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LETTER OF TRANSMITTAL

UNITED STATES DEPARTMENT OF LABOR,
WOMEN'S BUREAU,
Washington, June 16, 1932.

SIR: I have the honor to submit a report on the employment of women in vitreous enameling, a study of the enameling departments of about 50 plants, practically all making stoves, and of home interviews with nearly 700 women employed in these plants at the time or within the 12 months preceding the interview.

Stove enameling employs considerable numbers of women, and wherever the enamel used has a lead content of more than a very small per cent the women are likely to contract lead poisoning, with its grave effects on the present and the succeeding generation. About 30 per cent of the women interviewed in this survey reported having symptoms of poisoning, a figure rising to 38 per cent in the case of the women actually applying the enamel in the process of spraying.

The survey was made with the cooperation and scientific assistance of Dr. Alice Hamilton, assistant professor of industrial medicine at Harvard Medical School and an authority on lead poisoning. Her book, *Industrial Poisons in the United States*, has been freely used in this study. Doctor Hamilton has contributed an important foreword to the report.

The field work was conducted and the report has been written by Ethel L. Best, industrial supervisor.

I acknowledge with grateful appreciation the courtesy of plant officials and of the interviewed women. I am indebted to the Bureau of Standards for its cooperation in testing for lead certain samples of enamel supplied by employers for analysis.

Respectfully submitted.

MARY ANDERSON, *Director.*

Hon. W. N. DOAK,
Secretary of Labor.

FOREWORD

The enameling of stoves is a new industry in this country, introduced with the change in style of gas stoves and increasing rapidly in importance. It has been known for some time that the application of lead enamel to metal surfaces has been the cause of lead poisoning in France, Austria, Germany, and England, and it has also been known that a similar industry in the United States, the scattering of dry lead enamel on red-hot iron in the making of porcelain-enamelled sanitary ware, has caused a high rate of lead poisoning among the men so employed. The enameling of stoves is not nearly so dangerous an occupation as the latter, since the enamel is wet and the spraying can be done under a booth with an exhaust to carry the droplets away from the sprayer. Nevertheless, there are certain reasons why this industry was one calling for a careful study in the interests of the health of the workers, since in the first place these workers are women, in whom lead poisoning is a more serious danger than it is in men; second, they are to a great extent youthful workers, which makes them more susceptible to the action of the poison than are more mature workers; and, third, the work can be done, and in some places is done, with a leadless enamel, and therefore it was hoped that if the lead in the enamel were shown to cause injury to the women who apply it, those establishments that are now using a lead enamel might be induced to adopt a leadless enamel and thus do away with the most obvious danger attendant upon this particular sort of work.¹

The study made by the Women's Bureau should ideally have included analyses of the air in all the rooms where spraying is carried on and also a medical examination of the workers, supplemented by laboratory tests. This was obviously impossible, and therefore the next best method was adopted, namely, the inspection of a large number of places by the same intelligent observer, for this insures reports that are comparable; the determination of the lead content in the enamel used whenever this was possible; and interviews with a large number of women in their own homes in order to discover what effect, if any, the work had had upon their health. This method is, of course, open to criticism because the statement of the women is all we have to depend on, but the careful tabulation of the facts elicited in these interviews, with 686 women in all, brings some very significant things to light.

Two groups of women make up the larger number employed in this enamel work, the sprayers applying an enamel spray which may or may not contain lead, and the brushers who remove the excess of enamel after it has dried. The former are exposed to lead much more than the latter, for much of their work is done on cast iron which is covered with lead enamel, while the brushers are chiefly employed on sheet iron for which a leadless enamel generally is used. Thus, of the

¹ It might be said that the silica in the enamel is even more injurious than the lead, but there are many difficulties in the way of determining the harm done by silica. It takes many years' exposure to produce this effect, and in enameling stoves the labor turnover is unusually large. Moreover, an X-ray examination of the chest is necessary to prove silicosis.

sprayers 38.9 per cent worked on cast iron, that usually involves a lead enamel, but only 9.1 per cent of the brushers did so. This made it possible for the investigators to use the brushers as a group with which to compare the sprayers, for if it appeared that there was any marked difference between these two groups of women, drawn from the same economic class and working in the same establishments, it would be fair to conclude that the lead was largely responsible.

As to the prevalence of lead poisoning among the women, the method selected was to elicit from the women themselves a statement as to certain symptoms which are universally regarded as present in lead poisoning, and to discover whether these symptoms had arisen after employment with enamel or had increased in the course of this employment. The figures are presented for the two groups—those most exposed to lead, the sprayers, and those least exposed, the brushers. The contrast is therefore not between a perfectly normal group and a group exposed to lead but between two groups of varying degrees of exposure.

The figures presented are certainly significant. Thus, over 50 per cent more sprayers than brushers complained of a metallic or sweetish taste, indigestion, constipation, and menstrual disturbance. Other findings are that illness among the sprayers with symptoms suggestive of lead poisoning was more prevalent than any other form, although in general industrial experience the common cold always leads in frequency. The sprayers had a higher rate of absences due to ill health than had the brushers, 18.5 per cent of the sprayers who left work doing so because of illness, while only 8.8 per cent of the brushers gave illness as the cause. A rather ominous finding is this: That among the sprayers, those between 16 and 18 years yielded the highest percentage of illness suggestive of lead poisoning.

These women are on an average younger than the women in mixed industries in these same States. More than one-fourth, 26.6 per cent, were under 20 years and 51.8 per cent between 20 and 30 years. We have evidence from foreign sources pointing to the greater susceptibility of young persons to lead poisoning; and just recently, in a study made by the New York State Department of Labor, which covered 381 men engaged in lead work, it was found that those under 20 years of age showed a greater liability to lead poisoning than the older men.

Over two-fifths of the women, 43.4 per cent, were married. This unusually large proportion is a serious feature of the report, for it has been known for more than a century that lead is a race poison and that a woman suffering from lead poisoning is more likely to remain sterile after marriage than the woman who is not leaded; if she conceives, she is more likely to miscarry; if the child is carried to term it is more likely to be stillborn; and if it is born alive it is more likely to die in infancy. The data on this point which the investigators were able to collect correspond with these facts, although the numbers are too small to be regarded as very significant.

The records of the length of the period of employment before symptoms of illness developed show clearly the need for medical supervision in this industry, for it appears that some of the women had worked only a short time, 10 of them less than one month, before their health began to suffer. These were oversusceptible individuals who should never work with lead, and the only way to eliminate

them is to have all workers come under the eye of the same physician at regular intervals so that he may detect the early symptoms of lead poisoning and order the woman to be shifted to leadless work.

The report of conditions in these establishments shows that they vary greatly, from poor to excellent, but that in no establishment is the medical service adequate and in only a small minority is there adequate provision for cleanliness. A fact of practical importance to employers was elicited by the inquiry into the causes for quitting work. No less than 13.1 per cent of the women who left did so because of poor working conditions—heat, dust, fear of danger from the dust—as against only 3.7 per cent of cotton-mill workers in a Women's Bureau study who left for that reason.

We have to do here with an industry which has a recognized hazard, an enamel containing lead soluble in human gastric juice, and therefore capable of producing plumbism in the women who work with it. In Great Britain such an occupation comes under "special rules," which prescribe in detail the measures that must be used to carry off the spray so that none escapes and prescribe wet scraping or wiping instead of dry brushing. No dry enamel may fall on floor or benches, the finishing being done over pans of water. In addition, the employers are required to give special care to these workers with lead enamel, including the provision of washable working clothes and head covering, laundered by the management; hot water, soap, towels, and nail brushes; a clean place for street clothes; a clean lunch room with provision for heating food and no food ever to be taken into the workroom. A physician must be employed to examine new employees and to make subsequent examinations at regular intervals of all employed. If he finds symptoms suggestive of lead poisoning, that woman must no longer be employed in work with lead.

In contrast to these regulations, which are only what long experience has shown the British factory inspection service to be needed for the protection of workers from lead poisoning, we Americans have, in a great majority of our States, only general statutes framed for all industrial establishments and quite inadequate when applied to those in which poisons are used. A few States do deal with the lead trades. A number of them require physicians to report all cases of lead poisoning that they find in general practice, but this is admittedly a measure of no practical value. Several States provide for compensation for industrial lead poisoning, and experience shows that such legislation in the long run does make for better protection of the workers; but we can not depend on this alone, for even the best of employers are not specialists in factory hygiene and many are utterly ignorant of the hazard involved in work of this kind and of how to guard against it.

