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PROPOSED EMPLOYMENT

OF WOMEN DURING

THE WAR IN THE

INDUSTRIES OF

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# Women's Bureau Bulletin no. 1

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## PROPOSED EMPLOYMENT OF WOMEN DURING THE WAR IN THE INDUSTRIES OF NIAGARA FALLS, N. Y.<sup>1</sup>

In the summer of 1918, the Employers' Association of Niagara Falls wrote to the Department of Labor asking for the permission of the Federal Government, under its war powers, to introduce women to their plants and to employ them in "shift work"—that is to say, work involving employment during the night at hours prohibited by the New York State labor law. The request was made on behalf of a few firms, not the entire membership. The reason given was the great difficulty of securing men and the consequent set-back to the production program of the War Department and the Navy through failure to supply sufficient quantities of chemicals, metals and alloys for the war industries. The Niagara plants were manufacturing acetates for chemical warfare, picric acid for explosives, wheels for tanks, carbon products essential in the machine industries, storage batteries, graphite, electrodes, and a variety of chemicals, including chlorine, caustic soda, caustic potash, calcium carbide and other basic materials.

Failure to secure labor for the making of such important products would obviously be serious for the Nation at war and the request, therefore, demanded thorough consideration as a production problem. On the other hand, it had serious implications for the welfare of woman workers. The industries of Niagara Falls are classed as dangerous trades. The most recent official investigation made in 1912 by the Factory Investigating Commission of New York State had shown, moreover, that the ordinary safeguards already demonstrated to be effective as health measures in the same industries elsewhere had not been established at Niagara Falls. To permit the employment of women by day under these conditions would be to deviate markedly from the standards which have been slowly and laboriously built up for their protection in State labor laws and in the industrial customs of the United States. To permit their employment at night in a State like New York, which has a law prohibiting the work of women in factories between the hours of 10 p. m. and 6 a. m., would be a departure from the policy of the Federal Government, rigidly adhered to throughout the war, to require strict compliance with State labor laws, unless the national need should become so urgent as to convince the Federal authorities that temporary

modification of a State law in its application to a particular plant for a specified period was essential to the winning of the war.

It was clear, moreover, even in advance of the investigation of the plants in Niagara that the proposed employment of women at night was a symptom of difficulties in securing labor which, in view of the national importance of production there, demanded more comprehensive action than a decision for or against night work for women. The national emergency demanded that the conditions of employment established for all workers, whether they be men or women, should be such as to insure maximum production. The conditions necessary to insure maximum production are those which result in the minimum of absenteeism and shifting of workers from plant to plant—known as “labor turnover.” Furthermore, it was recognized that the conservation of the health of the workers was essential to the winning of the war. If labor shortage in Niagara plants was due primarily, or even in part, to ill-health and absenteeism traceable to a lack of proper precautions against the risks of the industries, then the employment of women at night would not be the remedy which would result in the production necessary for the Army and the Navy.

The women of America would be ready to respond to the needs of the country for the products of the dangerous trades by taking the places of men withdrawn into military service, but the Federal departments responsible for production could not well afford to have the labor of women wastefully used by introducing them first into industries which were likely to be harmful to them and which would be able to hold longer the available supply of men by scrupulous attention to the conditions affecting health.

#### COOPERATING AGENCIES.

The request from the employers of Niagara Falls was referred to the Woman in Industry Service of the Department of Labor just established by congressional appropriation. Because of the multiplicity of the problems involved, the Woman in Industry Service decided to associate with it in this work other Federal agencies vitally interested in the industries there, not only because the industries were essential in themselves, but because they illustrated a problem of man-power and the proposed introduction of women in many other industries of the country. To deal with those aspects of the problem which center primarily in conditions affecting the health of the workers the committee on hazardous occupations was formed with a membership representing Federal agencies concerned with women in industry and with the health of the civilian population, the department of labor in the State affected, and the Federal departments having a direct or indirect interest in contracts in the chemical industries. The

