
UNITED STATES DEPARTMENT OF LABOR

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Wage Structure of the Nonferrous Metals Industry, 1941-42



Bulletin No. 729

{Reprinted from the *Monthly Labor Review*, June, July,
August, and October, 1942, with additional data}

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LETTER OF TRANSMITTAL

UNITED STATES DEPARTMENT OF LABOR,
BUREAU OF LABOR STATISTICS,
Washington, D. C., January 14, 1943.

The SECRETARY OF LABOR:

I have the honor to transmit herewith a report covering a study made by the Bureau of Labor Statistics of the wage structure of the nonferrous metals industry, 1941-42.

A. F. HINRICHS, *Acting Commissioner.*

HON. FRANCES PERKINS,
Secretary of Labor.

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PREFACE

The survey of the wage structure of the nonferrous metals industry was undertaken in the fall of 1941 in recognition of the importance of the industry in the production of war materials and in anticipation of the critical wage problems which subsequently developed. This was the first comprehensive wage survey of the industry. Earlier surveys by the Bureau of Labor Statistics, however, had covered important branches of the industry. In 1924 and in 1931 the mining of nonferrous metals was included in a general study of wages in metal mining. (See U. S. Bureau of Labor Statistics, Bull. No. 573.) A survey of wages in copper and brass mills was made in 1927. (See *Monthly Labor Review*, August 1928, pp. 131-138.)

The broad scope of the present survey was determined in recognition of the high degree of integration of the industry. The production of nonferrous metals is dominated by a few large concerns which engage, directly or through subsidiaries, in mining, milling, smelting, refining, and the primary stages of fabrication. Some of these producers turn out completely fabricated consumer goods requiring much intricate processing. Two or more productive processes are frequently encountered in the same establishment or on the same premises. Economic developments in one branch of the industry generally exercise a direct and immediate influence on the other branches. Collective bargaining commonly involves workers engaged in several stages of production.

The survey covered the production of copper, lead, and zinc and their alloys, and included representative establishments producing mercury, manganese, molybdenum, and tungsten. Available information regarding wages in the aluminum industry has been withheld from publication to avoid disclosure of the operations of one large concern. The material secured permits presentation of considerable detail regarding wages in the production of the individual metals. Insofar as possible, separate detail is also presented by stage of production and by region.

The results of the Bureau's survey were widely used throughout 1942 by the various war agencies; particularly by the National War Labor Board in the settlement of labor disputes. In the summer of 1942 the wage data for mining, milling, smelting, and refining were brought up to date and were used in the important wage negotiations which were under way in these branches of the industry at that time. The results were published as a series of four articles in the June, July, August, and October (1942) issues of the *Monthly Labor Review*. These articles are reproduced in this bulletin with little change.

The study was conducted in the Bureau's Division of Wage Analysis, under the general supervision of Robert J. Myers. Harry Ober planned and directed the study and prepared the report on wages in 1942. The three reports on wages in 1941 were prepared jointly by Mr. Ober and Mr. Jacob Loft. Abner C. Lakenan and Frederick Mohr supervised the tabulation of the data.

A. F. HINRICHS,
Acting Commissioner, Bureau of Labor Statistics.

*Bulletin No. 729 of the
United States Bureau of Labor Statistics*

[Reprinted from the MONTHLY LABOR REVIEW, June, July, August,
and October, 1942, with additional data]

**Wage Structure of the Nonferrous
Metals Industry, 1941-42**

SUMMARY

Straight-time hourly earnings in the various branches of the nonferrous metals industry in August 1941 covered a wide range. Workers in mercury mines, for example, averaged only 61.2 cents per hour, while workers engaged in the alloying, rolling, and drawing of copper, brass, and bronze averaged 88.7 cents. The working force consisted almost exclusively of males.

Workers employed in mines and mills averaged 74.5 cents, with slightly more than one-third (34.3 percent) concentrated in the 10-cent range from 72.5 cents to 82.5 cents per hour. Except for the low rates prevailing in mercury mining, wage differences by type of metal were not marked. Compared on a regional basis, wages were highest in the western area and lowest in Michigan (47.9 cents).

Straight-time earnings averaged 79.8 cents in smelting and 78.3 cents in refining. Zinc smelters (83.5 cents) paid the highest average wage in this branch of the industry, while mercury smelters paid the lowest (60.5 cents). Eastern smelters and refineries, paying 89.1 cents and 82.2 cents on the average, maintained the highest wages, while the lowest wages were found in the Southwest (63.7 cents and 68.7 cents, respectively).

Workers engaged in the primary fabrication of nonferrous metals earned an average of 79.5 cents. Individual branch averages ranged from 88.7 cents paid in the alloying, rolling, and drawing of copper, brass, and bronze to 70.1 cents in secondary smelters. Earnings were highest in the New England States, where numerous occupational classes averaged more than \$1 an hour; and lowest in the South. No information was obtained regarding wages in the advanced fabrication processes.

As a result of numerous wage increases, straight-time hourly earnings were considerably higher in June 1942 than they had been in the earlier period. The smallest increase was in the smelting of lead, where earnings rose by 4 cents per hour to an average of 80.8 cents; the largest increase, 11.3 cents per hour, was in the mining and milling of copper and raised the average for this branch to 84.1 cents. Data for primary fabrication are not available for the second period. In June 1942 approximately one-third of all workers engaged in mining and milling and about half the workers engaged in smelting and refining earned 90 cents an hour or more.

PART I.—EARNINGS IN MINING AND MILLING OF NONFERROUS METALS, AUGUST 1941

Scope and Method of Survey

From the standpoint either of production volume or of extent of consumption in our modern economy, copper, lead, and zinc are the most important nonferrous metals. The production and fabrication of these metals into castings, sheets, rods, tubes, extrusions, and forgings therefore constitute the most important part of the nonferrous metal survey. Such minor metals as mercury, molybdenum, tungsten, and manganese also received consideration, but the mining of bauxite and its reduction into alumina and aluminum were not included.

The survey of the nonferrous-metal mining industry was made on the basis of a stratified sample covering about one-half of the establishments in copper, lead, and zinc, and mercury mining and milling, and about one-half of the workers. In order to assure the representativeness of the mines and mills included in the sample, careful consideration was given to size of the establishment, type of metal produced, geographic location, and corporate affiliation. Mines and mills employing fewer than 20 workers, however, were not covered. These smaller plants, which employ but a small proportion of the workers in the industry, were not considered suitable for inclusion with the larger establishments because of the narrowness of their occupational pattern and the instability of their operation. The data for the survey were collected from actual pay rolls by trained field representatives of the Bureau for a period in August 1941. The information obtained includes detailed records of hours worked, total earnings, and occupational descriptions, as well as the sex and color of each employee.

For the purposes of this survey, "mining" is considered to apply mainly to the operations involved in the actual extraction of ore and the necessary preparatory work in the stopes. Concurrently with this activity, however, mining establishments frequently engage in prospecting, exploration, and development, and it is impossible to dissociate the labor engaged in the latter operations from mining proper. Mines in which exploration, development, and prospecting were the sole or primary activities were not studied. Prospecting is a term generally applied to the search for and discovery of ore bodies at the surface. Exploration refers to the search for new ore bodies and extension of known ore bodies. Development involves those preparatory mining operations leading to the extraction of ore.

Milling, concentration, or ore dressing is the process of preparing the crude ore for more economical transportation and further processing. This involves the removal of much of the waste material from the mass of ore, and the separation of the various constituents of the ore so that in each kind of ore only one valuable metal predominates. These processes involve sorting the bulk or ground ore by mechanical methods or by hand, and the direct recovery of the metal by amalgamation and leaching.

Characteristics of the Industry

IMPORTANCE OF THE INDUSTRY

The mining of nonferrous metals does not furnish employment to any large proportion of the workers in the United States. The industry is, however, fairly concentrated on a regional basis and in such regions as the Tri-State District, the Idaho area, and other western mining regions, it provides an important source of employment and income for many communities.

Preliminary Census reports for 1939 contain data for mines and mills which reported a value of product or cost of development work amounting to at least \$2,500. The average number of wage earners reported by the Census for mines and mills producing copper, lead, zinc, mercury, tungsten, and molybdenum ores was about 42,000 in 1939. Of this number, 24,000 were employed in the extraction and primary treatment of copper ore, 15,000 in lead and zinc ore production, 700 in tungsten, 600 in mercury, and 900 in molybdenum. Since 1939, of course, employment in mining has increased considerably as a result of increased requirements of the war program.

From 1909 to 1939 the number of mines engaged in copper, lead, and zinc production was drastically reduced. In the earlier year there were 368 active copper mines as contrasted with 49 in 1939. Over the same three decades the number of lead and zinc mines recorded by the Census declined by nearly four-fifths. In part, this decline is the result of changes in reporting; prior to 1919 the Census excluded only those mines whose product was valued at less than \$500 per year, while after 1919 mines reporting a value of product of less than \$2,500 were excluded. In part, however, the reduction in number reflects the exhaustion of some mines and the abandonment of others with low-grade ore. Wide variation in the number of active mines from period to period results from changes in the prices of metal. To some extent, too, the reduction in the number of mines reflects the tendency toward consolidation of small working units into large mine units, a tendency which is still operating.

Employment in the mining industry is subject to wide cyclical fluctuations. From 1909 to 1939 the average number of wage earners in copper mining and milling declined by over half, with the major portion of the decline occurring in the decade following 1929. The working force in lead and zinc mining rose by about half from 1909 to 1929, but during the decade following 1929 it fell below the 1909 level.

Employment in mining over these three decades declined more sharply than the output or the value of the total product. Mechanization of mining, as well as the development of new methods of production, contributed considerably toward the reduction of labor requirements. The outstanding developments in mining during these years include improved methods of mine lay-out; improved drills and blasting practices, improved transportation and hoisting facilities, the introduction of mechanical loading, and the discovery of new methods of stoping (such as square setting and block caving). Important, too, were improvements made in the mills in the methods of treating low-grade ores—especially the flotation process which made possible the treatment of tailings formerly discarded, as well as the mining of low-grade ore bodies.

LOCATION OF THE INDUSTRY

The major copper-producing areas are Michigan, the Southwestern States of Arizona and New Mexico, the California, Nevada and Utah area, and the Northwestern States of Idaho, Montana, and Washington. Important shifts in production occurred in these regions from 1909 to 1939. Thus, Michigan, which produced about one-fifth of the total copper in 1909 in terms of value of the product, contributed only 7 percent of the total output in 1939. The relative share of Idaho, Montana, and Washington also dropped, during this period, from over a third to only a sixth of the total. By way of contrast, the combined share of California, Nevada, and Utah rose from one-sixth to over one-third between 1909 and 1939, and Arizona and New Mexico's proportion of the total output rose from one-fourth to over one-third.

Census figures for lead and zinc extraction show concentration in two main regions: The Mississippi Valley, with principal concentration within the Tri-State District (Jasper and Newton Counties, Mo., Cherokee County, Kans., and Ottawa County, Okla.); and the West, consisting of Arizona, Colorado, Idaho, Montana, Nevada, New Mexico, Utah, and Washington.

Less than 1 percent of the total value of lead and zinc was produced by mines of the western region in 1909, whereas, in the same year, the lead and zinc produced in the Mississippi Valley accounted for over four-fifths of the total value. The proportion of the total output produced in the latter region declined in succeeding years to somewhat over two-fifths of the total in 1939, while the value of the lead and zinc products of the western region rose during the same period to two-fifths of the total.

Table 1 indicates the regional distribution of the mines and mills included in the Bureau's survey.

TABLE 1.—*Sample of Nonferrous-Metal Mines and Mills Covered by Bureau's Survey*

Branch and region ¹	Number of units	Workers		Branch and region ¹	Number of units	Workers	
		Number	Percent			Number	Percent
All regions.....	160	26, 205	100. 0	Lead and zinc mines.....	54	9, 232	35. 2
Copper mines ²	22	10, 083	38. 5	West.....	18	5, 459	20. 8
Northwest.....	8	4, 116	15. 7	Tri-State.....	32	2, 854	10. 9
Southwest.....	11	4, 584	17. 5	East.....	4	919	3. 5
Michigan.....	3	1, 383	5. 3	Lead and zinc mills.....	37	2, 833	10. 8
Copper mills.....	14	2, 275	8. 7	Northwest.....	5	1, 081	3. 9
Northwest.....	3	651	2. 5	Southwest.....	9	524	2. 0
Southwest.....	9	1, 452	5. 5	Tri-State.....	19	957	3. 7
Michigan.....	2	172	. 7	East.....	4	321	1. 2
				Mercury mining.....	16	444	1. 7
				Other mining.....	9	912	3. 5
				Other milling.....	8	426	1. 6

¹ For States included in the various regions, see footnotes to tables 6, 7, and 8.

² Includes 3 open-cut mines.

CHARACTERISTICS OF THE LABOR FORCE

The labor force for the mining and milling of nonferrous metals is composed exclusively of males. The plants are found mainly in small communities, and draw a substantial proportion of their workers from agriculture. At present considerable numbers are also

recruited from the service industries and from marginal manufacturing establishments.

Mining generally involves hard labor and unpleasant conditions of work. It requires much knowledge and skill of the miner, and less skill but more industry on the part of the mucker. Considerable knowledge is also required to perform a number of other operations, such as the care and operation of hoisting equipment, and provisions for safety, drainage, and ventilation. In addition, maintenance of transportation facilities, tools, and machines requires experience and skill. Most of the mines visited by the Bureau's representatives reported anticipated or actual shortages of skilled miners and muckers. Upgrading of muckers and of miners' helpers to miners was one method resorted to by operators to cope with this situation. New employees hired were taken on mainly as miners' helpers and muckers.

The working force consists mainly of white workers, but substantial proportions of Mexican labor are found in the Southwest. Some Negroes are also employed in various regions, but their number is comparatively insignificant. The proportions of the different types of workers in the mines and mills studied by the Bureau are indicated in table 2.

TABLE 2.—*Composition of Labor Force in Nonferrous-Metal Mining and Milling, August 1941*

Branch	White other than Mexican		Mexican		Negro		Other	
	Work-ers	Per-cent	Work-ers	Per-cent	Work-ers	Per-cent	Work-ers	Per-cent
Mining, total.....	18,586	89.9	1,842	8.9	38	0.2	205	1.0
Copper.....	8,429	83.6	1,465	14.5	3	(¹)	186	1.8
Lead and zinc.....	8,892	96.3	288	3.1	35	.4	19	.2
Mercury.....	418	94.1	26	5.9				
Other.....	847	92.9	65	7.1				
Milling, total.....	4,954	89.5	526	9.5	5	.1	49	.9
Copper.....	1,727	76.0	496	21.8	3	(¹)	49	2.2
Lead and zinc.....	2,804	99.0	27	1.0				
Other.....	423	99.3	3	.7	2	(¹)		

¹ Less than a tenth of 1 percent.

EXTENT OF UNIONIZATION

Unionization was found to be relatively extensive in the Western States, whereas in the Tri-State District few workers were found in unions. Information obtained on extent of unionization indicates that in the nonferrous-metal mining industry as a whole somewhat less than half of the workers belong to unions. The majority of these are members of the International Union of Mine, Mill and Smelter Workers, a C. I. O. affiliate, which is the principal union in the metal-mining field. A small proportion of the workers belong to A. F. of L. unions.

Forty-four percent of the workers in the nonferrous mines and mills included in the Bureau's survey were covered under union agreements. Table 3 presents the percentages covered by agreements in the various regions.

Table 3.—Unionization in Nonferrous-Metal Mines and Mills, August 1941

Region ¹	All workers		Workers in union mines or mills		Workers in non-union mines or mills	
	Number	Percent	Number	Percent	Number	Percent
All regions.....	26, 205	100. 0	11, 528	44. 0	14, 677	56. 0
West.....	19, 599	100. 0	9, 739	49. 7	9, 860	50. 3
Tri-State.....	3, 811	100. 0	278	7. 3	3, 533	92. 7
Michigan.....	1, 555	100. 0	763	49. 1	792	50. 9
East.....	1, 240	100. 0	748	60. 3	492	39. 7

¹ For States included in the various regions, see footnote to table 6.

METHOD OF WAGE PAYMENT

Three methods of wage payment are prevalent in the industry: Time rates, piece rates, and base rates plus bonus. The characteristic time rate in the metal-mining industry is the day rate. Payment by the day has been the traditional mode in metal mining and still remains so despite the fact that the operation of Federal wage and hour regulations has made it necessary to calculate hourly earnings.

Piece workers are considered to include those employees who receive payment on the basis of some unit of output and whose earnings vary in direct proportion with the number of units produced. The unit may be the ton, the can, or some other measure, depending upon the specific work involved. Frequently, only certain employees, such as miners, muckers, and can hookers, are paid at piece rates.

Variants of the bonus method of wage payment are to be found in the mining of nonferrous metals. Frequently, the bonuses are calculated for the output of groups of workers, including drilling-machine operators, muckers, timbermen, and others, on a so-called "contract" basis. In such instances, one worker heads the group and acts as the "contractor." Each member of the group is guaranteed a minimum daily rate and the total earnings of the group are divided between the participants on some previously determined basis. The group may work on a piece-rate basis, and frequently may receive an additional bonus for production in excess of a set standard or "score." Nominally, the contract workers assume certain responsibilities and share certain benefits of an independent entrepreneur; they are charged for the use of the stope, powder, fuses, caps, and machinery provided by the management. In calculating the bonus earnings these charges, as well as the guaranteed daily rates, are deducted from the gross earnings. Actually, however, these various arrangements are little more than formalities. The worker enters into them as a condition of employment and has little say in the determination of the standards of output, the various charges made by management, or the conditions of work. His major concern is that his total earnings, whatever the arrangement, approximate the daily rates prevalent for comparable work.

Although it is common practice in these contractual arrangements to provide somewhat higher earnings than for comparable work on a daily rate basis, especially when development work is involved, upper limits are frequently set to the total amount that each worker may earn. In some cases, earnings in excess of a given amount are shared by the workers and the management on a predetermined percentage basis up to an absolute limit, above which all earnings are retained by the firm.

Although the objective of all such methods is to provide an incentive for diligence and hard work, they do not always lead to the most efficient methods of production, since in many instances the organization of the work is left to the contracting group, which is not in a position to attain the efficiency resulting from a high degree of division of labor. However, where development work is involved, in order to make the stope ready for extraction, the efficiency of workers under these contractual arrangements appears to be relatively high. Earnings in such cases are considerably higher than on regular stoping.

In general, bonus workers encountered in the Bureau's survey were classified as such when they were employed on a piece rate which did not vary directly with the number of units produced, either because of a guaranteed minimum wage or because of an upper limit to total earnings. Workers were also classified as bonus workers when they had a time rate and a set standard of output, with additional earnings for output above the set standard.

Of the 20,671 workers in nonferrous-metal mining covered by the Bureau's survey, 81.1 percent were paid at straight time rates (table 4). The remaining workers were paid on a basis more or less closely related to output; they were fairly evenly divided between those who received bonuses (9.4 percent) and those who were paid by the piece (9.5 percent). The proportions of time, piece, and bonus workers in copper mining paralleled closely those in nonferrous-metal mining as a whole. The proportion of piece and bonus workers combined (20.7 percent) in lead and zinc mining was slightly in excess of the corresponding proportion in copper mining.

In contrast with nonferrous-metal mining, almost all workers (98.6 percent) in nonferrous-metal milling covered by the survey were paid on a time basis. Only 0.6 and 0.8 percent of the workers in nonferrous-metal milling were piece and bonus workers, respectively. In copper milling, almost all workers (99.7 percent) were paid time rates. Similarly, 97.6 percent of the wage earners in lead and zinc milling were time workers.

TABLE 4.—*Distribution of Workers in Nonferrous-Metal Mines and Mills, by Method of Wage Payment and Branch, August 1941*

Branch	All workers		Time workers		Piece workers		Bonus workers	
	Number	Per-cent	Number	Per-cent	Number	Per-cent	Number	Per-cent
Mining, total.....	20,671	100.0	16,766	81.1	1,956	9.5	1,949	9.4
Copper.....	10,083	100.0	8,171	81.0	959	9.5	953	9.5
Lead and zinc.....	9,232	100.0	7,312	79.3	929	10.0	991	10.7
Mercury.....	444	100.0	444	100.0	—	—	—	—
Other.....	912	100.0	839	92.0	68	7.5	5	.5
Milling, total.....	5,534	100.0	5,460	98.6	31	.6	43	.8
Copper.....	2,275	100.0	2,269	99.7	—	—	6	.3
Lead and zinc.....	2,833	100.0	2,765	97.6	31	1.1	37	1.3
Other.....	426	100.0	426	100.0	—	—	—	—

"SLIDING SCALE" OF WAGES

It is conventional practice in metal mining to adjust the earnings of workers in accordance with the movements of market prices of specific metals. This method has been developed by employers over a long period of time, has generally been accepted by the unions, and is widely prevalent in negotiated wage agreements. The sliding scale

provides a rough means of adjusting wages to the various phases of the business cycle. The automatic adjustment of production costs in response to changing metal prices tends to stabilize company earnings and may contribute somewhat toward regularity of employment. In view of the wide divergence between the movements of metal prices and those in the cost of living, however, it is apparent that the sliding scale falls short of assuring a stable "real" income for the worker.

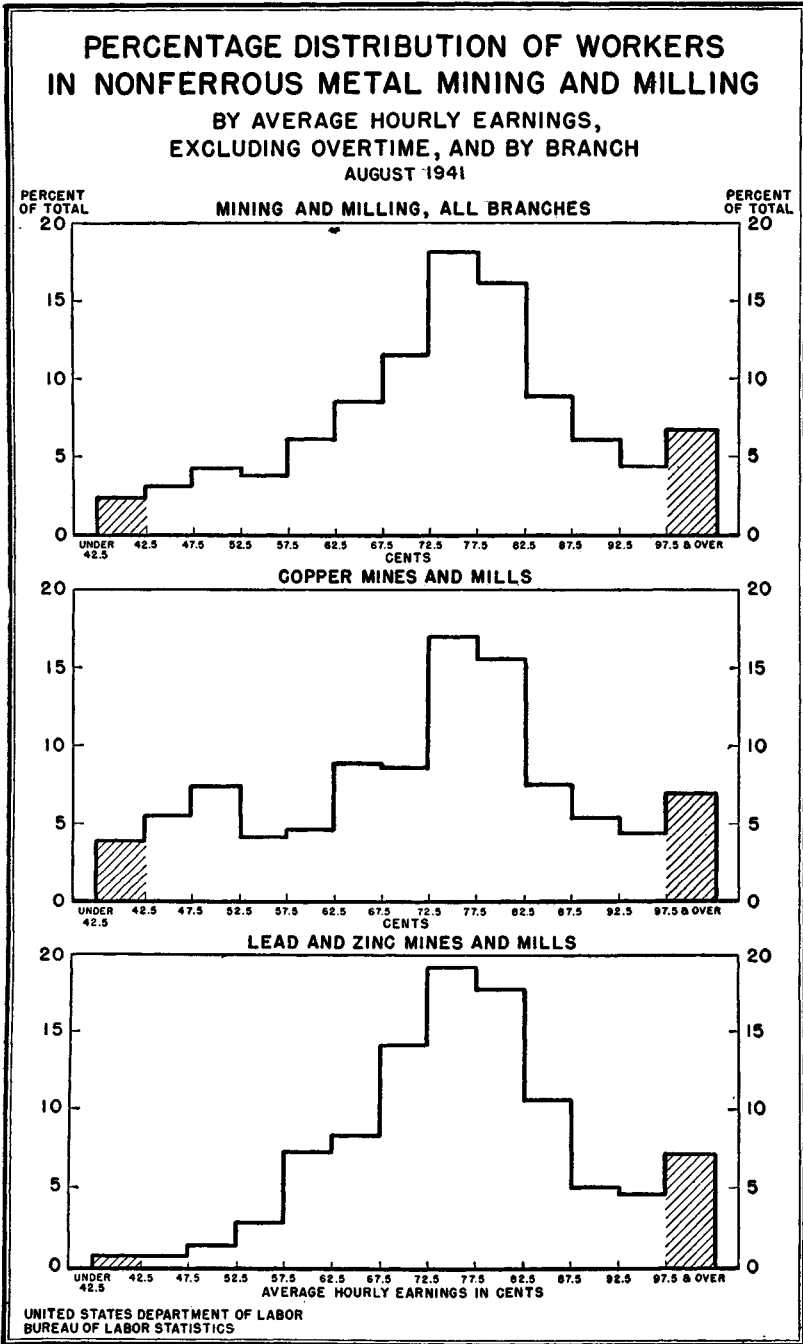
MEASUREMENT OF WORKING TIME

Practices with respect to recording time worked vary considerably in this industry. The vast majority of the mines have "collar to collar" arrangements, under which the working day typically begins at the time the miner enters the gate and ends when he is brought up to the surface from the individual working face. There is considerable variation in the interpretation of phrase "collar to collar," however. Some mines count only the trip to the mine as time worked while others count trips both ways. Some mines calculate time worked from the moment the miner enters the mine site, whereas others begin at the mine shaft. The trips from collar to working face consume anywhere from 5 to 30 minutes one way. There are some mines, however, which consider as time worked only the actual time spent at the working face. Because of these variations in practice it was necessary for purposes of the Bureau's survey to adopt a uniform procedure, and the typical "collar to collar" basis of recording time, mentioned above, was adopted. In mines where no "collar to collar" practice prevailed, the time consumed in traveling from the surface to the working face and back was added to the total hours recorded.

It is customary practice in the mining industry to schedule no regular lunch period. In such instances the miners are reported to "eat on the job." Some mines, however, do provide for a regular lunch period during which all work ceases and the workers are not "subject to call." In all cases where workers were reported to be eating on the job, the hours reported were considered as time worked and no deductions were made for time spent at lunch.

Hourly Earnings

In the 160 nonferrous-metal mines and mills covered by the survey, hourly earnings, excluding overtime, averaged 74.5 cents. Well over half (55.7 percent) of the workers earned 65.0 but under 85.0 cents per hour (table 5 and chart). Average hourly earnings in lead and zinc mines and mills were 76.6 cents, with 61.8 percent of the workers earning 67.5 but under 87.5 cents per hour. Workers in copper mines and mills earned an average of 72.8 cents per hour. In this branch of nonferrous-metal extraction there was a concentration of 51.3 percent of the workers who earned 65.0 but under 85.0 cents per hour. Average hourly earnings in mercury mines amounted to 61.2 cents, with 53.6 percent of the workers earning 55.0 but under 75.0 cents per hour; another 13.2 percent earned under 40.0 cents per hour. In other nonferrous mines and mills (including manganese, molybdenum, and tungsten), average hourly earnings were 77.4 cents, somewhat in excess of those in the nonferrous branches mentioned earlier; 62.9 percent of these workers earned 70.0 but under 90.0 cents per hour.



10 WAGE STRUCTURE—NONFERROUS METALS INDUSTRY

TABLE 5.—Percentage Distribution of Workers in Branches of Nonferrous-Metal Mining and Milling, by Average Hourly Earnings (Excluding Overtime), August 1941

Average hourly earnings	Total	Copper mines and mills	Lead and zinc mines and mills	Mercury mines	Other mines and mills ¹
Under 40.0 cents.....	2.0	3.2	0.6	13.2	0.5
40.0 and under 42.5 cents.....	.4	.7	.1	2.0	.1
42.5 and under 45.0 cents.....	2.0	3.8	.3	2.3	.2
45.0 and under 47.5 cents.....	1.1	1.7	.4	5.2	.2
47.5 and under 50.0 cents.....	1.0	1.6	.5	1.1	.3
50.0 and under 52.5 cents.....	3.3	5.9	.9	1.4	2.2
52.5 and under 55.0 cents.....	1.5	1.8	.9	1.6	2.6
55.0 and under 57.5 cents.....	2.3	2.3	2.0	10.3	1.9
57.5 and under 60.0 cents.....	3.1	1.7	4.3	3.4	5.3
60.0 and under 62.5 cents.....	3.0	2.9	3.1	9.0	1.3
62.5 and under 65.0 cents.....	4.5	3.6	5.8	7.7	.5
65.0 and under 67.5 cents.....	4.0	5.3	2.6	9.7	2.8
67.5 and under 70.0 cents.....	6.8	3.5	10.1	3.8	8.6
70.0 and under 72.5 cents.....	4.7	5.1	4.1	7.0	5.0
72.5 and under 75.0 cents.....	5.6	3.0	8.8	2.7	1.0
75.0 and under 77.5 cents.....	12.6	14.0	10.4	7.4	23.4
77.5 and under 80.0 cents.....	5.4	4.5	6.6	3.8	3.1
80.0 and under 82.5 cents.....	10.7	11.1	11.2	3.4	4.1
82.5 and under 85.0 cents.....	5.9	4.8	7.1	.7	7.0
85.0 and under 87.5 cents.....	2.9	2.7	3.5	.9	.7
87.5 and under 90.0 cents.....	3.6	3.2	2.4	.5	18.6
90.0 and under 92.5 cents.....	2.4	2.2	2.6	-----	1.9
92.5 and under 95.0 cents.....	2.4	1.4	3.3	-----	4.3
95.0 and under 97.5 cents.....	2.0	3.0	1.3	-----	.4
97.5 and under 100.0 cents.....	.9	.8	1.1	.7	-----
100.0 and under 105.0 cents.....	1.7	1.8	1.6	1.1	1.9
105.0 and under 110.0 cents.....	1.0	.9	1.3	.2	.2
110.0 cents and over.....	3.2	3.5	3.1	.9	1.9
Total.....	100.0	100.0	100.0	100.0	100.0
Number of workers.....	26,205	12,358	12,065	444	1,338
Number of units ²	160	36	91	16	17
Average hourly earnings.....	\$0.745	\$0.728	\$0.766	\$0.612	\$0.774
Average hourly earnings, including punitive overtime.....	\$0.782	\$0.775	\$0.789	\$0.667	\$0.835

¹ Manganese, molybdenum, and tungsten.

² Total of mines and mills, not of establishments.

When payment for overtime at penalty rates was included, average hourly earnings for all nonferrous mines and mills were increased by 3.7 cents. The corresponding increases in the different branches of nonferrous mining and milling amounted to 2.3 cents in lead and zinc, 4.7 cents in copper, 5.5 cents in mercury, and 6.1 cents in other mines and mills. Where the contrary is not specifically designated all hourly earnings discussed in the present article exclude penalty overtime payments. In general, workers in mines earned slightly more than those in mills, the respective averages being 75.5 cents and 71.3 cents.

REGIONAL DIFFERENCES

Average hourly earnings in the 160 nonferrous-metal mines and mills covered by the survey ranged from a low of 47.9 cents in Michigan to 77.2 cents in the West (table 6). Earnings in the Tri-State District averaged 71.4 cents and those in the East 76.3 cents. Over half (52.8 percent) of the 19,599 workers in nonferrous mines and mills in the West earned 65.0 but under 85.0 cents per hour. Sixty-two percent of the workers in the Tri-State District earned 55.0 but under 75.0 cents per hour. Over one-quarter (25.2 percent) of the 1,555 workers in Michigan earned less than 40.0 cents per hour and an additional 64.3 percent earned under 60.0 cents. More than two-fifths (44.5 percent) of the workers in the East earned 65.0 but under 85.0 cents per hour.