Specific statutory provisions regulating working conditions in the lead trades have been passed by several of the most important industrial States, at least two measuring up well with the British regulations. In addition, most of these provide for periodic medical examinations. A few States do not specify lead but cover the lead trades by general regulations, which in the hands of well-trained inspectors work quite as well.

This means then that in comparatively few States is there adequate legislation for the protection of women who apply lead enamel to stoves, but he would be a rash person who would dare to say that even in these States the statutes are always carried out with intelli-

gence and vigor. We may as well face the fact that the enameling of stoves, an industry of rapid growth and with probably a great future expansion, is one which subjects a large number of women to the danger of lead poisoning and that these women are not under present conditions efficiently protected against the danger. Even under the best conditions and supervision there will always be some danger; and therefore the most practical suggestion which can be made to the men at the head of the industry is that they substitute leadless enamel for lead enamel, a change which is greatly facilitated by the change from cast iron to sheet metal, which has already been made by a number of manufacturers.

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THE EMPLOYMENT OF WOMEN IN VITREOUS ENAMELING

INTRODUCTION

Of great concern to those interested in the welfare of gainfully employed women are the conditions under which they work. Studies have been made by the Women's Bureau of the employment of women in various States and in various industries; the extent and seriousness of industrial accidents have been touched upon; but until the present study was undertaken, no investigation had been made of the hazard of industrial poisoning. Lead poisoning, selected for study in plants using vitreous enamels, is a subject of grave importance to workers—especially to women workers, since women are more susceptible than are men.

According to the report of the committee on lead poisoning of the American Public Health Association, the increase in lead poisoning in this country is an indication that industrial control is inefficient or not practiced. In almost any of its forms, lead that enters the system either through the air passages or the digestive tract may be poisonous to human beings. Workers in many industries and trades are constantly exposed to lead in one of three forms: As dust or vapor in the breathing atmosphere; in a dry state; or in a wet, pasty, or spray form.

Lead poisoning should be eliminated or reduced to a minimum by preventing lead ingestion and absorption through the control of lead exposure. To accomplish this, the plan should be to remove lead from actual or atmospheric contact by the adoption of the following means:

A. Various industrial means, such as—

1. The supply of a lead-free atmosphere from outside sources.
2. Automatic processes.
3. Confining cabinets or isolated spaces.
4. Air conveyances for lead in dry, vapor, or spray forms.
5. Moist or oily processes.
6. Substitutes for lead.
7. High-class factory or work-place hygiene.

B. Various personal means, such as—

1. Personal hygiene, observing particularly instruction to employees on how to prevent lead poisoning.
2. Medical supervision with frequent examinations specifically for lead exposure, lead absorption, and lead poisoning.
3. Regulation of hours of labor involving lead exposure.
4. Limitation of the employment of youths, women, the delicate or sickly, and those who have previously suffered lead poisoning.
5. Prohibition of the employment of those showing increasing or marked evidence of lead absorption, any stage of lead poisoning, or a history of increased susceptibility, or marked symptoms in previous attacks.¹

¹ Report of Committee on Lead Poisoning, presented to the industrial hygiene section of the American Public Health Association, October, 1929, New York, 1930, pp. 28, 29-30.

As an indication that these suggestions have not been recognized and applied to any extent by industry, the following facts are presented: According to a publication of the National Safety Council, lead poisoning still furnishes a high percentage of the cases of industrial poisoning; of 360 cases of industrial poisoning admitted to the industrial clinic of the Massachusetts General Hospital during a period of six months, 217 were the result of exposure to lead. From occupational disease reports for Massachusetts and Ohio, in each case extending over a period of a year that ended in 1927, lead poisoning was second in frequency, representing 19 per cent of the diseases reported in Massachusetts and 16 per cent of those in Ohio. Two reasons were given for this high incidence of lead poisoning. One was the large number of trades in which lead was used, and the other was that among both employers and employees the insidious character of lead poisoning had not been recognized.²

PURPOSE AND SCOPE OF STUDY

The purpose of the present study was to secure authentic data on the conditions under which women work who are exposed to lead dust, with special reference to the protection provided against such dust and the effect of such conditions on the women employed in vitreous enamel shops. Lead and silica dust are the two hazards to which women working in enamel are exposed, but the study was confined to facts that might throw light on one of these only, that of lead exposure.

The survey was made with the cooperation of Dr. Alice Hamilton, since 1919 assistant professor of industrial medicine, Harvard Medical School. The field work was done at two separate times, during seven months in the fall, winter, and spring of 1929-30 and during three months in the fall and winter of 1930-31. Enamel departments were visited in 47 factories, practically all making stoves, in Illinois, Maryland, Michigan, Missouri, Ohio, and Wisconsin. From all but 2 of these, from 45 factories employing 1,330 women, information regarding conditions and personnel was secured.

Data were obtained in the individual plants as to the numbers employed, men and women, and the occupations in which the women were engaged. Hours of work, absences, separations, and other data pertinent to specific occupations also were obtained, as were the women's names, addresses, ages, marital status, and length of service. A brief inspection was made of working conditions in each plant, with special reference to sanitary and service facilities and all safeguards and regulations provided for the health and well-being of the women workers.

To secure the most accurate information available as to the percentage of lead present in the enamels used, statements regarding this were obtained from the management wherever possible. However, as a rule such reports were not satisfactory, first, because in most of the plants many different enamels were used, and the lead content of all generally was not known; and, second, because many establishments bought their enamel from other concerns, and, although in some cases they were able to say whether or not the enamel contained lead, the amount, where lead was present, could not be stated defi-

² National Safety Council. Health Practices Pamphlet No. 3, Chicago, 1929, p. 1.

nately. Where the lead content of the enamels was not known, all firms willing to cooperate to this extent supplied samples of their enamels, and these were analyzed by the United States Bureau of Standards.

With the information from the plant records as a background, 686 women workers from 39 establishments were interviewed in their homes, and information was secured as to nativity and color, ability to speak English, age at beginning work, present age and marital status, maternal history if married, occupation, hours of work, causes of absences and of separations, illnesses, and complete work history, with the occupations, dates, and duration of jobs and reasons for leaving them, conditions of work, with special reference to precautionary measures taken in regard to ventilation, cleaning of room or booth in which work was carried on, uniform worn, and personal hygiene precautions.

PLANT INTERVIEWS AND INSPECTIONS

OCCUPATIONS OF WOMEN

In a study of a single industry—for example, textiles, tobacco, or confectionery—women are employed in many different occupations and are found in many workrooms with varying conditions; while in this study, which is not of an industry but of a process in an industry, women worked in but few occupations. In most of the establishments visited all the enamel operations were carried on in one large room, but in a few the cast-iron room and the sheet-iron room—and it should be explained that there is lead in most of the enamel used on cast iron but little or none in sheet-iron enamel—were separate. In a number of the plants in which the enameling of cast iron and of sheet iron was done in the same room, cast iron was enameled at one end and sheet iron at the other. Since the room usually was a large one, with a high ceiling, the result was almost as satisfactory as if separate rooms had been used.

The two principal occupations in the enamel departments were spraying and brushing, and these were the two dustiest jobs. The sprayer worked in a booth inclosed on three sides and sprayed the piece of metal before her by means of a small air-pressure gun held in one hand. The piece of metal to be sprayed was placed on a rack in the booth, or if it was small, such as a handle for an oven door, it was held in one hand while being sprayed with the gun. In a few plants women were spraying pieces that moved slowly past them on a belt conveyor, but in most cases this type of spraying was considered work too heavy for women, since it required the uninterrupted holding of the gun.

In brushing, the women stood at tables and brushed the spray off the parts of the metal not intended to be enameled. In some places small hand brushes were used; in others the brushing was accomplished by holding the metal surface against a revolving brush operated by power.

Other less important occupations engaged in by women were dipping metal parts into enamel for a ground coat—only one or two were so employed in a plant; putting the grain into enameled surfaces that were intended to have that appearance; patching the imperfect places in the enamel—blisters or small holes; transferring by means of a stencil the company name or trade-mark to the oven doors of stoves (called decalcomania and providing work for one or two women in a plant); hanging the pieces of metal on the conveyor for drying and later taking them off. There were other occasional occupations at which a few women were employed, such as inspecting, beading, wiping, and general work.

Dipping was done by hand. The worker stood in front of a trough of liquid enamel, usually a ground coat, in which she dipped the piece of metal. After the pieces were dipped they were hung on a rack or conveyor and passed on to the oven for baking.

Putting the grain on the enameled surface required some rubbing, but was not a dusty job as compared with spraying or brushing.

Transferring (decalcomania) consisted of placing the paper pattern on the sprayed metal surface, rubbing the contrasting color from the pattern and removing the paper when the superimposed color was baked on.