members were: Lieut. Col. Harry E. Mock, chairman, Surgeon General's Office; Capt. Austin D. Reiley, secretary, Ordnance Department; Maj. Harold C. Bradley, Chemical Warfare Service; Lieut. Commander Donald Riley, Navy Department; Dr. J. W. Schereschewsky and Dr. A. J. Lanza, United States Public Health Service; Dr. Richard M. Pearce, National Research Council; Mr. Charles E. Oakes, Bureau of Standards; Mr. James M. Lynch, Mr. James L. Gernon, Mr. John H. Vogt, and Miss Nellie Swartz, New York State Industrial Commission; Dr. Royal Meeker and Dr. Alice Hamilton, Bureau of Labor Statistics; Mr. Grant Hamilton, Working Conditions Service; and Miss Mary Anderson and Miss Mary Van Kleeck, Woman in Industry Service, Department of Labor.

A subcommittee was appointed to supervise the field work and this committee met at regular intervals with the field force at Niagara Falls. Expert consultants, including Dr. Alice Hamilton, of the Bureau of Labor Statistics, Prof. C. E. A. Winslow, Dr. David L. Edsall, and Dr. W. Gilman Thompson, of the Public Health Service, and Mr. John E. Vogt, of the New York State department of labor, met with them at Niagara Falls on one or two occasions and inspected typical plants. The field force of the Public Health Service was under the direction of Dr. Paul M. Holmes.

#### SCOPE OF INVESTIGATION.

The investigators were instructed to center attention, first, upon the detailed analysis of every occupation with a conclusion, in each instance, as to whether a woman could be employed at once, or whether the employment of a woman should be postponed until the shortage of labor was more acute, or whether the occupation was such that a woman should never be employed; second, upon the hygienic and health conditions in each department of each plant, and recommendations for removal of hazards.

Outside the plants inquiry was made into the availability of woman workers in the community, and in this connection and to secure additional information on the other subjects of inquiry men and women in the community were interviewed, including officers of the local trade-unions, and physicians and priests familiar with conditions affecting the workers. Conferences were also held with the Employers' Association, the Chamber of Commerce, and the Rotary Club. The preliminary inquiry was made between August 10 and September 10, and time was then given to put into effect in the largest plants some of the most important recommendations before the final report was prepared and the conclusions set before the people of Niagara Falls.

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## PURPOSE OF INVESTIGATION.

The whole purpose of the investigation was to secure prompt action to improve conditions in the plants. The inquiry was brief and was not planned to secure new scientific data on the health hazards of the chemical industries which are already well known, but was designed rather to deal with an immediate, practical problem and to secure compliance with recommendations demonstrated to be feasible and effective.

The industries represented in Niagara Falls are as important to the commercial life of the country in time of peace as they have been essential during the war. Improvement of the working conditions there is typical of one of the big tasks of reconstruction which must be resolutely accomplished in many communities. The Federal Government representing the Nation as a whole is as vitally concerned in the conservation of the working forces, as fundamental in the upbuilding of our country after the war, as it was in securing production necessary to the war. The State department of labor, endowed already by legislative action with power to require proper provision for protecting the health of workers in dangerous trades, has a continuous interest in fulfilling its responsibility in the hazardous occupations of the State. Employers will find the establishment of well-recognized standards the surest means of securing and holding a satisfactory labor force. The workers in the community, who are the ones most directly affected, may well seize the opportunity to cooperate actively with State and Federal departments. The task is not one of discovery or investigation, but of continuous supervision of the health of the workers and unremitting application of the precautions and safeguards known to be effective. Niagara Falls has an opportunity now to demonstrate to other communities how much may be accomplished by united effort on the part of State and Federal departments, employers, and workers.