TABLE 6.—Percentage Distribution of Workers in Nonferrous-Metal Mines and Mills, by Average Hourly Earnings (Excluding Overtime) and by Region,¹ August 1941

Average hourly earnings	United States	West	Tri-State District	Michigan	East
Under 40.0 cents.....	2.0	0.5	1.2	25.2	0.3
40.0 and under 42.5 cents.....	.4	.1	.3	5.3	.1
42.5 and under 45.0 cents.....	2.0	1.1	.8	17.5	.2
45.0 and under 47.5 cents.....	1.1	.7	.8	8.0	.2
47.5 and under 50.0 cents.....	1.0	.2	1.3	11.6	-----
50.0 and under 52.5 cents.....	3.3	3.6	1.6	5.1	1.9
52.5 and under 55.0 cents.....	1.5	1.0	1.9	5.7	2.7
55.0 and under 57.5 cents.....	2.3	1.4	5.2	7.0	2.1
57.5 and under 60.0 cents.....	3.1	1.9	6.1	4.1	11.5
60.0 and under 62.5 cents.....	3.0	2.1	6.8	2.3	6.2
62.5 and under 65.0 cents.....	4.5	2.6	14.9	2.7	4.5
65.0 and under 67.5 cents.....	4.0	3.9	6.0	.6	4.0
67.5 and under 70.0 cents.....	6.8	5.8	14.6	1.1	4.5
70.0 and under 72.5 cents.....	4.7	5.4	2.9	1.2	2.3
72.5 and under 75.0 cents.....	5.6	6.0	5.5	.4	5.4
75.0 and under 77.5 cents.....	12.6	15.4	3.4	.6	13.6
77.5 and under 80.0 cents.....	5.4	6.5	2.6	.3	2.8
80.0 and under 82.5 cents.....	10.7	13.6	2.3	.6	1.7
82.5 and under 85.0 cents.....	5.9	6.2	5.0	.1	10.2
85.0 and under 87.5 cents.....	2.9	3.5	1.4	-----	2.3
87.5 and under 90.0 cents.....	3.6	4.1	2.3	-----	4.2
90.0 and under 92.5 cents.....	2.4	2.7	1.6	.1	2.7
92.5 and under 95.0 cents.....	2.4	2.6	1.9	.4	3.0
95.0 and under 97.5 cents.....	2.0	2.4	1.0	-----	2.7
97.5 and under 100.0 cents.....	.9	.8	1.2	.1	2.5
100.0 and under 105.0 cents.....	1.7	1.7	1.5	-----	3.5
105.0 and under 110.0 cents.....	1.0	.9	1.5	-----	3.0
110.0 and over.....	3.2	3.3	4.4	-----	1.9
Total.....	100.0	100.0	100.0	100.0	100.0
Number of workers.....	26,205	19,599	3,811	1,555	1,240
Number of units.....	160	96	51	5	8
Average hourly earnings.....	\$0.745	\$0.772	\$0.714	\$0.479	\$0.763
Average hourly earnings (including punitive overtime).....	.782	.812	.745	.500	.782

¹ West includes Nevada, Washington, Montana, Arizona, New Mexico, California, Colorado, Idaho, Arkansas, Oregon, Texas, and Utah; copper mines and mills in North Carolina and Tennessee are included with the Western States in order to avoid disclosure of individual operations. Tri-State District includes Missouri, Kansas, and Oklahoma. East includes New Jersey, New York, and parts of Tennessee.

EARNINGS BY TYPE OF PRODUCT

Copper mines and mills.—Average hourly earnings in western copper mines and mills amounted to 76.4 cents, as compared with a corresponding figure of 47.9 cents in Michigan (table 7). In connection with the low wage levels prevailing in Michigan copper mines, it is of interest to note that Michigan copper is derived from vein and replacement ores, whereas low-grade disseminated ore bodies are characteristic of western sources. Many of the operations in Michigan have been worked for years and, with the copper prices prevailing throughout much of 1941, were probably submarginal. Partly in recognition of this fact, the Office of Price Administration has recently established a price differential which permits the sale of some Michigan copper at 17 cents per pound, as compared with a basic limit of 12 cents for most of the copper from other areas.

Almost three-fifths (58.2 percent) of the workers in copper mines and mills in the West earned 65.0 but under 85.0 cents per hour. In Michigan, 89.5 percent of the workers earned less than 60.0 cents per hour, and 25.2 percent earned under 40.0 cents per hour.

TABLE 7.—Percentage Distribution of Workers in Copper Mines and Mills, by Average Hourly Earnings (Excluding Overtime) and by Region,¹ August 1941

Average hourly earnings	All mines and mills	West				Michigan mines and mills	
		Total	Northwest		Southwest		
			Mines	Mills	Mines		Mills
Under 40.0 cents	3.2	(²)			0.1	25.2	
40.0 and under 42.5 cents	.7	(²)		0.2	0.1	5.3	
42.5 and under 45.0 cents	3.8	1.8			3.3	17.5	
45.0 and under 47.5 cents	1.7	.8			.9	8.0	
47.5 and under 50.0 cents	1.6	.1	(²)		.2	11.6	
50.0 and under 52.5 cents	5.9	6.0			9.0	5.1	
52.5 and under 55.0 cents	1.8	1.3			.9	5.7	
55.0 and under 57.5 cents	2.3	1.7	0.1	.5	2.6	7.0	
57.5 and under 60.0 cents	1.7	1.4	(²)		1.5	4.1	
60.0 and under 62.5 cents	2.9	3.0	.1		5.3	2.3	
62.5 and under 65.0 cents	3.6	3.7	2.6	5.4	3.9	2.7	
65.0 and under 67.5 cents	5.3	6.0	3.4	3.5	6.9	.6	
67.5 and under 70.0 cents	3.5	3.8	4.5	2.9	4.0	1.1	
70.0 and under 72.5 cents	5.1	5.7	2.3	5.5	9.3	1.2	
72.5 and under 75.0 cents	3.0	3.4	1.7	1.2	3.7	.4	
75.0 and under 77.5 cents	14.0	16.1	35.4	4.3	4.4	.3	
77.5 and under 80.0 cents	4.5	5.1	3.9	2.3	7.2	.6	
80.0 and under 82.5 cents	11.1	12.7	10.3	25.9	16.0	.6	
82.5 and under 85.0 cents	4.8	5.4	7.5	11.5	4.2	.1	
85.0 and under 87.5 cents	2.7	3.0	4.4	4.3	2.0		
87.5 and under 90.0 cents	3.2	3.7	1.2	1.7	4.9		
90.0 and under 92.5 cents	2.2	2.5	3.8	4.0	1.4	.1	
92.5 and under 95.0 cents	1.4	1.5	2.1	3.2	1.0	.4	
95.0 and under 97.5 cents	3.0	3.4	4.2	16.9	1.6		
97.5 and under 100.0 cents	.8	.9	1.5	1.1	.6	.1	
100.0 and under 105.0 cents	1.8	2.0	2.7	4.5	1.3		
105.0 and under 110.0 cents	.9	1.0	1.4	.8	.9		
110.0 cents and over	3.5	4.0	6.9	.3	2.9		
Total	100.0	100.0	100.0	100.0	100.0	100.0	
Number of workers	12,358	10,803	4,116	651	4,584	1,555	
Number of units	36	31	8	3	11	5	
Average hourly earnings	\$0.728	\$0.764	\$0.835	\$0.832	\$0.731	\$0.661	
Average hourly earnings (including punitive overtime)	.775	.814	.875	.899	.785	.713	

¹ Northwest region includes Nevada, Washington, and Montana. Southwest region includes Arizona and New Mexico; Tennessee and North Carolina included to avoid disclosure of information for individual plants.

² Less than a tenth of 1 percent.

In the two constituent segments of the West, average hourly earnings in copper mining were 83.5 cents (Northwest) and 73.1 cents (Southwest). The corresponding figures for copper milling were 83.2 cents and 66.1 cents, respectively. These figures are consistent with other data appearing in this article which indicate that wages in the Northwest are higher than in any other area of importance in the industry.

Lead and zinc mines and mills.—In western lead and zinc mining and milling, average straight-time hourly earnings were 79.6 cents (table 8). Over three-quarters (78.4 percent) of the wage earners in this region received 67.5 but under 87.5 cents per hour.

In lead and zinc mining, average hourly earnings ranged from a low of 72.4 cents in the Tri-State District to a high of 81.2 cents in the West. In milling, average hourly earnings ranged from 68.2 cents in the Tri-State District to 73.2 cents in the East and 74.7 cents in the West.

TABLE 8.—Percentage Distribution of Workers in Lead and Zinc Mines and Mills, by Average Hourly Earnings (Excluding Overtime) and by Region,¹ August 1941

Average hourly earnings	All mines and mills	West			Tri-State District		East	
		Total	Mines	Mills	Mines	Mills	Mines	Mills
Under 40.0 cents.....	0.6	0.4	0.2	1.0	1.1	1.4	0.3	0.3
40.0 and under 42.5 cents.....	.1	(²)	(²)	.....	.....	.4	.....	.3
42.5 and under 45.0 cents.....	.3	(²)	(²)	.....	.....	1.0	.....	.3
45.0 and under 47.5 cents.....	.4	.2	.1	.7	.....	.8	.....	.3
47.5 and under 50.0 cents.....	.5	.1	.1	.7	.....	1.7	.....	.1
50.0 and under 52.5 cents.....	.9	.4	.2	.8	.....	1.4	.....	1.6
52.5 and under 55.0 cents.....	.9	.1	(²)	.5	.....	1.9	.....	2.4
55.0 and under 57.5 cents.....	2.0	.2	.1	.6	.....	5.0	.....	6.1
57.5 and under 60.0 cents.....	4.3	2.1	2.5	.8	.....	4.1	.....	12.3
60.0 and under 62.5 cents.....	3.1	.5	.4	.7	.....	7.7	.....	4.1
62.5 and under 65.0 cents.....	5.8	1.0	.8	1.7	.....	15.9	.....	11.8
65.0 and under 67.5 cents.....	2.6	.5	.6	.1	.....	5.4	.....	7.5
67.5 and under 70.0 cents.....	10.1	8.5	1.7	32.6	.....	11.3	.....	24.4
70.0 and under 72.5 cents.....	4.1	5.0	3.9	9.1	.....	2.8	.....	3.2
72.5 and under 75.0 cents.....	8.8	11.2	12.8	5.5	.....	5.7	.....	4.9
75.0 and under 77.5 cents.....	10.4	13.7	15.6	7.1	.....	3.3	.....	3.9
77.5 and under 80.0 cents.....	6.6	9.4	7.2	17.1	.....	2.4	.....	3.2
80.0 and under 82.5 cents.....	11.2	18.1	22.2	3.4	.....	1.8	.....	3.8
82.5 and under 85.0 cents.....	7.1	7.7	8.1	6.2	.....	6.1	.....	1.6
85.0 and under 87.5 cents.....	3.5	4.8	5.6	1.9	.....	1.5	.....	1.0
87.5 and under 90.0 cents.....	2.4	2.1	2.3	1.4	.....	2.7	.....	1.4
90.0 and under 92.5 cents.....	2.6	3.2	3.4	2.4	.....	1.9	.....	.6
92.5 and under 95.0 cents.....	3.3	4.0	4.9	1.0	.....	2.0	.....	1.8
95.0 and under 97.5 cents.....	1.3	1.3	1.3	1.1	.....	1.2	.....	.2
97.5 and under 100.0 cents.....	1.1	.8	1.0	.2	.....	1.4	.....	.5
100.0 and under 105.0 cents.....	1.6	1.3	1.4	1.0	.....	1.9	.....	.3
105.0 and under 110.0 cents.....	1.3	.9	.9	1.0	.....	1.9	.....	.4
110.0 and over.....	3.1	2.5	2.7	1.8	.....	5.4	.....	1.6
Total.....	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0
Number of workers.....	12,065	7,014	5,459	1,555	2,854	957	919	321
Number of units.....	91	32	18	14	32	19	4	4
Average hourly earnings.....	\$0.766	\$0.796	\$0.812	\$0.747	\$0.724	\$0.682	\$0.774	\$0.732
Average hourly earnings (including punitive overtime).....	.789	.816	.825	.787	.756	.712	.792	.752

¹ West includes Idaho, Montana, Washington, Colorado, New Mexico, Nevada, Utah. Tri-State District includes Oklahoma, Missouri, and Kansas. East includes New Jersey, New York, and Tennessee.

² Less than a tenth of 1 percent.

OCCUPATIONAL EARNINGS

There are two distinct occupational patterns in nonferrous-metal mining, each of which is determined by the nature of the processes involved. The primary operations consist of preparation of the stopes, shafts, haulageways, cross-cuts, chutes, and hoists; extraction of the ore from the stopes by drilling and blasting; loading the ore into cars, cans, or chutes; transportation of the ore to main hoists; and hoisting of the ore to the surface. Depending upon the size of the mine, the degree of division of labor, and such management practices as method of wage payment, each of these operations may be performed as a specialized task or in combination with others. Thus, miners are primarily engaged in drilling and blasting in some mines, while in others they may also do mucking and timbering. In addition to these operations there is a whole series of auxiliary operations relating to ventilation and safety, maintenance of equipment and tools, and the installation and repair of drainage. Also associated with mines are such professional persons as assayers, chemists, and engineers.

Mills are highly mechanized establishments geared to handling large bodies of ore. Most of the handling operations which involve hauling ore into the mill and interprocesses transportation are done by conveyors and chutes. The processes of crushing, grinding, screening, jig-separating, flotation, filtering, and drying are all machine operations performed by machine operators and helpers. Highly skilled technicians are in charge of the milling process as a whole. Standard sampling tests are performed by unskilled or semiskilled employees under the guidance of technicians. Since the processes involved in milling constitute for the most part distinct and separate mechanical operations, the division of labor in the mills is more highly developed than in the mines, and specialized occupations generally prevail.

Copper mines.—Of 10,083 workers employed in all copper mines surveyed (see table 9) almost one-quarter (24.1 percent) were drilling-machine operators. The large proportion of men employed at the working face of the mine, using pneumatic or electric drills, is characteristic of the high degree of division of labor prevalent in the extraction processes in copper mines. Drilling-machine operators are relatively highly paid. In the Northwest they earned an average of 94.8 cents per hour; in the Southwest they averaged 83.9 cents per hour; in Michigan they earned 54.9 cents per hour. Regional comparisons of average weekly earnings for drilling-machine operators, as well as other occupations, must necessarily be modified by differences in weekly hours.

TABLE 9.—*Straight-Time Hourly Earnings, Weekly Hours, and Weekly Earnings of Workers in Copper Mines, by Occupation¹ and by Region, August 1941*

Occupation	Northwest				Southwest				Michigan			
	Number of workers	Average hourly earnings	Average weekly hours	Average total weekly earnings	Number of workers	Average hourly earnings	Average weekly hours	Average total weekly earnings	Number of workers	Average hourly earnings	Average weekly hours	Average total weekly earnings
All occupations.....	4, 116	\$0. 835	40. 0	\$34. 98	4, 584	\$0. 731	45. 3	\$35. 56	1, 383	\$0. 491	43. 1	\$22. 15
Blacksmiths.....	36	. 834	50. 6	46. 59	39	. 801	47. 2	40. 56	22	. 459	44. 3	21. 33
Blacksmiths' helpers.....	21	. 751	47. 8	38. 84	31	. 669	47. 5	34. 40	25	. 396	43. 2	17. 92
Boilermakers.....	14	. 865	51. 0	50. 02	28	. 839	49. 3	45. 62	.....	.....	.....	.....
Cagers' helpers.....	34	. 746	40. 9	30. 89	8	(?)	(?)	(?)	6	(?)	(?)	(?)
Cagers, inside.....	62	. 798	40. 4	32. 97	25	. 821	43. 0	38. 12	7	(?)	(?)	(?)
Carpenters.....	47	. 898	47. 7	46. 17	59	. 824	47. 5	42. 95	14	. 487	43. 4	21. 02
Change-house men.....	16	. 674	43. 0	29. 98	28	. 556	42. 6	25. 94	11	. 385	40. 4	15. 82
Clerical workers:												
Plant.....	41	. 924	41. 2	34. 94	42	. 896	42. 9	39. 35	3	(?)	(?)	(?)
Office.....	27	. 861	43. 2	38. 56	48	. 873	43. 3	38. 86	3	(?)	(?)	(?)
Common laborers.....	194	. 691	40. 0	29. 19	451	. 505	45. 9	24. 89	45	. 478	43. 4	21. 46
Compressor men.....	13	. 869	45. 5	43. 06	19	. 733	47. 6	37. 68	10	. 422	46. 9	21. 09
Drilling-machine operators.....	1, 274	. 948	38. 7	38. 08	743	. 839	44. 0	39. 74	408	. 549	43. 5	25. 04
Helpers.....	10	. 795	39. 0	32. 53	78	. 652	46. 4	32. 52	2	(?)	(?)	(?)
Electricians.....	51	. 881	50. 2	48. 43	66	. 831	47. 8	43. 39	21	. 443	40. 5	18. 52
Firemen, railroad.....	25	. 805	37. 6	32. 05	37	. 695	46. 6	34. 94	3	(?)	(?)	(?)
Foremen and assistants, working.....	83	. 956	48. 6	50. 36	174	. 840	47. 1	42. 42	42	. 602	46. 2	29. 10
Hoistmen, surface.....	56	. 854	46. 8	42. 99	56	. 784	46. 9	39. 78	25	. 441	46. 1	21. 70
Hoistmen, underground.....	28	. 874	39. 5	36. 23	17	. 744	47. 6	39. 24	6	(?)	(?)	(?)
Laborers, maintenance.....	31	. 686	39. 2	27. 18	110	. 494	46. 9	24. 99	.....	.....	.....	.....
Loading-machine operators.....	11	. 804	48. 4	44. 02	150	. 791	43. 3	36. 90	.....	.....	.....	.....
Maintenance helpers, not elsewhere classified.....	52	. 765	47. 2	39. 55	191	. 637	46. 5	32. 09	18	. 438	43. 1	19. 65

See footnotes at end of table.

TABLE 9.—*Straight-Time Hourly Earnings, Weekly Hours, and Weekly Earnings of Workers in Copper Mines, by Occupation¹ and by Region, August 1941—Continued*

Occupation	Northwest				Southwest				Michigan			
	Number of workers	Average hourly earnings	Average weekly hours	Average total weekly earnings	Number of workers	Average hourly earnings	Average weekly hours	Average total weekly earnings	Number of workers	Average hourly earnings	Average weekly hours	Average total weekly earnings
Mechanics.....	51	\$0.878	48.6	\$46.52	88	\$0.808	48.6	\$42.91	15	\$0.443	47.4	\$22.51
Miscellaneous maintenance workers, not elsewhere classified.....	38	.881	49.7	48.50	147	.746	46.8	37.68	11	.425	45.2	20.71
Miscellaneous workers.....	143	.753	42.5	33.78	334	.702	44.3	33.17	15	.350	40.6	14.33
Motormen.....	233	.768	36.8	28.98	143	.806	44.9	38.80	24	.503	46.3	24.90
Helpers.....	228	.754	36.5	28.09	186	.699	45.9	34.70				
Muckers.....	148	.724	45.8	36.20	290	.680	42.8	31.17	338	.469	42.1	20.69
Nippers.....	73	.741	38.0	29.24	22	.615	45.2	30.11	14	.498	45.7	24.30
Oilers.....	17	.719	43.4	32.81	25	.691	47.4	35.38	10	.382	43.9	17.34
Pipe fitters.....	65	.828	41.3	35.50	32	.775	47.4	39.98	5	(?)	(?)	(?)
Helpers.....	11	.759	48.5	40.43	27	.663	46.4	33.30	1	(?)	(?)	(?)
Powdermen (blasting).....	24	.837	47.8	44.61	92	.726	45.2	35.21				
Power and transportation workers.....	39	.889	40.2	37.96	87	.775	47.9	40.34	16	.440	44.6	20.69
Powerhouse operators' helpers.....	10	.798	46.4	39.68	21	.681	51.5	38.64	9	(?)	(?)	(?)
Pumpmen.....	42	.822	45.3	39.40	29	.672	48.2	35.30	27	.442	40.9	18.34
Repairmen, mine and surface.....	181	.794	31.8	25.58	6	(?)	(?)	(?)	3	(?)	(?)	(?)
Roustabouts.....	32	.751	32.2	25.11	62	.564	45.2	27.40	1	(?)	(?)	(?)
Samplers, ore.....	30	.787	45.7	48.79	9	(?)	(?)	36.15	4	(?)	(?)	(?)
Shovel operators.....	10	1.058	42.4	48.12	45	1.031	46.0	51.12				
Storekeepers (powder).....	31	.766	40.8	32.33	15	.726	44.9	34.66	1	(?)	(?)	(?)
Technicians and supervisory workers.....	15	.872	45.2	41.76	35	1.050	42.2	45.46	1	(?)	(?)	(?)
Timbermen.....	408	.761	35.4	27.21	262	.834	44.0	39.41	121	.473	44.4	22.18
Timekeepers.....	23	.948	41.7	40.31	23	.850	42.8	37.90	4	(?)	(?)	(?)
Trackmen.....	87	.718	41.3	30.81	29	.729	45.1	35.24	14	.448	43.4	20.21
Trammers.....					72	.610	44.4	28.96	70	.461	36.8	16.97
Truck and tractor operators.....	22	.821	47.4	42.11	47	.764	46.1	38.09	6	(?)	(?)	(?)
Watchmen.....	29	.658	41.4	28.11	56	.614	48.4	32.36	2	(?)	(?)	(?)

¹ Note inclusion of clerical workers, office.

² Too few workers to show average.

Muckers, constituting a large unskilled occupational group in copper mining, earned an average of 72.4 cents per hour in the Northwest. In the Southwest they earned 68.0 cents per hour, and the corresponding figure in Michigan was 46.9 cents per hour.

Motormen earned an average of 76.8 cents in the Northwest, 80.6 cents in the Southwest, and 50.3 cents in Michigan.

Working foremen and their assistants received average hourly earnings of 95.6 cents in the Northwest, 84.0 cents in the Southwest, and 60.2 cents in Michigan.

Copper mills.—General helpers in the copper mills of the Northwest earned an average of 75.2 cents per hour (table 10). In the Southwest, where the majority of workers in this occupational classification were employed, average hourly earnings for the occupation were 54.9 cents. Flotation operators in the Northwest earned an hourly average of 81.3 cents, and in the Southwest, 70.0 cents. Ball-mill operators in northwestern copper mills earned an average of 80.2 cents per hour; in the Southwest, corresponding earnings were 65.9 cents.

TABLE 10.—*Straight-Time Hourly Earnings, Weekly Hours, and Weekly Earnings of Workers in Copper Mills, by Occupation¹ and by Region,² August 1941*

Occupation	Northwest				Southwest			
	Number of workers	Average hourly earnings	Average weekly hours	Average total weekly earnings	Number of workers	Average hourly earnings	Average weekly hours	Average total weekly earnings
All occupations.....	661	\$0.832	46.9	\$42.13	1,452	\$0.661	46.9	\$33.41
Ball-mill operators.....	25	.802	46.9	40.84	33	.659	46.1	33.09
Carpenters.....	23	.896	47.6	45.80	62	.862	47.3	43.92
Clerical workers.....	30	.912	47.4	46.61	57	.822	45.0	38.52
Crusher operators.....	23	.782	43.1	36.41	41	.662	48.0	34.35
Electricians.....	13	.918	42.3	41.63	28	.806	45.3	43.31
Flotation operators.....	30	.813	46.4	40.95	82	.700	47.1	35.20
Foremen, working.....	22	.978	49.1	50.47	41	.851	50.1	46.72
Foremen, assistant, working.....	21	.955	47.6	48.73	41	.745	47.4	38.34
General helpers, mill.....	77	.752	45.9	37.63	217	.649	46.1	27.29
Laborers, maintenance.....	25	.750	43.8	35.47	69	.617	48.3	27.15
Maintenance helpers, not elsewhere classified.....	63	.779	46.5	39.27	148	.601	44.6	28.64
Maintenance workers, not elsewhere classified.....	89	.931	47.4	47.57	105	.700	47.7	36.25
Mechanics.....	17	.706	47.8	46.49	40	.795	49.6	43.30
Miscellaneous workers, not elsewhere classified.....	79	.837	47.5	43.07	203	.683	46.4	34.11
Oilers and greasers.....	17	.793	48.0	41.41	47	.594	46.9	30.42
Ore handlers.....	15	.781	49.6	42.57	66	.562	50.5	31.39
Plant-protection and custodial workers.....	32	.665	46.8	33.10	46	.556	46.0	27.39
Repairmen.....	18	.830	45.3	40.93	56	.675	49.1	36.58
Samplers.....	21	.777	48.8	41.39	50	.625	46.1	31.04
Truck drivers.....	11	.826	51.2	47.19	20	.712	46.1	34.51

¹ Note inclusion of clerical workers.

² Michigan not shown in order to avoid disclosure of information for individual plants.

Lead and zinc mines.—Of 9,232 workers in lead and zinc mines covered by the survey, almost one-quarter (23.6 percent), as in copper mining, were drilling-machine operators (table 11). In the West, they earned 85.3 cents per hour; in the Tri-State District, 84.4 cents; and in the East, 92.1 cents.

Muckers in lead and zinc mines earned an hourly average of 74.4 cents in the West, 66.5 cents in the Tri-State District, and 65.1 cents in the East. Trammers in the same regions earned 75.8 cents, 63.0 cents, and 68.8 cents per hour, respectively.

Timbermen in lead and zinc mines earned an hourly average of 81.8 cents in the West and 83.6 cents in the East.

Average hourly earnings for common labor in lead and zinc mines ranged from 57.5 cents in the East to 61.3 cents in the Tri-State District and 70.3 cents in the West.

TABLE 11.—Straight-Time Hourly Earnings, Weekly Hours, and Weekly Earnings of Workers in Lead and Zinc Mines, by Occupation¹ and by Region, August 1941

Occupation	West			Tri-State District			East					
	Number of workers	Average hourly earnings	Average weekly hours	Average total weekly earnings	Number of workers	Average hourly earnings	Average weekly hours	Average total weekly earnings	Number of workers	Average hourly earnings	Average weekly hours	Average total weekly earnings
All occupations.....	5,459	\$0.812	39.1	\$32.27	2,854	\$0.724	42.5	\$32.11	919	\$0.774	40.7	\$32.23
Blacksmiths.....	59	.858	42.9	38.14	34	.728	45.1	34.91	14	.820	41.5	35.43
Helpers.....	35	.763	43.9	34.98	12	.621	43.5	28.01	3	(²)	(²)	(²)
Cagers.....	74	.820	39.7	33.04	62	.745	44.2	34.73	17	.722	41.8	31.21
Helpers.....	22	.758	39.4	29.89	10	.841	39.3	33.10	2	(²)	(²)	(²)
Carpenters.....	31	.865	43.7	40.09	15	.798	42.1	35.07	12	.740	44.7	34.59
Change-house men.....	39	.673	38.1	26.14	7	(²)	(²)	(²)	12	.638	39.2	25.11
Clerical workers:												
Office.....	43	.981	39.9	39.16	35	.844	39.6	33.78	16	.813	40.6	33.26
Plant.....	42	.983	41.0	40.62	17	.741	40.4	30.08	16	.791	40.8	32.66
Common laborers.....	137	.703	39.9	28.51	52	.613	42.0	27.23	27	.575	41.6	24.88
Compressor operators.....	36	.793	43.4	35.75	18	.694	48.1	36.20	6	(²)	(²)	(²)
Drilling-machine operators.....	1,451	.853	37.9	32.60	530	.844	42.1	36.72	198	.921	40.9	38.68
Helpers.....	34	.737	42.4	32.87	238	.639	43.0	29.12	33	.817	35.9	29.39
Electricians.....	52	.880	43.7	40.72	12	.821	45.5	39.54	8	(²)	(²)	(²)
Foremen and assistants, working, maintenance.....	105	.987	43.0	43.80	43	.770	46.3	37.62	24	.911	46.2	42.51
Holstmen, surface.....	151	.835	41.7	35.95	66	.729	46.0	35.85	22	.689	41.6	29.66
Holstmen, underground.....	47	.821	41.8	35.57	98	.661	45.1	31.91	9	(²)	(²)	(²)
Loading-machine operators.....	73	.825	42.8	36.80	85	.943	42.4	41.02	35	.717	46.3	35.63
Maintenance workers, not elsewhere classified.....	74	.834	43.7	38.21	25	.732	43.6	33.40	16	.845	39.4	33.58
Maintenance workers' helpers, not elsewhere classified.....	173	.717	41.3	30.75	51	.582	40.1	24.29	47	.710	40.1	28.79
Mechanics.....	80	.879	42.7	39.72	58	.813	41.0	34.18	24	.759	45.5	36.40
Miscellaneous workers, mine, not elsewhere classified.....	100	.803	42.2	34.98	246	.683	42.2	29.96	53	.759	41.2	32.11
Motormen.....	210	.795	40.1	32.22	75	.878	41.3	36.83	25	.721	38.9	28.47
Helpers.....	88	.755	39.0	29.69	55	.639	45.2	31.00	9	(²)	(²)	(²)
Muckers.....	944	.744	37.2	27.81	543	.665	41.4	28.93	107	.651	37.4	24.46
Nippers.....	40	.766	40.5	31.24	3	(²)	(²)	(²)	2	(²)	(²)	(²)
Pipe fitters.....	28	.807	40.2	32.81	14	.742	44.0	34.19	2	(²)	(²)	(²)
Pumpmen.....	50	.841	44.2	39.33	27	.671	45.0	31.77	9	(²)	(²)	(²)
Repairmen, maintenance.....	49	.857	41.2	36.41	11	.806	42.0	34.72	2	(²)	(²)	(²)
Repairmen, mine.....	75	.918	40.2	37.22	6	(²)	(²)	(²)	13	.832	39.8	33.10
Roustabouts.....	57	.748	39.6	29.83	93	.688	41.0	28.98	11	.572	39.4	22.95
Technicians.....	37	1.009	42.3	43.30	10	.974	40.0	38.95	6	(²)	(²)	(²)
Timbermen.....	579	.818	37.3	30.73					79	.836	40.0	33.56
Timbermen's helpers.....	186	.794	37.5	29.87					5	(²)	(²)	(²)
Tool and powder store-room men.....	32	.807	39.8	32.64	5	(²)	(²)	(²)	7	(²)	(²)	(²)
Trackmen.....	41	.753	39.6	30.00	109	.747	42.2	32.77	10	.684	40.7	28.56
Trammers.....	94	.758	40.0	30.86	55	.630	46.1	30.98	28	.688	40.6	28.70
Truck and tractor operators.....	29	.813	41.4	34.79	44	.588	42.4	26.04	7	(²)	(²)	(²)
Watchmen.....	64	.722	40.3	29.37	40	.561	38.7	22.13	3	(²)	(²)	(²)

¹ Note inclusion of clerical workers, office.
² Too few workers to show average.

Lead and zinc mills.—Ball-mill operators in lead and zinc mills covered by the survey earned an average of 69.4 cents per hour in the West, 72.9 cents in the Tri-State District, and 70.1 cents in the East (table 12). Average hourly earnings for crusher operators ranged from 63.1 cents in the Tri-State District to 71.5 cents in the West.

Ore handlers in western mills earned an average of 68.1 cents per hour; in eastern mills, 63.5 cents; and in the Tri-State District, 59.2 cents. General mill helpers received average hourly earnings of 60.2 cents in the East, 61.8 cents in the Tri-State District, and 69.3 cents in the West.

TABLE 12.—*Straight-Time Hourly Earnings, Weekly Hours, and Weekly Earnings of Workers in Lead and Zinc Milling, by Occupation¹ and by Region, August 1941*

Occupation	West				Tri-State District				East			
	Number of workers	Average hourly earnings	Average weekly hours	Average total weekly earnings	Number of workers	Average hourly earnings	Average weekly hours	Average total weekly earnings	Number of workers	Average hourly earnings	Average weekly hours	Average total weekly earnings
All occupations.....	1, 555	\$0. 747	44. 0	\$34. 61	957	\$0. 682	42. 9	\$30. 54	321	\$0. 732	42. 4	\$31. 91
Ball-mill operators.....	72	. 694	43. 7	32. 07	14	. 729	43. 4	34. 24	22	. 701	45. 8	34. 24
Carpenters.....	35	. 851	44. 5	40. 21	25	. 783	37. 6	29. 90	8	(²)	(²)	(²)
Clerical workers:												
Office.....	20	. 857	41. 6	36. 23	19	. 676	39. 9	27. 08	18	. 763	40. 2	30. 80
Plant.....	30	1. 023	40. 8	42. 05	10	. 733	42. 2	31. 68	4	(²)	(²)	(²)
Crusher operators.....	42	. 715	42. 8	31. 88	36	. 631	44. 8	29. 80	11	. 681	43. 3	30. 54
Electricians.....	12	. 855	39. 0	35. 18	15	. 817	45. 5	38. 80	3	(²)	(²)	(²)
Flotation operators.....	126	. 774	43. 8	35. 50	64	. 698	43. 1	31. 17	13	. 750	45. 3	36. 42
Foremen and assistant foremen, working.....	48	. 889	45. 5	42. 61	27	. 860	49. 6	45. 09	20	. 890	44. 3	39. 72
General mill helpers.....	232	. 693	41. 7	30. 06	100	. 618	42. 9	27. 89	34	. 602	43. 7	27. 51
Jig operators.....	47	. 703	46. 0	34. 44	184	. 680	42. 6	30. 05	32	. 726	41. 3	30. 66
Laborers, mill.....	44	. 650	47. 1	33. 00	7	(²)	(²)	(²)	6	(²)	(²)	(²)
Maintenance helpers, not elsewhere classified.....	113	. 729	47. 1	37. 04	29	. 671	46. 2	33. 10	10	. 731	40. 2	29. 46
Maintenance laborers.....	110	. 686	41. 8	29. 88	12	. 633	39. 3	25. 10				
Maintenance workers, not elsewhere classified.....	49	. 877	45. 8	43. 17	11	. 773	43. 5	36. 05	19	. 848	40. 4	34. 47
Mechanics.....	104	. 805	45. 4	39. 07	86	. 763	41. 5	32. 87	9	(²)	(²)	(²)
Miscellaneous workers, not elsewhere classified.....	151	. 786	42. 5	34. 71	100	. 627	42. 4	27. 71	40	. 745	42. 0	32. 10
Oilers, machinery.....	34	. 709	44. 7	33. 44	2	(²)	(²)	(²)	21	. 771	40. 0	30. 82
Ore handlers.....	148	. 681	45. 4	32. 69	92	. 592	44. 3	27. 59	16	. 635	42. 0	27. 40
Plant-protection and custodial workers.....	48	. 722	43. 1	32. 69	22	. 550	41. 0	22. 89	13	. 660	40. 0	26. 61
Power and transportation workers.....	30	. 781	48. 1	40. 68	22	. 815	46. 6	40. 71	9	(²)	(²)	(²)
Samplers.....	30	. 705	44. 9	33. 50	29	. 655	44. 4	30. 89	11	. 635	46. 5	31. 49
Truck drivers.....	21	. 797	44. 8	38. 18	51	. 779	40. 0	32. 21	2	(²)	(²)	(²)

¹ Note inclusion of clerical workers, office.

