only, such as maternity and nursing benefits or the family allowances. With the extension of the insurance activities into the field of public health it is probable, however, that the justification for financial aid from the public treasury will receive increased recognition.

Insurance Institutions

In most countries the insurance has been organized on the basis of the existing insurance institutions: Friendly societies, trade funds, and territorial funds. This policy, which is actuated by a desire to preserve the existing institutions, has often resulted in a mixture of different types of funds, among which insured persons are distributed in widely varying proportions.

The movement in Europe, however, has been toward territorial funds and away from trade funds and friendly societies. The grouping of all the insured persons in a particular area in a single institution has various advantages. Thus in a fund in which all kinds of trades are represented, the good and bad risks counterbalance each other, and as the membership is stable it is much less influenced by economic disturbances and unemployment crises than trade funds.

Such funds are also particularly well adapted to the organization of medical benefits.

The management of the insurance institutions is, in all but two countries, either in the hands of the insured persons alone or the insured persons and employers, or the public authorities may also be represented. State management exists only in Bulgaria and to some extent in Japan, but even in these countries it is regarded as only a temporary feature.

The management of the funds by the parties concerned seems to fulfill conditions required for efficiency and to be generally satisfactory. The general practice is to give the insured persons the strongest representation, and recent legislation reveals a well-marked tendency to increase the influence of insured persons in the management of insurance funds.

In summing up the tendencies revealed by the study the following statement is made:

Sickness insurance is endeavoring to fulfill ever more completely its task of protecting the health of the working-class family and maintaining the workers' capacity to produce, by widening the circle of insured persons, perfecting the system of benefits which perform the threefold function of relief, cure, and prevention, concentrating the means of action, and systematically organizing autonomous institutions under the control of the parties concerned.

Thus, compulsory sickness insurance, as creator of security, health, well-being, and productive capacity, and as instrument of education, is an element both important and necessary in the proper economic and social organization of communities.

Voluntary Insurance

IN A NUMBER of countries which have not adopted the plan of compulsory insurance against sickness, the establishment of insurance institutions by private initiative has been encouraged by the State. In these countries the laws give the mutual-aid movement a more favorable position than commercial companies and provide financial assistance from public funds. Legislation of this kind has been adopted in Italy (1886), Sweden (1891), Denmark (1892), Belgium (1894), Finland (1897), France (1898), Spain (1908), and Switzerland (1911). Voluntary insurance schemes are also found in Argentina, Australia, Canada, Great Britain, New Zealand, Union of South Africa, and Uruguay, and to a limited extent in India and Palestine.

In countries in which the societies benefit by special advantages in return for the obligations and supervision to which they are subject, the conditions under which they are approved by the State usually relate to the obligation to undertake insurance on the mutual principle, the admission of members, financial balance, auditing, and the rules for the investment of capital. The special advantages which they receive are the extension of legal capacity, exemption of certain rates and taxes, and, in many countries, the grant of public subsidies. The highest proportion of recognized funds is found in those countries in which the State contribution is a substantial one, while in countries such as Italy, where the public subsidies are small and not paid regularly, the institutions prefer to waive recognition by the State and carry on their work under the general law.

Types of Insurance Institutions

Insurance institutions are organized either as trusts or associations and are classified, according to the rules governing membership, into open and closed funds. The former admit all persons to membership who satisfy the conditions of age, health, and income prescribed by the law or the rules of the funds and the latter restrict their membership to persons working in the same undertaking (works funds), those in the same occupation (trade funds), or those belonging to the same political party or having the same religious belief.

Works funds and trade funds are found in all countries, while political funds are particularly well developed in Belgium and the Netherlands and denominational funds are also found in these two countries. The closed funds are formed often on a combined trade and religious basis or on a combined trade and political basis. In Belgium and Finland the predominating type is the closed fund, while in Denmark, France, Sweden, and Switzerland the open fund prevails and the closed funds have only a small membership. Organization of funds on a territorial basis is almost complete now in Denmark and has made much progress in Sweden and Switzerland and to a lesser extent in Belgium, Finland, France, Australia, New Zealand, and Uruguay. In Spain the number of territorial institutions has decreased, but there has been a corresponding increase in the denominational funds.