## REPORTS.

The Public Health Service has taken charge of the preparation of reports covering health, sanitation, and safety in the plants. The Woman in Industry Service of the United States Department of Labor, in cooperation with the bureau of women in industry of the New York State Industrial Commission, has prepared the following report dealing with the problem of labor supply, and especially the proposed employment of women. This report is submitted at a time when, with the signing of the armistice, the immediate pressure for the introduction of women has passed. The employers in Niagara Falls recognize this situation, and the majority of those not now employing them do not wish to introduce women into their plants. But as the introduction of women in new industries is a problem of

peace as well as of war, it seems profitable to discuss the various factors entering into it, as they are illustrated in the industries of Niagara.

## OCCUPATIONS FOR WOMEN.

The 21 plants covered in the investigation manufacture four main groups of products: first, abrasives, or the material of which grinding wheels used in many important machine industries are made; second, chemicals and gases, including liquid chlorine, bleaching powder, hydrochloric acid, sulphur chloride, chlorobenzol, caustic soda, picric acid, formaldehyde, potassium chlorate, sodium bichromate, carbon tetrachloride, sodium and sodium peroxide, tetrachlorethane, and chloroform; third, electrodes and carbon; fourth, metal and alloys, including ferro-alloys, chrome metal, alloys of chrome and tungsten, manganese and its alloys, titanium alloys, and aluminum sheet metal; and fifth, a miscellaneous group, including brass, aluminum castings, storage batteries, spindle wheels, electrical equipment for automobiles, lighting systems, and hand flashlights.

The number of plants in each group and the number of men and women employed are shown in the following table:

NUMBER OF PLANTS AND NUMBER OF MEN AND WOMEN EMPLOYED, BY MAIN GROUPS OF PRODUCTS.

Main product.	Number of plants.	Number employed.		
		Men.	Women.	Total.
Abrasives.....	3	1,734	490	2,224
Chemicals and gases.....	8	2,242	8	2,250
Electrodes and carbon.....	3	1,230	19	1,249
Metal and alloys.....	4	2,667	33	2,700
Miscellaneous.....	3	650	132	782
Total.....	21	8,523	682	9,205

Thus the total number employed in the plants visited was 9,205, of whom 682 were women. The largest group of women, 490, were employed in the abrasive plants. Here they were engaged in a variety of occupations, from the delicate operation of molding and mounting dental wheels and points to the more vigorous task of operating lathes which grind the wheels, throwing off quantities of inorganic dust. The next largest group were in a plant manufacturing storage batteries, but the majority were not in the departments in which the more dangerous compounds of lead were handled. In other plants they were employed in small numbers in such unusual work for women as shoveling coal, pushing wheelbarrows, piling brick, loading freight cars, and even outside painting.

The point of view from which the investigation was undertaken was to be open-minded about the work which women might do and

to map out in a series the operations in all the plants, including even those in which the employment of women was not proposed by the management. Roughly, the occupations could be classified into four groups, the first, including light operations requiring no training; the second, light operations requiring training; the third, operations endangering health when performed without safeguards which are not maintained at present; and the fourth, operations unsuitable for women. The purpose was to establish a plan of procedure rather than to run the risk of permitting women to be introduced first into processes most likely to be injurious to them because in these the shortage of labor would probably first be felt. In the emergency of the war it might become necessary for women to take part in many industries in which hazardous conditions were found, but the aim in the survey of Niagara Falls was to point out the hazards and the possibility of removing them in advance, so that if the employment of women should become necessary the dangers to health would have been reduced to a minimum.

#### HAZARDS TO HEALTH.

The chief hazards to health in the industries investigated are due to dusts, especially inorganic dusts in the manufacture of abrasives; fumes and gases given off in such processes as the manufacture of nitric acid, chlorine gas, or benzol; and the materials, causing irritation of the skin and mucous membranes, in making caustic bleach, picric acid, and intermediate compounds, and sodium bichromate. Poisoning from lead dust and fumes is the danger in the manufacture of storage batteries. Excessive heat and excessive noises are hazards in some occupations. The men in the bleaching chambers<sup>1</sup> suffer from the irritation of dust from chloride of lime, the overpowering effect of chlorine gas, and the discomfort of an excessively high temperature.