² Too few workers to show averages.

Mercury mining.—Average hourly earnings for the 444 mercury-mine workers covered by the survey were 61.2 cents (table 13). By occupation, average hourly earnings ranged from 43.5 cents for 11 inside cagers to 77.4 cents for 10 mechanics.

TABLE 13.—*Straight-Time Hourly Earnings, Weekly Hours, and Weekly Earnings of Workers in Mercury Mines, by Occupation, August 1941*

Occupation	Number of workers	Average hourly earnings	Average weekly hours	Average total weekly earnings
All occupations.....	444	¹ \$0. 612	47. 4	\$31. 63
Cagers, inside.....	11	. 435	40. 3	18. 83
Drilling-machine operators.....	98	. 695	47. 2	35. 67
Foremen, working.....	20	. 685	49. 7	36. 02
Holstmen.....	27	. 557	50. 4	31. 05
Maintenance workers, not elsewhere classified.....	15	. 659	48. 1	34. 95
Mechanics.....	10	. 774	50. 1	42. 30
Miscellaneous workers, not elsewhere classified.....	26	. 590	49. 9	32. 04
Muckers.....	123	. 526	47. 1	27. 22
Roustabouts.....	28	. 511	46. 1	25. 62
Shovel operators.....	12	. 731	49. 3	39. 44
Timbermen.....	12	. 665	47. 3	34. 30
Trammers.....	24	. 636	44. 6	30. 85
Truck and tractor operators.....	38	. 675	47. 2	34. 55

¹ Average without overtime punitive earnings; with such earnings, the average would have been \$0.667.

Other mining and milling.—The 912 workers in other nonferrous-metal mines earned an average of 78.2 cents per hour (table 14). The occupational range in earnings extended from 64.7 cents for 10 clean-up men to 89.9 cents for 31 working foremen and their assistants. Drilling-machine operators, numbering 152, earned an average of 85.3 cents per hour. Hand miners (121), a general classification comprehending a number of related skills, earned an average of 76.2 cents per hour.

TABLE 14.—*Straight-Time Hourly Earnings, Weekly Hours, and Weekly Earnings of Workers in Other¹ Nonferrous-Metal Mining, by Occupation, August 1941*

Occupation	Number of workers	Average hourly earnings	Average weekly hours	Average total weekly earnings
All occupations.....	912	\$0.782	45.7	\$38.01
Blacksmiths.....	11	.784	47.5	40.25
Clean-up men.....	10	.647	39.6	27.50
Drilling-machine operators.....	152	.853	46.1	42.34
Helpers.....	176	.721	45.9	35.75
Foremen and assistants, working.....	31	.899	47.8	45.88
Hoistmen, surface and underground.....	23	.731	47.7	37.58
Loading-machine operators.....	53	.876	46.4	43.88
Maintenance workers, not elsewhere classified.....	16	.868	45.6	43.26
Mechanics.....	15	.794	48.6	41.68
Miners, hand.....	121	.762	41.6	33.86
Miscellaneous workers.....	118	.766	46.5	38.49
Motormen.....	36	.782	48.9	41.70
Motormen's helpers.....	31	.707	46.9	36.26
Pumpmen, surface and underground.....	11	.809	47.4	42.57
Roustabouts.....	55	.755	44.5	35.86
Timbermen.....	53	.772	47.0	39.19

¹ Manganese, molybdenum, and tungsten.

² Average without punitive overtime earnings; with such earnings, the average would have been \$0.843.

Average straight-time hourly earnings for workers in other nonferrous-metal milling were 75.7 cents (table 15). The occupational range in average hourly earnings extended from 61.6 cents for swingmen to 90.5 cents for working foremen and their assistants.

TABLE 15.—*Straight-Time Hourly Earnings, Weekly Hours, and Weekly Earnings for Workers in Other¹ Nonferrous-Metal Milling, by Occupation,² August 1941*

Occupation	Number of workers	Average hourly earnings	Average weekly hours	Average total weekly earnings
All occupations.....	426	\$0.757	47.3	\$38.79
All-around mill-machinery operators.....	26	.657	47.9	34.17
Ball-mill operators.....	26	.827	47.2	42.12
Clerical workers.....	10	.866	49.3	45.60
Crusher operators.....	24	.729	46.0	35.83
Flotation operators.....	11	.840	43.7	39.58
Foremen and assistants, working.....	24	.905	50.8	50.28
General helpers, mill.....	101	.719	46.0	35.76
Maintenance workers, not elsewhere classified.....	32	.810	48.5	42.66
Mechanics.....	53	.813	48.6	43.05
Miscellaneous workers, not elsewhere classified.....	30	.763	46.4	38.02
Ore handlers.....	49	.699	47.9	36.20
Samplers.....	13	.735	45.1	35.46
Swingmen.....	15	.616	50.4	34.52
Table men.....	12	.741	45.1	35.45

¹ Manganese, molybdenum, and tungsten.

² Note inclusion of clerical workers.

³ Average straight-time hourly earnings; including payment for overtime, the average is raised to \$0.819.

Weekly Hours and Earnings

Although a standard workweek of 40 hours is generally recognized in the mining and milling of nonferrous metals, actual hours in the late summer of 1941 were considerably longer than this in many areas. It has been seen that weekly hours in various parts of the copper-mining industry averaged 40.0, 45.3, and 43.1, and that in other branches of mining and milling hours above 40 were typical.

A workweek of exactly 40 hours was the stint of only 36.3 percent of the wage earners in western nonferrous-metal mines during the period studied (table 16). Another contingent in the West, constituting 25.8 percent of the wage earners in that region, worked 48 hours. In the Tri-State District, 23.5 percent of those employed in nonferrous-metal mines worked 40 hours and an additional 35.8 percent worked 48 hours. A 48-hour workweek was reported for 47.5 percent of the workers in Michigan mines, with an additional 39.1 percent working 40 hours. Over half (53.3 percent) of the wage earners in eastern mines worked 40 hours weekly.

Of the wage earners in western nonferrous-metal mills, 57.3 percent worked 48 hours during the week studied, and another 19.8 percent worked a 40-hour week. In the Tri-State District, 42.9 percent and 27.4 percent worked 40 hours and 48 hours, respectively. Almost seven-tenths (69.7 percent) of the nonferrous-metal mill workers in Michigan and 59.3 percent in the East worked 40 hours.

Average total weekly earnings in the various branches and regions of nonferrous-metal mining and milling, as well as for many occupational groups, were shown in tables 9-15.

TABLE 16.—Proportionate Regional Distribution of Workers by Weekly Hours Worked, in Nonferrous-Metal Mines and Mills, August 1941

Item	West		Tri-State District		Michigan		East	
	Mines	Mills	Mines	Mills	Mines	Mills	Mines	Mills
Actual weekly hours:								
Under 24 hours.....	4.7	1.7	3.4	2.6	1.8	2.9	2.2	0.6
24 and under 32 hours.....	2.8	1.7	2.1	.5	1.8	.6	3.4	.3
32 and under 36 hours.....	4.6	1.9	3.1	1.3	3.7	2.9	5.3	2.8
36 and under 40 hours.....	3.0	.3	14.6	.6	.7	.6	1.3	2.5
Exactly 40 hours.....	36.3	19.8	23.5	42.9	39.1	69.7	53.3	59.3
Over 40 and under 44 hours.....	2.7	1.2	4.3	8.0	2.2	3.5	12.2	11.8
44 and under 48 hours.....	11.9	2.8	8.1	7.8	1.7	5.8	1.3	.3
Exactly 48 hours.....	25.8	57.3	35.8	27.4	47.5	9.9	18.3	11.5
Over 48 and under 56 hours.....	4.3	4.8	3.0	5.5	.4	-----	1.2	1.9
56 hours and over.....	3.9	8.5	2.1	3.4	1.1	4.1	1.5	9.0
Total.....	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0
Number of workers.....	15,515	4,084	2,854	957	1,383	172	919	321
Number of units.....	62	34	32	19	3	2	4	4

Average total weekly earnings in copper mines ranged from \$22.15 in Michigan to \$34.98 in the Northwest and \$35.56 in the Southwest (table 9). For drilling-machine operators, the regional differences spanned a range from \$25.04 in Michigan to \$39.74 in the Southwest. Within the group of workers in northwestern copper mines, average

total weekly earnings varied between a low of \$25.11 for roustabouts and a high of \$50.36 for working foremen and their assistants. In the Southwest, the corresponding occupational differences extended from \$24.89 for common laborers to \$51.12 for shovel operators. In Michigan, the occupational range was from \$14.33 for miscellaneous workers to \$29.10 for working foremen and their assistants.

In northwestern copper mills workers earned an average of \$42.13 weekly (table 10). This average exceeded the amount of the average weekly pay envelope for copper-mine workers in the same region. The corresponding average of \$33.41 for southwestern copper-mill workers fell below the average for copper-mine workers in that region. In northwestern copper mills, the occupational differences in weekly earnings extended from an average of \$33.10 for plant-protection and custodial workers to an average of \$50.47 for working foremen. The range in southwestern copper mills was from an average of \$27.15 for maintenance laborers to an average of \$46.72 for working foremen.

Average total weekly earnings in lead and zinc mining varied within a narrow regional range; \$32.11 in the Tri-State District, \$32.23 in the East, and \$32.27 in the West (table 11). In the West, change-house workers earned only \$26.14, whereas working foremen and their assistants earned \$43.80. The occupational range in the Tri-State District was from \$22.13 for watchmen to \$41.02 for loading-machine operators. In the East, roustabouts earned an average of \$22.95 and working foremen and their assistants earned an average of \$42.51. In contrast with lead and zinc mining, regional differences in average total weekly earnings in the lead and zinc mills covered a broader range: In the Tri-State District, the average was \$30.54; in the East, \$31.91; and in the West, \$34.61 (table 12).

Workers in mercury mines averaged \$31.63 per week (table 13), while workers in other mines and mills earned \$38.01 and \$38.79, respectively (tables 14 and 15).

PART II.—EARNINGS IN THE SMELTING AND REFINING OF NONFERROUS METALS, AUGUST 1941

Characteristics of the Industry

Wage structure in the primary smelting and refining of nonferrous metals is conditioned in large measure by the characteristic technical processes of the industry. These processes involve work under difficult, unpleasant, and frequently dangerous conditions, resulting from the heat of the furnaces, the metal and acid fumes, and dust. To some extent, too, the operations in this branch of the nonferrous-metals industry require the possession by the labor force of specialized technical knowledge, especially at the furnaces and in the maintenance departments. While no formal apprenticeship or other training is ordinarily required for these operations, proficiency in many can be acquired only after years of experience.

Smelting is comprised of those processes whereby concentrated ores of varying composition are treated with heat in order to separate the various metals from the waste materials. After smelting, the metals generally contain some impurities and, in order to bring them up to the specifications of the consuming market, require further refining. Refining of metals to eliminate impurities is accomplished through a variety of technical methods, among which the electrolytic method is prominent. Some ores, notably the oxides, are commonly treated by the leaching method; instead of being subjected to smelting, the ores are dissolved by means of chemicals and recovered from the solution by passing a current through it. This results in the deposition of the pure metal upon cathodes.

It is difficult to draw a sharp line of demarcation between smelting and refining, since the objective of both processes is to obtain pure metal, and in many instances both processes involve similar operations. It is general practice, however, to distinguish establishments within the industry according to the specific processes with which individual plants are primarily concerned. These processes are: (a) Smelting copper, lead, zinc, mercury, etc.; (b) electrolytic refining of copper; and (c) production of electrolytic zinc and lead.

Smelting processes differ widely depending upon the metal treated and upon the composition and complexity of the ores. Copper smelters, for the most part, process the concentrates in three distinct stages: roasting and sintering, reverberatory furnace smelting, and converting. In some instances where blast furnaces are utilized, roasting is dispensed with. Moreover, Michigan ores, which contain the copper in pure form, employ reverberatory furnaces alone, both for smelting and for furnace refining. As indicated previously, some ores are processed by the leaching method and heat treatment becomes a minor phase of the entire process in these instances. These differences in operations exert considerable influence upon occupational patterns and therefore upon wage structure.

The most common method in smelting zinc concentrates is the horizontal or "batch" retort process. The prevailing sequences in this process are roasting and distillation. Roasting liberates the sulphurous gases from the concentrates and converts the zinc into zinc oxide. The gases are converted generally into sulphuric acid, a common by-product of zinc smelting, while the zinc oxide is mixed with pulverized coal and ores, and fed into the retorts of the furnaces. The coal oxidizes the zinc oxide, and the zinc, in the form of vapors, settles and cools in condensers. The zinc is then cast into slabs. Frequently, the zinc is further refined by distillation to meet market requirements. Some firms are now utilizing an improved variation of this process, i. e., vertical retort furnace smelting. In horizontal retort furnaces the smelting process is intermittent, since the completion of the process in one batch of retorts requires an interruption in the operations for recharging; by way of contrast, the vertical retort furnace permits continuous charging of the retorts, with the charge in the form of pressed briquets of ore and pulverized coal. Zinc-smelting operations require large numbers of workers around the furnaces, in the manufacture of the clay retorts, and in pulverizing the coal.

The most prevalent method of lead smelting involves roasting of the concentrates and smelting in blast furnaces. The product from the blast furnace, however, contains a number of impurities and various methods of refining the lead are necessarily associated with smelters. Involved in the refining process are methods of softening the lead or removing the copper and antimony content, and desilverization or elimination of the silver content from the lead. When high-grade lead is required it may be refined electrolytically.

Electrolytic copper refineries remove whatever impurities remain in the blister copper or matte after the smelting operation, and recover, in addition, the precious metals contained in the blister copper. These refineries engage in furnace refining, as well as in treating the copper electrolytically. Here the blister copper is melted in reverberatory furnaces, oxidized, poled, and cast into anodes. These anodes are loaded into tanks containing an electrolyte and cathodes made from thin copper "starting" sheets. When the current passes from the anode through the electrolyte to the cathode, pure copper particles are deposited on the latter. This copper is then charged into furnaces and ultimately is drawn, to be cast into wire bars, billets, cakes, and other commercial forms. The slime which collects at the bottom of the electrolytic tanks contains impurities as well as recoverable precious metals thrown off in the transfer of copper from anode to cathode. This slime is removed and processed further to obtain valuable byproducts.

The production of zinc by the electrolytic method generally involves leaching instead of smelting. As indicated earlier, this process consists of roasting the ore and dissolving the metal constituents by means of sulphuric acid. The electrolyte, after purification, is treated by passing an electric current through it and the metallic zinc is thus deposited in layers on a cathode. The zinc is then stripped off the cathodes, melted and cast into slabs. The process as a whole bears a

good deal of similarity to the production of copper by the leaching method. This method of producing zinc has become increasingly important since its introduction in 1915 and accounts at present for about one-fifth of the total production.

IMPORTANCE OF THE INDUSTRY

Census coverage of primary smelting and refining establishments in 1919 included those plants with products valued at \$500 or more. In succeeding Census tallies no data were collected for establishments with annual products under \$5,000. This change in coverage, however, probably had little effect on the number of establishments reported in the industry, for the technical character of the operations involved, as well as the comparatively high value per unit of output, contributes to the establishment and maintenance of large plants.

The average number of wage earners in copper, lead, and zinc primary smelting and refining reported by the Census in 1919 was about 40,000. By 1929 the size of the labor force in this industry had declined by almost 22 percent from the 1919 mark. The depression following 1929 resulted in a further drastic shrinkage of the work force by 1933 to scarcely more than one-third of the 1919 level. Despite the recovery in subsequent years, the labor force reported by the Census of 1937 was only three-fourths as great as that of 1919. In 1939, Census figures for primary smelting and refining of nonferrous metals included the production of aluminum from bauxite, in addition to copper, lead, and zinc, and the labor force comprised 27,630 workers. Following 1939, however, employment in this industry expanded considerably so that by August 1941, the period of the Bureau's wage survey, employment in most plants was well above the 1939 level.

SIZE OF ESTABLISHMENT

As has been indicated earlier, operations in the primary smelting and refining industry (which treats derivatives of virgin nonferrous ores) are carried on mainly by medium-sized and large establishments. Thus, of the 63 establishments reported by the Census of 1939, nearly a third employed over 500 wage earners, and over one-half employed from 101 to 500 wage earners. Only two establishments were reported to employ less than 50 workers. On the other hand, none of the establishments employed more than 2,500 wage earners.

Of the 63 establishments reported by the Census of 1939 to be engaged in the primary smelting and refining of nonferrous metals, 59 were operated by central administrative offices controlling two or more plants. The remaining 4 were operated under some form of independent management. With the exception of 1 establishment, smelters and refineries were owned by corporations. In general, smelting and refining facilities are highly integrated with respect to business control. In copper production, for example, the American Bureau of Metal Statistics reported that in 1940, 10 firms owned plants which smelted ore or concentrates from 25 or more extraction sources. Similarly, 8 firms controlled the refineries which treated copper from 30 or more commercial sources.¹

¹ See Yearbook of the American Bureau of Metal Statistics, 1940, pp. 21-23.

LOCATION OF THE INDUSTRY

Despite the continual westward shift of the nonferrous-mining industry over a period of years, the eastern States of New York, New Jersey, Pennsylvania, Maryland, and West Virginia comprise the most important region for smelting and refining nonferrous metals (copper, lead, and zinc); two-fifths of the wage earners in this industry are found in these States. Of the States included in this geographic division, West Virginia and New York are relatively unimportant from the standpoint of employment. The Western States, with more than twice as many establishments as the Eastern States, accounted for somewhat over one-third of the total employment in 1939. The Central States, where fully one-third of the establishments in the industry are located, accounted for about one-fourth of total employment in the industry in that year. A variety of factors are responsible for the location of a considerable bulk of this industry in the East. Of prime importance in the smelting of domestic ores is proximity to sources of fluxes and, of course, of concentrates; proximity to ports of entry is important for smelters and refineries which use imported concentrates and metals. In addition, the early accumulation of capital equipment in eastern smelters and refineries, intended to supply nearby fabrication centers, played an important role in maintaining the dominant position of the East within the industry.

CHARACTERISTICS OF THE LABOR FORCE

Smelting and refining of nonferrous metals involves a number of specialized technical operations and the labor force of this industry manifests distinctive characteristics. In all branches of the industry a considerable amount of labor is employed in the yards at handling and storing concentrates and metals, as well as in delivery of these materials from storage to mix rooms, roasters, and furnaces. Many of these operations are accomplished with the aid of hoists, cranes, trucks, jitney cars, and narrow-gage railroads. In the mix rooms ores and mattes are crushed, ground, and treated in a manner similar to milling. These tasks are performed by operators and helpers. Coal pulverizing and gas producing are also important operations. The operations of roasting, smelting, and converting are performed by furnace operators who are skilled workers and by furnace helpers who may either specialize in one operation or perform a number of operations. Most smelters, especially zinc smelters, produce their own clay retorts and condensers, and other refractory vessels in pottery departments. In all stages of the process, metals are weighed, checked, sampled, and tested by samplers and testers. The recovery of metals from dust and from flues, and the treatment of furnace fumes in Cottrell treaters involve considerable amounts of specialized labor. In the electrolytic refineries much of the labor force is required to operate electrolytic tanks and to check and eliminate the causes of short circuits which result in waste of power, labor, and materials. Although many of these operations can be performed by relatively unskilled labor after a short period of training, the rates for such

labor are somewhat higher in this than in other industries because of the difficult and unpleasant conditions of work.

Many of the processes in the industry are intermittent, and in order to provide more or less continuous employment workers are frequently shifted, in the course of a week's work, among a number of different operations; for example, from furnace operator to laborer. In times of lay-offs employers generally retain the most versatile workers in lower paying occupations. With the expansion of production in the industry in recent months, upgrading of workers to higher paying occupations has taken place. Simultaneously, new workers have been hired for the unskilled operations.

The labor force in this industry is composed predominantly of male white workers (table 17). Of the 13,579 employees surveyed by the Bureau, 93.3 percent were white other than Mexican, 4.7 percent were Mexicans, and 1.8 percent were Negroes. In the refineries 84.0 percent of the 8,108 workers surveyed were white other than Mexican, 10.6 percent were Negroes, and 5.4 percent were Mexicans. In both smelting and refining most of the Mexican labor was found in the Southwest; in this region 50.4 percent of the smelter workers and 29.6 percent of the refinery employees were Mexicans. Over 95 percent of the Negroes working in refineries were employed in the East, where they accounted for 17.2 percent of the labor force in the surveyed plants.

TABLE 17.—Racial Composition of Labor Force in Nonferrous-Metal Smelting and Refining, August 1941

Region ¹	All workers				White, other than Mexican		Negro		Mexican		Other
	Smelting		Refining		Smelting (percent)	Refining (percent)	Smelting (percent)	Refining (percent)	Smelting (percent)	Refining (percent)	
	Number	Percent	Number	Percent							
United States.....	13,579	100.0	8,108	100.0	93.3	84.0	1.8	10.6	4.7	5.4	0.2
Northwest.....	4,708	100.0	1,465	100.0	99.3	99.6	.4	.4	.1		.2
Southwest.....	1,091	100.0	1,464	100.0	47.6	69.1	.2	1.3	50.4	29.6	1.8
North Central.....	1,479	100.0	396	100.0	82.2	95.5	12.1	3.0	5.7	1.5	
South Central.....	2,099	100.0			99.3		.7				
East.....	4,202	100.0	4,783	100.0	90.5	82.8	.5	17.2			

¹ For States included in regions, see footnote to table 22.

EXTENT OF UNIONIZATION

In the smelters studied by the Bureau nearly three-fifths (57.3 percent) of the employees were working in plants covered by union agreements (table 18). The bulk of the union membership in smelters was affiliated with the C. I. O. The International Union of Mine, Mill, and Smelter Workers is the most important union in this field. Most of the A. F. of L. membership found in the surveyed smelters was in the North Central region. Over three-fifths (63.9 percent) of the employees in refining were in plants covered by union agreements. Most of this union group was found in the East.

TABLE 18.—*Unionization of Workers in Nonferrous-Metal Smelters and Refineries, August 1941*

Region ¹	Smelting						Refining					
	Total		Union establishments ²		Nonunion establishments		Total		Union establishments ²		Nonunion establishments	
	Number	Percent	Number	Percent	Number	Percent	Number	Percent	Number	Percent	Number	Percent
United States.....	13,579	100.0	7,784	57.3	5,795	42.7	8,108	100.0	5,181	63.9	2,927	36.1
Northwest.....	4,708	100.0	3,752	79.7	956	20.3	1,465	100.0	1,151	78.6	314	21.4
Southwest.....	1,091	100.0	955	87.5	1,091	100.0	1,464	100.0	451	30.8	1,013	69.2
North Central.....	2,099	100.0	955	45.5	1,144	54.5	396	100.0	258	63.9	143	36.1
South Central.....	1,479	100.0	1,479	100.0								
East.....	4,202	100.0	1,598	38.0	2,604	62.0	4,783	100.0	3,326	69.5	1,457	30.5

¹ For States included in regions, see footnote to table 22.² Includes plants covered by agreements with independent unions.

Scope and Method of Survey

The survey of nonferrous smelting and refining was based on a sample of somewhat more than half of all establishments smelting or refining substantial quantities of copper, lead, or zinc. In addition, a number of mercury smelters, which were found to be generally associated with mines, were also included in this study. In order to assure validity in the selection of the sample, careful consideration was given to size of establishment, type of metal produced, form of processing, geographic location, and corporate affiliation. Smelters and refineries employing less than 20 persons were not covered, except in mercury smelting. In the latter industry only the production unit engaged in smelting was included. The data were collected by trained field representatives of the Bureau for a pay-roll period in August 1941. The information obtained included detailed records of hours worked, total earnings, and occupational descriptions, as well as the sex and color of each employee.

In all, the sample included some 33 production units in copper, lead, and zinc smelting and refining, and 22 in mercury smelting. The number of workers surveyed in these plants totaled 21,687 (table 19).

TABLE 19.—*Nonferrous-Metal Smelters and Refineries Covered by Bureau's Survey, August 1941*

Region ¹	Smelting			Refining		
	Units	Workers		Units	Workers	
		Number	Percent		Number	Percent
United States.....	43	13,579	100.0	12	8,108	100.0
Northwest.....	20	4,708	34.7	3	1,465	18.1
Southwest.....	6	1,091	8.0	3	1,464	18.1
North Central.....	4	1,479	10.9	3	396	4.9
South Central.....	7	2,099	15.5			
East.....	6	4,202	30.9	3	4,783	58.9

¹ For States included in regions, see footnote to table 22.

Method of Wage Payment

The workers in the surveyed smelters and refineries were paid preponderantly upon a time basis. Over nine-tenths of the labor force in both smelters and refineries received time rates (table 20). The largest concentrations of piece and incentive bonus workers in nonferrous-metal smelters were found in the East. Two and one-half percent of the smelter workers in this region were paid by the piece, and an additional 23.5 percent were paid on an incentive bonus basis.

TABLE 20.—*Distribution of Workers in Nonferrous-Metal Smelting and Refining by Method of Wage Payment and by Region, August 1941*

Region ¹	All workers				Time workers			
	Smelting		Refining		Smelting		Refining	
	Work-ers	Per-cent	Work-ers	Per-cent	Work-ers	Per-cent	Work-ers	Per-cent
United States.....	13, 579	100. 0	8, 108	100. 0	12, 385	91. 2	7, 833	96. 6
Northwest.....	4, 705	100. 0	1, 465	100. 0	4, 675	99. 3	1, 405	95. 9
Southwest.....	1, 091	100. 0	1, 464	100. 0	1, 091	100. 0	1, 459	99. 7
North Central.....	1, 479	100. 0	396	100. 0	1, 456	98. 5	392	99. 0
South Central.....	2, 089	100. 0			2, 056	98. 0		
East.....	4, 202	100. 0	4, 783	100. 0	3, 107	74. 0	4, 577	95. 7
	Piece workers				Bonus workers			
United States.....	181	1. 3	35	0. 4	1, 013	7. 5	240	3. 0
Northwest.....	27	. 6			6	. 1	60	4. 6
Southwest.....			5	. 3				
North Central.....	12	. 8	4	1. 0	11	. 7		
South Central.....	36	1. 7			7	. 3		
East.....	106	2. 5	26	. 5	969	23. 5	180	3. 8

¹ For States included in regions, see footnote to table 22.

The basis for bonus payments in smelters and refineries varied with the character of the task performed. In some cases, men working in tank houses were paid an efficiency bonus calculated with reference to economy in the use of electric current. Bonuses were also paid to stripping gangs on the basis of output above set standards. Frequently casting crews on the casting wheel were paid a bonus for each round cast above a set number of rounds per day. Bonuses were also awarded in some cases for furnaces charged above set scores. Piece rates were prevalent in smelter yards for unloading concentrates and materials and for loading metals.

It is customary in smelters and refineries to pay workers for a full shift in certain bottleneck operations, such as the stripping of cathodes and charging of furnaces, and to permit them to leave the plant when the work is completed in less time. In these instances expensive equipment is involved and the completion of these operations with dispatch may speed up all other operations. Such "finish-go-home" arrangements were found to prevail in many smelters and refineries. In some instances the day's work varied considerably and in other

instances it regularly required about 6 hours, but 8 hours' pay was customarily provided. In computing hours of work for these cases the Bureau has credited "finish-go-home" employees with full-time hours.

The practice of adjusting general levels of pay in accordance with a "sliding scale" based upon the price of metals is also prevalent in this industry, as in mining and milling. Some of the union agreements provide for such adjustments.

Hourly Earnings

WARTIME TREND OF EARNINGS

Monthly data on average hourly earnings reported regularly to the Bureau by a substantial number of smelters and refineries indicate that the outbreak of the war in Europe resulted in no sharp and substantial jump in wages in this industry. Average hourly earnings in the smelting and refining of copper, lead, and zinc increased, in fact, by only about 2 percent from August 1939 to August 1940. During the year preceding the Bureau's survey, however, wages rose steadily and appreciably; in the month of the survey, August 1941, average earnings were approximately 15 percent above the level of a year earlier. This increase, little of which was due to premium overtime payments, reflected the growing influence of labor unions and the industry's efforts to attract more workers.

Hourly earnings in the industry have continued to increase since the time of the Bureau's survey, and in March 1942 were 8 percent above the level of August 1941. The analysis presented in this article, therefore, should be considered as a "stop-action" picture of an industry in transition.

EARNINGS IN AUGUST 1941

Excluding overtime payments, average hourly earnings in zinc smelters were 83.5 cents (table 21). In lead smelters the corresponding average was 76.8 cents; in copper smelters, 75.0 cents; and in mercury smelters, 60.5 cents. Average hourly earnings were increased from 0.6 cent in lead smelting to 5.9 cents in mercury smelting by the inclusion of payment for overtime.

Straight-time average hourly earnings of individual workers in zinc smelters ranged from 30.0 cents to \$2.014. In this branch of non-ferrous-metal smelting over half (51.3 percent) of the workers received average hourly earnings of 72.5 but under 92.5 cents.

TABLE 21.—Percentage Distribution of Workers in Nonferrous-Metal Smelting and Refining by Average Hourly Earnings (Excluding Overtime) and by Branch, August 1941

Average hourly earnings	Smelting				Copper refining (electrolytic)	Electrolytic zinc production ¹
	Zinc	Copper	Lead	Mercury		
Under 37.5 cents.....	0.1	0.1	0.1	13.4	0.1	-----
37.5 and under 40.0 cents.....	(3)	-----	-----	2.2	(3)	-----
40.0 and under 42.5 cents.....	(3)	-----	.1	8.1	.2	0.1
42.5 and under 45.0 cents.....	.1	1.3	-----	-----	.3	-----
45.0 and under 47.5 cents.....	(3)	.1	.3	.7	3.9	.1
47.5 and under 50.0 cents.....	.1	.1	.6	-----	2.3	.2
50.0 and under 52.5 cents.....	.2	3.5	-----	2.2	1.4	.5
52.5 and under 55.0 cents.....	.1	1.3	.4	4.4	-----	-----
55.0 and under 57.5 cents.....	.2	2.1	.2	2.2	.5	-----
57.5 and under 60.0 cents.....	.7	2.4	.2	4.4	.3	.5
60.0 and under 62.5 cents.....	2.6	3.1	-----	9.0	.6	-----
62.5 and under 65.0 cents.....	4.1	3.2	10.1	3.0	1.0	.1
65.0 and under 67.5 cents.....	3.7	3.1	10.4	14.9	.4	-----
67.5 and under 70.0 cents.....	7.7	15.4	10.8	5.2	11.6	5.8
70.0 and under 72.5 cents.....	5.6	10.0	14.2	14.2	4.3	12.7
72.5 and under 75.0 cents.....	7.5	3.6	4.2	4.4	8.4	7.6
75.0 and under 77.5 cents.....	8.3	8.9	14.1	2.2	13.2	9.8
77.5 and under 80.0 cents.....	5.2	8.8	4.9	3.7	11.5	12.0
80.0 and under 82.5 cents.....	4.4	6.9	5.5	.7	8.1	3.1
82.5 and under 85.0 cents.....	8.5	6.7	2.6	.7	5.4	13.9
85.0 and under 87.5 cents.....	6.9	3.2	4.1	-----	5.0	8.7
87.5 and under 90.0 cents.....	4.7	2.3	3.4	.7	4.5	10.4
90.0 and under 92.5 cents.....	5.8	3.0	4.0	-----	3.2	1.3
92.5 and under 95.0 cents.....	5.2	1.3	2.4	-----	2.4	.4
95.0 and under 97.5 cents.....	2.9	3.0	1.3	-----	1.8	.2
97.5 and under 102.5 cents.....	4.6	1.4	1.6	-----	3.5	4.1
102.5 and under 107.5 cents.....	3.7	1.5	1.0	.7	2.1	2.0
107.5 and under 112.5 cents.....	1.7	1.2	.4	1.5	1.1	.4
112.5 and under 117.5 cents.....	1.0	.4	.5	-----	.3	.2
117.5 cents and over.....	4.4	1.1	2.6	1.5	1.7	.9
Total.....	100.0	100.0	100.0	100.0	100.0	100.0
Number of workers.....	7,983	4,366	1,095	135	6,785	1,323
Number of units.....	14	9	4	16	8	4
Average hourly earnings.....	\$0.835	\$0.750	\$0.768	\$0.605	\$0.779	\$0.809
Average hourly earnings (including punitive overtime).....	\$0.848	\$0.790	\$0.774	\$0.664	\$0.787	\$0.814

¹ Includes 1 lead refinery.² Less than a tenth of 1 percent.