The patching that occurred occasionally on enamel consisted of scraping off the blisters and recoating with enamel. While patching was about the same as graining as regards dust, it involved more risk to the worker, as it was done on cast iron (which as before explained, usually has lead in the enamel), while graining generally was done on sheet iron.

EMPLOYMENT POLICIES

Methods of hiring.

Before a person enters upon any work both the employer and employee should be as certain as it is possible to be that the worker is physically fit and mentally able to perform the duties that the job entails. The method of employment among establishments included in this study varied from plant to plant. Three-fourths of the 45 plants included had centralized systems, all workers being hired by an employment manager, a foreman, a superintendent, or other person. This is by far the most desirable method, since one person can then be held responsible. In the remaining 11 establishments workers were hired by several different people, a much less satisfactory method.

Preliminary physical examinations.

In occupations where a poisonous substance or the dust or fumes from such are involved the careful hiring of all workers, irrespective of sex or age, is of more than ordinary importance. Careful hiring should include a thorough physical examination that would eliminate any person with weak lungs, throat, or other organ especially susceptible to such poisons.

In the particular case of susceptibility to lead poisoning, with which this study is concerned, the greatest care should be taken in hiring workers. The American Public Health Association states in its bulletin on lead poisoning that "All workers should be examined at the time of hiring."¹ It may not be possible through a physical examination to eliminate those who will later show an oversusceptibility or an idiosyncrasy to lead poisoning, but it will prevent the hiring of a worker with a physical defect that would cause special susceptibility. The importance of a physical examination before hiring was not generally recognized by the plants included in this study, for in only 4 of the 45 was a physical examination given before the workers were engaged.

Age and sex precautions.

The risk of lead poisoning to young persons and women, according to the best authorities on the subject, seems to be greater than to others. Especial care should be taken in selecting young persons and women, and a physical examination should be given each worker

¹ Report of Committee on Lead Poisoning, presented to the industrial hygiene section of the American Public Health Association, October, 1929, New York, 1930, p. 34.

before hiring.² In efforts to improve conditions among lead workers the American Public Health Association has set forth the following standards in regard to age and sex:

1. No worker less than 21 years of age shall be permitted to engage in any occupation where lead is used, that is, subjected to lead exposure.
2. No female under 45 years of age should be permitted to handle any dry substance or dry compound containing lead in any form where the lead content is in excess of 2 per cent.³

Need of periodic physical examinations.

In all studies of industrial poisons there is an unknown factor that it is impossible to foresee or guard against, and this is individual susceptibility. If there is more than ordinary danger to younger workers, or to women, or to workers in poor health, these need not be hired for jobs where there is exposure to toxic substances, but the individual's susceptibility is impossible to foresee and evaluate. Doctor Hamilton illustrates this wide difference in individual susceptibility as follows: In a certain very dusty, white-lead plant she had as guide a man who had worked there for 32 years, ever since he was 12 years old, who had never been poisoned, although at times he had been unable to see across the room because the lead dust was so thick. Yet in this same plant another man had sickened after two weeks and had died of acute plumbism at the end of less than six months.⁴

In a lecture before the Royal Society of Arts Sir Kenneth Goadby suggests that the same unequal distribution of susceptibility is true also of industrial poisoning. The majority of workers exposed to lead poisoning, for instance, seem to develop a "tolerance" in the course of the first three months or at any rate the first year of employment, but some apparently do not.⁵

In diagnosing 1,217 cases of plumbism Tanquerel des Planches found 424 who were originally strong and vigorous, 584 of medium strength, and only 208 of feeble constitution.⁴

Because of this difference in susceptibility, in addition to physical examinations before employees are hired for trades in which lead is used the health of the workers should be checked through periodic physical examinations, and accurate records should be kept from which may be ascertained any changes taking place in the worker's physical condition.

In none of the plants visited were both entrance and periodic physical examinations given. As has already been noted, only four firms gave entrance examinations, and six other firms reported physical examinations given either every three months, every month, or at irregular intervals. Besides the six establishments where women were examined periodically, there were a few in which the men employees were examined occasionally because of their greater exposure to lead, but women were not examined.

² Hamilton, Alice. *Industrial Poisons in the United States*. New York, 1925, pp. 8-13.

³ Report of Committee on Lead Poisoning, presented to the industrial hygiene section of the American Public Health Association, October, 1929, New York, 1930, p. 30.

⁴ Hamilton, Alice. *Industrial Poisons in the United States*. New York, 1925, p. 14.

⁵ Florence, P. Sargent. *Economics of Fatigue and Unrest*. London, 1924, p. 342.

Health care.

To prevent illness among their employees and to treat those who become ill or have minor accidents, many concerns, especially those employing large numbers, have a medical department. The need of the services of doctors and nurses in plants where poisonous substances are used constantly is very great. This need varied considerably in the plants included in the study, according to the differing toxic qualities of the enamel dust to which the workers were exposed.

Of the 43 plants reporting on the subject of medical and nursing care, 18 made no provision of any kind for such care. Of the 25 others, 13 had only a visiting doctor, 8 had only a plant nurse, and 4 had both of these. The last named would seem to be a desirable arrangement, as the nurse can keep in close touch with the workers and give information to the doctor on his periodic visits.

Records of illness and the treatment administered were recorded in only 3 plants. One other kept records of cases of illness and still another records of treatments given.

HOURS

In all establishments the length of the working day is of importance to the workers. Factors such as great heat, excessive dust, or poisonous substances have an especially injurious effect upon the worker when coupled with long daily hours. Due to the very nature of the work in enamel rooms one or more of these conditions is always present there, in some to a less extent than in others.

Doctor Hamilton makes this statement: " * * * it is safe to assert that long hours of work increase industrial poisoning simply because they increase the actual dose of poison and also lessen the chance of completely eliminating one dose before another is taken." This same authority gives the following facts regarding the number of cases of T. N. T. poisoning in a shell-loading plant: They numbered only 23 in June when an 8-hour day was worked; in July and August, with hot weather and hours of 10, 11, and 12 a day—even 16 hours occasionally—the number of cases was more than doubled in July and trebled in August, while in September, with shorter hours and cooler weather, the number of cases dropped to 36.⁶

The longest hours worked in enamel rooms usually were in the late spring, the summer, and the early fall. The busy seasons varied somewhat in different plants but always occurred within this time. In some establishments the busiest time would last for three months, or there would be two peaks, one in the spring and one in the early fall, or a busy time in late summer that might last until November. As a rule, however, the busiest time was in the hottest months, when the trying temperatures were made worse in the enamel departments by the furnaces and drying rooms that in many cases were in the same inclosure as the sprayers, brushers, and other enamel workers.

Daily hours.

For about one-half of the plants visited and for more than two-fifths of the women employees the regular or scheduled hours of work were 9 and under 10 a day, and in some of these plants considerable overtime was worked in the busy seasons. A little more

⁶ Hamilton, Alice. Industrial Poisons in the United States. New York, 1925, p. 3.

than one-fourth of the factories and about 16 per cent of the workers had a scheduled day of 8 hours or less. Much the largest group in any single classification had hours of over 8 and less than 9 a day.

TABLE 1.—*Scheduled hours of work*

DAILY HOURS			
Scheduled hours	Number of plants	Women in enamel departments	
		Number	Per cent
Total.....	45	1,330	100.0
7½ and less than 8.....	3	67	5.0
8.....	9	145	10.9
Over 8 and less than 9.....	11	584	43.9
9.....	16	406	30.5
Over 9 and less than 10.....	6	128	9.6
SATURDAY HOURS			
Total.....	45	1,330	100.0
4 and less than 4½ ¹	8	430	32.3
4½ and less than 5 ²	16	449	33.8
5 and less than 6.....	11	294	22.1
6 and over (including 9).....	10	157	11.8
WEEKLY HOURS			
Total.....	45	1,330	100.0
Less than 44.....	1	20	1.5
44 and less than 48.....	12	275	20.7
48.....	7	346	26.0
Over 48 and less than 50.....	9	296	22.3
50.....	7	239	18.0
Over 50 and less than 57.....	9	154	11.6

¹ Includes 1 firm, 6 women, with a schedule of 3 hours and 55 minutes.

² 1 firm, 129 women, had a schedule of 4 hours and 55 minutes.

Saturday hours.

In 24 of the plants a day of less than 5 hours was worked on Saturday, but 10 establishments, employing almost one-eighth of the women, had Saturdays of from 6 to 9 hours. Such long Saturdays are especially undesirable in this employment, as they give but little time for rest and the elimination of the poison that may have accumulated during a long week's work.