Besides the dangers which characterize these specific trades, general hazards to health which are unfortunately found in many industries, although not inherent in the nature of any of them, were noted, such as the lifting and carrying of heavy weights without mechanical devices, or the lack of adequate illumination, or insufficient ventilation, or neglect of facilities for comfort and sanitation, and fatigue due to long hours of work, and night work for the men workers.

In general, the precautions<sup>2</sup> necessary are the removal of dust and gases at their source; minimizing the handling of poisonous or irritating substances by introducing automatic processes; screening of

<sup>1</sup> Helmets are used by the bleach workers in one plant. Foreign experience has demonstrated the feasibility of an automatic handling of this process, but only one plant in Niagara has installed such a machine, and it is not used.

<sup>2</sup> These were thoroughly discussed in the Report of the New York State Factory Investigating Commission for 1913.

furnaces or other sources of extreme heat; screening of lights to prevent glare; the use of mechanical devices to lessen the amount of heavy work; absolute cleanliness of floor and machinery and the use of proper impervious materials for floors or work tables in such industries as the manufacturing of lead products; adequate washing facilities, including also soap, individual towels, hot and cold water, and education in their use; provision for proper work clothes and spectacles, goggles, gloves, or respirators; and, above all, as necessary to insure the other precautions, competent medical supervision and education of the workers in hygiene and safeguards necessary in their trade.

#### SPECIAL HAZARDS FOR WOMEN.

Certain occupational dangers in these trades affect women more seriously than men. Lead poisoning is one of these. Fortunately, in America few women have been employed in the lead industries, and in Niagara Falls it is only in isolated instances that any women have been exposed to this danger. Nevertheless, as the tendency to introduce women into occupations new to them may still continue it is desirable to point out the dangers in the lead trades.

Expert observers, both in this country and abroad, have held that women are more susceptible than men to the effects of lead. But the most serious danger for women in these occupations is due to the effect of lead on the generative organs. Those who have suffered from lead poisoning are more likely to be sterile or to suffer miscarriages or to bear dead children or to lose their children as infants. Lead poisoning in men has not been known to have any ill effects upon the offspring, but for a woman the poison affects not only herself but her children in the future, and these serious results occur more frequently if she works in the lead industries after her marriage.

The manufacture of storage batteries is a particularly hazardous branch of the lead industries, because of the use of lead oxide in large quantities. The utmost care is necessary to make it reasonably safe for men. The floor should be made of impervious material and kept clean by flushing. Mechanical devices should be installed to minimize the handling of lead and to carry the dust away from the workers. Hot running water, soap, and individual towels should be provided in accessible wash rooms. Bubbling drinking water should be supplied. The worker should be furnished full suits of overalls, caps, and washable gloves in good repair, and these should be laundered by the company at least twice a week. The workers should be required to wash hands and face, rinse their mouths, and take off their overalls before eating lunch and before quitting work, and lunch should never be eaten in the workroom. Each worker should be examined by a physician before being employed and reexamined at regular intervals,

preferably once a week, and those who are anemic, or who show signs of tuberculosis or nephritis should not work in the lead trades. The workers should be instructed as to the precautions necessary for them to take and the importance of care of the teeth, a proper breakfast before going to work, and careful cleanliness of hands and finger nails. They should know how to watch for early symptoms of lead poisoning—digestive disturbances, bad taste in the mouth, loss of appetite, constipation, fatigue disproportionate to their work, loss of sleep, and headache—and the doctor should be consulted as soon as such symptoms arise.

In the manufacture of storage batteries, the most dangerous process is mixing the paste and applying it to the plates, and the employment of women in this work should never be allowed. But in the other processes, also, such as the molding and casting of grids and the assembling of formed plates lead oxide constitutes a danger. Scrupulous cleanliness in the workrooms, abundant ventilation, separation of processes so that the workers in one occupation will not be exposed to the risks of another process, and proper exhaust systems to remove dust and fumes are essential.