The average hourly earnings of the 4,366 workers in copper smelters ranged from 34.4 cents to \$1.553. Over three-fifths (63.4 percent) of these employees were concentrated in the wage class of 65.0 but under 85.0 cents.

Almost three-quarters (74.2 percent) of the labor force in lead smelters received 62.5 but under 82.5 cents per hour. In mercury smelting, 57.3 percent of the workers earned 52.5 but under 72.5 cents per hour.

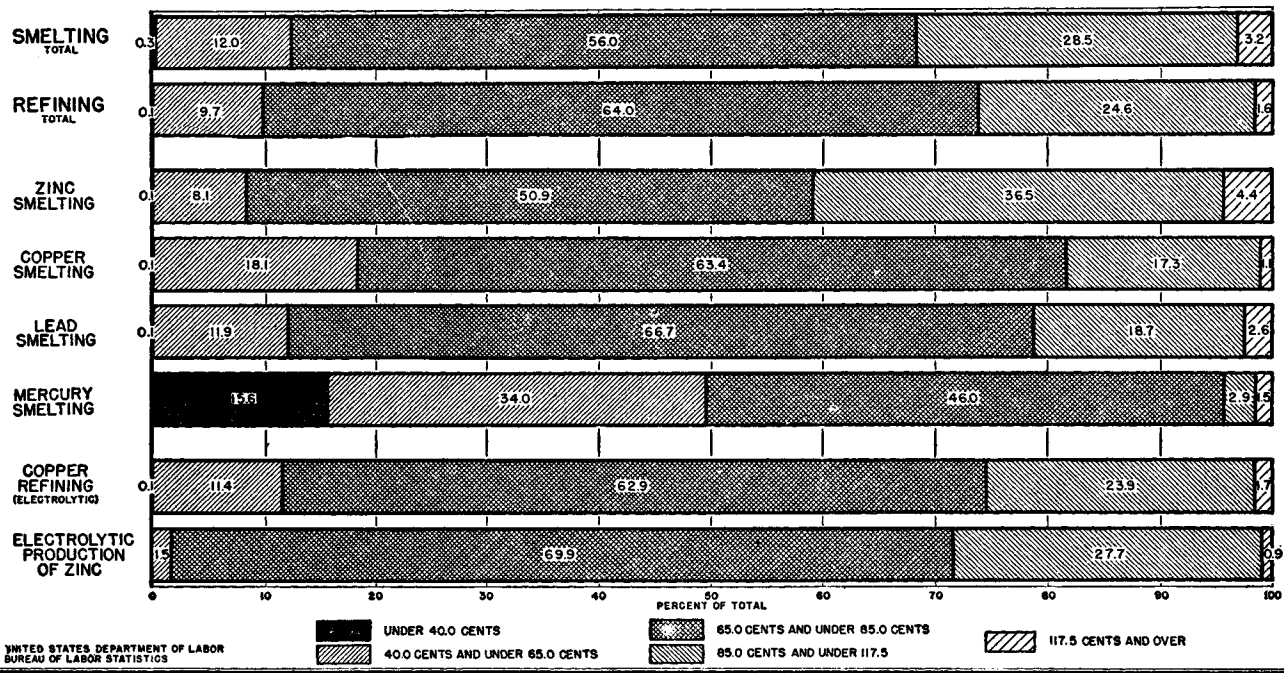
Straight-time average hourly earnings were 77.9 cents in electrolytic copper refineries and 80.9 cents in electrolytic zinc-production plants. Hourly earnings were increased by 0.8 cent in electrolytic copper refining and by 0.5 cent in electrolytic zinc production by the inclusion of overtime payments.

Although the over-all range of average hourly earnings in electrolytic copper refining extended from 34.4 cents to \$1.956, 67.5 percent of the workers in this branch earned 67.5 but under 87.5 cents per hour. In electrolytic zinc production, over four-fifths (83.2 percent) of the workers received 70.0 but under 90.0 cents per hour.

It is of interest to note that in the nonferrous-metal smelters and refineries covered by the Bureau's survey, punitive overtime payments amounted to 2.7 percent of the total wage bill. The corresponding proportion in nonferrous mining and milling was 5.0 percent.

PERCENTAGE DISTRIBUTION OF WORKERS IN NONFERROUS METAL SMELTING AND REFINING

BY AVERAGE HOURLY EARNINGS, EXCLUDING OVERTIME, AND BY BRANCH
AUGUST 1941



UNITED STATES DEPARTMENT OF LABOR
BUREAU OF LABOR STATISTICS

REGIONAL DIFFERENCES

Hourly earnings, excluding overtime, in all smelters covered by the Bureau's survey averaged 79.8 cents, while in all refineries covered the corresponding average was 78.3 cents (table 22). Regional differences in average straight-time hourly earnings in smelters were spanned by a range from 63.7 cents in the Southwest to 89.1 cents in the East. The southwestern figure was thus 80 percent and the eastern figure was 112 percent of national average hourly earnings. In non-ferrous-metal refineries, the regional range in average hourly earnings extended from 68.7 cents in the Southwest (or 88 percent of the United States average) to 82.2 cents in the East (or 105 percent of the United States average).

Well over half (57.2 percent) of all workers in smelters earned 67.5 but under 87.5 cents per hour. In the Northwest, almost four-fifths of the smelting workers received hourly earnings in this same range. More than half (58.3 percent) of the smelting workers in the Southwest clustered in the 20-cent earning range of 50.0 but under 70.0 cents per hour. The major concentration of smelting workers in the South Central States, in the earnings range of 72.5 but under 92.5 cents per hour, encompassed 63.0 percent of the total. Over half (53.9 percent) of the North Central smelting workers earned 67.5 but under 87.5 cents per hour. Over two-fifths (43.6 percent) of the workers in non-ferrous-metal smelters in the East earned 70.0 but under 90.0 cents per hour.

Slightly less than seven-tenths (69.3 percent) of the workers in the surveyed refineries earned 67.5 but under 87.5 cents per hour. In the Northwest and Southwest, 84.0 percent and 49.6 percent, respectively, of the refinery workers were found in this range. In eastern refineries, over seven-tenths (70.3 percent) of the workers earned 70.0 but under 90.0 cents per hour.

OCCUPATIONAL EARNINGS

Occupational earnings in zinc smelters ranged from a low of 61.9 cents per hour for laboratory helpers to a high of 121.6 cents for lead burners (table 23). The two large occupational groups of chargers and of yard and maintenance laborers (numbering 459 each) received 95.9 cents and 70.3 cents, respectively, as average hourly earnings. Two other large occupational groups, metal drawers and furnace men's helpers, earned an average of 93.8 cents and 81.0 cents, respectively, per hour. Chiselers, who cleaned the condensers used in the distillation of zinc, earned an average of 99.9 cents per hour. Among those workers concerned with the manufacture of the clay vessels used in the distillation of zinc, the mixing-machine operators earned an average of 79.0 cents per hour, retort and condenser makers earned 88.6 cents per hour, and pottery handlers earned 75.6 cents per hour.

The terminal averages in the range of occupational earnings in copper smelters were those of the motormen's and larrymen's helpers (55.7 cents) and the lead burners (\$1.316). The latter group also received the highest average hourly earnings in zinc smelting. They are highly skilled men who maintain the lead lining of enclosures and tanks in good repair by sealing joints and seams.

TABLE 22.—Percentage Distribution of Workers in Nonferrous-Metal Smelting and Refining, by Average Hourly Earnings (Excluding Overtime) and by Region,¹ August 1941

Average hourly earnings (in cents)	United States		Northwest		Southwest		North Central		South Central		East	
	Smelt- ing	Re- fining	Smelt- ing	Re- fining	Smelt- ing	Re- fining	Smelt- ing	Re- fining	Smelt- ing	Re- fining	Smelt- ing	Re- fining
Under 37.5.....	0.3	0.1	0.1	0.1	1.4	0.2	-----	-----	0.7	-----	(?)	-----
37.5 and under 40.0.....	(?)	(?)	-----	-----	-----	-----	-----	-----	2	-----	(?)	-----
40.0 and under 42.5.....	.1	.2	.1	-----	-----	-----	0.1	0.3	4	-----	0.3	-----
42.5 and under 45.0.....	.5	.2	-----	.1	5.3	.9	.1	-----	.1	-----	.1	-----
45.0 and under 47.5.....	.4	3.3	(?)	.1	4.2	16.5	.1	4.8	2	(?)	.1	-----
47.5 and under 50.0.....	.1	2.0	(?)	.1	2	5.9	.2	17.6	.5	(?)	(?)	-----
50.0 and under 52.5.....	1.3	1.2	.3	-----	13.7	4.4	-----	6.6	.3	(?)	.2	-----
52.5 and under 55.0.....	.6	.8	.2	-----	5.1	3.1	.1	4.0	.3	(?)	(?)	-----
55.0 and under 57.5.....	.8	.4	.2	.1	8.1	.4	.1	1.3	.2	0.1	.4	-----
57.5 and under 60.0.....	1.3	.3	.3	.1	9.2	1.0	.1	1.0	.3	1.1	.1	-----
60.0 and under 62.5.....	2.6	.5	.4	.1	5.5	1.6	12.4	.5	3.5	.5	.3	-----
62.5 and under 65.0.....	4.3	.8	1.8	.2	9.5	2.3	7.1	.3	4.9	5.0	.6	-----
65.0 and under 67.5.....	4.2	.3	3.0	.1	6.2	1.3	8.2	-----	4.2	3.5	.2	-----
67.5 and under 70.0.....	10.3	10.6	22.3	28.4	1.0	6.1	14.2	1.0	1.9	2.2	7.4	-----
70.0 and under 72.5.....	7.8	5.7	13.0	7.9	7.5	7.0	3.3	13.3	5.9	4.6	4.0	-----
72.5 and under 75.0.....	5.9	8.3	8.6	4.8	3.0	5.7	2.3	8.1	6.7	4.7	10.2	-----
75.0 and under 77.5.....	8.9	12.6	13.6	15.9	1.8	2.6	10.0	6.8	7.3	5.9	15.1	-----
77.5 and under 80.0.....	6.3	11.6	8.8	9.4	5.6	8.5	3.6	2.0	5.9	5.0	13.9	-----
80.0 and under 82.5.....	5.2	7.3	5.6	5.1	3.4	2.7	4.9	1.3	7.5	4.4	9.8	-----
82.5 and under 85.0.....	7.4	7.6	6.1	10.0	.5	13.0	6.6	1.3	16.1	6.5	5.7	-----
85.0 and under 87.5.....	5.4	5.6	1.6	2.5	2.6	4.0	9.0	17.6	9.2	7.3	6.1	-----
87.5 and under 90.0.....	3.8	5.5	3.0	5.6	1.9	6.6	2.2	1.5	4.9	5.2	5.5	-----
90.0 and under 92.5.....	4.7	2.8	3.8	4.0	.5	.5	6.1	3.5	5.4	6.0	3.2	-----
92.5 and under 95.0.....	3.7	2.1	1.2	.2	.5	.1	1.2	-----	3.5	8.3	3.4	-----
95.0 and under 97.5.....	2.8	1.6	2.2	.8	.8	.8	1.2	.3	1.7	5.0	2.2	-----
97.5 and under 102.5.....	3.3	3.6	1.2	1.4	.3	3.2	1.9	1.8	4.6	6.2	4.6	-----
102.5 and under 107.5.....	2.7	2.1	1.2	.5	.7	1.0	1.8	4.3	1.7	5.8	2.7	-----
107.5 and under 112.5.....	1.4	1.0	.5	.6	.2	.1	2.4	.5	.5	2.9	1.4	-----
112.5 and under 117.5.....	.7	.3	.3	.3	.5	.1	.3	-----	.3	1.6	.4	-----
117.5 and over.....	3.2	1.6	1.1	.6	.8	.4	.5	.3	1.1	8.2	2.1	-----
Total.....	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0
Number of workers.....	13,579	8,108	4,708	1,465	1,091	1,464	1,479	396	2,069	4,202	4,783	-----
Number of units.....	43	12	20	3	6	3	4	3	7	6	3	-----
Average hourly earnings.....	\$0.798	\$0.783	\$0.770	\$0.777	\$0.637	\$0.687	\$0.765	\$0.695	\$0.804	\$0.891	\$0.822	-----
Average hourly earnings (including punitive over- time).....	\$0.820	\$0.791	\$0.809	\$0.781	\$0.688	\$0.700	\$0.771	\$0.710	\$0.811	\$0.897	\$0.828	-----

¹ Northwest includes Montana, Nevada, Washington, Utah, Colorado, Idaho, California, Oregon. Southwest includes Arizona, New Mexico, Texas. South Central includes Arkansas, Oklahoma, Missouri, Tennessee. North Central includes Illinois, Ohio, Michigan, Indiana. East includes New Jersey, Pennsylvania, West Virginia, Maryland.

² Less than a tenth of 1 percent.

TABLE 23.—Hourly Earnings (Excluding Overtime), Weekly Hours, and Weekly Earnings of Workers in Zinc Smelting, by Occupation, August 1941

Occupation	Workers	Average hourly earnings	Average weekly hours	Average total weekly earnings
All occupations.....	7,983	\$0.835	39.6	\$33.55
Apprentices, craft.....	51	.811	44.9	36.54
Bag-house men's helpers.....	89	.824	39.8	32.80
Bin men's helpers.....	16	.690	40.6	28.26
Blacksmiths.....	30	.925	44.3	42.92
Blacksmiths' helpers.....	23	.785	44.1	36.28
Blow-out men.....	90	.794	39.3	31.17
Brakemen, railroad.....	13	.788	43.0	35.29
Bricklayers.....	38	1.036	40.8	43.49
Bricklayers' helpers.....	28	.754	40.1	30.37
Bumpers.....	107	.908	37.8	34.42
Cadmium operators.....	28	.892	40.1	35.92
Carpenters.....	43	.939	43.5	42.54
Carpenters' helpers.....	18	.753	42.4	33.10
Casting-machine operators.....	33	.816	40.0	32.64
Cellar men.....	40	.803	38.0	30.62
Chambermen.....	31	.978	40.1	39.54
Chambermen's helpers.....	10	.869	39.8	34.54
Chargers.....	459	.969	36.8	34.29
Checkers.....	13	.764	40.0	30.17

TABLE 23.—Hourly Earnings (Excluding Overtime), Weekly Hours, and Weekly Earnings of Workers in Zinc Smelting, by Occupation, August 1941—Continued

Occupation	Workers	Average hourly earnings	Average weekly hours	Average total weekly earnings
Chemists and metallurgists	46	\$0.902	40.7	\$36.87
Chemists' assistants	22	.902	39.5	35.99
Chiselers (condenser cleaners)	139	.999	32.1	32.03
Clerical, other plant and office	46	.901	40.4	36.72
Clerical, plant	102	.917	40.3	37.26
Condenser setters	65	.912	35.5	32.76
Condie boys (condenser cleaner)	103	.872	33.6	29.42
Conveyor operators	56	.716	40.1	28.98
Cottrell operators	17	.914	40.2	36.85
Cranemen	84	.850	40.5	34.63
Crusher operators	16	.830	39.0	32.48
Drivers (team, truck, tractor)	49	.783	39.8	31.43
Dryer operators	18	.815	39.9	32.91
Electricians	68	.977	43.1	43.38
Electricians' helpers	17	.745	39.8	30.37
Engineers, powerhouse	24	.975	40.0	39.11
Engineers, railroad	22	.926	41.5	39.43
Fire and fuel men, powerhouse	33	.817	39.7	32.89
Firemen, machines and boilers	11	.805	40.9	33.34
Firemen, railroad	25	.802	40.5	33.41
Foremen and assistants, working	194	.964	43.0	42.77
Furnace operators (dross and byproducts)	142	.766	42.8	34.04
Furnace men, retort	228	.980	40.6	40.63
Furnace men's helpers	332	.810	39.5	32.03
Gas-producer operators	119	.914	39.5	36.17
Gas-producer operators' helpers	12	.910	38.0	34.57
Helpers, powerhouse	21	.925	40.2	37.43
Hookers, shoveler (furnace cleaning)	208	.840	37.5	31.56
Ironworkers	14	1.056	39.7	42.09
Janitors	25	.693	37.3	26.02
Kiln men	29	.759	38.6	29.30
Laborers, furnace	271	.749	35.9	26.95
Laborers, process	508	.720	39.7	28.93
Laborers, yard and maintenance	459	.703	38.4	27.10
Laboratory helpers	20	.619	38.6	23.93
Leacher operators	21	.856	44.6	39.91
Lead burners	25	1.216	46.8	61.49
Lead burners' helpers	16	.850	50.4	48.37
Loamers	139	.864	37.6	32.62
Machinists	46	.967	49.2	52.02
Machinists' helpers	42	.781	44.7	37.52
Maintenance and service helpers, not elsewhere classified	147	.733	40.8	30.76
Maintenance and service workers, not elsewhere classified	127	.896	47.6	46.01
Mechanics	117	.855	42.9	37.92
Mechanics' helpers	29	.786	39.9	31.39
Metal drawers	414	.938	36.9	34.79
Metal handlers and loaders	152	.878	39.2	34.46
Mill operators, crush and grind	53	.770	41.0	31.94
Mill operators' helpers	12	.751	35.5	26.66
Mixer (pug) mill operators	45	.802	38.6	31.03
Mixing-machine operators (pottery)	41	.790	38.8	31.19
Motormen, tram	96	.775	39.9	31.00
Oilers, plant	66	.786	38.9	30.87
Other smelter workers' helpers	228	.741	40.0	30.35
Other smelter workers, not elsewhere classified	163	.784	43.9	36.05
Painters	54	.694	38.8	27.09
Pipe fitters	33	.942	49.8	51.42
Pipe fitters' helpers	17	.775	47.8	42.82
Pottery handlers	90	.756	41.0	31.45
Pump men	10	.869	39.4	34.33
Pump men, acid	24	.896	39.7	37.55
Retort and condenser makers	38	.886	39.9	35.65
Roaster operators	131	.848	41.2	35.83
Roaster operators' helpers	76	.833	39.5	32.95
Samplers' helpers	21	.704	40.7	29.06
Screenmen, jigmen	51	.729	42.0	31.71
Screenmen, jigmen's helpers	11	.723	40.0	28.93
Sintering-machine operators	50	.854	39.9	34.38
Sintering-machine operators' helpers	47	.813	39.9	32.69
Stampers	110	.853	38.7	33.23
Stenographers	20	.747	40.0	29.94
Stuffers	91	.831	36.9	30.75
Tinsmiths	16	.964	40.2	38.90
Tinsmiths' helpers	24	.731	40.1	29.40
Truckers, hand	215	.769	39.1	30.15
Watchmen	74	.697	39.5	27.52
Weighers and samplers	69	.782	39.2	30.76
Welders	27	.950	41.5	40.22

Process laborers in copper smelters collect scrap prior to the charging of the furnaces and handle the disposal, in appropriate dumps, of slag from the furnaces. They formed the largest occupational group, numbering 525, in the surveyed copper smelters (table 24). Their average hourly earnings amounted to 65.2 cents.

TABLE 24.—Hourly Earnings (Excluding Overtime), Weekly Hours, and Weekly Earnings of Workers in Copper Smelting, by Occupation, August 1941

Occupation	Number of workers	Average hourly earnings	Average weekly hours	Average total weekly earnings
All occupations.....	4,366	\$0.750	43.9	\$34.70
Apprentices.....	18	.671	47.1	34.14
Blacksmiths.....	9	.858	47.1	46.76
Boilermakers.....	36	.829	45.1	39.55
Boilermakers' helpers.....	35	.735	40.1	30.73
Carpenters.....	69	.880	44.5	41.84
Casting-machine operators.....	15	.749	47.4	38.34
Clerical office workers.....	75	.827	40.6	33.92
Clerical plant workers.....	126	.952	41.6	40.56
Converter-furnace operators.....	53	.815	46.3	40.18
Converter-furnace punchers.....	118	.710	44.3	33.24
Conveyor operators.....	39	.640	43.1	28.69
Cottrell operators.....	28	.769	41.7	33.05
Cottrell operators' helpers.....	34	.773	45.4	37.17
Cranemen, overhead.....	93	.819	44.5	38.41
Cranemen, overhead helpers.....	36	.732	40.9	30.59
Dumpmen.....	22	.687	45.6	33.66
Electricians.....	57	.901	46.1	44.59
Engineers, railroad.....	25	.901	42.1	39.23
Engineers, powerhouse.....	44	.729	44.4	35.89
Flue dust men.....	42	.683	41.1	29.26
Foremen and assistants, working.....	110	.910	46.4	44.47
Furnace operators' helpers, all-around.....	212	.754	45.5	36.56
Janitors.....	41	.670	44.6	31.83
Laborers, furnace.....	96	.652	43.8	29.97
Laborers, maintenance.....	148	.627	41.2	27.24
Laborers, process.....	525	.652	42.9	29.44
Laborers, yard.....	254	.657	43.3	30.00
Lead burners.....	22	1.316	44.2	61.23
Lead burners' helpers.....	29	.720	41.3	31.49
Locomotive crane engineers.....	42	.836	47.4	42.83
Machinists.....	71	.901	44.8	42.55
Metal handlers.....	76	.676	46.1	33.63
Mill operators, crushing and grinding (ore and flux).....	26	.788	44.9	37.34
Mill operators' helpers, crushing and grinding (ore and flux).....	12	.664	43.3	30.07
Miscellaneous mill workers, not elsewhere classified.....	145	.827	40.6	33.92
Miscellaneous mill workers' helpers, not elsewhere classified.....	88	.722	44.0	33.23
Motormen and larrymen.....	76	.686	42.9	30.93
Motormen's and larrymen's helpers.....	28	.557	47.6	28.66
Ore handlers.....	43	.633	38.0	24.31
Other maintenance workers, not elsewhere classified.....	211	.884	44.4	41.66
Other maintenance workers' helpers, not elsewhere classified.....	178	.715	43.9	33.21
Powerhouse workers, not elsewhere classified.....	123	.812	45.8	39.40
Repairmen, plant equipment.....	72	.809	44.0	37.57
Repairmen, plant equipment, helpers.....	58	.746	46.3	37.06
Reverberatory furnace chargers.....	46	.673	46.6	33.69
Reverberatory furnace operators.....	43	.783	45.9	38.47
Reverberatory furnace tappers.....	56	.728	45.3	35.07
Roaster operators.....	68	.774	46.6	38.56
Samplers.....	164	.711	42.4	30.99
Screenmen.....	23	.700	41.9	30.76
Switchmen, railroad.....	38	.815	42.6	36.74
Technicians.....	46	.952	41.2	39.69
Technicians' assistants.....	21	.757	41.6	32.01
Track repairmen.....	73	.612	45.2	29.55
Transportation workers, not elsewhere classified.....	77	.783	46.1	38.54
Watchmen.....	51	.671	44.7	31.78

It will be noted that the helpers of Cottrell-treater operators (copper-smelting plants) received higher average hourly earnings (77.3 cents) than the operators themselves (76.9 cents). Cottrell treaters are devices to recover valuable metallic dusts from the gases thrown off by the furnaces. The helpers, unlike the operators, come into frequent contact with the metal powder deposited in the treaters

and are paid accordingly for their work which, although unskilled, is hazardous and disagreeable.

In the lead smelters covered by the Bureau's survey, plant clerical workers received the highest average hourly earnings (\$1.023) among the various occupations (table 25). These employees are concerned with the routing of material through the plant and the maintenance of production, assay, and progress records; they should be distinguished from office clerical workers who are not directly involved in plant work. At the other end of the occupational scale in lead smelters, maintenance laborers received average hourly earnings of 64.8 cents.

TABLE 25.—*Hourly Earnings (Excluding Overtime), Weekly Hours, and Weekly Earnings of Workers in Lead Smelting, by Occupation, August 1941*

Occupation	Number of workers	Average hourly earnings	Average weekly hours	Average total weekly earnings
All occupations.....	1,095	\$0.768	38.4	\$30.52
Bag-house men.....	14	.798	40.3	32.26
Blast furnace chargers.....	12	.831	40.2	33.48
Blast furnace operators.....	16	.870	41.4	36.63
Blast furnace tappers.....	32	.793	40.4	32.23
Boilermakers.....	15	.891	39.3	35.20
Carpenters.....	23	.859	45.9	41.95
Castine-machine operators.....	10	.926	35.9	33.45
Clerical office workers.....	24	.944	38.7	36.49
Clerical plant workers.....	22	1.023	40.0	40.93
Conveyor operators.....	15	.741	38.4	28.47
Cranemen, overhead.....	17	.789	40.0	31.54
Foremen and assistants, working.....	25	.863	42.2	37.11
Janitors.....	17	.713	40.5	29.04
Laborers, furnace.....	31	.788	39.1	30.78
Laborers, process.....	68	.692	38.8	26.88
Laborers, yard.....	59	.660	39.5	26.08
Machinists.....	21	.839	39.7	35.11
Maintenance laborers.....	46	.648	37.7	24.46
Maintenance workers, not elsewhere classified.....	54	.804	40.0	32.34
Maintenance workers' helpers, not elsewhere classified.....	56	.729	40.7	30.21
Mill operators (ore and flux grinding).....	16	.722	40.5	29.41
Motormen and larrymen.....	43	.746	39.1	29.28
Other furnace operators, not elsewhere classified.....	32	.749	40.1	30.03
Other furnace operators' helpers, not elsewhere classified.....	51	.733	39.6	29.05
Other plant workers, not elsewhere classified.....	103	.817	39.6	32.36
Other plant workers' helpers, not elsewhere classified.....	63	.701	37.6	26.42
Samplers.....	49	.722	38.5	27.81
Sinter (roaster) operators.....	21	.741	40.2	29.90
Switchmen, railroad.....	13	.767	38.3	30.61
Track repairmen, railroad.....	11	.654	40.5	26.72
Transportation workers, not elsewhere classified.....	26	.782	40.4	31.84
Truckers, hand (flux and calcine).....	65	.803	37.3	29.96
Watchmen.....	15	.675	40.3	27.30
Weighers.....	10	.808	37.1	30.03

In the small group of mercury-smelter workers covered by the Bureau's survey, average hourly earnings varied between 52.4 cents for crusher operators and 73.7 cents for "other smelter workers," a miscellaneous category (table 26). Furnace men, who formed more than a third of this smelting force, earned an average of 59.1 cents per hour.

Of the 6,785 workers employed in electrolytic copper refineries, technicians received the highest average hourly earnings, \$1.058 (table 27). The lowest average hourly earnings (59.2 cents) were received by track repairmen. The largest occupational group was composed of process laborers, who earned an average of 66.7 cents per hour.

TABLE 26.—Hourly Earnings (Excluding Overtime), Weekly Hours, and Weekly Earnings of Workers in Mercury Smelting, by Occupation, August 1941

Occupation	Workers	Average hourly earnings	Average weekly hours	Average total weekly earnings
Total, all occupations	135	\$0. 605	49. 5	\$32. 89
Crusher operators	17	. 524	48. 1	27. 45
Furnace men	55	. 591	50. 3	33. 08
Furnace men's helpers	18	. 574	47. 1	29. 76
Laborers	16	. 546	49. 4	29. 66
Maintenance workers	10	. 710	52. 0	41. 05
Other smelter workers	19	. 737	49. 7	38. 60

TABLE 27.—Hourly Earnings (Excluding Overtime), Weekly Hours, and Weekly Earnings of Workers in Electrolytic Copper Refining, by Occupation, August 1941

Occupation	Workers	Average hourly earnings	Average weekly hours	Average total weekly earnings
All occupations	6, 785	\$0. 779	40. 2	\$31. 67
Air hoistmen	80	. 774	39. 7	31. 02
Apprentices, trade or craft	37	. 600	40. 5	26. 89
Blacksmiths	16	. 957	41. 7	40. 69
Blacksmiths' helpers	27	. 787	39. 8	31. 52
Boilermakers	21	. 871	39. 4	34. 63
Boilermakers' helpers	45	. 750	40. 6	30. 97
Brakemen, railroad	63	. 758	39. 9	30. 58
Bricklayers	42	1. 032	41. 2	43. 34
Bricklayers' helpers	19	. 753	40. 3	30. 42
Carpenters	74	. 939	40. 2	38. 02
Casting-machine operators	56	. 846	41. 6	35. 89
Checkers	19	. 739	38. 4	28. 73
Chippers, billets	57	. 775	41. 2	32. 36
Circulation men, tanks	41	. 795	39. 9	31. 72
Clay mixers	13	. 741	40. 0	29. 65
Clerical, plant	151	. 850	39. 9	34. 02
Concentrator operators	41	. 796	39. 8	31. 72
Concentrator operators' helpers	16	. 746	39. 9	29. 75
Cranemen	211	. 810	41. 0	33. 67
Cranemen's helpers	156	. 734	39. 1	28. 78
Electrolytic tank operators	14	. 826	40. 0	33. 06
Electricians	96	. 929	41. 5	39. 34
Engineers, powerhouse	29	1. 024	40. 6	41. 80
Engineers, railroad	58	. 835	41. 8	35. 69
Firemen, powerhouse	39	. 795	40. 5	32. 75
Flappers	58	. 618	41. 2	26. 08
Foremen, working	128	. 953	41. 0	39. 68
Foremen, assistant working	193	. 850	41. 3	35. 63
Furnace chargers (reverberatory)	20	. 893	40. 0	35. 77
Furnace operators, miscellaneous, not elsewhere classified	12	. 754	41. 2	31. 54
Furnace operators' helpers, miscellaneous, not elsewhere classified	58	. 784	39. 7	31. 19
Furnace operators, refining	28	. 859	40. 0	34. 37
Furnace operators' helpers, refining	31	. 820	39. 9	32. 72
Furnace operators (reverberatory and refiner)	83	. 863	40. 7	35. 63
Furnace operators' helpers (reverberatory and refiner)	71	. 758	39. 3	29. 96
Furnace skimmer (reverberatory)	42	. 740	39. 5	29. 61
Furnace tapper (reverberatory)	40	. 896	41. 3	38. 13
Hot-sheet men	228	. 791	40. 4	32. 30
Inspectors (billets, wire, bars, etc.)	107	. 768	39. 7	30. 52
Ironworkers	48	. 962	40. 2	38. 90
Janitors	44	. 685	39. 7	27. 25
Laborers, furnace	106	. 639	38. 7	24. 74
Laborers, maintenance	250	. 682	38. 8	26. 65
Laborers, process	628	. 667	39. 8	26. 53
Laborers, samplers	29	. 702	39. 8	28. 21
Laborers, yard	285	. 690	40. 2	8. 18
Ladlemen's helpers	25	. 676	39. 5	26. 87
Leach operators	41	. 820	40. 2	33. 07
Loaders and unloaders	125	. 718	39. 7	28. 61
Loopers and punchers	42	. 829	40. 7	34. 09
Machinists	93	. 962	42. 1	41. 53
Machinists' helpers	32	. 776	41. 7	33. 10
Maintenance workers, not elsewhere classified	167	. 858	40. 4	35. 11
Maintenance workers' helpers, not elsewhere classified	67	. 725	42. 4	31. 74
Mechanics	27	. 846	42. 6	37. 21
Metal handlers (car loaders)	185	. 716	39. 0	27. 90

TABLE 27.—Hourly Earnings (Excluding Overtime), Weekly Hours, and Weekly Earnings of Workers in Electrolytic Copper Refining, by Occupation, August 1941—Continued

Occupation	Workers	Average hourly earnings	Average weekly hours	Average total weekly earnings
Mill workers, miscellaneous, not elsewhere classified	217	\$0.748	39.7	\$29.87
Mill workers' helpers, miscellaneous, not elsewhere classified	152	.764	40.3	30.96
Mold chancers	51	.732	40.1	29.56
Mold coolers	15	.732	40.1	29.39
Mold fishers	32	.821	41.5	35.08
Mold painters, greasers, sprayers	61	.805	40.3	32.79
Motormen, trammers, larrymen	62	.730	40.8	30.09
Office workers, miscellaneous, not elsewhere classified	101	.852	39.4	33.63
Oilers and greasers	12	.720	37.7	27.17
Pipe fitters	33	.925	41.2	38.72
Pipe fitters' helpers	26	.758	39.0	29.73
Pourers and ladlemen	59	.866	39.9	34.60
Powerhouse workers, not elsewhere classified	60	.824	40.4	33.51
Pumpmen, tanks	36	.797	40.2	32.11
Rackers	47	.736	40.9	30.70
Repairmen, plant equipment	37	.854	42.3	37.19
Repairmen's helpers, plant equipment	71	.751	40.6	30.83
Repairmen, track	31	.592	42.7	26.01
Riggers	31	.913	41.5	39.17
Roaster operators (slime and sludge)	20	.804	40.0	32.16
Samplers	42	.777	39.6	30.80
Samplers' helpers	72	.742	39.7	29.51
Stenographers	43	.795	39.6	31.52
Storeroom men	14	.814	40.9	33.69
Strippers	76	.852	41.2	35.41
Switchboard operators, powerhouse	28	.884	40.9	36.45
Tank operators	33	.803	38.5	31.30
Technicians	32	1.058	39.7	42.02
Technicians' assistants	63	.691	39.7	27.61
Transportation workers, not elsewhere classified	30	.843	41.8	35.98
Transportation workers' helpers, not elsewhere classified	36	.725	42.8	32.07
Truck and tractor drivers	29	.800	41.5	33.78
Voltmeter men	79	.785	41.7	33.31
Washers and cleaners	133	.734	39.8	29.31
Watchmen	165	.741	39.5	29.36
Weighers	101	.810	41.4	34.18

It will be noted that in electrolytic copper refineries the average hourly earnings of miscellaneous furnace operators (75.4 cents) were lower than those of their helpers (78.4 cents). Differences in skill in these jobs are outweighed in the determination of earnings by the hazardous and disagreeable nature of the work.