Conditions of Admission

In general, the insurance funds are free to fix the conditions of membership and they may if they wish accept members regardless of their economic situation. In Denmark and France, however, the recognized sickness-insurance funds may admit only persons whose wages or income falls below a certain fixed maximum. In the earlier funds the tendency was toward strict limitation of membership, but at the present time the regulations on admission are becoming more liberal, although for financial reasons the funds generally try to secure their members from among the younger elements of the population, among whom the risk of sickness is relatively low. In order to eliminate bad risks the voluntary insurance institutions almost uniformly exclude persons who do not reach a certain health standard, so that in practice voluntary insurance is not open to the persons who most need medical protection. In Belgium, Sweden, and Switzerland an attempt has been made toward correcting this condition, and in Denmark persons who are unable to work as a result of incurable disease must be admitted by recognized funds, and the State is responsible for the additional expenditure incurred. While from the social standpoint the system is said to have yielded excellent results, it is considered that it is essentially a system of State relief carried on through the voluntary system and that the burden to the State is heavier than is the case under a system of compulsory insurance.

Age of admission is usually within the limits of 16 years and 45 years, although in some countries in recent years there has been an effort to develop the insurance of children by setting up school-insurance funds.

In Denmark and Finland the conditions of admission create very definite legal privileges for the workers, as they alone may join the insurance funds subsidized by the State. In Denmark, also, it is usual for employers to insist that their employees belong to a recognized sickness fund, with the result that while the system is theoretically one of workers' voluntary insurance, in practice it often becomes compulsory owing to the action taken by employers.

The cost of supervision under the voluntary system is prohibitive when members leave the area in which a fund operates, and as a result in nearly all cases there is a residential clause under which persons lose their membership when they leave the area of the fund. This is one of the great disadvantages of the voluntary funds, as a person who has passed the age limit and can not satisfy the conditions of the fund in his new place of residence is thus unable to provide for the future at the very time when his need is greatest. In Switzerland the right of free transfer has to a large measure offset this disadvantage, although it has not given entire satisfaction either to the organizations or to the members.

Membership

The growth of voluntary insurance in most countries has been slow, and it is said that as a whole the results are not satisfactory except in Denmark where in 1925 over 57 per cent of the population were insured. In other countries the proportion of insured persons ranged at that time from 1 per cent in Canada to 14.3 per cent in Belgium.

Most sickness funds do not classify their members by occupation or social position so that it is not clear in many cases how large a proportion are wage earners. In Denmark wage earners constitute 81 per cent of the total number insured, in Sweden 65 per cent, and in Switzerland about 60 per cent, but in many countries comparatively few of the workers belong to the funds. The small membership is attributed mainly to the fact that at the present time a large number of workers, especially those with families, do not earn enough to pay insurance contributions. The fact that the class among whom disease and infant mortality are most serious does not benefit to any great extent by the sickness insurance, is considered to be the weightiest objection to the voluntary form of insurance.

Financial Resources

The funds are supported mainly by the members' contributions. Other sources of revenue are voluntary contributions of employers, State subsidies, interest on capital, donations and legacies, and receipts from entertainments. The contributions by the States vary. In Italy and Spain the State subsidy takes the form of relief, which is granted only in exceptional circumstances, in Belgium, Denmark, France, Sweden, and Switzerland the State contributes regularly to the insurance institutions, and in the other countries there is no State contribution.

Benefits

The benefits granted by the voluntary insurance funds include cash payments, medical and surgical care, drugs and hospital treatment, etc. The cash benefits include in addition to the daily allowances, assistance to convalescents, allowances to dependents of deceased members, nursing benefits, and funeral benefits. The daily benefits, however, quite generally afford insufficient relief, as nowhere have they been raised proportionately to the increase in the cost of living. For example, in Belgium the mutual benefit societies pay their sick members only 3 or 4 francs a day and other countries show practically the same low scale of benefits, particularly those in which the currency has most depreciated.

The tendency toward taking steps to restore the health of the sick person which has been evidenced by the compulsory insurance schemes is also evident in the voluntary schemes, although to a less marked degree. In Belgium, where voluntary sickness insurance has grown rapidly since 1920, the family medical service alone has cost more than 50,000,000 francs out of a total expenditure on benefits of 82,000,000 francs.

In summing up the results of the voluntary insurance movement it is said that in spite of the force of this movement of social solidarity it has failed to provide a satisfactory solution of the problem of workers' insecurity, its effectiveness being limited by three obstacles: Small and unstable membership, insufficient revenue and benefits, and dispersal of effort,