Weekly hours.

For 20 establishments, employing almost one-half of the women, scheduled weekly hours of 48 or less were reported, but as many as 9 plants, with nearly 12 per cent of the women, had weekly hours in excess of 50.

EARNINGS

Actual weekly earnings were not recorded, but the differences in earnings of women on the various types of work were inquired into, as it was thought that higher earnings might result in greater length of service even in a harder or more disagreeable job. If this was the

case, it was not apparent either in length of service or in the women's reasons for leaving, although in a majority of establishments the spraying work was better paid than were any of the other jobs and the separations were relatively fewer. The lower separation rate among the sprayers may have been from other causes as well as higher pay; for example, the greater skill required and the more careful selection of the workers.

WORKROOM CONDITIONS

The factors in the physical environment or hygiene of any establishment that are most important to the human body are grouped under six heads by Doctor Florence:⁸

1. Air: Temperature and humidity; ventilation and room space; dust and fumes (exhaust systems); smell.
2. Light: Volume, concentration, glare.
3. Noise: Volume, irregularity, vibration.
4. Accident and fire hazards; safety devices; first aid.
5. Sanitation and tidiness; cleaning and drinking water; lavatories.
6. Seating and rest rooms.

Of these six factors, the most important to the workers with whom this study is concerned is the condition of the air in which they work. In Doctor Hamilton's book she writes that "Among European authorities there has been practical agreement for many years that the great danger for the lead worker comes from contamination of the air by lead dust or lead fumes, which are essentially the same." According to conclusions reached by Legge, based on analyses by Duckering of the lead content of the air in certain workshops, two milligrams per day is the lowest dose that when inhaled as dust or fumes may, in the course of years, set up lead poisoning. "If the working day is eight hours, * * * this would mean about 5 milligrams of lead to 10 cubic meters of air, for a man breathes about 600 cubic centimeters 16 times a minute, 4,608 liters in eight hours. If there is no more lead in the air than this, encephalopathies and palsies will not occur, and colics rarely."⁹

Doctor Smyth, of the industrial hygiene department of the University of Pennsylvania, conducted a study in Pennsylvania of industrial hazards involved in spray painting. He reported as follows: "With under 1 per cent of lead in the material being sprayed this limit [that quoted by Legge] should usually not be exceeded if reasonable care is exercised and reasonable exhaust ventilation provided. With amounts much in excess of 1 per cent, concentrations much above the safe limit will frequently be encountered, though not always. The many uncontrollable variables in commercial spraying make it impossible always to be sure of safety in this respect."¹⁰

As mentioned in the introduction to this report, information concerning air conditions was obtained by the agent at the time of inspection of the plant and later from interviews with women workers.

⁸ Florence, P. Sargent. *Economics of Fatigue and Unrest*. London, 1924. pp. 109, 110.

⁹ Hamilton, Alice. *Industrial Poisons in the United States*. New York, 1925. p. 42, 57.

¹⁰ Smyth, Henry Field. *What Are the Health Hazards of the Spray-Coating Industry?* Reprinted by United States Bureau of Labor Statistics, 1930. p. 5.

LOCAL SAFEGUARDS

In spraying booths.

Since the greatest number of women are employed as sprayers or brushers, the safeguards installed to protect these workers were intensively studied.

In all the booths in which women worked on spraying there were local exhausts to carry off the dust-laden air. The majority of the exhaust openings were round, and they varied in diameter from 1 to 2 feet, with the greatest number about 18 inches. Other types of openings were the slat type with an opening of from 1 to 1½ inches between the slats, and a plate type with small round holes scattered over its surface. Both of these latter types of vents covered the entire back of the booth. These two types may have given better suction for all parts of the booth; but there seemed to be considerable difficulty in keeping them free from enamel, and when they became clogged, suction was interfered with.

About one-fourth of the sprayers reporting stated that their exhausts worked unsatisfactorily. Of those who reported the exhaust as working well, some seven women qualified the statement by adding, "but it is bad in other booths where I work sometimes." It is easy to understand the comparatively large number of exhausts that did not work properly when the lack of attention given to these in many of the plants is recalled; nothing was done unless an actual breakdown forced some action. From the appearance of the majority of the sprayers, with face, hair, and clothing covered with enamel dust, it would seem that many of the exhausts in the plants visited were ineffective, or that the rebound of the spray from the surface treated was very great.

Very little appeared to be known in most plants of the actual velocity of the air in the booths, and in most cases even a desirable standard was not known. According to the report of a special study made for the Pennsylvania Department of Labor and Industry " * * * even with large flat surfaces, if properly placed in the booth, it is perfectly possible to spray so as to expose the sprayer to a minimum cloud of enamel averaging under 1,000,000 quarter-unit particles per cubic foot, and if air velocities are maintained well over 100 feet per minute this should always be possible. With velocities over 200 feet per minute this should be even easier to obtain * * * " ¹¹

The velocity in the plants usually was determined by the installing engineers of the exhaust equipment, and in a few States the efficient running after installation was checked from time to time by factory inspectors. Only eight plants reported testing of the velocity by their own or other engineers or inspectors, and the other plants relied on a breakdown or marked inefficiency of operating to show when repairs were necessary.

By holding one's hand in the booth near the article sprayed it was possible to get some indication of the movement of air toward the vent. In 6 plants the ventilation appeared excellent as judged by this index and by the absence or small amount of dust on the sprayer.

¹¹ Commonwealth of Pennsylvania. Department of Labor and Industry. Spray Painting in Pennsylvania. Special Bul. No. 16, 1926, pp. 105-108.

In 7 other plants the exhausts seemed fairly effective, but in 13 they were unsatisfactory, as shown by the amount of dust on the workers and the poor pull of air, and in 3 they were so poor as to be almost negligible in effect.

Ventilation in sprayers' booths	Number of firms
Total reporting.....	45
Firms with women sprayers or sprayers' helpers....	37
Excellent.....	6
Good.....	18
Poor.....	13
Bad.....	3
Not reported ²	7

¹ Includes 1 in which ventilation was good in part and poor in part.

² Factory partly closed or men spraying at time of visit.

As already noted, there were differences in the size and type of exhausts in the various booths, and occasionally the location of a booth was such that a current of air seemed to blow back the spray in spite of a good exhaust within the booth. This latter condition was quite marked in five plants.

Rebound.

The extent to which the spray rebounded from the surface varied considerably. In the different booths in the same plant it varied with the angle of the piece sprayed, the pressure in the gun and its distance from the surface, and the position of the sprayer in relation to her work, but in brief it may be said that the rebound was considerable in 10 plants, noticeable in 14, and almost none in 4. As each worker sprayed many pieces differing in size and shape, it was impossible from a mere brief inspection to state more exactly the amount of rebound.

When large flat pieces resting on a horizontal support were being sprayed, the sprayer frequently leaned over her work and came in the direct line of spray as it was drawn up toward the vent. If the metal pieces were placed in an upright or nearly upright position, it seemed more difficult for the exhaust to draw off the spray, and there was likely to be considerable rebound. In the study of spray painting in Pennsylvania last referred to, more particles were found in the air when the piece was placed in an upright or nearly upright position than when it was placed at a different angle. To quote from the report, "Where the pieces sprayed were laid flat or nearly so, * * * no counts ran as high as 2,250,000 and 4 out of 6 ran well under 1,000,000. When the stampings were sprayed upright or only slightly slanting, the lowest of three tests gave over 5,000,000 quarter-unit particles per cubic foot."¹²

Even in booths with exhausts installed and running effectively there is likely to be considerable dust or spray thrown back on the operator if the gun is held too near the work. The women interviewed reported on the distance from the work at which they held the

¹² Ibid., p. 105. ¶

gun and whether or not there was a rebound of spray. These figures follow:

Distance from gun to surface sprayed	197 sprayers reporting on rebound of spray		
	Total	Reporting rebound	Reporting no rebound
Less than 1½ feet.....	14	7	7
1½ and less than 2 feet.....	60	29	31
2 feet.....	111	41	70
Over 2 and including 3 feet.....	12	1	11

From these figures, in spite of the small numbers, there appears to be a distinct relation between the distance of the gun from the surface sprayed and the amount of rebound. Though all but 26 women held the gun 1½ to 2 feet from the surface, there is a definite decrease in the proportion reporting rebound as the distance of the gun from the surface sprayed is increased.