In the electrolytic production of zinc, chemists received the highest average hourly earnings (\$1.040) of any occupational group (table 28). Yard laborers received the lowest corresponding average, 69.8 cents. The two central occupational groups in the refining process, furnace operators and electrolytic tank operators, received average hourly earnings of 90.3 cents and 86.0 cents, respectively.

TABLE 28.—Hourly Earnings (Excluding Overtime), Weekly Hours, and Weekly Earnings of Workers in the Electrolytic Production of Zinc, by Occupation, August 1941

Occupation	Number of workers	Average hourly earnings	Average weekly hours	Average total weekly earnings
All occupations	1,323	\$0.809	37.9	\$30.84
Carpenters	20	.874	38.5	33.77
Casters and pourers	65	.855	36.7	31.46
Chemists	19	1.040	40.0	41.61
Chemists' assistants	10	.745	37.6	28.32
Clerical office workers	13	.785	40.0	31.41
Clerical plant workers	20	.822	40.1	33.00
Electrolytic tank operators	11	.860	41.5	36.34
Furnace operators	71	.903	36.8	33.36
Furnace operators' helpers	98	.842	36.7	31.12
Janitors	13	.726	40.0	29.25

Footnote at end of table.

TABLE 28.—Hourly Earnings (Except Overtime), Weekly Hours, and Weekly Earnings of Workers in the Electrolytic Production of Zinc,¹ by Occupation, August 1941—Con.

Occupation	Number of workers	Average hourly earnings	Average weekly hours	Average total weekly earnings
Laborers, not elsewhere classified.....	23	\$0.706	34.2	\$24.22
Laborers, process.....	121	.721	38.0	27.42
Laborers, yard.....	51	.698	34.9	24.34
Machine repairmen.....	28	.876	39.6	35.16
Machine repairmen helpers.....	32	.736	39.8	29.39
Mill operators, not elsewhere classified.....	55	.807	39.5	32.28
Mill operators' helpers.....	33	.747	37.8	28.54
Ore and metal handlers.....	39	.737	37.8	27.89
Other workers, not elsewhere classified.....	329	.870	37.0	30.45
Powerhouse workers.....	13	.899	40.6	36.77
Repairmen, not elsewhere classified.....	59	.867	40.2	35.51
Repairmen's helpers, not elsewhere classified.....	36	.753	40.3	30.48
Samplers.....	10	.870	40.0	34.81
Screen and filter operators.....	22	.792	41.1	33.26
Store room and warehouse workers.....	12	.742	38.7	28.70
Strippers.....	84	.842	38.2	32.45
Truck drivers.....	10	.802	39.8	32.34
Watchmen.....	26	.724	38.6	28.38

¹ Includes 1 lead refinery.

Weekly Hours and Earnings

In the nonferrous-metal smelters, 58.5 percent of the labor force worked exactly 40 hours during the week of the Bureau's survey and an additional 25.1 percent worked 48 or more hours per week (table 29). Almost three-quarters (74.8 percent) of those employed in the nonferrous-metal refineries worked 40 hours weekly.

TABLE 29.—Percentage Distribution of Workers in Nonferrous-Metal Smelting and Refining, by Weekly Hours Worked and by Region, August 1941

Actual weekly hours	United States		Northwest		Southwest		North Central		South Central		East	
	Smelting	Refining	Smelting	Refining	Smelting	Refining	Smelting	Refining	Smelting	Refining	Smelting	Refining
Under 24.....	2.5	1.9	2.4	1.4	2.5	6.1	2.0	0.8	3.1	2.6	0.9	
24 and under 32.....	3.2	1.2	1.7	.8	.9	3.3	1.1	1.0	2.6	6.4	.8	
32 and under 36.....	4.1	3.2	2.6	2.9	1.9	5.8	6.5	3.0	7.3	3.8	2.5	
36 and under 40.....	2.3	5.2	1.0	9.1	.7	2.5	5.3	.5	2.0	3.1	5.2	
Exactly 40.....	58.5	74.8	45.9	79.6	6.7	62.3	73.4	65.7	67.5	76.7	77.9	
Over 40 and under 44.....	2.6	5.0	.9	1.1	1.2	2.0	4.9	13.6	3.9	3.3	6.4	
44 and under 48.....	1.7	1.5	1.4	.8	1.8	1.0	2.0	2.0	4.0	.7	1.8	
Exactly 48.....	21.3	4.9	38.6	4.0	71.5	11.3	3.6	4.8	7.8	1.8	8.2	
Over 48 and under 56.....	1.5	1.2	1.0		6.8	2.1	1.1	3.5	.8	1.2	1.1	
56 and over.....	2.3	1.1	4.5	.3	6.0	3.6	.1	5.1	1.0	.4	.2	
Total.....	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	

The largest concentration of smelting workers in each region, with the exception of the Southwest, worked 40 hours weekly. In southwestern smelters, over four-fifths (84.3 percent) of the labor force worked 48 or more hours weekly. In refineries a majority of the workers in each region (ranging from 62.3 to 77.9 percent of each regional group) worked 40 hours weekly.

Average total weekly earnings by branch of the industry varied remarkably little, the lowest average being \$30.52 in lead smelting and the highest \$34.70 in copper smelting (tables 23-28). Outstanding among the various occupational classes were the lead burners in zinc and copper smelters, whose high wage rates and long hours of work yielded averages in excess of \$61.00 per week.

PART III.—EARNINGS IN PRIMARY FABRICATION OF NONFERROUS METALS, AUGUST 1941

Primary Fabrication Processes

The term "primary fabrication," as employed in this discussion, relates to the manufacture of metal shapes which are destined, for the most part, to be used in further manufacture, either as raw materials or as parts of other products. The industries included in this category perform such operations as the following: alloying, rolling, drawing, foregoing, extruding, ordinary casting—such as sand casting, permanent mold casting, and die casting—and the manufacture of machined castings, including bearings, bushings, and fittings. Establishments engaged primarily in the secondary smelting and refining of nonferrous metals are also included in this board segment of the nonferrous-metals industry.

Nonferrous metals are delivered to the fabricating plants in standard forms of slabs, ingots, bars, cakes, and billets. Some of these are customarily melted, preparatory to fabrication; others are preheated. In many instances they are combined with other metals to form alloys appropriate to the purpose for which the end-product will be used. For example, copper and nickel are combined to form cupro-nickel; arsenic is mixed with copper to form arsenic copper; varying proportions of zinc and lead are combined with copper to form a wide variety of brasses; tin, zinc, lead and aluminum are used in combination with copper to form a variety of bronzes. In addition, such alloys as antifriction-bearing metal, solder, and type metal are produced in this segment of the industry. Some firms engage primarily in alloying, and sell their alloys to foundries and other metal-working establishments. Others do their own alloying, casting, and rolling.

In the production of nonferrous-metal sheets, plates, rods, tubes, and wire, the mill processes characteristic of the iron and steel industry have been adapted. The metal is generally cast into cakes which are preheated in a furnace and then reduced in thickness by successive passes through breakdown rolls and intermediate and finishing rolls, until they are reduced to the required gauge. In the manufacture of wire, bars of nonferrous metal are hot-rolled into rods. The rods are then preheated and removed by conveyors to a roughing mill. After successive passes through the breakdown-intermediate-, and finishing-rolls, the greatly elongated bars emerge and are automatically coiled. Wire is then produced from these rods by drawing them through a series of successively smaller dies. Tubes are produced either by the piercing of heated shapes or by extrusion. At all stages of the process the handling of heated metals, immersion in acid baths, and pickling are characteristic operations.

The other chief method of shaping nonferrous metals involves casting. Castings are produced by a variety of methods, of which sand

casting, permanent mold casting, and die casting are the outstanding variants. The processes involved in sand casting include pattern making, sand mixing, core making, melting and pouring, blasting the core and removing the casting from the mold, and finishing. Molding varies considerably with the nature of the castings produced. Large castings, for special parts, are generally made on a unit-production basis. Castings of a standardized character are manufactured by mass-production methods. Depending upon the complexity of the castings and degree of standardization, the division of labor varies considerably from plant to plant. Sand castings may be made by hand or by machine or partially by hand and partially by machine. Many establishments do not make their own patterns, but merely cast according to a pattern supplied them by their customers.

Permanent-mold casting implies a considerable degree of standardization because the mold is generally made of metal for the purpose of duplicating a large number of castings of the same dimensions. In addition, permanent-mold castings generally have a finer grain structure and a smoother surface than sand castings and are relatively free from the blowholes, sand holes, and surface "scabs" that often mar the latter. As a result, considerable labor is eliminated in the finishing of the castings.

The most significant development in casting technique, from the standpoint of mass production of relatively cheap and accurate castings, has been the growth of die casting. One of the important features of castings produced in this manner is the fact that they do not require much machining. Die castings are produced by forcing molten metal under uniform pressure into a steel die. Parts produced by the process of die casting are generally more accurate and less bulky than could be obtained by either sand- or permanent-mold casting.

Depending upon the type of casting process and the purpose for which the castings are used, various degrees of finishing are involved. Some finishing operations are performed in foundries while others are carried on in the plants which further fabricate the castings. Core knockout, chipping, sawing, grinding, and polishing are normally accomplished with standard tools developed for each purpose. "Gates" and "risers" are removed by hand saws or mechanical presses. Pneumatic chipping hammers are used to remove those that cannot be readily sawed or sheared off. Abrasive wheels, mounted on lathes, are used to rough-grind external surfaces; for large castings, portable air-driven or electrically-driven tools are employed for rough grinding. Tumbling sand castings of 50 pounds or less in rotating barrels is another method of cleaning these products. Sand or steel-grit blasting is also used to remove minor surface roughness from castings. By "pickling" the castings in weak acid solutions, their surfaces are prepared for metal plating.

Some establishments, particularly the group which produces semi-finished castings such as valves, fittings, bearings and bushings, engage in finishing operations which involve considerable machining. In these plants many of the operations, in addition to casting, are common to machine-shop practice. Thus, the range of operations covered in this segment of the industry is very broad and includes most of the metal-working processes.

Characteristics of the Industry

The establishments included in the Bureau's survey of the primary fabrication of nonferrous-metal products fall within a number of Census classifications included under the broad industrial group "Nonferrous metals and their products." As a background for the discussion of earnings in primary fabrication of nonferrous metals, the following Census industrial classifications may be utilized: "alloying"; "rolling and drawing of nonferrous metals (except aluminum)"; "nonferrous metal foundries (except aluminum)"; "nonferrous metal products, not elsewhere classified"; and "secondary smelting and refining of nonferrous metals." Although no extensive coverage of aluminum products was undertaken in this survey, it was not feasible to exclude aluminum in all instances, because many foundries and other fabricating establishments were found to employ considerable proportions of aluminum. Moreover, the survey included a few establishments which engage primarily in the fabrication of aluminum. The processes of the aluminum-fabrication plants are essentially similar to those of plants using other metals, and from the standpoint of wage structure the inclusion of these plants introduces no disturbing element.

There were, in 1939, about 1,500 establishments in the industrial categories covered by the Census. They employed 94,000 wage earners and in terms of "value added by manufacture," these activities were evaluated at \$350,000,000. Employment and production rose abruptly after the outbreak of the present war, however, and these figures greatly understate the magnitude of the industry at the present time.

SIZE OF ESTABLISHMENT

Small establishments predominate in the fabrication of nonferrous metals. Three-fifths of the establishments engaged in the alloying, rolling and drawing of nonferrous metals (except aluminum), in 1939, employed fewer than 50 wage earners each. These small plants, however, contributed only 8 percent of the industry's total production value. Of 600 nonferrous-metal foundries (excluding aluminum), over 93 percent employed 50 wage earners or less in 1939. In contrast with the branch of nonferrous-metal fabrication discussed above, this category of small plants produced 55 percent of the dollar value of the total foundry output in 1939. Almost nine-tenths of the plants fabricating nonferrous-metal products not elsewhere classified (plants manufacturing bearings and bushings, die castings, finished castings, forged and hot-pressed parts, fittings, spun ware, powder, and other products) employed 50 employees or less in 1939, but accounted for only 14 percent of the dollar value of the industry's product. Over three-fourths of secondary smelting and refining establishments employed 50 wage earners or less in 1939, but produced only 27 percent of the industry's dollar value of output. On the other hand, there are few large establishments in any branch of the nonferrous-metals industry (excluding aluminum) which can compare in size with large establishments in the steel and automobile industries.

In all the branches of the nonferrous-metal fabrication reviewed above, the majority of establishments in 1939 were operated under

some form of independent management. Less than half of the alloying, rolling, and drawing plants were operated by central administrative offices controlling two or more plants. The corresponding proportions in other branches of nonferrous-metal fabrication were as follows: 23 percent of secondary smelters; 10 percent of plants fabricating nonferrous-metal products, not elsewhere classified; and 8 percent of nonferrous-metal foundries. The majority of plants in each of the branches were under corporate control in 1939. The proportion of total plants under such control varied from 52 percent of nonferrous-metal foundries to 88 percent in alloying, rolling, and drawing plants.

LOCATION OF THE INDUSTRY

Although the extraction sources of most of the nonferrous metals are in the western part of the United States, the Atlantic coastal plain and the immediate trans-Appalachian regions have long maintained a dominant position in the primary fabrication of nonferrous-metal products. Several factors account for the eastern location of fabricating plants. Among these are the presence of smelters and refineries in the East, the early development of the capital equipment necessary for primary fabrication, and the convenient markets offered by the highly industrialized population centers along the Atlantic Coast. Fully 47 percent of the wage earners engaged in alloying, rolling, and drawing nonferrous metals (except aluminum) were employed in three New England States (Connecticut, Massachusetts, and Rhode Island) in 1939. An additional 27 percent of the labor force in this branch of nonferrous-metal fabrication was employed in the Middle Atlantic States. The East Central States accounted in 1939 for more than half of the wage earners engaged in the secondary smelting and refining of nonferrous metals. An additional 32 percent was employed in the Middle Atlantic States.

THE LABOR FORCE

Labor requirements in the primary fabrication of nonferrous metals as in other industries, are conditioned by the characteristic processes of the various branches involved. It is feasible to discuss these processes from the standpoint of the sequence of production operations. Thus, in all branches of the industry the yard operations of loading and unloading metal, scrap, and fuel involve hard labor. Frequently such tasks must be accomplished with dispatch in order to make transportation facilities available. Scrap sorting, baling, and cabbaging constitute an important phase of the operations in secondary smelters, as well as in alloying, rolling, and drawing establishments and in foundries. These processes are generally performed by magnetic-machine operators, cabbaging-machine operators, cranemen, crane followers and scrap sorters, and grinding-machine operators.

Both scrap and virgin metal are melted in a variety of furnaces by furnace operators and their helpers. Metal mixers perform the alloying processes under the guidance of trained technicians. Generally the molten metals are cast into some special form for further processing. Preheating of some shapes which require no further chemical treatment is performed by furnace operators and their helpers.

Processing operations vary considerably. They include all forms of casting. Sand casting involves the highly skilled occupations of pattern making, as well as such other skilled operations as core making, mold making, and pouring. These operations may be performed by one, two, or more persons in a small foundry, or they may be divided into a sequence of specialized operations in larger foundries. In permanent-mold and die-casting work, machine operators and helpers possessing the dexterity and speed characteristic of repetitive mass-production operations are required. In alloying, rolling and drawing plants, machine operators capable of adjusting and operating a variety of specialized machines constitute a large proportion of the labor force. For the most part, these machine operators are comparable with semiskilled machine operators in machinery-manufacturing establishments. The most skilled operations are those involved in rolling, which require considerable experience and training. At various stages during fabrication, the finished and semiprocessed metals require heat-treating and annealing, which are performed by furnace operators and their helpers.

Considerable variation also obtains in finishing operations. These may be performed by all-round finishers, using a variety of grinding and pickling operations, or by specialized workers. The occupational groups involved in this work include grinders, polishers, chippers, oxyacetylene operators, metal sawyers, and burrs. Pickling and plating are frequently specialized operations. In addition, the products moving from one stage of the production process to another must be tested and inspected. Inspectors and testers vary from the most skilled employees, capable of using every metal-measuring instrument in the skilled machinist's kit, to routine inspectors utilizing only one measuring device.

In all stages of the processing, materials must be handled and moved. Material handling and interprocess transportation require considerable numbers of crane operators, hoist operators, motormen, hand truckers, and tow-motor operators. This auxiliary equipment is also used in substantial proportions in shipping and storing a variety of heavy materials.

In addition to the employees performing the above processes, other workers are engaged in the maintenance of power and plant. Maintenance employees make minor repairs and installations in the processing departments. There are also important maintenance machine shops and tool rooms which make the dies, gauges, and other tools for the mills. These tool-room employees are generally highly skilled men and their experience is transferable from industry to industry.

The labor force in this industry is composed predominantly of male, white employees. Only in recent months have employers found it necessary to fill some occupations with women. Female workers are employed as inspectors in some of the finished-castings plants.

Over nine-tenths (91.7 percent) of the workers in plants surveyed by the Bureau were white, other than Mexican (see table 30.) Negroes formed 7.6 percent of the working force, and were concentrated mainly in plants in the Middle Atlantic and East Central States. Mexicans formed a negligible minority group in the mass of fabrication workers. They were concentrated mainly in the Western States.

TABLE 30.—*Composition of Labor Force in Primary Fabrication of Nonferrous Metals, August 1941*

Region ¹	White, other than Mexican		Mexican		Negro		Other	
	Work-ers	Per-cent	Work-ers	Per-cent	Work-ers	Per-cent	Work-ers	Per-cent
All regions.....	60,496	91.7	489	0.7	5,021	7.6	6	(²)
New England States.....	11,868	95.8			516	4.2		
Middle Atlantic States.....	14,225	92.0			1,244	8.0		
Border States.....	3,147	92.0			274	8.0		
East Central States.....	26,833	91.9	31	.1	2,331	8.0	1	(²)
West Central States.....	1,826	76.7	142	6.0	409	17.2	3	0.1
Southern States.....	507	69.6			221	30.4		
Western States.....	2,090	85.8	316	13.0	26	1.1	2	.1

¹ For regional classification, see footnote to table 32.

² Less than a tenth of 1 percent.

Extent of Unionization

Several C. I. O. and A. F. of L. unions are engaged in organizational activity in this industry. In the brass-milling branch the International Union of Mine, Mill and Smelter Workers (C. I. O.) has made important organizational gains recently. Some brass mills, notably in the Middle West, have been organized by the International Association of Machinists (A. F. of L.). In the casting industry, unionization is carried on by the International Molders' and Foundrymen's Union (A. F. of L.), by the Die Casters' Union (C. I. O.), and to a more limited extent by the United Automobile Workers (C. I. O.). Other unions active in various branches of the industry include the United Electrical, Radio, and Machine Workers, the United Steel Workers, and the Aluminum Workers of America.

In the primary-fabrication plants covered by the Bureau's survey, over three-fifths (65.6 percent) of the working force was employed in plants covered by union agreements (table 31). Union coverage ranged from a low of 27.5 percent of the workers in southern plants to 96.1 percent of those in plants in the border States.

TABLE 31.—*Unionization in Primary Fabrication of Nonferrous Metals, August 1941*

Region ¹	All workers		Workers in plants covered by union agreements ²		Workers in plants not covered by union agreements	
	Num-ber	Per-cent	Number	Percent	Number	Percent
All regions.....	66,012	100.0	43,310	65.6	22,702	34.4
New England States.....	12,384	100.0	6,675	53.9	5,709	46.1
Middle Atlantic States.....	15,469	100.0	10,057	65.0	5,412	35.0
Border States.....	3,421	100.0	3,286	96.1	135	3.9
East Central States.....	29,196	100.0	20,518	70.3	8,678	29.7
West Central States.....	2,380	100.0	1,035	43.5	1,345	56.5
Southern States.....	728	100.0	200	27.5	528	72.5
Western States.....	2,434	100.0	1,539	63.2	895	36.8

¹ For regional classification, see footnote to table 32.

² Includes plants covered by agreements with independent unions.

Scope and Method of Survey

The survey of the primary-fabricating branches of the nonferrous-metals industry was made on a sample basis. Approximately one-fourth (based on the 1939 Census) of the plants in the foundry, die-casting, and other machine-products branches and one-half of those engaged in alloying, rolling and drawing and secondary smelting were covered in this survey. This difference in the proportion of plants studied has necessitated the assignment of double weight, in tables relating to earnings, to those branches studied on a 25-percent basis. In order to assure that the sample selected would be representative, careful consideration was given to geographic location, size and corporate affiliation of establishment, type of metal fabricated, and form of processing. Establishments employing fewer than 10 workers, however, were not covered. These small plants accounted for only a small proportion of the total employment in this segment of the industry. The data were collected by trained field representatives of the Bureau for a pay-roll period in August 1941. The information obtained included detailed records of hours worked, total earnings, sex and color designations for each employee, and occupational descriptions.

The sample included 273 production units employing 49,232 wage earners. Over two-fifths of the employees surveyed were employed in the brass-milling industry and a substantial proportion of these (21.1 percent of the total number of workers covered) were in the New England States. Foundries constituted the largest group from the standpoint of the number of plants covered and the second largest from the point of view of employment (table 32).

TABLE 32.—*Sample of Nonferrous-Metal Fabricating Plants Covered by Bureau's Survey, August 1941*

Industry and region ¹	Units	Number of workers	Industry and region ¹	Units	Number of workers
Total.....	273	49,232	Foundries—Continued.		
Alloying, rolling and drawing plants.....	68	28,482	West Central States.....	5	861
Copper, brass and bronze.....	28	22,228	Southern States.....	9	342
New England States.....	12	10,408	Western States.....	21	723
Middle Atlantic States.....	7	6,460	Other States.....	31	1,693
Other States.....	9	5,360	Secondary smelters.....	46	3,970
Other metals.....	40	6,254	New England States.....	3	97
New England States.....	3	281	Middle Atlantic States.....	18	1,858
Middle Atlantic States.....	13	1,025	East Central States.....	17	1,368
Border States.....	6	2,831	Other States.....	8	647
East Central States.....	13	1,673	Machined-products plants (bearings, bushings, valves, fittings, etc.).....	22	5,684
Other States.....	5	444	Middle Atlantic States.....	6	995
Foundries.....	126	8,691	East Central States.....	10	4,214
New England States.....	12	515	Other States.....	6	475
East Central States.....	48	4,557	Die-casting plants.....	11	2,405

¹ The New England region includes Connecticut, Massachusetts, and Rhode Island; the Middle Atlantic region includes Maryland, New Jersey, New York, and Pennsylvania; the border region includes Kentucky, Virginia, and West Virginia; the East Central region includes Illinois, Indiana, Michigan, Ohio, and Wisconsin; the West Central region includes Iowa, Kansas, Minnesota, and Missouri; the Southern region includes Alabama, Georgia, Louisiana, North Carolina, Oklahoma, and Texas; the Western region includes California, Colorado, Montana, Oregon, and Washington.

NOTE: In table 34 and all succeeding tables in this section, the number of workers in the foundry, die-casting, and machined-products branches is doubled to compensate for differences in sampling proportions and to accord these branches their proportionate weight in the industry.

Method of Wage Payment

The predominant method of wage payment in the surveyed nonferrous-metal fabrication plants was based upon straight hourly rates. Over seven-tenths (70.8 percent) of the total working force received time rates (table 33). There was, however, some variation between the various branches of the fabrication industry in this respect. Only 55.5 percent of the workers engaged in alloying, rolling, and drawing copper, brass, and bronze were paid on a time basis. By way of contrast, 95.9 percent of the workers in secondary smelters were paid time rates.

TABLE 33.—Distribution of Workers in Nonferrous Metal Fabrication Plants, by Method of Wage Payment and Branch of Industry, August 1941

Branch	All workers		Time workers		Piece workers		Bonus workers	
	Number	Per cent	Number	Per cent	Number	Per cent	Number	Per cent
All branches.....	66,012	100.0	46,727	70.8	5,769	8.7	13,516	20.5
Alloying, rolling and drawing:								
Copper, brass, and bronze.....	22,228	100.0	12,330	55.5	1,554	7.0	8,344	37.5
Other nonferrous metals.....	6,254	100.0	5,450	87.2	64	1.0	740	11.8
Foundries.....	17,382	100.0	14,454	83.2	1,760	10.1	1,168	6.7
Secondary smelters.....	3,970	100.0	3,807	95.9	19	.5	144	3.6
Machined products.....	11,368	100.0	7,750	68.1	1,030	9.1	2,588	22.8
Die casting.....	4,810	100.0	2,936	61.0	1,342	27.9	532	11.1

Of the remaining portion of the working force more than one-quarter (or 8.7 percent of the total) were paid by the piece. In each branch of fabricating, with the exception of die casting, piece payment was unimportant. In die casting, fully 27.9 percent of the labor force were paid by the piece.

Slightly more than one-fifth (20.5 percent) of the total work force in nonferrous-metal fabrication was paid on an incentive-bonus basis. The greater part of this group was found in those plants which were alloying, rolling, and drawing copper, brass, and bronze products. In this section of nonferrous-metal fabrication, fully 37.5 percent of the workers were paid guaranteed daily rates, with bonus rates offered for production in excess of standard performance. Only 3.6 percent of the workers in secondary smelters, and 6.7 percent of those in foundries, were paid on an incentive-bonus basis.

*Hourly Earnings*¹

Excluding overtime payments, average hourly earnings in primary nonferrous-metal fabrication plants amounted to 79.5 cents in August 1941 (table 34). The corresponding averages in the various branches of the industry ranged from 70.1 cents in secondary smelters to 88.7 cents in plants alloying, rolling, and drawing copper, brass and bronze.

¹Unless specifically indicated average hourly earnings in all instances exclude overtime payments.

TABLE 34.—Percentage Distribution of Workers in Primary Fabrication of Nonferrous Metals, by Average Hourly Earnings, and Branch, August 1941

Average hourly earnings	Total	Alloying, rolling, and drawing—		Foundries	Secondary smelters	Machined products	Die-casting
		Copper, brass, and bronze	Other non-ferrous metals				
Under 40 cents.....	1.3	0.1	1.0	2.5	2.9	1.6	0.2
40.0 and under 42.5 cents.....	1.2	.2	2.3	2.5	1.3	1.0	.5
42.5 and under 45.0 cents.....	.7	.2	.5	1.3	1.4	1.1	.1
45.0 and under 47.5 cents.....	1.6	.4	1.9	2.8	2.5	2.0	.5
47.5 and under 50.0 cents.....	1.0	.3	.4	1.6	.8	2.2	1.0
50.0 and under 52.5 cents.....	3.1	.7	2.2	5.8	6.5	3.3	1.9
52.5 and under 55.0 cents.....	1.4	.3	1.6	2.0	2.0	2.7	.9
55.0 and under 57.5 cents.....	5.1	.7	3.0	9.4	6.0	9.0	2.9
57.5 and under 60.0 cents.....	4.3	.3	16.2	6.1	4.9	3.2	2.7
60.0 and under 62.5 cents.....	5.2	1.3	4.6	8.7	4.5	8.8	4.3
62.5 and under 65.0 cents.....	2.8	.7	6.0	2.5	7.2	3.9	2.5
65.0 and under 67.5 cents.....	3.9	1.4	3.1	5.0	6.7	6.6	4.2
67.5 and under 70.0 cents.....	2.7	1.8	3.7	2.0	5.2	3.9	2.8
70.0 and under 72.5 cents.....	4.2	3.2	4.5	4.4	3.6	5.7	5.2
72.5 and under 75.0 cents.....	4.4	5.5	8.2	2.2	7.0	3.1	2.5
75.0 and under 77.5 cents.....	5.9	8.4	4.8	4.3	6.7	3.6	6.9
77.5 and under 80.0 cents.....	3.6	6.1	3.2	1.5	4.3	2.6	2.5
80.0 and under 82.5 cents.....	5.7	9.4	2.7	3.4	4.3	3.8	6.3
82.5 and under 85.0 cents.....	3.9	6.0	4.3	1.2	4.5	2.7	3.1
85.0 and under 87.5 cents.....	4.4	6.8	3.1	3.1	2.9	3.1	3.8
87.5 and under 90.0 cents.....	3.6	5.6	2.5	1.7	3.6	3.1	3.3
90.0 and under 92.5 cents.....	3.9	6.0	3.1	3.0	2.0	2.3	4.4
92.5 and under 95.0 cents.....	1.5	2.7	1.2	.6	1.3	1.1	.9
95.0 and under 97.5 cents.....	3.3	4.6	1.5	3.2	.9	2.6	3.6
97.5 and under 102.5 cents.....	6.3	9.6	4.5	4.9	2.4	4.4	6.7
102.5 and under 107.5 cents.....	4.0	5.0	1.7	4.0	1.4	3.5	5.5
107.5 and under 112.5 cents.....	2.7	3.3	2.3	2.4	.8	2.6	3.1
112.5 and under 117.5 cents.....	2.4	2.3	1.2	3.6	.7	1.9	3.0
117.5 and under 122.5 cents.....	1.6	2.0	.7	1.5	.2	1.5	3.2
122.5 and under 127.5 cents.....	1.4	1.2	1.5	1.2	.2	1.7	3.5
127.5 cents and over.....	2.9	3.9	2.5	1.6	1.3	1.4	8.0
Total.....	100.0	100.0	100.0	100.0	100.0	100.0	100.0
Number of workers.....	66,012	22,228	6,254	17,382	3,970	11,368	4,810
Average hourly earnings.....	\$0.795	\$0.887	\$0.744	\$0.729	\$0.701	\$0.743	\$0.885
Average hourly earnings (including extra payment for overtime).....	.845	.942	.792	.779	.732	.794	.924

When overtime payments are included, average hourly earnings in all fabrication plants combined are increased by 5.0 cents. The smallest increase resulting from overtime payments is 3.1 cents in secondary smelters, and the largest was 5.5 cents in plants which were alloying, rolling, and drawing copper, brass, and bronze products.

Earlier articles in this series have noted a marked tendency for earnings in the mining and milling and in the smelting and refining of nonferrous metals to concentrate about some point of central tendency. This observation does not hold true for earnings in nonferrous-metal fabrication plants. It is doubtful, in fact, whether many manufacturing industries will show greater dispersion of hourly earnings.

Slightly over one-third (34.8 percent) of the workers in fabrication plants earned 67.5 cents but under 87.5 cents per hour. A little more than half (50.7 percent) of the workers in plants alloying, rolling, and drawing copper, brass, and bronze earned 80.0 cents but under 102.5 cents per hour. In plants which processed other nonferrous metals in similar manner, 51.1 percent of the workers earned 57.5 cents but under 77.5 cents per hour.

Of the workers in nonferrous-metal foundries, 32.0 percent earned 50.0 cents but under 62.5 cents per hour; an additional 24.0 percent received between 65.0 cents and 85.0 cents per hour; and still another (18.1 percent) earned 95.0 cents but under 117.5 cents per hour. Forty-five percent of the workers in secondary smelters earned 62.5 cents but under 82.5 cents per hour. Less than two-fifths (38.2 percent) of the workers in plants which produced machined products received 60.0 cents but under 80.0 cents per hour. In die-casting plants, slightly more than three-tenths (31.2 percent) of the labor force earned 75.0 cents but under 95.0 cents per hour, and an additional 26.3 percent earned 102.5 cents or more per hour.

REGIONAL DIFFERENCES

Straight-time hourly earnings showed wide regional variation. Workers in southern fabrication plants averaged only 56.9 cents per hour, whereas those working in plants in the New England States earned an average of 87.4 cents per hour (table 35).