In the processes involving exposure to lead in the industries of Niagara Falls these precautions are not strictly observed. Some changes have been made recently. A concrete floor is being laid instead of the wooden floor with lead dust ground into it too deep for removal by any superficial method of cleaning. A mixing machine will be installed which will render unnecessary some of the handling of lead. These are promising beginnings, but they must be followed by much more radical improvements before the employment of women in any of the lead processes should be permitted.

For the most part, the other industrial poisons in plants in Niagara Falls have not been demonstrated to be more harmful to women than to men, except in the sense that the duties of women at home added to the work in a factory render them more liable to illness. Public opinion wisely insists, therefore, that women should not be employed under conditions exposing them to such dangers. Public opinion should go farther and insist that all unnecessary risks should be eliminated for men.

It is in the abrasives industry that the largest group of women in the plants inspected were employed. The inorganic dusts of this industry are demonstrated to have a serious effect in predisposing to tuberculosis and other respiratory diseases. It may be due in part to this industry that Niagara Falls has held a record for a high percentage of tuberculosis among the cities of the State. Here, again, the effects upon men and women are similar. But in the effort to protect women workers New York State has for some years

had a law prohibiting the employment of women in grinding tools on carborundum or emery wheels. This should be held to apply also to the manufacture of carborundum products since the amount of dust is probably greater in their manufacture than in processes of grinding on the completed product.

It is being proved possible to remove this dust in Niagara Falls plants. Blowers are being tested by the management, on recommendation of the committee, which are likely to make this danger to health unnecessary if they are installed throughout the processes and kept in good working order. Until these precautions are taken women should not be employed in the dust-generating processes or in the workrooms where they are carried on, and those now employed should be transferred to other work as rapidly as possible.

In addition to the occupational poisons, of which lead is believed to be the only one injuring women more than men, certain conditions in the processes are more serious for women than for men. The lifting of heavy weights, for instance, may cause strains affecting seriously the capacity of women for child-bearing. Due to differences in the structure of the body continuous standing is considered more harmful for women than for men. Occupations involving unusual stretching or straining may be unduly fatiguing for women, especially as, generally speaking, a woman's reach is less than that of a man, and the muscles of arms and back are not so strong. Strains on vital organs are, therefore, more likely to occur and may be especially serious for married women. Moral hazards such as employment in isolation must also be considered as having a peculiar danger for women.

The amount which a woman of average strength may safely lift has not been scientifically determined. The proper method of lifting may make possible the handling of a larger weight with less injury. New York State forbids women in the core rooms of foundries to lift more than 25 pounds. Shortly after our entrance into the war, the Chief of Ordnance and the Quartermaster General simultaneously issued suggestions to contractors setting forth standards for the employment of women and these declared that no woman should be required to lift repeatedly a weight of more than 25 pounds. This standard, therefore, has official precedent to commend it. In applying it, however, it should be remembered that even 25 pounds may be too great if lifted too frequently, or if the lift requires stooping, or if the payment of piecework creates a strain due to too much speeding up. Moreover, women who are below the average in strength, or who are pregnant, or who have a tendency to cardiac disease should never be permitted to lift even a lesser weight repeatedly.

It should be said here that progress in the invention of mechanical devices is rendering unnecessary much of the heavy labor of industry. In one plant manufacturing shells in another city, the employment of women led to the use of a small pulley device whereby the shell was swung into place on the lathe machine and swung back to the work table. Trucks run by motors are already supplanting hand-wheeling in some of the Niagara plants. Mechanical conveyors make it possible to move material from one part of the workroom to another. These together with elevators and hoists combined with the proper routing of materials through the plant should remove many of the present burdens which are undoubtedly responsible for making common labor scarce.

Having in mind the special hazards to women and the desirability of protecting them against certain dangers which affect men and women alike, but which should not be permitted to women because of the very vital relation between the health of women and the health of the race and because, too, for women the burdens of housekeeping and care of children must be added to the burdens of industry, the Woman in Industry Service has recommended to the people of Niagara Falls that under present conditions these women should not be employed in the following processes:

- A. Shoveling or wheelbarrow work, because of the tendency to lift too heavy weights in such occupations.
- B. Yard work, because of exposure to inclement weather and because so much of the yard work is heavy.
- C. Loading or unloading freight cars.
- D. Occupations involving the lifting of a weight of more than 25 pounds.
- E. Occupations in which women are exposed to risks of poison, which have been proved to be more harmful to women than to men, such as the lead industry.
- F. Occupations in the abrasives industry in which the worker is exposed to dust for which there is no adequate system of removal.