In the study by the Pennsylvania Department of Labor and Industry the fact was brought out that the average sprayer does not actually spray all the time; he must place in the booth the part to be sprayed and must remove it after the spraying; must adjust the rack to the different-sized articles to be sprayed; frequently must wash out the gun; and in a good many cases must clean the booth, all during the regular hours of work. From the results of that study it was felt that a sprayer in a booth was exposed to a hazard for at the most one-half, varying from one-tenth, of his scheduled hours of work.¹³ From observations in the Women's Bureau survey, however, the statement may be made that the general dust in the workroom is heavy with enamel dust even when the worker is not actually spraying, and the cleaning of the booths gives an even greater exposure to enamel dust than does the actual spraying; so the conclusion seems warranted that if there is lead in the enamel, the worker is exposed much of the time even when not actually operating the gun.

Cleaning of spraying booths.

The work of cleaning the booths, including the vents and baffles, usually was accomplished by scraping down the sides with a flat metal scraper and sweeping the enamel from the floor. Washing the booth with a wet cloth or hose ordinarily was done once a week; if the color of the enamel was changed, additional washings were necessary. The cleaning of the booths was done by men in 20 plants, by women in 8, and by both men and women in 8. Women were not employed as sprayers in all the plants, but in some they worked as sprayers' helpers, in which case they assisted the men in the cleaning of the booths.

¹³ Ibid., p. 97.

Persons by whom cleaning of booths was done	Total	Reporting frequency of cleaning			
		Total reporting	Daily	Weekly	Inapplicable, or frequency not reported
Total number of firms.....	45	35	34	1	10
Total firms reporting.....	36	35	34	1	1
Booths cleaned by--					
Men.....	20	20	19	1	
Women.....	8	7	7		1
Both men and women.....	8	8	8		
Inapplicable (no women sprayers).....	9				9

In the home interviews, three-fourths of the women working on cast iron reported that they scraped the enamel from the walls of the booth or helped others to do so, and therefore they were exposed to dust without the safeguard of the exhaust, which was shut off during the cleaning. A somewhat smaller proportion of women working on sheet iron cleaned their own booths or assisted others with the cleaning. The work of cleaning, although not consuming a great deal of time, was commented upon as being especially dusty because of the turning off of the exhausts.

At brushing tables.

Women sprayers, although more exposed to lead than were the brushers, did not constitute the largest group of women workers interviewed. Among those visited there were 297 brushers, in contrast to 239 sprayers. In most cases the brushers were exposed to more dust from the enamel than were the sprayers, for besides the dust from their own work there was the general dust of the workroom, which in many cases contained lead from the cast-iron spraying. The brushing itself was done almost entirely on sheet iron, the enamel for which contained no lead or lead in very small amounts.

According to experts, "The danger done by repeated small doses of lead is lasting; that done by one short exposure to heavily contaminated air is probably transient and leaves no permanent damage."¹⁴ It would appear, therefore, that steady exposure to dust containing only small quantities of lead might result in injury to the workers. In the Pennsylvania study it was found by careful testing that where the material being sprayed contained less than 1 per cent of lead amounts recovered in air tests varied from 0.0134 to 0.245 milligrams per liter. It was found also that in only three of the air tests where material containing over one-tenth of 1 per cent of lead was being sprayed were the tests negative for lead.¹⁵ Therefore, even small amounts of lead in the air may constitute a menace to the health of the worker.

Since the process of brushing dry enamel off the edges of metal is dusty in the extreme and the dust is difficult to control, some precautions should be taken to lessen the amount. In some plants the table tops were of wire mesh instead of solid material, which allowed the enamel dust to fall through to containers underneath that were emptied when necessary. In addition to wire-mesh tops, some tables

¹⁴ Hamilton, Alice. *Industrial Poisons in the United States*. New York. 1925, p. 1.

¹⁵ Commonwealth of Pennsylvania. Department of Labor and Industry. *Spray Painting in Pennsylvania*. Special Bul. No. 16, 1926, p. 96.

were equipped with exhausts under the table and others had narrow exhausts around the edges of the tables that pulled out the dust.

Of the 63 brushers who reported exhausts under or along the edges of their tables, all but 7 considered the working of the exhausts satisfactory. The need for more tables equipped with exhausts or at least with mesh tops was apparent, both from the dust visible at the time of inspections of the plants and from the statements of the women workers. If possible, a different method of removing the superfluous enamel, instead of the brushing process, seems desirable.

In three plants the brushing was done largely by power-driven revolving brushes, which were equipped with hoods and exhausts to pull out the dust. Considerable dust escaped, however, and came back on the worker, because of the large surface brushed and the small area covered by the hood. A hood with wide flares would be better, if not too clumsy to work with.

The brushers complained of dust everywhere, on clothing, face, hair, and hands. One girl said, "I blow my nose or cough and what comes is all green, or blue, or yellow, just like what I spray. It must be bad to be like that inside of you." Because the brushing was done almost entirely on sheet metal and the enamel used on this contained very little lead or none at all, the exposure of the brushers to toxic conditions was much less than that of the sprayers who sprayed cast iron, the enamel for which in most cases contained lead. Many of the plants visited were interested in the problem of eliminating at least some of the dust from the brushing operation, and were planning to install dust-removing equipment.

The cleaning problem of the brushers was quite unlike that of the sprayers. Where the table tops were of wood there was no regular time or method of cleaning them. As one woman said, "When the dust gets too thick you brush it off." This brushing off would occasion little if any more dust than the regular brushing work. Where the table tops were of wire-mesh construction, no cleaning was necessary beyond the emptying of the receptacle under the table. This was done by men or, in about one-half the cases, by the women themselves. In the plants equipped with automatic brushes the exhaust hood carried off much of the dust, but the hood needed occasional cleaning out, and this work usually was done by the operator. None of the methods used in cleaning the brushing equipment caused an increase of dust above that ordinarily incurred in the work.

Personal protection.

Respirators.—The protection afforded by wearing a respirator while working in air containing lead dust is considered by some authorities an important safeguard for the worker. Sharpe, in his tests with respirators, found that an efficient one would reduce the lead content of air from 232 milligrams per 10 cubic meters to between 11 and 12.4 milligrams, and the general findings of the study were "that even if the respirator usually employed does not give complete protection against lead in the atmosphere, it does offer some protection. * * * Therefore we are inclined to feel that whenever material containing over 1 per cent of lead is being sprayed, the man should wear a respirator unless he is working at a spray booth with very good exhaust ventilation."¹⁶

¹⁶ Ibid., p. 97.

From the above it would seem that respirators or masks should have been worn by the sprayers in most of the establishments visited. However, Doctor Hamilton, in a chapter on the prevention of industrial poisoning, says: "No apparatus, respirator, or Army mask, through which a man can breathe with entire ease and comfort while doing heavy work, will serve to hold back all the poisonous dust or vapor in the air. If such a mask is really efficient, it will cause some discomfort and difficulty to the wearer. This means that it is a device for emergency use, not for use during 8 or 10 hours continuously, day in and day out, * * *." ¹⁷

The truth of this statement was confirmed both by the workers who had worn them and by the managements who had supplied them. One superintendent had been forced to take women off the cast-iron spraying because they could not be made to wear their respirators. The men were better about wearing them, but at the time this plant was visited a number of the men were working with their respirators around their necks instead of over their mouths and noses. A very general practice among the women was expressed by one woman, who said "He [the superintendent] told me to put on my 'muzzle,' but I took it off as soon as his back was turned."

In the light of the extreme difficulty of enforcing the rule it is not surprising to find that only 5 of the 45 plants required the wearing of masks or respirators. Only 1 woman in 15 reported the wearing of respirators, and nearly a third of this group wore them only part of the time. A larger proportion of women than this could have worn respirators if they had wished to do so, as a number of plants supplied them when desired, but as one girl said, "They have respirators for us, but I feel better when I take mine off," and another reported, "I could have had one, but didn't want it." In a plant where the enamel used contained considerable lead the women had been taken off spraying because, the superintendent said, "You just can't make them wear respirators and they are always getting sick."

Dress coverings—aprons or coveralls.—There was an apparent need of protection, not only from the air breathed but from the dust that settled on the face, hair, and clothing of the worker. This need was realized so far as covering for the clothes was concerned by eight firms, which required that aprons or coveralls be worn by women. In five of these establishments they were furnished by the management, usually at cost, while in three the girls provided their own. The other plants reporting as to uniforms ¹⁸ had no rules on the subject; it was left to the discretion of the individual worker, who generally was only a little more conscious of the need of protection from the dust than was the management. Less than two-fifths of the women interviewed reported wearing aprons or coveralls.