Over two-fifths (44.6 percent) of the workers in all fabrication plants in the New England States earned 75.0 cents but under 95.0 cents per hour. In the Middle Atlantic States, 41.9 percent of the workers received between 65.0 and 85.0 cents per hour. Only 28.2 percent of the workers in the border States received hourly earnings in this range and an additional 25.4 percent received 57.5 cents but under 60.0 cents per hour.

TABLE 35.—Percentage Distribution of Workers in Primary Fabrication of Nonferrous Metals, by Average Hourly Earnings and by Region,¹ August 1941

Average hourly earnings	Total	New England States	Middle Atlantic States	Border States	East Central States	West Central States	Southern States	Western States
Under 40 cents.....	1.3	0.2	1.0	1.6	1.1	2.3	28.8	1.0
40.0 and under 42.5 cents.....	1.2	.4	1.2	1.3	1.0	5.8	10.5	.9
42.5 and under 45.0 cents.....	.7	.1	1.1	1.0	.6	2.6	1.9	.7
45.0 and under 47.5 cents.....	1.6	.4	2.7	1.6	1.2	5.5	8.9	.8
47.5 and under 50.0 cents.....	1.0	.3	1.5	1.2	1.1	1.9	.3	.3
50.0 and under 52.5 cents.....	3.1	.9	4.8	1.1	2.9	5.7	8.4	4.7
52.5 and under 55.0 cents.....	1.4	.4	1.5	1.9	1.6	4.7	.5	.3
55.0 and under 57.5 cents.....	5.1	1.9	4.0	.3	7.3	5.4	5.2	7.7
57.5 and under 60.0 cents.....	4.3	1.2	2.5	25.4	3.8	8.9	.8	4.2
60.0 and under 62.5 cents.....	5.2	2.6	4.2	3.0	6.7	8.2	1.9	9.4
62.5 and under 65.0 cents.....	2.8	1.1	2.8	3.4	3.5	3.1	-----	2.2
65.0 and under 67.5 cents.....	3.9	2.6	4.5	2.3	4.4	4.5	3.3	3.4
67.5 and under 70.0 cents.....	2.7	2.1	3.0	1.3	2.7	2.2	1.1	5.5
70.0 and under 72.5 cents.....	4.2	4.3	4.2	2.7	4.3	4.0	1.9	5.5
72.5 and under 75.0 cents.....	4.4	4.7	6.8	7.0	2.8	2.1	.8	5.3
75.0 and under 77.5 cents.....	5.9	6.1	8.6	3.3	5.0	3.9	1.6	6.6
77.5 and under 80.0 cents.....	3.6	6.6	4.3	3.2	2.6	.9	1.1	1.3
80.0 and under 82.5 cents.....	5.7	8.0	6.2	1.8	5.1	4.2	2.5	5.2
82.5 and under 85.0 cents.....	3.9	4.7	4.3	6.6	3.4	3.0	-----	1.4
85.0 and under 87.5 cents.....	4.4	6.3	4.3	3.0	4.1	2.8	1.9	3.0
87.5 and under 90.0 cents.....	3.6	4.8	3.3	2.0	3.7	1.7	1.1	1.5
90.0 and under 92.5 cents.....	3.9	5.7	3.4	5.4	3.5	1.5	6.6	3.4
92.5 and under 95.0 cents.....	1.5	2.4	1.4	1.7	1.3	.5	-----	.5
95.0 and under 97.5 cents.....	3.3	4.3	2.9	1.3	3.3	1.6	1.4	6.3
97.5 and under 102.5 cents.....	6.3	9.5	5.3	4.2	6.2	3.7	5.8	4.1
102.5 and under 107.5 cents.....	4.0	4.7	2.8	2.0	4.7	3.7	.5	2.8
107.5 and under 112.5 cents.....	2.7	3.7	1.5	3.0	3.0	1.3	.5	2.3
112.5 and under 117.5 cents.....	2.4	2.8	1.6	1.5	2.7	2.5	1.1	3.9
117.5 and under 122.5 cents.....	1.6	2.0	1.2	.9	1.8	.7	-----	2.1
122.5 and under 127.5 cents.....	1.4	1.6	1.1	2.0	1.6	.4	1.1	1.0
127.5 cents and over.....	2.9	3.6	2.0	4.0	3.0	.7	.5	3.7
Total.....	100.00	100.0	100.0	100.0	100.0	100.0	100.0	100.0
Number of workers.....	66,012	12,384	15,469	3,421	29,196	2,380	728	2,434
Average hourly earnings.....	\$0.795	\$0.874	\$0.770	\$0.764	\$0.794	\$0.678	\$0.569	\$0.785
Average hourly earnings (including extra payment for overtime).....	\$0.845	\$0.935	\$0.825	\$0.830	\$0.839	\$0.703	\$0.604	\$0.808

¹ For regional classification, see footnote to table 32.

Less than one-third (31.0 percent) of the labor force in fabrication plants situated in the East Central States earned 70.0 cents but under 90.0 cents per hour. In the West Central States, over two-fifths (42.7 percent) of the workers received 50.0 cents but under 70.0 cents per hour.

The distribution of workers' hourly earnings in southern fabrication plants explains the low average noted previously for this region. Over one-fourth (28.8 percent) of the workers in plants in Southern States earned less than 40.0 cents per hour and an additional 36.5 percent received 40.0 cents but under 60.0 cents per hour. In the Western States, almost two-fifths (39.2 percent) of the working force earned 60.0 cents but under 80.0 cents per hour.

OCCUPATIONAL EARNINGS

Almost half of the workers in the plants alloying, rolling, and drawing products of copper, brass, and bronze were found in the New England States. In this area, occupational earnings ranged from a low average of 66.9 cents per hour for learners to a high of \$1.334 for chief clerks (table 36). Furnace operators received \$1.307 per hour in this region, \$1.253 in the Middle Atlantic States, and \$1.357 in other States. Average hourly earnings for wire-drawing operators ranged from 89.5 cents in the New England States to \$1.074 in the Middle Atlantic States.

TABLE 36.—Hourly Earnings, Weekly Hours, and Weekly Earnings in Alloying, Rolling, and Drawing Copper, Brass, and Bronze, by Occupation and by Region,¹ August 1941

Occupation	New England States			Middle Atlantic States			Other States		
	Average hourly earnings	Average weekly hours	Average total weekly earnings	Average hourly earnings	Average weekly hours	Average total weekly earnings	Average hourly earnings	Average weekly hours	Average total weekly earnings
All occupations.....	\$0.896	44.7	\$42.93	\$0.847	44.6	\$40.39	\$0.917	42.0	\$39.86
Annealers and heat treaters.....	.926	47.1	47.62	.847	44.3	39.98	.899	44.2	41.67
Helpers.....	.849	44.5	40.84	.772	43.2	35.32	.803	42.6	35.59
Apprentices.....	.681	44.6	33.60	.653	49.4	35.49	(?)	(?)	(?)
Baling and briquetting operators.....	.908	45.5	45.72	.816	47.7	42.52	.927	42.0	40.21
Bricklayers.....	.973	51.8	57.69	(?)	(?)	(?)	.991	42.7	44.26
Carpenters.....	.950	48.4	50.93	.953	44.9	45.05	.968	46.2	47.77
Catchers.....	1.101	48.1	58.28	.804	39.9	32.70	.844	38.1	32.23
Chief clerks.....	1.334	45.8	64.67						
Collars, sheets.....	.884	40.6	36.89	.893	44.0	41.65	.945	40.8	39.48
Crane operators.....	.891	46.0	44.51	.895	46.3	44.83	.950	43.5	41.28
Die setters.....	.938	40.6	40.28	.965	42.3	42.65	1.007	40.7	41.76
Dummy blockmen.....	.908	42.8	42.41	(?)	(?)	(?)	.984	40.2	39.84
Electricians.....	.994	53.9	62.46	1.019	49.1	55.10	1.032	47.6	53.29
Engine-lathe operators.....	.952	47.2	48.65	.933	48.8	50.56	.780	41.4	34.19
Extrusion-press operators.....	1.002	42.9	46.22	.954	41.3	40.62	1.154	40.3	46.89
Helpers.....	.863	43.3	39.71	.669	41.8	29.38	.996	39.4	39.39
Foremen and assistants, working.....	1.052	48.8	56.45	1.019	46.5	51.25	1.095	44.5	51.38
Furnace operators.....	1.307	45.0	63.06	1.253	46.6	62.97	1.357	44.9	64.63
Helpers.....	1.099	42.1	48.48	1.139	47.6	58.87	.982	45.2	47.21
Furnace operators, preheating.....	.979	40.8	43.06	.929	41.0	39.80	1.066	39.8	43.10
Helpers.....	(?)	(?)	(?)	.896	43.4	41.12	1.005	41.0	42.39
Gaugers.....	.908	42.2	39.74	.825	41.6	35.62	.836	41.0	34.95
Grinding-machine operators.....	.865	45.6	42.11	.756	40.2	30.49	.820	45.4	39.59
Inspectors.....	.853	45.4	41.28	.825	44.6	39.24	.850	40.8	35.60
Janitors.....	.741	46.5	38.00	.721	42.9	32.69	.788	41.2	33.73
Laborers.....	.792	45.2	38.46	.753	43.4	34.65	.807	41.0	33.95
Learners.....	.669	44.7	32.10	.630	41.0	27.58	.793	41.5	33.81
Loaders and unloaders.....	.837	45.4	40.50	.723	43.9	33.70	.824	42.3	35.99

See footnotes at end of table.

TABLE 36.—Hourly Earnings, Weekly Hours, and Weekly Earnings in Alloying, Rolling, and Drawing Copper, Brass, and Bronze, by Occupation and by Region,¹ August 1941—Continued

Occupation	New England States			Middle Atlantic States			Other States		
	Average hourly earnings	Average weekly hours	Average total weekly earnings	Average hourly earnings	Average weekly hours	Average total weekly earnings	Average hourly earnings	Average weekly hours	Average total weekly earnings
Machine repairmen	\$1.001	49.2	\$55.30	\$0.959	49.7	\$53.35	\$1.057	46.4	\$52.79
Helpers	.789	49.5	43.93	.790	45.7	39.20	.798	43.3	36.12
Maintenance workers, not elsewhere classified	.939	49.3	52.28	.921	47.5	48.23	.953	45.1	45.76
Helpers	.791	49.9	44.90	.797	46.1	39.96	.833	43.8	38.51
Millwrights	.973	49.6	53.70	.885	45.5	43.95	.989	46.3	49.14
Millers	.850	48.4	45.66	.806	46.9	41.80	.829	43.9	38.21
Office workers, not elsewhere classified	.772	44.7	36.50	.730	43.5	33.19	.775	40.9	32.33
Other plant workers, not elsewhere classified	.840	43.4	38.51	.789	45.1	38.28	.878	41.2	37.21
Painters	.872	50.7	50.19	.850	48.9	45.76	-----	-----	-----
Picklers	.880	42.6	39.03	.859	45.6	42.13	.879	39.6	35.44
Pipe fitters	.950	50.8	55.87	1.017	48.6	55.47	.978	49.2	63.49
Pourers	1.159	38.6	47.28	1.350	45.7	65.34	(?)	(?)	(?)
Powerhouse engineers	1.039	50.8	59.08	1.021	43.0	45.37	(?)	(?)	(?)
Powerhouse firemen	.888	45.8	43.19	.872	41.8	37.87	.904	43.8	41.23
Power-press operators	.906	43.3	41.75	.851	46.2	42.43	.850	36.9	31.45
Rod and tube draw bench operators	.925	44.6	43.83	.958	41.3	41.35	.955	40.5	39.06
Helpers	.847	45.9	41.97	.830	39.1	33.66	.746	40.9	31.08
Rod and tube pointing operators	.895	44.8	42.76	.909	41.5	39.30	.892	41.1	37.37
Rod-straightener operators	.882	41.9	38.59	.876	37.9	33.82	.874	39.1	34.18
Rollers, not elsewhere classified	1.002	42.8	44.84	1.015	47.3	52.14	.823	47.5	42.46
Rollers, breakdown and rundown	1.153	41.4	49.98	1.070	45.1	52.10	1.234	41.5	52.57
Rollers, finishing	1.199	40.6	49.05	1.022	45.6	50.06	1.106	42.3	48.43
Rollers, helpers	.811	41.0	34.98	.815	48.0	42.82	.974	41.7	41.76
Sawfilers	.832	46.2	41.36	.834	48.3	44.28	.825	41.7	35.80
Saw operators	.891	45.2	43.18	.881	41.1	37.62	.919	41.7	39.40
Helpers	.831	45.8	40.98	.816	41.1	35.60	.839	40.3	34.70
Scalping-machine operators	.872	40.9	37.38	(?)	(?)	(?)	(?)	(?)	(?)
Scrap handlers	.838	45.2	40.51	.817	46.6	41.11	.864	45.6	42.00
Scrapmen, extruding	.982	36.8	37.89	.891	36.8	33.98	1.158	41.8	50.00
Set-up men	.929	45.2	44.67	.972	48.3	52.19	.949	42.3	41.29
Shear operators	.892	45.3	43.84	.874	42.2	38.34	.847	42.4	37.17
Sheet straighteners	.949	42.3	41.36	.871	47.7	45.27	.973	41.4	41.47
Shipping clerks	.872	44.7	41.40	.900	46.8	45.28	.866	42.4	37.77
Helpers	.821	43.6	37.87	.784	41.3	33.73	.805	39.4	32.18
Slitting-machine operators	.944	41.2	40.46	.796	43.0	36.02	.978	37.5	37.62
Stickers	.893	41.3	38.44	.937	43.2	43.20	1.044	44.3	48.85
Store and stock-room keepers	.820	45.4	40.02	.861	42.6	38.87	.887	44.0	41.05
Strand men	.885	38.2	36.48	-----	-----	-----	.964	39.9	38.49
Tanners	.862	41.2	37.65	.923	43.6	42.85	.880	42.2	38.65
Tool and die makers	.975	46.2	48.51	1.031	43.9	47.49	1.116	41.9	48.61
Truckers, hand	.721	43.5	33.23	.814	48.8	43.63	.777	40.7	32.66
Truckers, motor	.883	46.1	44.32	.815	47.3	41.79	.922	41.6	39.59
Tube straighteners	.942	43.6	46.92	.924	37.9	35.49	.985	39.6	40.08
Watchmen	.810	45.8	40.28	.778	42.0	33.76	.733	46.7	35.91
Weighers	.856	44.1	39.85	.833	47.3	42.89	.841	44.0	36.97
Welders and brazers	.914	45.9	46.16	.936	47.8	48.85	.921	45.4	44.88
Wire drawing operators	.895	43.3	40.72	1.074	44.7	50.70	.898	42.9	40.30
Helpers	.783	44.7	37.09	-----	-----	-----	.918	41.5	39.40

¹ For regional classification, see footnote to table 32.

* Number of workers too small to justify computation of average.

More than two-fifths of the workers in plants which processed other nonferrous metals in similar manner were in the border States. In this region, occupational earnings spanned a range from 47.5 cents per hour for office machine operators to \$1.384 for stickers (table 37). Average hourly earnings for laborers ranged from 60.0 cents in the border States to 64.8 cents in the East Central States. The corresponding range for rollers extended from 63.2 cents in States not classified as to region, to 99.8 cents in the East Central States.

TABLE 37.—Hourly Earnings, Weekly Hours, and Weekly Earnings in Alloying, Rolling, and Drawing Miscellaneous Nonferrous Metals, by Occupation and Region,¹ August 1941

Occupation	Middle Atlantic States			Border States		
	Average hourly earnings	Average weekly hours	Average total weekly earnings	Average hourly earnings	Average weekly hours	Average total weekly earnings
All occupations.....	\$0.715	43.9	\$33.22	\$0.774	44.6	\$37.70
Annealers.....				.918	42.5	41.07
Helpers.....				.692	45.7	34.48
Assemblers and finishers.....	.620	45.8	30.68	.951	40.8	39.27
Bookkeepers.....	.796	41.1	33.35			
Box makers.....	(²)	(²)	(²)	.699	39.6	27.71
Carpenters.....	(²)	(²)	(²)	1.008	41.5	43.15
Catchers.....				.776	40.5	33.27
Clerical, plant.....	.672	40.5	27.69	.687	40.1	27.86
Die makers.....	(²)	(²)	(²)	1.264	47.3	72.04
Electricians.....	(²)	(²)	(²)	1.131	42.7	51.87
Extrusion-press operators.....	.725	44.2	33.58	.805	51.7	50.17
Helpers.....	.523	39.5	21.74	.586	46.4	30.67
Foremen and assistant foremen, process, working.....	.915	45.7	44.08	1.033	46.6	53.06
Foremen, labor, working.....	.799	48.9	42.55	.746	46.4	38.06
Furnace operators.....	.747	47.0	37.58.	.691	45.7	36.12
Furnacemen, preheating.....	(²)	(²)	(²)	1.020	42.8	46.00
Helpers.....	(²)	(²)	(²)	.761	45.3	37.38
Inspectors.....	.790	48.6	41.86	.739	42.5	32.84
Janitors.....	(²)	(²)	(²)	.664	44.9	32.20
Laborers.....	.623	43.4	28.38	.600	47.5	32.47
Loaders and unloaders.....	.588	38.6	23.92	.635	47.6	34.49
Machinists' helpers.....	(²)	(²)	(²)	.795	52.6	51.95
Maintenance workers, not elsewhere classified.....	.920	44.1	42.32	1.102	42.8	50.01
Helpers.....	.719	44.6	34.00	.758	40.6	31.39
Mechanics.....				(²)	(²)	(²)
Melters.....	(²)	(²)	(²)			
Metallurgists.....	(²)	(²)	(²)	.736	39.1	28.74
Millwrights.....				1.079	48.6	61.58
Helpers.....				.787	43.1	37.19
Miscellaneous plant workers.....	.691	42.1	30.33	.812	41.7	35.09
Office-machine operators.....	(²)	(²)	(²)	.475	39.1	18.56
Oilers, plant machinery.....	(²)	(²)	(²)	.827	49.1	46.78
Other clerical workers.....	(²)	(²)	(²)	.830	39.5	32.77
Packers.....	.598	42.4	26.68	.637	48.1	34.66
Pickling and washing.....				.899	39.4	35.43
Plant-machinery repairmen.....	1.092	46.7	55.76	1.183	50.4	60.09
Pourers.....	.655	43.7	30.05	.676	46.5	36.33
Pouring and casting workers, not elsewhere classified.....	(²)	(²)	(²)	.674	48.7	39.03
Power house workers, not elsewhere classified.....	(²)	(²)	(²)	.954	41.1	39.65
Press operators, forming, die casting.....	(²)	(²)	(²)	.871	40.7	36.38
Punch-press operators.....	.593	44.8	28.67	.686	44.5	33.56
Rollers.....	.857	47.0	43.57	.881	45.4	44.31
Helpers.....	.510	49.6	27.81	.601	49.0	34.19
Saw operators.....	(²)	(²)	(²)	.711	46.9	37.05
Helpers.....				.615	48.6	34.78
Scalping-machine operators.....				.860	46.0	43.65
Helpers.....				.737	45.8	37.14
Scrap handlers.....				.587	47.1	31.63
Scrap-processing workers, not elsewhere classified.....	(²)	(²)	(²)	.687	50.5	39.89
Shear operators.....	.728	39.0	29.46	.787	46.2	40.00
Helpers.....				.649	44.3	31.57
Shipping clerks.....	.747	44.4	35.14	(²)	(²)	(²)
Shipping workers.....	.669	44.7	31.90	.780	47.6	41.66
Slitting- and shearing-machine operators.....	.653	44.5	30.85	.818	41.2	35.61
Stenographers.....	.619	38.4	23.84	.532	39.0	20.72
Stickers.....				1.384	36.0	49.83
Stock clerks.....	.823	45.9	39.73	.742	42.3	32.28
Straightening workers.....				.749	31.6	32.50
Tool and die workers, not elsewhere classified.....	(²)	(²)	(²)	.983	44.1	47.14
Truck drivers.....	.807	43.0	36.19	(²)	(²)	(²)
Truckers, mechanical.....	(²)	(²)	(²)	.672	47.7	36.36
Watchmen.....	.551	43.2	25.56	.698	47.8	36.50

See footnotes at end of table.

TABLE 37.—Hourly Earnings, Weekly Hours, and Weekly Earnings in Alloying, Rolling and Drawing Miscellaneous Nonferrous Metals, by Occupation and Region,¹ August 1941—Continued

Occupation	East Central States			Other States		
	Average hourly earnings	Average weekly hours	Average total weekly earnings	Average hourly earnings	Average weekly hours	Average total weekly earnings
All occupations.....	\$0.745	40.2	\$30.83	\$0.656	41.7	\$28.44
Annealers.....	(²)	(²)	(²)	(²)	(²)	(²)
Helpers.....				.681	44.5	32.02
Assemblers and finishers.....	(²)	(²)	(²)	(²)	(²)	(²)
Bookkeepers.....	(²)	(²)	(²)	(²)	(²)	(²)
Box makers.....	(²)	(²)	(²)	.557	41.8	23.93
Carpenters.....	(²)	(²)	(²)	(²)	(²)	(²)
Catchers.....	.800	46.3	39.69	.630	38.9	24.54
Clerical, plant.....	.760	40.2	31.12	.592	39.5	23.54
Die makers.....	(²)	(²)	(²)	(²)	(²)	(²)
Electricians.....	(²)	(²)	(²)	(²)	(²)	(²)
Extrusion-press operators.....	.783	43.4	35.61	.732	47.8	37.97
Helpers.....	(²)	(²)	(²)	(²)	(²)	(²)
Foremen and assistant foremen, process, working.....	1.025	41.1	44.02	1.038	41.4	43.52
Foremen, labor, working.....	(²)	(²)	(²)	(²)	(²)	(²)
Furnace operators.....	.836	41.3	35.14	.749	42.4	32.63
Furnacemen, preheating.....				(²)	(²)	(²)
Helpers.....				(²)	(²)	(²)
Inspectors.....	.779	39.8	31.11	.426	38.3	16.58
Janitors.....	.625	39.1	24.54	(²)	(²)	(²)
Laborers.....	.648	38.1	24.85	.600	40.7	25.28
Loaders and unloaders.....	.695	38.0	27.30	.569	36.5	21.47
Machinists' helpers.....	(²)	(²)	(²)	(²)	(²)	(²)
Maintenance workers, not elsewhere classified.....	.788	40.1	32.13	(²)	(²)	(²)
Helpers.....	.653	41.5	27.64	(²)	(²)	(²)
Mechanics.....	.946	42.1	40.97	(²)	(²)	(²)
Melters.....	.732	45.2	35.06	.752	43.1	33.80
Metallurgists.....	(²)	(²)	(²)	(²)	(²)	(²)
Millwrights.....	(²)	(²)	(²)			
Helpers.....	(²)	(²)	(²)			
Miscellaneous plant workers.....	.701	41.4	30.23	.748	41.7	32.26
Office-machine operators.....	(²)	(²)	(²)			
Oilers, plant machinery.....	(²)	(²)	(²)	(²)	(²)	(²)
Other clerical workers.....	.771	42.3	34.29	(²)	(²)	(²)
Packers.....	.597	36.2	21.85	.482	35.8	17.27
Pickling and washing.....	(²)	(²)	(²)	.689	43.7	31.41
Plant-machinery repairmen.....	.901	42.6	40.28	.824	43.6	37.75
Pourers.....	.902	45.1	42.57	.697	53.6	41.76
Pouring and casting workers, not elsewhere classified.....	.783	39.4	31.11	(²)	(²)	(²)
Powerhouse workers, not elsewhere classified.....	(²)	(²)	(²)	(²)	(²)	(²)
Press operators, forming, die casting.....	.629	35.3	22.22			
Punch-press operators.....	.757	38.0	29.71			
Rollers.....	.998	42.4	43.78	.632	45.0	30.15
Helpers.....	.812	41.6	34.32	.695	43.0	31.64
Saw operators.....	(²)	(²)	(²)			
Helpers.....						
Scraping-machine operators.....						
Helpers.....						
Scrap handlers.....	(²)	(²)	(²)			
Scrap-processing workers, not elsewhere classified.....	(²)	(²)	(²)	.570	41.8	24.58
Shear operators.....	(²)	(²)	(²)	(²)	(²)	(²)
Helpers.....				(²)	(²)	(²)
Shipping clerks.....	.751	45.4	36.38	(²)	(²)	(²)
Shipping workers.....	.718	41.1	30.52	.534	39.6	21.46
Slitting- and shearing-machine operator.....	.785	40.9	32.45	.735	43.1	32.92
Stenographers.....	.679	38.5	26.17	.656	39.2	25.73
Stickers.....	.926	46.0	45.13			
Stock clerks.....				(²)	(²)	(²)
Straightening workers.....	(²)	(²)	(²)			
Tool and die workers, not elsewhere classified.....	(²)	(²)	(²)			
Truck drivers.....	(²)	(²)	(²)	.765	44.8	36.04
Truckers, mechanical.....	.760	38.6	30.14			
Watchmen.....	.589	45.1	27.72	(²)	(²)	(²)

¹ For regional classification, see footnote to table 32.
² Number of workers too small to justify computation of average.

Over half of the workers in nonferrous metal foundries were in the East Central States. Occupational earnings in this region ranged from a low average of 45.5 cents per hour for watchmen to a high of \$1.195 for pattern makers (table 38).

TABLE 38.—Hourly Earnings, Weekly Hours, and Weekly Earnings of Workers in Nonferrous-Metal Foundries, by Occupation and Region,¹ August 1941

Occupation	New England States			East Central States			West Central States		
	Average hourly earnings	Average weekly hours	Average total weekly earnings	Average hourly earnings	Average weekly hours	Average total weekly earnings	Average hourly earnings	Average weekly hours	Average total weekly earnings
All occupations.....	\$0.725	45.3	\$35.22	\$0.743	44.9	\$35.65	\$0.690	42.6	\$30.69
Apprentices.....	(?)	(?)	(?)	.575	43.5	26.18	(?)	(?)	(?)
Assemblers.....				.923	46.1	40.49			
Bookkeepers.....	(?)	(?)	(?)	.783	39.9	31.71	.880	37.4	33.05
Carpenters.....	(?)	(?)	(?)	.819	39.2	33.72			
Casting cleaners.....	.619	49.9	34.93	.607	42.1	26.83			
Chippers.....	(?)	(?)	(?)	.725	51.9	41.71	.684	50.0	37.31
Core cleaners.....				.615	40.3	25.34	(?)	(?)	(?)
Core-oven tenders.....				.627	53.3	37.64	(?)	(?)	(?)
Core pasters.....				.729	49.4	39.01	(?)	(?)	(?)
Coremakers, hand and machine.....	.932	48.9	49.67	.911	42.1	40.17	.825	41.9	35.71
Helpers.....	(?)	(?)	(?)	.647	45.4	31.52	.480	39.3	19.03
Crane operators.....	(?)	(?)	(?)	(?)	(?)	(?)	(?)	(?)	(?)
Drill-press operators.....				(?)	(?)	(?)	(?)	(?)	(?)
Engine-lathe operators.....	(?)	(?)	(?)	(?)	(?)	(?)	.916	40.7	34.70
Filers.....				.665	48.8	35.86			
Foremen and assistant foremen, working.....	(?)	(?)	(?)	.903	47.4	51.27	.873	43.9	39.46
Furnace operators.....	.764	48.1	40.31	.712	47.8	37.02	.615	44.1	28.80
Helpers.....	.622	48.5	33.36	.623	47.8	32.79	.543	41.6	23.61
Grinder operators.....	.596	47.4	30.47	.657	44.2	30.81	.555	45.7	27.35
Heat treaters.....				.711	45.8	35.34			
Inspectors and testers.....	(?)	(?)	(?)	.684	47.9	35.74	.614	40.0	26.22
Janitors.....	(?)	(?)	(?)	.673	40.8	28.56	(?)	(?)	(?)
Laborers.....	.567	43.2	26.06	.602	45.7	29.51	.571	43.1	26.17
Lathe operators, other.....				.999	36.9	37.19	(?)	(?)	(?)
Learners, not elsewhere classified.....	(?)	(?)	(?)	.705	37.4	30.32	(?)	(?)	(?)
Machine repairmen.....	(?)	(?)	(?)	.916	47.6	47.58	(?)	(?)	(?)
Maintenance workers, not elsewhere classified.....	(?)	(?)	(?)	.821	48.5	43.60	(?)	(?)	(?)
Helpers.....	(?)	(?)	(?)	.732	43.0	32.88	(?)	(?)	(?)
Millwrights.....	(?)	(?)	(?)	.698	62.3	51.14			
Molders, apprentices.....	(?)	(?)	(?)	(?)	(?)	(?)	(?)	(?)	(?)
Bench.....	.968	45.7	46.79	.980	42.5	43.09	.858	42.8	38.14
Floor.....	1.058	42.7	49.33	1.072	39.9	43.38	1.051	45.6	51.06
Hand and machine.....	.781	44.4	36.79	.908	43.6	42.08	.835	41.8	36.18
Helpers.....	.593	44.0	27.77	.660	44.4	31.29	.566	42.3	24.90
Learners.....	(?)	(?)	(?)	(?)	(?)	(?)	(?)	(?)	(?)
Office clerical workers.....	(?)	(?)	(?)	.558	39.6	22.35	.661	40.0	26.42
Other foundry workers.....	.673	50.2	36.93	.732	40.6	30.59	.744	41.8	32.03
Pattern makers, wood and metal.....	(?)	(?)	(?)	1.195	44.0	55.87	(?)	(?)	(?)
Plant clerical workers.....	(?)	(?)	(?)	.679	43.0	30.62	.668	40.1	26.90
Polishers and buffers.....				.663	47.8	34.54			
Pourers.....	.591	42.7	26.72	.792	38.8	31.35	(?)	(?)	(?)
Helpers.....	(?)	(?)	(?)	.619	53.0	37.29	(?)	(?)	(?)
Sandblast operators.....	(?)	(?)	(?)	.773	47.7	40.25	(?)	(?)	(?)
Sand conditioners.....				.634	49.3	34.17	.514	44.2	24.23
Saw operators.....	(?)	(?)	(?)	.726	47.3	37.19	(?)	(?)	(?)
Shake-out men.....	(?)	(?)	(?)	.656	47.1	33.66	.492	46.0	24.22
Shipping workers.....	(?)	(?)	(?)	.617	45.6	30.77	.715	43.6	32.62
Store and stock keepers.....	(?)	(?)	(?)	.666	45.0	31.58	(?)	(?)	(?)
Timekeepers.....	(?)	(?)	(?)	.591	51.4	36.18	(?)	(?)	(?)
Tool and die makers.....				1.030	47.8	53.32			
Truck and tractor drivers.....	(?)	(?)	(?)	.732	45.1	35.50	.690	42.2	29.54
Truckers, hand.....				.611	50.0	34.19	.546	40.7	23.87
Turret-lathe operators.....				.647	52.5	38.40	.753	41.2	31.78
Watchmen.....	(?)	(?)	(?)	.455	51.9	26.01	.551	48.5	28.10
Welders.....				.705	48.9	37.97	(?)	(?)	(?)

See footnotes at end of table.