#### HOURS OF WORK.

The initial reason for a survey of the proposed employment of women in Niagara Falls plants, as already explained, was the wish of certain firms manufacturing war products to employ women at night. With the increasing shortage of labor they foresaw that in processes requiring continuous operation the employment of women on the day shifts would presuppose the possibility of their taking their turn at night with the rotation of shifts. Similar requests had reached Washington from other States and the whole matter was under careful consideration there. It was felt that only an extreme

emergency due to the war could justify the employment of women at night and that then their employment should be permitted only for a temporary period while the emergency lasted. Moreover, from the beginning of the war, the Federal Government was opposed to any relaxation of standards gained in State labor laws. New York State is one of the nine States prohibiting night work of women.

The reason for this insistence upon insuring to women a rest period at night is the experience of the nations of the world with the bad effects of night work. Before the war, by international treaty, 13 nations prohibited it. In our own country successful defense of the constitutionality of the New York statute resulted in bringing together a mass of evidence which may be summed up by saying that neither a man nor a woman is naturally a nocturnal worker. Physiologically speaking, the vitality is lowered at night and this persists even after the habit of night work has been long established. For women there are the added dangers due to loss of sleep by day because of home duties, and to the moral risks of employment at night. For society there are also to be considered the bad effects of night work of women upon the welfare of children, and upon family life. From the point of view of industrial efficiency, night work is not to be desired because output is diminished during the night hours.

Had the war gone on a plan was under consideration in Washington to take night work under Federal control through clauses in contracts forbidding employment of women between 10 p. m. and 6 a. m., unless the plant held a special certificate granted for a temporary period by the Secretary of War or the Secretary of the Navy, with the approval of the Secretary of Labor. With the signing of the armistice, the War Labor Policies Board passed a resolution, declaring that only the emergency created by the war could have justified any consideration of the possibility of permitting night work for women, reaffirming its conviction that women should not be employed at night and recommending the immediate cessation of night work in Government owned plants.

The New York State law on this subject thus has the sanction of the Federal Government based on war experience and the backing of similar legislation in other States and abroad. It is, therefore, impossible for any plants in Niagara Falls to employ women between the hours of 10 p. m. and 6 a. m. Doubtless with the passing of the war emergency none of them contemplates it.

In a number of plants in Niagara Falls the practice of long working periods of 10, 12 or even 13 hours for men continues. It should be pointed out that even during the war the steel industry adopted an 8-hour day, instead of the 12-hour shift so common for many years

in the steel industry. The drift to-day is toward an 8-hour day as a health measure for the workers and an efficiency measure for the industries. In dangerous trades, involving risks of poisoning, long hours are very serious because they expose the worker just so much longer to poison, while they render him through fatigue more susceptible to its ill effects. In the industries of Niagara, therefore, the 8-hour day must be listed among the safeguards which should be established against occupational diseases.

#### WAGES.

No investigation of wages paid in Niagara plants was made in this inquiry. In reports on occupational diseases abroad, the greater susceptibility of low-paid workers to disease has been pointed out as pertinent to the whole discussion of safeguards. Low wages mean undernourishment, and crowded living quarters, and these increase the danger of ill health.