Head coverings.—Covering for the hair was considered necessary in even fewer firms than was the wearing of uniforms; only 3 of the 45 plants had rules regarding the wearing of caps or head covering. Notwithstanding this small proportion, one-third of the women interviewed wore some head covering. In both spraying and brushing the clothes and hair of the workers became coated with dust, so covering of some sort was needed. Nevertheless, nearly two-thirds of the brushers and almost three-fifths of the sprayers wore no head covering.

¹⁷ Hamilton, Alice. *Industrial Poisons in the United States*. New York. 1925, p. 538.

¹⁸ In 1 plant there was no record as to uniforms.

Hand coverings.—Gloves were required for some operations by six firms. In most cases they were provided by the management or were sold at cost to the women. However, the gloves worn were to protect the hands not from dust, but from the sharp edges of the metal. Had they been worn as a protection against dust, it is doubtful whether they would have served as a safeguard against lead poisoning. Absorption through the skin apparently is possible, but "its practical importance in industry is slight compared with the importance of absorption through the inspired air or even absorption of lead which is conveyed to the mouth on food or tobacco by handling it with lead-smearred fingers."¹⁹

On the whole, few precautions were taken to prevent dust from permeating the skin, clothing, and hair of the worker.

SANITARY AND SERVICE FACILITIES

In any plant where the nature of the work is such that there is considerable dust it is important that the facilities for drinking water and for washing should be sufficient in number and satisfactory as to equipment. When, as in the case of vitreous enameling, much of the dust contains lead, sanitary drinking and washing facilities are of even greater importance than in trades where less injurious dust occurs.

In summing up past experiences as to the means by which lead is absorbed by the system, Doctor Hamilton declares that although the most important entrance is through the nose and lungs—in other words, through dust in the air breathed—it can, nevertheless, enter through the mouth and even through the skin, and after such entrance the distribution within the body is the same as when it is breathed through the lungs except that the action is slower. However, leaded dust absorbed through the mouth and carried thence to the gastrointestinal tract will have far less effect than will the same amount entering through the lungs and going from there directly to the general circulation. "In chronic cases following the absorption of lead by either route the distribution within the body does not differ, and in both modes of absorption there is an almost complete selective localization of lead in the bones." This lead may lie stored in the bones or may get into the blood stream. Through experiments on animals carried on at Harvard between 1922 and 1924 it was found that "the toxic effects are due not to deposits of lead at the site of injury but rather to the 'lead stream'; that is, to the small concentration of soluble lead which is transported in the circulating blood."²⁰

Washing facilities.

As stated before, the danger of lead poisoning, although greatest from particles in the air breathed, is present also when the worker carries lead particles into his body with food or drink. Since this is true, it is important that no food should be eaten without washing the hands and that there should be a special room set aside where meals may be eaten, free from the dust of the workroom. The American Public Health Association gives the following three rules²¹ which all employees exposed to lead should observe before eating:

¹⁹ Hamilton, Alice. *Industrial Poisons in the United States*. New York, 1925, pp. 40-41.

²⁰ *Ibid.*, pp. 40-41, 50, 51, 47.

²¹ Report of Committee on Lead Poisoning, presented to the industrial hygiene section of the American Public Health Association, October, 1929. New York, 1930, p. 33.

1. Thoroughly dust or exchange the outer clothing, or place clothing not subjected to workroom lead exposure over same.
2. Wash the hands and face thoroughly.
3. Clean the finger nails.

To remove dust from the hands thoroughly requires more than cold water. Hot water, soap, individual towels, and, if possible, nail brushes should be provided for the safety and comfort of the workers. All these conveniences were not found in any one plant in the present study, but 4 plants supplied hot water, soap, and towels, 2 hot water and soap, 1 hot water and towels, and 8 hot water only. Thus, the provision of hot water was reported for one-third of the plants. Five plants supplied soap and towels but no hot water, 5 supplied soap only, and 5 towels only. In 13 plants none of these facilities were furnished, and for 2 the reports are incomplete. In many cases the plant facilities were supplemented by towels and soap brought from home by the workers.

Lunch-room provisions.

The places where the regular noon meal was eaten varied widely. In the smaller towns some of the women went home, though in only one establishment was their number considerable. A regular lunch room was provided in 4 plants, and in 5 others there was a combination lunch, cloak, and wash room, equipped with tables and chairs. In 15 plants the cloak room was designated as the place where lunch usually was eaten, in 7 it was reported that the girls usually ate in the workroom, while in a few places they ate in the office, the wash room, or some in one place and some in another. From the women themselves it was learned that they seldom ate in the workroom if any other place was available, because it was "so dusty."

A rule prohibiting the eating of lunch in the workroom was found in 7 enamel departments, although in only 1 plant was much care taken by the management to enforce this regulation or the rule that all must have clean hands before eating. In this enamel department an inspector was appointed whose duty it was to see that the rules were obeyed. Two plants had rules that lunches must be eaten in the lunch room. In 8 of the 31 plants where there were no rules, the girls ate in the lunch room.

It is not surprising, with so many plants failing to supply washing equipment, that only seven firms were conscious enough of possible risk to the worker to have rules that washing must be done before food could be eaten. The women who were interviewed, however, reported almost without exception that they always washed their hands before the noon meal, though some of them added that an apple, candy, or a sandwich frequently was eaten during the morning while working in the spray booth or at the brushing table.

Drinking facilities.

Drinking facilities in the form of bubblers were provided in 34 of the 45 plants, but in only 2 were the bubblers of the sanitary type, where the jet of water issues at an angle from the vertical and can neither fall back nor be forced back on the point of discharge. In 1 of these 2 plants there was an insanitary bubbler also. In 5 of the 11 factories without bubblers, cups were supplied by the workers; common cups were used in 4, and in 2 there was no report as to who furnished the cups.

Cloak rooms.

The greater need in a dusty trade than in others of lunch rooms and wash rooms is almost equally true of cloak rooms. It was necessary in most enamel rooms for the workers to change their dresses and shoes before beginning work, and to change back again at the end of the day. Some provision for change of clothing was made in all the plants visited. In only 4 cases was a separate cloak room supplied; in the other 41, space was provided in lunch room, wash room, toilet compartment, or office. In 14 instances the cloak room and lunch room were combined. This last would appear to be one of the least satisfactory arrangements, on account of the dust from the work clothes. As a rule, the women changed to work dresses or coveralls, or else put on aprons over their dresses. The clothes in which they worked usually were extremely dusty from the enamel, and closed lockers in which to keep them were provided in nearly two-thirds of the plants visited. In the remaining third wall hooks were the usual provision, but one furnished racks and one made no provision, the wraps being hung in the workroom. The need for adequate provision to care for dusty clothes is very apparent in the vitreous-enamel industry, and that this need was realized is clear from the fact that the great majority of firms supplied lockers and that only one firm made no provision for wraps. Increased cloak-room facilities are desirable, however, as in only 4 plants were special rooms provided where clothes could be changed and wraps could be kept.

Rest rooms.

The work of both spraying and brushing is very steady and is carried on under conditions of considerable heat, especially during the summer months. There is, therefore, marked need for a rest room, or if space does not allow of this there should be at least a cot in a cloak room where a worker may lie down if necessary. Few plants, only 6 in all, had any such provision, and in only one of these was there a separate rest room. In the other 5 different provisions were made: One had a cot in a first-aid room and the others a cot or sofa in the cloak room, lunch room, or toilet room. In 39 factories, if a girl fainted or was taken ill, she was laid on the floor until she felt better or could be taken home.

Toilet facilities.

In the majority of the plants visited toilet facilities were sufficient in number and in good condition. Only five were reported in poor repair. Eight were unsatisfactory as to cleanliness, and in 11 plants the method of cleaning was unsatisfactory, as it was done by the workers themselves instead of by a matron or by a janitor after hours. On the whole, the provisions for toilet facilities were more adequate and in better condition than were the washing arrangements and other service facilities.

ENAMELING-PLANT BUILDINGS**Type.**

Since the enameling industry is a comparatively new one, many of the buildings and rooms in which the enamel work was done had been built or at least remodeled for the needs of the industry. Most of the departments were in 1-story buildings. To assist in ventilation the

buildings had high ceilings as a rule, with a skylight of some type that could be opened so as to allow the heat and dust to escape and to give free access to light and air. Many of the skylights were of the monitor type, which gave added height to the ceiling in the center of the room. Four-fifths of the enamel rooms visited had a high point of 20 feet, according to the estimate of the superintendent of the plant and the agent of the Women's Bureau, and a low point of probably 15 feet or over. In only four rooms was the ceiling distinctly low, approximately 12 feet at its lowest point, as judged by a rough estimate.