TABLE 38.—Hourly Earnings, Weekly Hours, and Weekly Earnings of Workers in Non-ferrous-Metal Foundries, by Occupation and Region,¹ August 1941—Continued

Occupation	Southern States			Western States			Other States		
	Average hourly earnings	Average weekly hours	Average total weekly earnings	Average hourly earnings	Average weekly hours	Average weekly earnings	Average hourly earnings	Average total weekly hours	Average weekly earnings
All occupations.....	\$0.582	43.8	\$27.04	\$0.784	41.0	\$33.39	\$0.718	48.2	\$37.88
Apprentices.....	(2)	(2)	(2)	.523	39.9	22.36	(2)	(2)	(2)
Assemblers.....	(2)	(2)	(2)	.572	40.3	23.98	(2)	(2)	(2)
Bookkeepers.....	(2)	(2)	(2)	(2)	(2)	(2)	.670	40.8	27.75
Carpenters.....	(2)	(2)	(2)	(2)	(2)	(2)	(2)	(2)	(2)
Casting cleaners.....	.418	44.1	19.72	.698	44.1	32.19	.733	43.1	32.94
Chippers.....	(2)	(2)	(2)	(2)	(2)	(2)	.664	55.1	42.22
Core cleaners.....							.448	44.3	21.53
Core-oven tenders.....							(2)	(2)	(2)
Core pasters.....							.628	48.3	32.73
Coremakers, hand and machine.....	.832	42.8	37.64	(2)	(2)	(2)	.846	46.0	41.96
Helpers.....	(2)	(2)	(2)				.569	48.9	30.35
Crane operators.....							.743	59.5	50.98
Drill-press operators.....	(2)	(2)	(2)				.704	45.4	33.84
Engine-lathe operators.....							.734	52.5	42.75
Filers.....							.559	48.5	29.48
Foremen and assistant foremen, working.....	(2)	(2)	(2)	1.093	42.5	47.25	.913	54.5	55.65
Furnace operators.....	.548	48.6	29.34	.840	43.4	38.06	.793	50.9	44.83
Helpers.....	(2)	(2)	(2)	(2)	(2)	(2)	.718	49.2	35.47
Grinder operators.....	(2)	(2)	(2)	.610	42.5	27.12	.608	52.0	35.94
Heat treaters.....				(2)	(2)	(2)			
Inspectors and testers.....	(2)	(2)	(2)	.708	40.3	29.21	.570	47.0	29.18
Janitors.....	(2)	(2)	(2)	(2)	(2)	(2)	(2)	(2)	(2)
Laborers.....	.415	43.6	19.37	.576	41.4	24.87	.579	48.8	31.49
Lathe operators, other.....				(2)	(2)	(2)	(2)	(2)	(2)
Learners, not elsewhere classified.....	.494	47.8	25.66	(2)	(2)	(2)	.518	47.7	26.74
Machine repairmen.....	(2)	(2)	(2)	(2)	(2)	(2)	(2)	(2)	(2)
Maintenance workers, not elsewhere classified.....				(2)	(2)	(2)			
Helpers.....							.779	47.4	40.38
Millwrights.....							(2)	(2)	(2)
Molders, apprentices.....				(2)	(2)	(2)	.540	47.3	27.99
Bench.....	.813	40.5	34.26	1.017	38.9	40.43	.702	44.2	42.23
Floor.....	.848	41.1	35.76	1.124	44.4	52.20	1.109	45.3	53.61
Hand and machine.....	.827	44.2	38.49	.974	39.2	38.54	.899	46.5	44.86
Helpers.....	.413	44.3	19.57	.692	38.4	27.00	.662	50.1	36.67
Learners.....	(2)	(2)	(2)	(2)	(2)	(2)	.601	52.2	35.55
Office clerical workers.....	.468	41.2	19.85	(2)	(2)	(2)	.531	40.6	21.85
Other foundry workers.....	.831	42.7	38.54	.869	43.8	42.02	.874	50.8	44.21
Pattern makers, wood and metal.....	(2)	(2)	(2)	(2)	(2)	(2)	.919	49.3	49.77
Plant clerical workers.....	(2)	(2)	(2)	(2)	(2)	(2)	.550	42.7	24.39
Polishers and buffers.....	(2)	(2)	(2)	.932	35.1	32.76	(2)	(2)	(2)
Pourers.....	(2)	(2)	(2)	.837	39.4	33.05	(2)	(2)	(2)
Helpers.....				(2)	(2)	(2)	(2)	(2)	(2)
Sandblast operators.....	(2)	(2)	(2)				(2)	(2)	(2)
Sand conditioners.....							.586	43.6	27.09
Saw operators.....							(2)	(2)	(2)
Shake-out men.....	(2)	(2)	(2)	(2)	(2)	(2)	.531	48.5	28.45
Shipping workers.....	(2)	(2)	(2)	.525	46.7	26.43	.665	49.4	36.59
Store and stock keepers.....	(2)	(2)	(2)				(2)	(2)	(2)
Time keepers.....	(2)	(2)	(2)	(2)	(2)	(2)	(2)	(2)	(2)
Tool and die makers.....				(2)	(2)	(2)	(2)	(2)	(2)
Truck and tractor drivers.....	(2)	(2)	(2)	(2)	(2)	(2)	.682	50.0	37.00
Truckers, hand.....				(2)	(2)	(2)	(2)	(2)	(2)
Turret-lathe operators.....		(2)	(2)	.921	40.6	37.66	.818	48.2	42.47
Watchmen.....	.394	45.3	18.57	(2)	(2)	(2)	.569	46.3	28.76
Welders.....	(2)	(2)	(2)	(2)	(2)	(2)	(2)	(2)	(2)

¹ For regional classification, see footnote to table 32.² Number of workers too small to justify computation of average.

In the secondary non-ferrous metal smelters, one of the prominent occupations was that of the furnace operators, who earned an average of 74.0 cents per hour in the Middle Atlantic States, 75.1 cents in the East Central States, and 88.6 cents in other States (table 39). Process laborers, who collect scrap prior to the charging of the furnaces and handle the disposal of slag and dross from the furnaces, averaged 58.9 cents in the Middle Atlantic States and 58.3 cents in the East Central States.

TABLE 39.—Hourly Earnings, Weekly Hours, and Weekly Earnings of Workers in Secondary Nonferrous-Metal Smelters, by Occupation and Region,¹ August 1941

Occupation	Middle Atlantic States			East Central States			Other States		
	Average hourly earnings	Average weekly hours	Average total weekly earnings	Average hourly earnings	Average weekly hours	Average total weekly earnings	Average hourly earnings	Average weekly hours	Average total weekly earnings
All occupations.....	\$0.692	43.1	\$31.45	\$0.680	41.6	\$29.38	\$0.760	41.7	\$32.78
Bookkeepers.....	.748	39.8	29.88	.801	40.7	32.90	(?)	(?)	(?)
Briquetting operators.....	.637	42.6	28.60	.611	44.0	28.16	(?)	(?)	(?)
Crane operators.....	(?)	(?)	(?)	.711	39.1	28.49	(?)	(?)	(?)
Extrusion-press operators.....	.911	44.5	43.24	(?)	(?)	(?)	(?)	(?)	(?)
Foremen and assistants, working.....	.962	47.6	49.29	.940	42.0	40.61	.941	43.9	43.78
Furnace operators.....	.740	44.7	34.99	.751	41.1	32.04	.885	43.2	39.93
Helpers.....	.678	44.9	32.47	.728	41.8	31.56	3.907	43.9	41.83
Grinding-machine operators.....	(?)	(?)	(?)	(?)	(?)	(?)	.638	45.7	32.78
Janitors.....	.635	42.6	27.93	(?)	(?)	(?)	(?)	(?)	(?)
Laborers, general.....	.685	43.1	31.15	.650	39.5	26.00	(?)	(?)	(?)
Laborers, maintenance.....	(?)	(?)	(?)	.601	41.5	25.70	(?)	(?)	(?)
Laborers, process.....	.589	40.4	24.96	.583	41.1	25.18	.561	40.7	23.74
Loaders and unloaders.....	.662	42.4	29.18	.566	39.1	22.92	.639	34.1	21.96
Maintenance workers, other.....	.802	45.6	39.72	.902	42.9	40.00	.947	45.5	45.36
Helpers.....	.694	46.0	34.03	.701	42.5	30.83	(?)	(?)	(?)
Mechanics.....	.842	44.8	40.42	(?)	(?)	(?)	(?)	(?)	(?)
Metal mixers.....	.673	44.7	31.80	.719	40.2	29.27	(?)	(?)	(?)
Other clerical workers.....	.665	40.0	26.99	.647	42.5	30.33	.688	41.3	29.04
Other plant workers.....	.722	41.0	30.92	.679	42.2	29.17	.870	39.5	34.51
Packers.....	.688	41.9	29.51				.742	39.3	29.11
Plant clerks.....	.754	41.4	32.03	.679	40.2	27.56	.742	39.9	29.65
Samplers.....	(?)	(?)	(?)	.687	39.4	27.67	(?)	(?)	(?)
Scrap handlers.....	.672	43.5	30.90	.645	44.8	30.48	.604	44.3	28.38
Stenographers.....	.615	38.6	23.79	.623	38.5	23.99	.711	40.6	29.22
Technicians.....	.906	44.0	41.50	(?)	(?)	(?)	(?)	(?)	(?)
Technicians' assistants.....	.963	42.4	28.96	(?)	(?)	(?)	(?)	(?)	(?)
Truck drivers.....	.696	47.1	36.03	.770	45.0	36.33	(?)	(?)	(?)
Truckers, hand.....	.724	42.5	32.53	.603	43.4	27.45	(?)	(?)	(?)
Watchmen.....	.594	48.1	30.31	.512	51.4	29.07	(?)	(?)	(?)
Weighers.....	.757	42.9	33.84	.682	42.4	30.00	.947	40.7	39.07

¹ For regional classification, see footnote to table to table 32.

² Number of workers too small to justify computation of average.

³ Excess helpers' earnings over those of furnace operators is result of different returns for nonidentical establishments playing a variety of rates.

Almost three-fourths of the workers in machined-products plants (producing bearings, fittings, valves, etc.) were in the East Central States. In this region, the range in average hourly earnings extended from 46.9 cents for typists to \$1.227 for tool makers (table 40). Assemblers earned an average of 68.2 cents per hour in this region which compared with 63.3 cents in the Middle Atlantic States. Screw-machine operators received an average of 88.8 cents per hour in the East Central States, whereas those in other States received 76.3 cents per hour.

TABLE 40.—Hourly Earnings, Weekly Hours, and Weekly Earnings, of Workers in Machined-Products Plants, by Occupation and Region,¹ August 1941

Occupation	Middle Atlantic States			East Central States			Other States		
	Average hourly earnings	Average weekly hours	Average total weekly earnings	Average hourly earnings	Average weekly hours	Average total weekly earnings	Average hourly earnings	Average weekly hours	Average total weekly earnings
All occupations.....	\$0.703	40.7	\$30.48	\$0.763	45.2	\$36.93	\$0.749	42.6	\$32.89
Annealers.....	.822	48.2	44.02	.719	48.0	37.53	.833	44.1	37.57
Assemblers.....	.653	47.3	32.26	.682	43.8	31.89	.633	39.0	24.81
Assistant foremen, working.....	(?)	(?)	(?)	.913	50.9	51.49	(?)	(?)	(?)
Beginners and learners.....	.492	38.4	19.84	.579	46.5	29.05	(?)	(?)	(?)
Blanking-press operators.....	(?)	(?)	(?)	.722	50.2	39.98	.728	37.0	26.97
Boring-machine operators.....	(?)	(?)	(?)	1.022	50.2	56.72	(?)	(?)	(?)
Brazers.....	(?)	(?)	(?)	1.011	50.6	56.60	(?)	(?)	(?)
Buffers.....	(?)	(?)	(?)	.623	41.0	26.85	1.207	39.5	47.66
Burrers, hand and machine.....	.539	38.2	21.33	.703	42.2	30.86	(?)	(?)	(?)
Casting cleaners.....	(?)	(?)	(?)	.829	40.5	33.75	(?)	(?)	(?)
Checkers, yard and shipping.....	(?)	(?)	(?)	.703	47.9	36.76	(?)	(?)	(?)
Core pasters.....	(?)	(?)	(?)	.623	38.9	24.95	(?)	(?)	(?)
Coremakers, hand and machine.....	.598	43.3	27.12	.775	43.8	35.78	.790	39.8	32.51
Die casting, forging, forming and punching workers, not elsewhere classified.....	.638	40.0	26.82	.853	50.7	47.85	(?)	(?)	(?)
Die and tool workers, not elsewhere classified.....	(?)	(?)	(?)	1.023	49.6	55.91	(?)	(?)	(?)
Draftsmen.....	(?)	(?)	(?)	.836	43.8	38.13	(?)	(?)	(?)
Drill-press operators.....	.593	41.5	25.85	.705	44.6	33.70	(?)	(?)	(?)
Electricians.....	(?)	(?)	(?)	.923	49.7	51.24	(?)	(?)	(?)
Engine-lathe operators.....	.775	43.5	36.23	1.015	40.4	41.46	.719	44.9	33.91
Flaskmakers.....	(?)	(?)	(?)	.968	46.0	46.72	(?)	(?)	(?)
Foremen, working.....	(?)	(?)	(?)	1.011	48.3	53.33	(?)	(?)	(?)
Furnace operators.....	.712	45.4	34.61	.912	46.8	46.40	(?)	(?)	(?)
Helpers.....	(?)	(?)	(?)	.844	40.2	35.06	(?)	(?)	(?)
Grinding-machine operators.....	.713	43.1	32.53	.827	41.2	36.17	.599	41.5	26.49
Hand truckers.....	.550	40.4	22.94	.670	45.7	32.91	.552	46.4	27.29
Inspectors.....	.576	45.8	28.17	.701	44.0	32.74	.613	48.3	31.82
Janitors and custodial workers.....	(?)	(?)	(?)	.609	46.8	31.41	(?)	(?)	(?)
Laborers, general.....	.599	49.6	32.83	.657	44.5	31.21	.459	49.7	25.54
Laborers, plant.....	.563	48.9	30.50	.645	44.1	30.49	.501	43.0	22.76
Laborers, stores, stock and warehouse.....	(?)	(?)	(?)	.589	47.4	30.29	(?)	(?)	(?)
Lathe operators, not elsewhere classified.....	.610	42.2	27.12	.665	44.2	31.58	(?)	(?)	(?)
Loaders and unloaders.....	(?)	(?)	(?)	.653	46.5	32.92	.465	55.2	29.50
Machine operators, helpers, not elsewhere classified.....	(?)	(?)	(?)	.687	47.2	34.99	(?)	(?)	(?)
Maintenance workers, not elsewhere classified.....	(?)	(?)	(?)	.929	49.4	50.62	(?)	(?)	(?)
Helpers.....	(?)	(?)	(?)	.579	49.6	33.32	(?)	(?)	(?)
Millwrights.....	(?)	(?)	(?)	.789	49.5	43.23	(?)	(?)	(?)
Helpers.....	(?)	(?)	(?)	.723	51.1	41.04	(?)	(?)	(?)
Mold-making workers, not elsewhere classified.....	(?)	(?)	(?)	.793	39.9	33.51	(?)	(?)	(?)
Molders, bench, hand.....	.902	35.9	32.79	.909	46.4	45.39	(?)	(?)	(?)
Helpers.....	.611	36.5	22.39	.545	44.9	20.80	(?)	(?)	(?)
Molders, machine.....	.798	43.1	36.64	.943	39.8	38.64	.847	41.8	36.05
Helpers.....	(?)	(?)	(?)	.764	37.6	28.98	(?)	(?)	(?)
Other clerical workers, not elsewhere classified.....	.649	45.6	31.39	.665	45.2	31.69	(?)	(?)	(?)
Other miscellaneous workers, not elsewhere classified.....	.701	42.8	31.68	.821	46.8	41.63	.822	44.3	38.19
Packers.....	.499	44.4	23.65	.559	44.2	26.23	(?)	(?)	(?)
Plant clerks.....	.592	43.3	26.84	.553	45.2	26.97	.648	39.8	25.78
Platers.....	(?)	(?)	(?)	.792	44.0	36.95	1.089	40.5	44.55
Helpers.....	(?)	(?)	(?)	.636	44.4	30.07	.888	38.0	33.81
Polishers.....	(?)	(?)	(?)	.843	45.1	40.57	1.065	33.0	40.45
Pourers.....	.696	41.4	30.65	1.041	40.9	42.83	(?)	(?)	(?)
Repairmen, plant.....	(?)	(?)	(?)	1.003	47.5	51.28	(?)	(?)	(?)
Saw operators, metal.....	(?)	(?)	(?)	.813	45.7	39.60	(?)	(?)	(?)
Scrap-processing workers, not elsewhere classified.....	(?)	(?)	(?)	.635	47.1	32.40	(?)	(?)	(?)
Screw-machine operators.....	(?)	(?)	(?)	.888	45.4	43.23	.763	42.1	33.01

See footnotes at end of table.

TABLE 40.—*Hourly Earnings, Weekly Hours, and Weekly Earnings of Workers in Machined-Products Plants, by Occupation and Region,¹ August 1941—Continued*

Occupation	Middle Atlantic States			East Central States			Other States		
	Average hourly earnings	Average weekly hours	Average total weekly earnings	Average hourly earnings	Average weekly hours	Average total weekly earnings	Average hourly earnings	Average weekly hours	Average total weekly earnings
Set-up men.....	\$0.836	43.1	\$38.00	\$1.115	46.9	\$56.37	.....	.....	.....
Shake-out men.....	.690	40.1	29.67	.782	40.6	32.80	\$0.582	43.0	\$26.59
Shipping clerks.....	(?)	(?)	(?)	.679	46.6	33.98	(?)	(?)	(?)
Shipping workers.....	(?)	(?)	(?)	.682	45.5	33.13	(?)	(?)	(?)
Stenographers.....	.663	41.0	27.67	.584	40.6	23.88	(?)	(?)	(?)
Store and stockkeepers.....	(?)	(?)	(?)	.641	47.6	33.15	(?)	(?)	(?)
Threading-machine operators.....	(?)	(?)	(?)	.761	48.3	40.79	(?)	(?)	(?)
Helpers.....	.648	42.5	29.17	.801	46.9	41.49	(?)	(?)	(?)
Tool makers.....	.986	44.0	45.44	1.227	49.6	67.29	1.160	40.7	47.54
Tool-shed attendants.....	(?)	(?)	(?)	.688	47.9	35.70	(?)	(?)	(?)
Turret-lathe operators.....	.706	44.3	33.60	.887	45.6	43.65	(?)	(?)	(?)
Typists.....	(?)	(?)	(?)	.469	41.7	20.10	(?)	(?)	(?)
Watchmen.....	(?)	(?)	(?)	.618	48.5	32.71	(?)	(?)	(?)
Welding and soldering workers, not elsewhere classified.....	(?)	(?)	(?)	.649	42.4	28.96	(?)	(?)	(?)

¹ For regional classification, see footnote to table 32.

² Number of workers too small to justify computation of average.

Occupational earnings in diecasting plants ranged from a low average of 59.0 cents per hour for process laborers to a high of \$1.284 for die makers (table 41). The large group of die-casting operators, a key occupation in the technical process involved in this branch of fabrication, earned an average of 99.8 cents per hour.

TABLE 41.—*Hourly Earnings, Weekly Hours, and Weekly Earnings of Workers in Non-ferrous-Metal Die-Casting Plants, by Occupation, August 1941*

Occupation	Average hourly earnings	Average weekly hours	Average total weekly earnings	Occupation	Average hourly earnings	Average weekly hours	Average total weekly earnings
All occupations.....	\$0.885	41.4	\$38.30	Loaders and unloaders.....	\$0.732	44.2	\$33.87
Apprentices.....	.676	49.3	37.12	Melters and melters' helpers.....	.894	42.3	39.25
Beginners and learners.....	.600	47.0	30.56	Millwrights.....	.823	46.4	40.75
Cleaners, castings.....	.837	39.8	34.09	Other clerical workers, not elsewhere classified.....	.693	41.5	29.49
Clerical, plant.....	.751	41.4	31.73	Other maintenance workers, not elsewhere classified.....	.911	47.3	46.89
Die-casting operators.....	.998	39.9	40.67	Helpers.....	.725	42.9	33.45
Helpers.....	.762	36.8	29.37	Other plant workers.....	.939	40.2	39.53
Die makers.....	1.284	48.0	67.90	Helpers, not elsewhere classified.....	.693	39.1	27.54
Die setters.....	.914	43.5	42.33	Packers.....	.651	40.9	27.56
Draftsmen.....	1.104	43.3	49.84	Plant-equipment repairmen.....	1.046	46.2	52.16
Drill-press operators.....	.944	36.2	34.55	Punch-press operators.....	.928	36.2	33.85
Electricians.....	.950	45.0	46.46	Shipping clerks.....	.833	44.0	38.69
Filers, castings.....	.818	38.6	32.08	Stenographers.....	.671	39.7	26.72
Foremen and assistants, working.....	1.003	44.4	47.23	Tool makers.....	1.241	47.7	64.04
Grinding-machine operators.....	.957	36.2	34.62	Tool-room attendants.....	.772	46.2	38.09
Inspectors, final.....	.761	39.0	30.03	Truck drivers.....	.806	45.3	40.50
Inspectors, rough.....	.740	39.6	30.03	Tuckers, hand.....	.724	41.8	31.25
Janitors.....	.706	40.9	30.47	Watchmen.....	.694	44.5	32.83
Laborers, general.....	.627	42.7	27.88				
Laborers, process.....	.590	38.1	22.67				
Lathe operators.....	1.070	38.8	42.82				

Weekly Hours and Earnings

Average weekly hours in the primary fabrication of nonferrous metals in August 1941, ranged from 41.4 for die-casting workers to 45.0 for foundry workers. Workers in secondary smelters worked 42.3 hours weekly. In alloying, rolling, and drawing, the plants that processed copper, brass, and bronze reported an average work week of 44.0 hours, whereas those which processed other nonferrous metals ported 43.0 hours as the average workweek. Workers employed in plants producing machined products worked an average of 44.2 hours weekly. Tables 36-41 present occupational average weekly hours for each surveyed branch of primary nonferrous-metal fabrication. In most cases, the data are classified, in addition, by region.

Average total weekly earnings by branch of the industry varied appreciably. The lowest average was \$30.98 for workers in secondary smelters, and the highest was \$41.45 for those engaged in alloying, rolling, and drawing copper, brass, and bronze. This latitude in total weekly earnings exceeded that in nonferrous-metal smelting and refining where the lowest average was \$30.52 in lead smelting and the highest was \$34.70 in copper smelting in August 1941.

PART IV.—EARNINGS IN MINING AND PROCESSING OF NONFERROUS METALS, JUNE 1942

Nature of the June 1942 Data

The data on average hourly earnings in June 1942 constitute essentially a revision of the August 1941 data for mining and milling (Part I) and for smelting and refining (Part II); the data on primary fabrication (Part III) have not been brought up to date. The information essential to the revision of the 1941 data was obtained by the Bureau through a mail survey involving all the firms which provided the information for the earlier survey. The adjustments made were restricted primarily to general wage increases; increases limited to specific occupational groups were considered only when they were of sufficient magnitude to affect appreciably the average hourly earnings of the plants involved.

In view of the fact that the most recent study of this industry did not involve the collection of complete pay-roll data, it was impossible to make any revisions in the gross weekly earnings which appeared in the 1941 tabulations. Schedules of hours of work have changed decidedly in many establishments, especially in the mines. A considerable number of mining firms, for example, reported a change in the weekly hours of work from 40 to 48, or from 42 to 48. These changes also substantially affected overtime hours and punitive overtime earnings.

The response to the Bureau's inquiries regarding recent wage changes by firms engaged in the mining and smelting of mercury was inadequate. Since it was impracticable in the time available to send field representatives to the small and scattered mercury plants, it was found necessary to abandon the presentation of statistics for this branch of the industry. The total number of workers previously surveyed in mercury mining (444) and smelting (135) was small, however, and the effect of their omission on average hourly earnings in the industry as a whole is insignificant.

Except for the omission of the mercury operations, the establishments included in the present tabulations are identical with those studied in 1941 and are believed to be representative of the respective branches of the industry. The occupational patterns presented are representative primarily of the August 1941 period, since the adjustments made applied only to wage rates and not to changes in occupational structure. Significant shifts in occupational patterns may have taken place as a result of the increase in output for war purposes.

The data on average hourly earnings refer essentially to straight-time earnings, since extra earnings derived from overtime have been eliminated from all of the wage averages presented. Premiums for evening and night shifts are not an important factor in mining and milling or in smelting and refining. With regard to other characteristics of the data (the analysis of the sample, the background of the

industry, the characteristics of the labor force, and relevant wage and hour practices) the findings of the 1941 survey, published in the June and July (1942) issues of the *Monthly Labor Review*, provide a considerable amount of information which applies equally to the present data.

Wage changes from August 1941 to June 1942.—With few exceptions, the wage increases which were granted by individual firms between August 1941 and June 1942 were general increases covering all plant employees. Where some occupational groups in a given plant were paid on a time basis and others on a piece-rate basis, the piece rates were generally raised by approximately the same percentage as were the hourly rates. Over and above the general increases, specific occupational groups sometimes received additional increases, especially the workers in the mechanical and maintenance occupations.

Establishments reporting to the Bureau regarding wage changes during the 10-month period numbered 75 in mining and milling and 34 in smelting and refining. Of the mining and milling establishments 12 reported that they granted no wage increases; 28 had granted increases of less than 15 percent; and the remaining 35 reported increases of 15 percent or more. In the smelting and refining of non-ferrous metals 6 establishments reported no increases, 24 reported increases of less than 15 percent, and the remaining 4 reported increases of 15 percent or more.

Average Hourly Earnings in June 1942

Average hourly earnings were generally higher in June 1942 than in August 1941 (table 42). Workers engaged in the mining and milling of copper in June 1942 earned an average of 84.1 cents per hour; those in the extraction of lead and zinc, 84.3 cents; and those in other mines and mills 88.0 cents. The respective averages for these three industry branches in August 1941 were 72.8 cents, 76.6 cents, and 77.4 cents an hour. On a relative basis, workers in copper mines and mills received the greatest increase, amounting to 15.5 percent on the average; while those in lead and zinc mines and mills received the smallest average increase, amounting to 10.1 percent. Employees engaged in other mining and milling received wage increases averaging 13.7 percent.

In smelting and refining operations the increases were, on the whole, somewhat lower than in mining and milling, and ranged from 4.0 cents per hour in lead smelting to 9.1 cents in copper smelting. Average hourly earnings in the three major smelting branches—copper, lead, and zinc—amounted to 84.1 cents, 80.8 cents and 90.1 cents, respectively, in June 1942. Workers engaged in the electrolytic refining of copper and in electrolytic zinc production earned on the average 83.9 cents and 89.0 cents during the same period. On a relative basis, the increases in average hourly earnings in these various branches of smelting and refining ranged from 5.2 percent in lead smelters to 12.1 percent in copper smelters.

TABLE 42.—*Straight-Time Average Hourly Earnings in Nonferrous-Metals Industry, by Branch, August 1941 and June 1942*

Branch of industry	Average hourly earnings		Increase, August 1941 to June 1942	
	August 1941	June 1942	Amount	Percent
Mining and milling of—			<i>Cents</i>	
Copper.....	\$0. 728	\$0. 841	11. 3	15. 5
Lead and zinc.....	. 766	. 843	7. 7	10. 1
Other.....	. 774	. 880	10. 6	13. 7
Smelting of—				
Copper.....	. 760	. 841	9. 1	12. 1
Lead.....	. 768	. 808	4. 0	5. 2
Zinc.....	. 835	. 901	6. 6	7. 9
Electrolytic refining of copper.....	. 779	. 839	6. 0	7. 7
Electrolytic zinc production.....	. 809	. 890	8. 1	10. 0

The distribution of workers by average hourly earnings in the various segments of the nonferrous-metals industry shows a decided shift of workers into the higher earnings brackets. In mining and milling in the United States as a whole, for example, only 1 worker in 7 had earnings of 90 cents or more in August 1941, whereas 1 worker in every 3 had such earnings in June 1942 (table 43). The highest proportion of workers (42.0 percent) found in this earnings class was in the mining and milling of the minor metals.

TABLE 43.—*Percentage Distribution of Workers in Nonferrous-Metals Industry by Average Hourly Earnings and Branch, June 1942*

MINES AND MILLS

Average hourly earnings	Total	Copper mines and mills	Lead and zinc mines and mills	Other mines and mills ¹
Under 40.0 cents.....	0. 2	(²)	0. 3	.....
40.0 and under 42.5 cents.....	. 1	(²)	. 1	0. 5
42.5 and under 45.0 cents.....	. 3	0. 6	. 1	.....
45.0 and under 47.5 cents.....	. 5	. 6	. 3	. 1
47.5 and under 50.0 cents.....	. 2	. 3	. 2	. 1
50.0 and under 52.5 cents.....	1. 1	1. 8	. 5	. 1
52.5 and under 55.0 cents.....	. 7	1. 2	. 2	. 2
55.0 and under 57.5 cents.....	1. 6	2. 9	. 4	. 1
57.5 and under 60.0 cents.....	1. 9	2. 8	. 7	3. 7
60.0 and under 62.5 cents.....	3. 0	5. 2	1. 0	1. 1
62.5 and under 65.0 cents.....	2. 4	2. 9	1. 9	8. 2
65.0 and under 67.5 cents.....	2. 2	2. 0	2. 3	2. 9
67.5 and under 70.0 cents.....	2. 4	1. 7	3. 2	. 8
70.0 and under 72.5 cents.....	3. 0	2. 3	3. 7	3. 1
72.5 and under 75.0 cents.....	4. 7	2. 4	7. 6	. 2
75.0 and under 77.5 cents.....	4. 7	3. 0	7. 0	. 9
77.5 and under 80.0 cents.....	6. 6	5. 7	8. 0	2. 2
80.0 and under 82.5 cents.....	9. 8	5. 5	14. 1	10. 0
82.5 and under 85.0 cents.....	10. 6	12. 9	8. 8	4. 0
85.0 and under 87.5 cents.....	5. 0	6. 1	4. 2	1. 3
87.5 and under 90.0 cents.....	6. 0	4. 7	5. 4	23. 5
90.0 and under 92.5 cents.....	5. 9	4. 4	7. 6	4. 8
92.5 and under 95.0 cents.....	5. 2	6. 1	4. 6	3. 7
95.0 and under 97.5 cents.....	5. 3	7. 0	3. 4	6. 4
97.5 and under 100.0 cents.....	2. 6	3. 9	1. 5	. 6
100.0 and under 105.0 cents.....	5. 3	4. 2	4. 8	20. 4
105.0 and under 110.0 cents.....	3. 5	3. 5	3. 6	3. 5
110.0 cents and over.....	5. 2	6. 3	4. 5	2. 6
Total.....	100. 0	100. 0	100. 0	100. 0
Number of workers.....	25, 761	12, 358	12, 065	1, 338
Number of units ²	144	36	91	17
Average hourly earnings, June 1942.....	\$0. 844	\$0. 841	\$0. 843	\$0. 880

See footnotes at end of table.

TABLE 43.—Percentage Distribution of Workers in Nonferrous-Metals Industry by Average Hourly Earnings and Branch, June 1942—Continued

Average hourly earnings	Smelting			Copper refining (electrolytic)	Electrolytic zinc production ⁴
	Zinc	Copper	Lead		
Under 37.5 cents.....	(¹)		0.1		
37.5 and under 40.0 cents.....	0.1				
40.0 and under 42.5 cents.....			.1	(²)	0.1
42.5 and under 45.0 cents.....	.1	0.1		0.1	.1
45.0 and under 47.5 cents.....	(²)	(²)	.3	.2	.2
47.5 and under 50.0 cents.....	(²)	(²)	.6	(²)	.5
50.0 and under 52.5 cents.....	.2	.1		2.9	
52.5 and under 55.0 cents.....	.1	1.3	.4	1.5	
55.0 and under 57.5 cents.....	.1	1.1		1.6	
57.5 and under 60.0 cents.....	.1	.3	.2	1.4	.5
60.0 and under 62.5 cents.....	.1	.7		1.5	
62.5 and under 65.0 cents.....	.2	2.9	10.0	.7	.1
65.0 and under 67.5 cents.....	2.3	2.5	6.6	.5	
67.5 and under 70.0 cents.....	4.4	2.5	4.0	.5	.9
70.0 and under 72.5 cents.....	3.3	4.2	4.4	.7	3.3
72.5 and under 75.0 cents.....	8.4	2.8	2.8	5.5	1.9
75.0 and under 77.5 cents.....	3.2	2.9	6.5	3.0	2.2
77.5 and under 80.0 cents.....	4.9	18.0	10.1	13.7	5.8
80.0 and under 82.5 cents.....	4.7	8.9	13.3	12.0	12.3
82.5 and under 85.0 cents.....	6.3	9.5	12.4	13.0	9.6
85.0 and under 87.5 cents.....	3.5	3.5	6.5	7.8	5.4
87.5 and under 90.0 cents.....	7.4	12.0	2.0	5.8	8.8
90.0 and under 92.5 cents.....	8.6	3.7	5.9	5.1	6.3
92.5 and under 95.0 cents.....	7.4	7.6	2.3	5.2	17.4
95.0 and under 97.5 cents.....	4.6	3.1	4.8	2.9	7.4
97.5 and under 102.5 cents.....	10.2	4.7	1.6	5.5	7.0
102.5 and under 107.5 cents.....	8.3	3.1	1.6	3.5	6.7
107.5 and under 112.5 cents.....	5.0	1.4	.4	2.1	.6
112.5 and under 117.5 cents.....	3.0	1.5	.5	1.1	2.0
117.5 cents and over.....	3.5	1.6	2.6	2.2	.9
Total.....	100.0	100.0	100.0	100.0	100.0
Number of workers.....	7,983	4,366	1,095	6,785	1,323
Number of units.....	14	9	4	8	4
Average hourly earnings, June 1942.....	\$0.901	\$0.841	\$0.808	\$0.839	\$0.890

¹ Manganese, molybdenum, and tungsten.

² Less than a tenth of 1 percent.

³ Total of mines and mills, not entire establishments.

⁴ Includes 1 lead refinery.

Similar changes in the distributions of individual earnings occurred in the smelting and refining of all major nonferrous metals. The most marked change in the distribution of earnings took place in electrolytic zinc production and in zinc smelting; in both branches about one-half of the workers earned 90 cents per hour or more in June 1942, while only three-tenths of the zinc smelting workers and one-tenth of electrolytic-zinc workers were in this earnings class in August 1941.