In the Niagara Falls housing survey made by the Independence Bureau in November and December, 1917, information from 36 plants on the wages of 12,349 men and 1,029 women showed that 63 of every 100 women earned a weekly rate of \$12 or less. It is not shown how many of these earned more than \$8 or \$9 a week. Of the men, 19 per cent received a rate of \$25 or more a week, while the same proportion received \$18 or less. The majority of the men, 61 per cent, were rated at \$18 to \$25 a week. These are wage rates and not actual earnings.<sup>1</sup>

For women, the policy of the Federal Government repeatedly affirmed during the war is that when a woman does the same work as a man she shall receive the same wage. Casual inquiry has shown that some of the plants in Niagara Falls have paid the same rate to women as to men. In others, contrary to the policy recommended by the Government, a lower rate has been adopted for women. On this subject no other recommendation can be made, since data are lacking except to point out the policy deemed necessary by the Government during the war, and to add that the health of the workers in such occupations as those in the chemical industries is more than usually dependent upon the standard of living which their wages enable them to maintain.

#### THE LABOR SUPPLY.

A brief inquiry into the available supply of women workers not now employed in Niagara Falls indicated that the number probably did not exceed 300 to 350, of whom many were young married women with children. The shortage of housing for women rendered impracticable the drawing in of a larger number from other communities.

<sup>1</sup> Independence Bureau Report of Niagara Falls Housing Survey, December, 1917 (p. 10).

The Independence Bureau in its report to the Niagara Falls Housing Committee had reported that "permanent boarding facilities for women are scarce. The average price of lodging is \$3 or \$4 a week, and board is obtained separately. There are a few rooms with board and lodging supplied together at \$5 or \$6 a week, but the price of decent board is more generally \$8 or \$10 a week."<sup>1</sup> In the housing plans afterwards adopted by the Federal Government no special provision was made for women living alone, so that the industries would necessarily rely upon those who are already living in Niagara or who go there with their families.

In making inquiry as to the number of women workers who might be secured to take men's places, numerous indications were encountered of the fact that it was not merely or even chiefly withdrawal for military service which was crippling Niagara industries, but an abnormal turnover of labor, an aggravation of a condition reported to have existed before the war. It was said that outgoing trains carry away as many workers as incoming trains bring and that the working population of the city changes almost as fast as does the tourist population. Men and women outside the industries, but cognizant of conditions through long residence there and close contact with the workers, pointed out that living and working conditions which workers in Niagara Falls have found particularly hard to endure are low wages, inadequate housing, and transportation, and exposure to industrial poisoning. They were convinced that the failure of manufacturers to grasp the connection between production, good working conditions, and good living conditions had resulted in an acute labor shortage of both men and women. It was to solve all these complicated problems that employers were looking to the introduction of women workers. This would probably not have been the solution during the war. It is not likely to be the solution now. The industries of Niagara Falls face a problem of plant management and community responsibility. Failure to solve it will accentuate present difficulties. Success in solving it would place Niagara Falls in the front rank of industrial communities.

#### SUMMARY AND RECOMMENDATIONS.

Under present conditions in the industries investigated in Niagara Falls the extension of the employment of women is not desirable. If women are to be employed in the hazardous occupations of the country it should be only under conditions which have been made as safe as possible. This has not been achieved as yet at Niagara Falls. There are plants in Niagara in industries not included in the inspection in which conditions are said to be favorable for the employment

<sup>1</sup> Independence Bureau Report of Niagara Falls Housing Survey, December, 1917 (p. 8).

of women. It is wiser that the comparatively few available women not now employed should find opportunities in these plants instead of in the industries in which serious risks to health would be encountered.

But to advise against the employment of women is not to solve the labor problem of Niagara. Clearly even during the war this was not a problem of the desirability or undesirability of introducing women into work hitherto done by men, or of employing women at night. The great need of the industries at Niagara is to adopt a program to insure better health in the plants and better health in the community.

Dust and fumes from the plants are affecting the homes of the people. Housing problems are acute. This investigation was confined to plant inspections and does not afford a basis, therefore, for recommendations regarding a health program for the community. Even a cursory inquiry shows the need, however, for united effort to make Niagara Falls as attractive a place for workers to live as it has been famous as a resort for travelers.