Certain general conditions of equipment and plant housekeeping affect all workers in a department regardless of their particular occupation, whether spraying, brushing, graining, or hanging on the conveyor line. No matter what the work, if a woman stands or walks all day, the material of the floor is important. A floor made of cement, although satisfactory from the viewpoint of cleanliness and of trucking, is not equally so for the feet of the person standing on it throughout the day. Of the 45 enamel rooms, 31 had cement floors and in only 7 of these were wooden platforms provided for the workers to stand on. The floors in the majority of the workrooms were in good repair and clean, considering the dustiness of the work. Cleaning was done usually by sprinkling damp sawdust on the floor and then sweeping. This method prevented the flying of the dust, which would have been bad for the enamel ware and for the workers. Men did the sweeping that was carried on during working hours.

Heating.

The importance of special heating equipment varies with the locality of the plant and the type of work performed in it. In a clothing factory in the South, for example, artificial heat is not so necessary as in a clothing factory in the North; in a machine shop where small parts are inspected the need of artificial heat is greater than in a laundry, where the industry itself contributes warmth.

As the enamel rooms studied were in the North, there was need of some artificial heat, though the ovens and drying equipment supplied considerable warmth to many of the workers. For others the heat from these was inadequate in winter, as the rooms usually were large, with high ceilings, and the women working at some distance from the ovens profited little by their heat. Special heating equipment for the greater comfort of the workers was found in 27 enamel rooms, but in 16 no heat was furnished except that created by the operating of the industry.

Lighting.

In the majority of cases both natural lighting and artificial lighting were good. Neither spraying nor brushing requires the close watching essential in machine stitching or fine assembling of small parts, but sufficient light is necessary to insure the even spread of the enamel in spraying and care as to the exact line in brushing. The principal failure in natural lighting was its inadequacy throughout in eight plants and its insufficiency in parts of seven plants. In the case of artificial lighting, the amount nearly always was sufficient, but in 15 plants there was glare for some of the workers, especially for those working in the spray booths.

General ventilation.

The facilities for natural ventilation of the workroom by means of windows, doors, and skylights were noted, and also any artificial means, such as electric fans or wall exhausts. In addition to this information regarding the means of ventilation its adequacy from the standpoint of the woman who works every day in the plant was judged by the agent who made the survey. Ventilation, usually by means of windows on two or more sides and with a skylight of the monitor type, appeared to be excellent or good throughout in 23 of the enamel departments.

In 18 plants the dust and heat were such as to make the report "poor" or "bad," and in 1 the conditions were described as fair. Three plants were not running, so no report of these could be made. In 4 plants, in addition to the 23 described as satisfactory throughout, conditions were good in some rooms and not in others.

Artificial ventilation, usually wall exhausts or exhaust pipes at the feed and take-off ends of the dryer or continuous ovens, was found in 13 establishments. These exhausts seemed to be effective in 6 departments and partially so in 3 others. In a few plants there were fans in some parts of the workrooms, but these could not be very near the workers because of the dust.

In a plant that was visited but not included in the survey because no women were employed the ventilation on a warm day in summer was such as to make the temperature comfortable. This room was equipped with an overhead carrier system through which cool air was forced. The vents were at such an angle that no air blew on the workers, and in spite of the fact that the ovens and dryers were in operation the room was cool.

INTERVIEWS WITH WOMEN IN THE INDUSTRY

In this study of women employed in vitreous enamel workrooms the personal interviews with the women throw much light on the conditions under which they worked and the effect on their physical well-being. A total of 686 women from 39 of the establishments included in the study were visited in their homes. This is an average of between 17 and 18 women per plant, but the number varied from 1 of the 5 women employed in one establishment to 53 of the 69 employed in another. This variation was caused partly by the number in the plant and partly by the inability to locate women who had moved, but the findings of the interviews also were taken into consideration. Thus, all the women were visited who were employed in plants where the enamel was known to contain lead, but only a limited number of visits were made, unless suspicious symptoms were reported by the women, where no lead was reported by the employing company or the lead content was not known.

Occupation.

As noted previously, the two major woman-employing occupations in the enamel room are spraying and brushing, and more than three-fourths of the women visited were thus employed. Although the women brushers were the largest group in the 45 plants, the proportion of brushers visited in their homes was not so great as that of sprayers. This was the case for two reasons: (1) The brushers were a less skilled group than the sprayers and as a rule received less pay, so that their turnover was considerably higher and addresses were less reliable; (2) the brushers worked on sheet metal to a much greater extent than did the sprayers, and the enamel for this generally contained little or no lead. Since the enamel for cast iron, on which many of the sprayers were employed, usually was a lead enamel, as many sprayers as possible were visited.

Women other than sprayers and brushers constituted only 22 per cent of all who were interviewed.

The 686 women were distributed by occupation as follows: Brushers, 297; sprayers, 239; dippers, 44; grainers and patchers, 32; others 72.

Age and occupation.

To quote from Doctor Hamilton: "The younger the patient the smaller the dose is the rule in medical practice with, of course, some striking exceptions. Since we know of no such exceptions among the industrial poisons, it is safe to conclude that boys and girls are more susceptible to them than are grown people." In some countries certain occupations with seemingly slight exposure, such as sweeping out the floor of a printing shop (in Norway) or working in the stereotype department (in Denmark), are forbidden to young persons.¹

In the present study the proportion of the 685 women reporting their age who were under 20 years was a little over one-fourth (26.6 per cent). This was about the same per cent as was found in cotton

¹ Hamilton, Alice. Industrial Poisons in the United States. New York, 1925, p. 12.

mills in a study made by the Women's Bureau (27.5 per cent) and a lower proportion than was shown for women in varied industries as reported in State studies of Illinois and New Jersey, where the women under 20 were in each case 32.2 per cent of the total.²

TABLE 2.—Age, by occupation

Occupation	686 vitreous enamel workers								
	Total	Total reporting age		Under 20 years		20 and under 30 years		30 years and over	
		Number	Per cent	Number	Per cent	Number	Per cent	Number	Per cent
Total.....	686	685	100.0	182	26.6	355	51.8	148	21.6
Spraying.....	239	239	100.0	60	25.1	135	56.5	44	18.4
Brushing.....	297	296	100.0	91	30.7	146	49.3	59	19.9
Dipping.....	44	44	(1)	9	22	22	50.0	13	27.8
Graining and patching.....	34	34	(1)	6	16	16	50.0	12	27.8
Other.....	72	72	100.0	16	22.2	36	50.0	20	27.8

¹ Not computed; base less than 50.

The largest group of women working with vitreous enamel were 20 and less than 30 years of age (51.8 per cent). This is a much higher per cent than was found in the two State studies, where the per cent was 40.8 in one and 39.8 in the other, and an even greater contrast to that in cotton manufacturing, where only 34.7 per cent were 20 and less than 30 years of age.

Two of the groups together include the women who, according to Sir Thomas Oliver, are most susceptible to lead poisoning, namely, those from 18 to 23 years.³ The proportion of older women, those of 30 years of age or more, was lower in the vitreous enamel industry than in general industry or in cotton mills, according to findings in the surveys above mentioned.

Within the occupational divisions of the enamel industry a larger proportion of the women employed in brushing than of those in spraying were under 20 years. This would naturally be the case where the job, as in brushing, requires but little skill. Among those 30 years of age or older the proportions spraying and brushing were more nearly alike, 18.4 per cent and 19.9 per cent, respectively. In the occupations other than spraying and brushing considerably larger proportions of the women were at least 30 years of age. (For greater detail see Table I in the Appendix.)

Marital status.

It is not surprising to find the proportion of married women unusually large in the enamel industry, where more than one-half of the women were between the ages of 20 and 30 years. Over two-fifths (43.4 per cent) of the women were married. This is a larger proportion than that found in cotton mills, where the per cent was unusually high (40), and a much greater proportion than in all industries in the

² U. S. Department of Labor. Women's Bureau. Lost Time and Labor Turnover in Cotton Mills, Bul. 52, 1923, p. 26; Women in Illinois Industries, Bul. 51, 1923, p. 9; and Women in New Jersey Industries, Bul. 37, 1924, p. 8.

³ Oliver, Thomas. Dangerous Trades. London, 1902, p. 296.

two State studies referred to, Illinois and New Jersey.⁴ The widowed, separated, and divorced women were less than 10 per cent (8.6) of the total, and the single women a little less than one-half (48 per cent).