OCCUPATIONAL EARNINGS

In table 44 are presented data on average hourly earnings by occupation for each of the branches of mining and milling and of smelting and refining. For convenience in presentation, the data for several branches have been combined. The occupations listed are not intended to present the occupational pattern for each branch of the industry but show the various average wages by occupation. In mining and milling the occupational pattern does not vary appreciably with the type of metal mined or milled. In smelting and refining, however, there is a decided difference in the occupational pattern

from branch to branch, and only a few occupations, notably various categories of yard and transportation labor and the maintenance occupations, recur in all of these branches.

TABLE 44.—*Straight-Time Average Hourly Earnings of Workers in Nonferrous-Metals Industry, by Branch, Occupation, and Region, June 1942*

Occupation	Copper			Lead and zinc			Other ¹
	South-west	North-west	Michi-gan	West	Tri-State district	East	
	\$0. 858	\$0. 926	\$0. 595	\$0. 874	\$0. 814	\$0. 857		$0. 887
All occupations.....							
Blacksmiths.....	. 920	. 938	. 552	. 912	. 822	. 908	. 903
Helpers.....	. 775	. 847	. 518	. 833		(?)	
Boilermakers.....	. 977	. 967					
Cagers.....				. 877	. 850	. 810	
Helpers.....	(?)	. 841	(?)	. 819	. 841	(?)	
Cagers, inside.....	. 933	. 897	(?)				
Carpenters.....	. 944	. 991	. 579	. 918	. 876	. 822	
Change-house men.....	. 661	. 773	. 496	. 767	. 757	. 733	
Clean-up men.....							. 734
Clerical workers:							
Office.....	. 960	. 912	(?)	. 987	. 838	. 856	
Plant.....	. 986	. 950	(?)	. 994	. 745	. 779	
Common laborers.....	. 626	. 788	. 537	. 772	. 695	. 638	
Compressor operators.....	. 842	. 969	. 531	. 881	. 804	(?)	
Drilling-machine operators.....	. 661	1. 038	. 656	. 919	. 924	1. 011	. 959
Helpers.....	. 766	. 890	(?)	. 791	. 746	. 908	. 830
Electricians.....	. 960	. 979	. 564	. 954	. 879	. 875	
Firemen, railroad.....	. 818	. 898	(?)				
Foremen and assistants, working.....	. 976	1. 044	. 697				. 998
Foremen and assistants, working, maintenance.....				1. 017	. 870	. 965	
Hoistmen, surface.....	. 889	. 952	. 547	. 883	. 825	. 752	
Hoistmen, underground.....	. 889	. 967	(?)	. 898	. 781	. 652	
Hoistmen, surface and underground.....							. 818
Laborers, maintenance.....	. 619	. 787					
Loading-machine operators.....	. 941	. 932		. 857	1. 010	. 773	. 997
Maintenance workers, not elsewhere classified.....				. 894	. 818	. 981	. 983
Helpers.....	. 770	. 867	. 549	. 806	. 640	. 832	
Mechanics.....	. 939	. 975	. 566	. 931	. 849	. 823	. 904
Miners, hand.....							. 847
Miscellaneous maintenance workers, n. e. c.....	. 873	. 980	. 549				
Miscellaneous workers.....	. 830	. 850	. 459	. 853	. 766	. 825	. 874
Motormen.....	. 934	. 861	. 629	. 869	. 923	. 813	. 900
Helpers.....	. 835	. 848		. 840	. 764	. 703	. 830
Muckers.....	. 822	. 825	. 579	. 802	. 778	. 723	
Nippers.....	. 729	. 842	. 620	. 830	(?)	(?)	
Oilers.....	. 807	. 815	. 510				
Pipefitters.....	. 919	. 922	(?)	. 879	. 800		
Helpers.....	. 801	. 861	(?)				
Powdermen (blasting).....	. 875	. 933					
Power and transportation workers.....	. 887	. 980	. 542				
Powerhouse operators' helpers.....	. 836	. 887	(?)				
Pumpmen.....	. 801	. 918	. 549	. 912	. 776	. 758	
Pumpmen, surface and underground.....							. 894
Repairmen, maintenance.....					. 869	(?)	
Repairmen, mine.....				. 916	(?)	. 964	
Repairmen, mine and surface.....	(?)	. 877	(?)				
Roustabouts.....	. 688	. 849	(?)	. 795	. 750	. 631	. 871
Samplers, ore.....	(?)	. 800	(?)				
Shovel operators.....	1. 151	1. 147					
Storekeepers (powder).....	. 859	. 863	(?)				
Technicians.....				1. 029	1. 011	(?)	
Technicians and supervisory workers.....	1. 107	. 907	(?)				
Timbermen.....	. 972	. 853	. 575	. 884		. 963	. 886
Helpers.....				. 869		(?)	
Timekeepers.....	. 989	. 971	(?)				
Tool and powder storeroom men.....				. 868	(?)	(?)	
Trackmen.....	. 842	. 815	. 554	. 815	. 816	. 749	
Trammers.....	. 723		. 542	. 813	. 746	. 787	
Truck and tractor operators.....	. 897	. 916	(?)	. 861	. 699	(?)	
Watchmen.....	. 750	. 752	(?)	. 763	. 679	(?)	

¹ Manganese, molybdenum, and tungsten.

² Too few workers to permit computation of average.

TABLE 44.—Straight-Time Average Hourly Earnings of Workers in Nonferrous-Metals Industry, by Branch, Occupation, and Region, June 1942—Continued

Occupation	Copper		Lead and zinc			Other ¹
	North-west	South-west	West	Tri-State district	East	
	\$0.929	\$0.788	\$0.821	\$0.778	\$0.827		$0.863
All occupations.....						
All-round mill-machinery operators.....						.771
Ball-mill operators.....	1.020	.790	.787	.785	.790	.948
Carpenters.....	1.000	.986	.926	.842	.857	.....
Clerical workers.....	1.010	.912	.....	.....	.....	.966
Office.....	.....	.....	.....	.....	.....	.....
Plant.....	.....	.....	.....	.....	.....	.....
Crusher operators.....	.880	.789	.881	.684	(?)	.794
Electricians.....	1.022	1.010	1.032	.744	(?)	.840
Flotation operators.....	.912	.833	.952	.740	(?)	.....
Foremen and assistants, working.....	.....	.....	.849	.812	.822	.846
Foremen's assistants, working.....	.....	.....	.948	.958	.968	1.011
Foremen, working.....	1.050	.869	.....	.....	.....	.....
General helpers, mill.....	1.060	.991	.....	.....	.....	.....
Jig operators.....	.849	.683	.745	.720	.678	.820
Laborers, maintenance.....	.844	.644	.788	.796	.839	.....
Laborers, mill.....	.....	.....	.775	.652	.....	.....
Maintenance helpers, n. e. c.....	.880	.720	.737	(?)	.....	.....
Maintenance workers, n. e. c.....	1.029	.832	.813	.770	.859	.....
Mechanics.....	1.007	.930	.966	.866	.972	.922
Miscellaneous workers, n. e. c.....	.934	.813	.885	.824	.956	.930
Oilers and greasers.....	.892	.736	.852	.721	.833	.860
Oilers, machinery.....	.....	.....	.802	(?)	.903	.....
Ore handlers.....	.888	.707	.755	.714	.731	.822
Plant protection and custodial workers.....	.760	.669	.799	.637	.768	.....
Power and transportation workers.....	.....	.....	.872	.927	.988	.....
Repairmen.....	.924	.807	.....	.....	.....	.....
Samplers.....	.878	.765	.784	.765	.723	.856
Swingmen.....	.....	.....	.....	.....	.....	.723
Table men.....	.....	.....	.....	.....	.....	.825
Truck drivers.....	.945	.812	.880	.879	(?)	.....

SMELTING AND REFINING

Occupation	Smelting			Electro-lytic copper refining	Electro-lytic production of zinc
	Copper	Zinc	Lead		
All occupations.....	\$0.841	\$0.901	\$0.808	\$0.839	\$0.890
Air hoistmen.....	.....	.....	.....	.823	.....
Apprentices.....	.781	.....	.....	.....	.....
Apprentices, craft.....	.....	.871	.....	.....	.....
Apprentices, trade or craft.....	.....	.....	.....	.716	.....
Bag-house men.....	.....	.....	.842	.....	.....
Helpers.....	.....	.925	.....	.....	.....
Binmen's helpers.....	.....	.696	.....	.....	.....
Blacksmiths.....	.947	.998	.....	1.016	.....
Helpers.....	.....	.855	.....	.854	.....
Blast-furnace chargers.....	.....	.....	.803	.....	.....
Blast-furnace operators.....	.....	.....	.919	.....	.....
Blast-furnace tappers.....	.....	.....	.830	.....	.....
Blow-out men.....	.....	.866	.....	.....	.....
Boilermakers.....	.932	.....	.947	.962	.....
Helpers.....	.834	.....	.....	.827	.....
Brakemen, railroad.....	.....	.905	.....	.814	.....
Bricklayers.....	.....	1.122	.....	1.087	.....
Helpers.....	.....	.787	.....	.803	.....
Bumpers.....	.....	.977	.....	.....	.....
Cadmium operators.....	.....	.970	.....	.....	.....
Carpenters.....	.984	.974	.899	1.008	.956
Helpers.....	.....	.788	.....	.....	.....
Casters and pourers.....	.....	.....	.....	.....	.945
Casting-machine operators.....	.876	.913	.992	.905	.....
Cellar men.....	.....	.858	.....	.....	.....
Chamber men.....	.....	1.058	.....	.....	.....
Helpers.....	.....	.949	.....	.....	.....
Chargers.....	.....	.985	.....	.....	.....

¹ Manganese, molybdenum, and tungsten.
² Too few workers to permit computation of average.

TABLE 44.—*Straight-Time Average Hourly Earnings of Workers in Nonferrous-Metals Industry, by Branch, Occupation, and Region, June 1942—Continued*

SMELTING AND REFINING—Continued

Occupation	Smelting			Electrolytic copper refining	Electrolytic production of zinc
	Copper	Zinc	Lead		
Checkers.....		\$0. 870		\$0. 780	
Chemists.....					\$1. 040
Chemists' assistants.....		. 960			. 821
Chemists and metallurgists.....		. 914			
Chippers, billet.....				. 841	
Chislers (condenser cleaners).....					
Circulation men, tanks.....		. 920		. 849	
Clay mixers.....				. 796	
Clerical, office workers.....	\$0. 853		\$0. 931		. 799
Clerical, other plant and office workers.....		. 972			
Clerical, plant workers.....	. 990	. 973	1. 023	. 891	. 822
Concentrator operators.....				. 847	
Helpers.....				. 796	
Condenser setters.....		. 904			
Condie boys (condenser cleaners).....		. 886			
Converter-furnace operators.....	. 927				
Converter-furnace punchers.....	. 818				
Conveyor operators.....	. 758	. 733	. 791		
Cottrell operators.....	. 869	. 979			
Helpers.....	. 860				
Cranemen.....		. 917		. 870	
Helpers.....				. 788	
Cranemen, overhead.....	. 917		. 828		
Helpers.....	. 816				
Crusher operators.....		. 905			
Drivers (team, truck, tractor).....		. 870			
Dryer operators.....		. 893			
Dumpmen.....	. 792				
Electricians.....	1. 000	1. 042		. 999	
Helpers.....		. 828			
Electrolytic tank operators.....				. 876	. 959
Engineers, powerhouse.....		1. 051		1. 079	
Engineers, railroad.....	. 972	1. 033		. 903	
Fire and fuel men, powerhouse.....		. 911			
Firemen, machines and boilers.....		. 833			
Firemen, powerhouse.....	. 837			. 865	
Firemen, railroad.....		. 873			
Flappers.....				. 706	
Flue dust men.....	. 778				
Foremen and assistants, working.....	1. 002	1. 033	. 891		
Foremen, working.....				1. 010	
Foremen, assistants, working.....				. 915	
Furnace chargers (reverberatory).....				. 948	
Furnace operators.....					. 991
Helpers.....					. 934
Furnace operators (dross and byproducts).....		. 855			
Furnace operators, miscellaneous, n. e. c.....				. 821	
Helpers.....				. 844	
Furnace operators, refining.....				. 924	
Helpers.....				. 873	
Furnace operators (reverberatory and refining).....				. 923	
Helpers.....				. 812	
Furnace men, retort.....		1. 081			
Furnace men, helpers.....		. 907			
Furnace operators' helpers, all-round.....	. 856				
Furnace skimmers.....				. 797	
Furnace tappers.....				. 951	
Gas-producer operators.....		1. 014			
Helpers.....		. 975			
Helpers, powerhouse.....		. 998			
Hookers, shovelers (furnace cleaning).....		. 917			
Hot-sheet men.....				. 848	
Inspectors (billet, wire bars, etc.).....		1. 127		. 822	
Ironworkers.....				1. 013	
Janitors.....	. 765	. 768	. 758	. 750	. 785
Kilnmen.....		. 842			
Laborers, furnace.....	. 784	. 795	. 837	. 697	
Laborers, maintenance.....	. 713			. 747	
Laborers, n. e. c.....					. 786
Laborers, process.....	. 750	. 794	. 757	. 730	. 788
Laborers, samplers.....				. 756	
Laborers, yard.....	. 750		. 712	. 750	. 785
Laborers, yard and maintenance.....		. 776			
Laboratory helpers.....		. 683			
Ladlemen's helpers.....				. 744	

* Average for June 1942 lower than average for August 1941, owing to a change in the method of calculating hours of work for some workers in zinc smelting.

TABLE 44.—*Straight-Time Average Hourly Earnings of Workers in Nonferrous-Metals Industry, by Branch, Occupation, and Region, June 1942—Continued*

SMELTING AND REFINING—Continued

Occupation	Smelting			Electrolytic copper refining	Electrolytic production of zinc
	Copper	Zinc	Lead		
Leach operators.....				\$0.875	
Leacher operators.....		\$0.943			
Lead burners.....	\$1.397	1.267			
Helpers.....	.780	.910			
Loamers.....		.943			
Loaders and unloaders.....				.777	
Locomotive crane engineers.....	.928				
Loopers and punchers.....				.599	
Machine repairmen.....					\$0.962
Helpers.....					.826
Machinists.....	.986	1.047	\$0.865	1.024	
Helpers.....		.806		.834	
Maintenance laborers.....			.664		
Maintenance workers, n. e. c.....			.824	.923	
Helpers.....			.799	.794	
Maintenance and service workers, n. e. c.....		.964			
Helpers.....		.795			
Mechanics.....		.926		.900	
Helpers.....		.863			
Metal drawers.....		.989			
Metal handlers.....	.782				
Metal handlers and loaders.....		.992			
Metal handlers (car loaders).....				.791	
Mill operators, crush and grind.....	.880	.817	.764		
Helpers.....	.750	.813			
Mill operators, n. e. c.....					.899
Helpers.....					.840
Mill workers, miscellaneous, n. e. c.....				.814	
Helpers.....				.833	
Miscellaneous mill workers, n. e. c.....	.846				
Helpers.....	.808				
Mixer (pug-mill) operators.....		.905			
Mixing-machine (pottery) operators.....		.920			
Mold changers.....				.810	
Mold coolers.....				.808	
Mold fishers.....				.880	
Mold painters, greasers, sprayers.....				.862	
Motormen, tram.....		.858			
Motormen, trammers and larrymen.....				.793	
Motormen and larrymen.....	.788		.776		
Motormen's and larrymen's helpers.....	.704				
Office workers, miscellaneous, n. e. c.....				.900	
Oilers and greasers.....				.802	
Oilers, plant.....		.839			
Ore handlers.....	.712				
Ore and metal handlers.....					.822
Other furnace operators, n. e. c.....			.818		
Helpers.....			.785		
Other maintenance workers, n. e. c.....	.969				
Helpers.....	.812				
Other plant workers, n. e. c.....			.863		
Helpers.....			.741		
Other smelter workers, n. e. c.....		.864			
Helpers.....		.813			
Other workers, n. e. c.....					.901
Painters.....		.782			
Pipefitters.....		1.004		.999	
Pipefitters' helpers.....		.815		.829	
Pottery handlers.....		.846			
Pourers and ladlers.....				.921	
Powerhouse workers, n. e. c.....	.902			.881	
Powerhouse workers.....					.938
Pumpmen.....		.976		.852	
Pumpmen, acid.....		1.018			
Rackers.....				.816	
Repairmen, plant equipment.....	.890			.914	
Helpers.....	.848			.809	
Repairmen, n. e. c.....					.959
Helpers.....					.839
Repairmen, track.....				.691	
Retort and condenser makers.....		.980			
Reverberatory-furnace chargers.....	.801				
Reverberatory-furnace operators.....	.889				
Reverberatory-furnace tappers.....	.831				
Riggers.....				.980	
Roaster operator.....	.876	.931		.861	
Helpers.....		.885			

TABLE 44.—*Straight-Time Average Hourly Earnings of Workers in Nonferrous-Metals Industry, by Branch, Occupation, and Region, June 1942—Continued*

SMELTING AND REFINING—Continued

Occupation	Smelting			Electrolytic copper refining	Electrolytic production of zinc
	Copper	Zinc	Lead		
Samplers.....	\$0.815		\$0.744	\$0.828	\$0.934
Helpers.....		\$0.798		.793	
Screenmen, jigmen.....	.777	.811			
Helpers.....		.837			
Screen and filter operators.....					.896
Sintering-machine operators.....		.908			
Helpers.....		.865			
Sinter (roaster) operators.....			.749		
Stampers.....		.928			
Stenographers.....		.795		.843	
Storeroom men.....				.868	
Storeroom and warehouse workers.....					.769
Strippers.....				.923	.954
Stuffers.....		.909			
Switchboard operators, power.....				.944	
Switchmen, railroad.....	.908		.823		
Tank operators.....				.863	
Technicians.....	.980			1.107	
Technicians' assistants.....	.844			.747	
Tinsmiths.....		1.057			
Helpers.....		.839			
Track repairmen.....	.706				
Track repairmen, railroad.....			.714		
Transportation workers, n. e. c.....	.870		.808	.904	
Helpers.....				.814	
Truck and tractor drivers.....				.862	
Truck drivers.....					.898
Truckers, hand.....		.837	.850		
Voltmeter men.....				.845	
Washers and dryers.....				.796	
Watchmen.....	.769	.763	.706	.794	.763
Weighers and samplers.....		.819			
Weighers.....			.853	.870	
Welders.....		1.017			

A comparison of the occupational averages presented in these tables with the 1941 data published earlier reveals that for the most part the wage increases have been relatively uniform from one occupation to another. A change in the method of computing certain averages in one large plant has resulted in apparent wage decreases in two occupations. Actually, all occupations have experienced some wage increase.

APPENDIX.—OCCUPATIONAL DISTRIBUTION OF WORKERS IN THE PRIMARY FABRICATION BRANCHES OF THE INDUSTRY, AUGUST 1941

TABLE A.—Number of Workers in Various Branches of Primary Fabrication of Miscellaneous Nonferrous Metals, by Occupation and Region, August 1941

ALLOYING, ROLLING, AND DRAWING COPPER, BRASS, AND BRONZE

Occupation	New England	Middle Atlantic	Other	Occupation	New England	Middle Atlantic	Other
All occupations.....	10,408	6,460	5,360	Painters.....	20	11	8
Annealers and heat treaters...	215	128	85	Picklers.....	123	72	88
Helpers.....	228	145	61	Pipe fitters.....	24	11	13
Apprentices.....	23	48	5	Pourers.....	172	25	4
Baling and briquetting operators.....	47	25	14	Powerhouse engineers.....	42	19	8
Bricklayers.....	22	7	11	Powerhouse firemen.....	34	32	11
Carpenters.....	54	23	24	Power-press operators.....	18	49	36
Catchers.....	16	66	13	Rod and tube draw bench operators.....	355	128	123
Chief clerks.....	19	5	2	Helpers.....	129	32	51
Coilers, sheets.....	203	69	92	Rod and tube pointing operators.....	143	62	54
Crane operators.....	339	186	161	Rod-straightener operators.....	65	18	71
Die setters.....	25	19	53	Rollers.....	82	62	19
Dummy blockmen.....	10	1	13	Rollers, break-down and run-down.....	134	65	37
Electricians.....	95	38	36	Rollers, finishing.....	65	90	85
Engine-lathe operators.....	25	11	9	Rollers, helpers.....	257	345	71
Extrusion-press operators.....	24	10	27	Saw flers.....	12	13	10
Helpers.....	14	9	9	Saw operators.....	213	87	125
Foremen and assistants, working.....	305	237	175	Helpers.....	65	38	54
Furnace operators.....	327	87	210	Scalping-machine operators.....	58	6	4
Helpers.....	158	68	38	Scrap handlers.....	75	63	35
Furnace operators, preheating.....	31	35	37	Scrapmen, extruding.....	12	13	12
Helpers.....	2	16	16	Set-up men.....	18	12	40
Gaugers.....	60	15	12	Shear operators.....	90	87	43
Grinding-machine operators.....	16	32	29	Sheet straighteners.....	44	28	26
Inspectors.....	244	300	202	Shipping clerks.....	47	20	22
Janitors.....	58	26	22	Shipping helpers.....	308	160	148
Laborers.....	863	805	531	Slitting-machine operators.....	77	56	13
Learners.....	28	50	24	Sticklers.....	202	146	92
Loaders and unloaders.....	143	21	131	Store and stock-room keepers.....	52	20	18
Machine repairmen.....	226	142	82	Strand men.....	60	57	57
Helpers.....	71	30	23	Tinners.....	10	38	30
Maintenance workers, not elsewhere classified.....	133	56	44	Tool and die makers.....	119	28	97
Helpers.....	138	53	52	Truckers, hand.....	86	20	62
Millwrights.....	35	17	34	Truckers, motor.....	210	74	57
Oilers.....	51	26	24	Tube straighteners.....	73	21	80
Office workers, not elsewhere classified.....	539	554	411	Watchmen.....	124	63	43
Other plant workers, not elsewhere classified.....	1,551	927	670	Weighers.....	85	54	66
				Welders and brazers.....	63	40	20
				Wire drawing operators.....	283	57	114
				Helpers.....	41	8	31

TABLE A.—Number of Workers in Various Branches of Primary Fabrication of Miscellaneous Nonferrous Metals, by Occupation and Region, August 1941—Continued

ALLOYING, ROLLING, AND DRAWING MISCELLANEOUS NONFERROUS METALS

Occupation	Middle Atlantic	Border	East Central	Other
All occupations	1, 025	2, 831	1, 675	725
Annealers		16	1	2
Helpers		39	8	14
Assemblers and finishers	21	30	5	1
Bookkeepers	11		5	0
Box makers		10	6	13
Carpenters	8	11	3	4
Catchers		92	27	20
Clerical, plant	38	112	98	25
Die makers	2	14	8	1
Electricians	3	34	7	2
Extrusion-press operators	42	13	35	13
Helpers	20	17	4	3
Foremen and assistant foremen, process, working	44	74	26	10
Foremen, labor, working	10	19	2	2
Furnace operators	29	78	42	26
Furnacemen, preheating	1	34		2
Helpers	1	25		2
Inspectors	14	107	197	21
Janitors	9	27	12	3
Laborers	97	207	256	63
Loaders and unloaders	23	73	30	38
Machinists' helpers	6	19	3	7
Maintenance workers, not elsewhere classified	14	34	17	5
Helpers	14	38	15	8
Mechanics		1	13	8
Melters	9		27	23
Metallurgists	1	16	3	2
Millwrights		19	5	
Helpers		12	2	
Miscellaneous plant workers	83	430	136	35
Office-machine operators	9	10	5	
Oilers, plant machinery	4	12	1	1
Other clerical workers	7	30	26	9
Packers	54	64	144	21
Pickling and washing		18	4	13
Plant-machinery repairmen	20	54	35	14
Pourers	44	47	18	10
Pouring and casting workers, not elsewhere classified	4	43	35	8
Powerhouse workers, not elsewhere classified	9	16	6	1
Press operators, forming, die casting	17	30	70	
Punch-press operators	17	20	31	
Rollers	101	187	76	84
Helpers	20	87	21	44
Saw operators	2	24	2	
Helpers		20		
Scalping-machine operators		18		
Helpers		18		
Scrap handlers		21	3	
Scrap-processing workers, not elsewhere classified	7	16	2	13
Shear operators	13	48	1	2
Helpers		57		3
Shipping clerks	12	6	26	2
Shipping workers	116	166	64	88
Sifting and shearing-machine operators	12	18	22	14
Stenographers	20	33	17	13
Stickers		12	30	
Stock clerks	10	20		1
Straightening workers		47	4	
Tool and die workers, not elsewhere classified	1	14	3	
Truck drivers	16	5	4	14
Truckers, mechanical	4	23	11	
Watchmen	19	41	24	8

NONFERROUS-METAL FOUNDRIES

Occupation	New England	East Central	West Central	Southern	Western	Other
All occupations	515	4, 557	861	342	723	1, 693
Apprentices	6	20	3	6	14	7
Assemblers		30		5	39	8
Bookkeepers	7	20	13	2	1	16
Carpenters	2	12		1	1	5
Casting cleaners	27	212		30	24	82
Chippers	9	47	14	6	8	42

TABLE A.—Number of Workers in Various Branches of Primary Fabrication of Miscellaneous Nonferrous Metals, by Occupation and Region, August 1941—Continued

NONFERROUS-METAL FOUNDRIES—Continued

Occupation	New England	East Central	West Central	Southern	Western	Other
Core cleaners		126	2			11
Core-oven tenders		26	7			3
Core pasters		95	9			12
Coremakers, hand and machine	39	333	95	14	9	115
Helpers	6	71	17	6		13
Crane operators	1	2	2			11
Drill-press operators		6	9	4		20
Engine-lathe operators	1	6	13			15
Filters		98				36
Foremen and assistant foremen, working	6	75	18	9	23	34
Furnace operators	25	146	24	14	24	56
Helpers	14	14	13	5	7	23
Grinder operators	23	216	48	5	36	129
Heat treaters		15				1
Inspectors and testers	3	161	11	2	33	34
Janitors	2	10	8	3	1	4
Laborers	84	394	79	41	108	280
Lathe operators, other		14	1			1
Learners, not elsewhere classified	5	32	6	15	6	15
Machine repairmen	2	26	4	2	4	6
Maintenance workers, not otherwise classified	2	36	9		2	11
Helpers	1	17	6			6
Millwrights	1	59				6
Molders, apprentices	9	8	7		4	13
Molders, bench	36	157	53	21	55	115
Molders, floor	36	93	17	12	14	85
Molders, hand and machine	58	538	37	15	74	100
Molders' helpers	16	287	52	31	40	77
Molders, learners	5	3	6	8	6	10
Office clerical workers	8	53	12	13	4	19
Other foundry workers	15	133	69	26	75	59
Pattern makers, wood and metal	2	50	8	4	4	18
Plant clerical workers	6	158	27	3	7	47
Polishers and buffers		41		1	35	9
Pourers	12	125	5	2	12	9
Helpers	2	71	4		1	1
Sandblast operators	6	46	3	3		9
Sand conditioners		35	13			10
Saw operators	9	48	4			8
Shake-out men	8	104	10	2	5	21
Shipping workers	6	42	19	7	10	32
Store and stock keepers	1	16	5	1		9
Timekeepers	1	10	1	1	1	3
Tool and die makers		19			4	5
Truck and tractor drivers	4	20	12	2	3	10
Truckers, hand		66	33		5	3
Turret-lathe operators		60	40	7	16	40
Watchmen	9	40	12	12	5	24
Welders		15	1	1	1	6

SECONDARY NONFERROUS-METAL SMELTERS

Occupation	Middle Atlantic	East Central	Other	Occupation	Middle Atlantic	East Central	Other
All occupations	1,858	1,368	744	Mechanics	33	9	6
Bookkeepers	10	12	4	Metal mixers	27	21	6
Briquetting operators	11	12	3	Other clerical workers	29	18	33
Crane operators	3	12	2	Other plant workers	153	55	105
Extrusion-press operators	17	7	9	Packers	15		14
Foremen and assistants, working	47	31	21	Plant clerks	55	19	37
Furnace operators	254	261	110	Samplers	2	11	1
Helpers	225	173	75	Scrap handlers	195	122	54
Grinding-machine operators	6	1	12	Stenographers	38	16	13
Janitors	14	7	3	Technicians	19	2	7
Laborers, general	12	75	2	Technicians' assistants	30	8	1
Laborers, maintenance	9	26	1	Truck drivers	25	24	5
Laborers, process	346	191	148	Truckers, hand	69	25	7
Loaders and unloaders	95	141	25	Watchmen	45	14	8
Maintenance workers, other	37	39	13	Weighers	19	19	16
Helpers	18	17	3				

TABLE A.—Number of Workers in Various Branches of Primary Fabrication of Miscellaneous Nonferrous Metals, by Occupation and Region, August 1941—Continued

MACHINED-PRODUCTS PLANTS							
Occupation	Mid-Atlantic	East-Central	Other	Occupation	Mid-Atlantic	East-Central	Other
All occupations.....	995	4,216	473	Maintenance workers, n. e. c.....	8	37	4
Annealers.....	12	9	9	Helpers.....	9	25	8
Assemblers.....	15	163	22	Millwrights.....	7	20	2
Assistant foremen, working.....	1	29	7	Helpers.....	1	13	1
Beginners and learners.....	40	59	3	Mold-making workers, n. e. c.....	6	46	3
Blanking-press operators.....	7	12	20	Molders, bench, hand.....	18	10	5
Boring-machine operators.....	4	20	2	Helpers.....	20	19	4
Brazers.....	1	14	22	Molders, machine.....	37	38	22
Buffers.....	1	24	22	Helpers.....	1	34	1
Burrers, hand and machine.....	27	65	28	Other clerical workers, n. e. c.....	13	58	7
Cast-iron cleaners.....	6	10	28	Other miscellaneous workers, n. e. c.....	46	170	19
Checkers, yard and shipping.....	1	11	28	Packers.....	24	46	6
Core pasters.....	26	46	13	Plant clerks.....	35	275	20
Coremakers, hand and machine.....	16	47	3	Platers.....	3	24	11
Die casting, forging, forming and punching workers not elsewhere classified.....	5	22	1	Helpers.....	1	32	12
Die and tool workers, n. e. c.....	1	34	1	Polishers.....	4	29	18
Draftsmen.....	21	126	7	Pourers.....	15	11	6
Drill-press operators.....	2	10	2	Repairs, plant.....	5	29	5
Electricians.....	28	23	16	Saw operators, metal.....	1	41	1
Engine-lathe operators.....	8	10	4	Scrap-processing workers, n. e. c.....	2	11	1
Flaskmakers.....	8	97	4	Screw-machine operators.....	2	545	11
Foremen, working.....	11	46	4	Set-up men.....	34	91	1
Furnace operators.....	4	24	6	Shake-out men.....	15	18	17
Helpers.....	36	107	17	Shipping clerks.....	5	23	9
Grinding-machine operators.....	9	79	9	Shipping workers.....	5	52	4
Hand truckers.....	68	408	14	Stenographers.....	12	24	9
Inspectors.....	8	43	4	Store and stock keepers.....	1	46	1
Janitors and custodial workers.....	28	103	12	Threading-machine operators.....	6	26	3
Laborers, general.....	90	107	21	Helpers.....	33	65	4
Laborers, plant.....	2	73	10	Tool makers.....	10	39	10
Laborers, stores, stock and warehouse.....	72	85	10	Tool-shed attendants.....	5	27	1
Lathe operators, n. e. c.....	7	104	10	Turret lathe operators.....	48	114	2
Loaders and unloaders.....	1	36	2	Typists.....	1	20	1
Machine operators' helpers, n. e. c.....	1	36	2	Watchmen.....	6	30	7
				Welding and soldering workers, n. e. c.....	1	74	8

NONFERROUS METAL-DIE-CASTING PLANTS

Occupation	United States	Occupation	United States	Occupation	United States
All occupations.....	2,405	Grinding-machine operators.....	25	Other maintenance workers, n. e. c.....	45
Apprentices.....	47	Inspectors, final.....	115	Helpers.....	26
Beginners and learners.....	29	Inspectors, rough.....	210	Other plant workers.....	88
Cleaners, castings.....	292	Janitors.....	27	Helpers, n. e. c.....	87
Clerical, plant.....	79	Laborers, general.....	16	Packers.....	59
Die-casting operators.....	291	Laborers, process.....	35	Plant-equipment repairmen.....	26
Helpers.....	26	Lathe operators.....	15	Punch-press operators.....	55
Die makers.....	207	Loaders and unloaders.....	14	Shipping clerks.....	22
Die setters.....	27	Melters and melters' helpers.....	64	Stenographers.....	21
Draftsmen.....	18	Millwrights.....	13	Tool makers.....	41
Drill-press operators.....	60	Other clerical workers, not elsewhere classified.....	38	Tool-room attendants.....	21
Electricians.....	14			Truck drivers.....	12
Filers, castings.....	105			Truckers, hand.....	31
Foremen and assistants, working.....	57			Watchmen.....	27