In the industries the need is to apply in the plants the precautions which are well known in hazardous trades, especially the construction of proper systems of dust and fume removal and the establishment of higher standards of sanitation and hygiene in the interest of preventing occupational diseases. It is very important, also, to make provision for continuous medical supervision of the health of the workers, instruction for them in the dangers of their occupations and the best means of protecting themselves against occupational diseases.

Under article 6, section 99, of the labor law of the State the Industrial Commission of New York State has full power to require adequate medical protection for the workers in dangerous trades. This section reads as follows:

*Dangerous trades.*—Whenever the industrial board shall find as a result of its investigations that any industry, trade, or occupation, by reason of the nature of the materials used therein or the products thereof, or by reason of the methods or processes or machinery or apparatus employed therein or by reason of any other matter or thing connected with such industry, trade, or occupation, contains such elements of danger to the lives, health, or safety of persons employed therein as to require special regulation for the protection of such persons, said board shall have power to make such special rules and regulations as it may deem necessary to guard against such elements of danger by establishing requirements as to temperature, humidity, the removal of dusts, gases, or fumes, and requiring licenses to be applied for and issued by the commissioner of labor as a condition of carrying on any such industry, trade, or occupation, and requiring medical inspection and supervision of persons employed and applying for employment and by other appropriate means.<sup>1</sup>

The combined efforts of Federal, State, and municipal authorities should be utilized to make possible physical examination of workers, advice as to the occupations which they can safely follow, and instruc-

<sup>1</sup> New York State Labor Law and Industrial Code, July 1, 1917 (p. 84).

tion in the methods of guarding against the dangers of occupations and especially to stimulate the management in the plants to achieve in the field of protection of the health of the workers as notable results as they have attained in the scientific progress of the chemical industries in this country.

The first essential is a program by the management to change conditions. Changes now under way give promise of such a program. The statement made in the report of the New York State Factory Investigating Commission about the chemical industries in the United States as a whole should be no longer true in Niagara.

In no other industry are perils to the body and dangers to the health of the workers so many, so insidious, and so deadly. The workers come in direct, close, and daily contact with lead, arsenic, phosphorus, antimony, mercury, chromium compounds, and other powerful poisons. Injurious gases and harmful fumes are evolved in hundreds of its various processes. Irritating dusts, excessively high temperatures, burning and spurting liquids, dangerous explosives, and many other open and hidden, seen and unseen dangers lurk at almost every step.

And yet, here in the United States, there is no industry in which there is less protection to the health and interests of the workers, or where a standard for ever-increasing production and large profits is maintained at such a sacrifice of human life.<sup>1</sup>

Attention must be centered first upon the engineering problem of applying in the plants the precautions and safeguards which are well known, especially to construct proper systems of dust removal and to establish the usual standards of safety and facilities for comfort.

It is important also to develop progressive plans for employment management in the plants, with a spirit back of it which makes the relations of a firm with its workers and the safeguarding of their health at least as important in the organization of the industry as the sale of the products. Several plants have employment executives. The extension and strengthening of their work are desirable.

Most vital now is the development of health activities in the community, preferably under the direction of a municipal health department in cooperation with the United States Public Health Service, while the industrial commission of the State carries forward its supervision over health conditions in the plants.

The final recommendation is fundamental as affecting all the others which have been made. The most immediate, practical way to stimulate the management to make progress in the engineering problems of safety and sanitation in the plants and to insure more effective health supervision is to extend the scope of the workmen's compensation law of New York State to include occupational diseases. If a woman operating a machine in a Niagara plant loses a finger she is

<sup>1</sup> New York State. Second Report of the Factory Investigating Commission, 1913. Chapter on Chemical Industries (p. 459).

entitled to compensation according to the workmen's compensation law. If in the same plant, she is poisoned by lead, with all the dangers of serious after-effects not only for her but for her children, the present workmen's compensation law does not protect her. The result is that throughout the State marked progress has been made in guarding against accidents, but only very slight progress has been made in guarding against the disease which is as directly due to the occupation as any industrial accident. No other single measure can be put forward with equal confidence as sure to result in great improvements in the plants of Niagara Falls, and in similar industries throughout the State.