TABLE 3.—*Marital status, by occupation*

Occupation	686 vitreous enamel workers reporting marital status							
	Total		Single		Married		Widowed, separated, or divorced	
	Number	Per cent	Number	Per cent	Number	Per cent	Number	Per cent
Total.....	686	100.0	329	48.0	298	43.4	59	8.6
Spraying.....	239	100.0	116	48.5	99	41.4	24	10.0
Brushing.....	297	100.0	141	47.5	136	45.8	20	6.7
Dipping.....	44	(¹)	19	-----	24	-----	1	-----
Graining and patching.....	34	(¹)	15	-----	14	-----	5	-----
Other.....	72	100.0	38	52.8	25	34.7	9	12.5

¹ Not computed; base less than 50.

The largest proportion of married women in any single occupation, 45.8 per cent, was in the brushing group, though spraying, with 41.4 per cent, followed closely. Brushing is the dustiest job, but the exposure to dust containing lead is considerably less than in spraying.

In addition to the injurious effects of lead on the women themselves the danger to future generations is great. Although the percentage of married women was high among those included in the study, some were beyond the child-bearing age and some had been married only a few months. Of the 157 women who had been married either before or during the time in which they worked in the enamel rooms, who had worked there for one year or longer, and who had been married for at least a year, 114 (72.6 per cent) reported no children. Only 41 (26.1 per cent) reported living children born since their first employment in enamel work. In 2 cases mothers reported the birth of children who lived but a short time. In addition to these 157 there were 7 women, some of whom had worked in enamel less than one year, and who had been married less than one year, who reported a miscarriage. Of the total 164 women whose maternal histories were reported, three-tenths (30.5 per cent) had become pregnant during or subsequent to the time of their employment in enamel work, and of these pregnancies about 1 in 7 (14 per cent) had resulted in miscarriages.

In considering these figures it must be remembered that although the majority of women worked in dust having a lead content, there were some who worked in shops or workrooms where a leadless enamel was used, and therefore the entire group of 164 women may not have been exposed to the effects of lead. It is probable, however, that the majority of the women had been exposed to some lead dust, the amount varying with the kind of enamel and the character of the work. This statement is based on the fact that all the women were

⁴ U. S. Department of Labor. Women's Bureau. Lost Time and Labor Turnover in Cotton Mills, Bul. No. 52, p. 148; Women in Illinois Industries, Bul. No. 51, p. 9; and Women in New Jersey Industries, Bul. No. 37, p. 65.

visited who were employed in plants where the enamel was known to contain lead, but only a limited number of visits were made, unless suspicious symptoms were reported by the women, where no lead was reported by the employing company or the lead content was not known.

Of a group of women in England, facts concerning whom were obtained from the reports of 11 factory inspectors, it was found that from 212 pregnancies among 77 married women lead workers only 61 living children resulted.⁵ Figures showing the worse effects on the offspring of women who worked with lead after marriage as compared with those working with it before marriage are quoted by Sir Thomas Oliver. The number of miscarriages and stillbirths among 100 women were 86 where women worked in lead before marriage and 135.5 where they worked in lead after marriage, as compared with 43.2 for those mothers engaged in housework. The deaths of infants under 1 year were 157 per 1,000 of the infants born to mothers engaged in lead work before marriage and 271 per 1,000 of the infants born to mothers engaged in lead work after marriage.⁶

Not only is the infant mortality rate very high, but the children of leaded mothers who do survive are less strong than the children of mothers free from lead, according to Prendergast (*British Medical Journal*, May, 1910), who had a large experience in the English pottery towns.

Symptoms of lead poisoning are often confused with those of other diseases, and for this reason progress in combating the condition has been much delayed. According to Linenthal (*Early Diagnosis of Lead Poisoning*, in Kober and Hanson's *Diseases of Occupation and Vocational Hygiene*), "The symptoms of early plumbism are not well defined, yet there is a group of symptoms which, when not open to explanation on any other basis, must, when a history of exposure to contact with lead has been obtained, be taken as evidence of early lead poison." Doctor Hamilton makes the following statement: "The diagnosis of lead poisoning can not be based upon any one clinical finding, nor upon an entirely typical symptom complex, but rather must depend upon a more or less varying group of subjective symptoms together with one or more objective signs occurring in a person whose occupation is known to involve exposure to lead."⁷ Dr. Wade Wright found that many of the symptoms in the early stages of lead poison were common to other complaints and that subjective feelings were very important in making a diagnosis.⁷ Naegeli says that too little emphasis has been laid on the variability of lead poisoning, on the fact that many cases are monosymptomatic, and the diagnosis must depend not on objective findings but on the word of the patient. (*Blutkrankheiten u. Blutdiagnostik*, Berlin, 1919.)

THE PRESENCE OF SYMPTOMS

According to Dr. Marvin D. Shie, of the United States Public Health Service (*Industrial Lead Poisoning*, *Journal of American Medical Society*, March, 1921), who has examined more than 900 lead workers,

⁵ Legge, Thomas M. *Industrial Lead Poisoning*. In *Journal of Hygiene*, Cambridge, January, 1901, p. 104.

⁶ Oliver, Thomas. *A Lecture on Lead Poisoning and the Race*. In the *British Medical Journal*, 1911, p. 1096.

⁷ Hamilton, Alice. *Industrial Poisons in the United States*. New York, 1925, pp. 94, 104.

symptoms to be looked for in lead workers are pallor, muscular weakness, headaches, general asthenia, anorexia, especially for breakfast, constipation, rheumatism, muscular tenderness, abdominal pains, and nervousness. In a report by the Public Health Service of lead poisoning in the pottery trades the preliminary symptoms of lead poisoning termed "suggestive" coincide with practically all of 12 symptoms given by Doctor Hamilton to the agents of the Women's Bureau for securing facts regarding symptoms in this study: Indigestion, headache, constipation, loss of morning appetite, loss of weight, metallic or sweet taste in mouth, nervousness, menstrual disturbance, dizziness, pains in joints, tremors, and loss of sleep.

Among the women who were visited in their homes and who reported on symptoms, 3 in 10 reported one or more of the foregoing suggestive symptoms as occurring during the period in which they worked on enamel. About one-third of these women reported only a single symptom, but more than one-fourth reported five or more. (See Table II in the Appendix.) This is a large proportion of women reporting five or more suggestive symptoms, compared with only 1 of a group of 72 leaded persons reported by Apfelbach as suffering from six of the cardinal symptoms. These cardinal symptoms as listed by him are colic, constipation, pallor and anemia, blue line, stippled cells, and tremor.⁸

Kind of enamel and the metal worked upon.

As each plant was visited questions were asked the management as to the lead content of the principal vitreous enamels used in coating the metal surfaces. In the majority of cases it was not possible to obtain an answer to this question. Either the enamel was bought already fritted from another company or it was made at another plant in their own organization, or if made on the premises the amount of lead in the frit was known but not the amount of soluble lead after it was fritted. Samples from many of the plants were sent to the Women's Bureau for analysis by the United States Bureau of Standards, which gave its service in the making of these tests.

According to the findings of the Bureau of Standards on the soluble lead content for the enamels used, and the statements of the other firms that lead was used in some of the principal enamels, approximately three-fourths of the women were employed in plants that used lead enamel. Twelve plants reported no lead in the enamels on which women were working and eight reported no lead in the principal enamels used in their enamel department, whether the work was on sheet or cast iron. Six of these eight fritted their own enamel and two bought it from a firm that makes a specialty of a leadless cast-iron enamel. The absence of lead symptoms reported in the home interviews with the women in these eight plants confirmed in most cases the statements of the managements.

In the following summary the number of women engaged in plants in which lead was known to be present, and in plants in which the report was negative or the presence of lead was not reported, is correlated with the number of symptoms reported.

⁸ Apfelbach, George L. The Early Diagnosis of Lead Poisoning. In American Journal of the Medical Sciences, December, 1918, vol. 156, p. 783.

Presence of lead in enamel	Women reporting on whether or not they had symptoms	Women with 1 or more symptoms		Women with 5 or more symptoms	
		Number	Per cent	Number	Per cent ¹
Total.....	670	² 198	29.6	53	² 7.9
Lead in enamel.....	490	² 154	31.4	43	² 8.8
No lead or unknown.....	180	44	24.4	10	5.6

¹ Per cent based on total reporting on symptoms.

² Includes 4 women who reported symptoms but not specified number—2 less than 5, 2 not reported.

² 2 women not reporting as to 5 or more are excluded from base.

From the foregoing figures it will be seen that of the women who reported on symptoms in plants using a lead enamel 31 per cent stated that they had one or more symptoms and nearly 9 per cent that they had five or more, while in plants reporting negatively or not at all the proportion was less than 25 per cent with one or more symptoms and 5.6 per cent with five or more. Although these differences are not so great as might be expected, they are significant, and probably would have been greater had there been no unknown combined with the report of no lead in the enamels. (For further details see Table II in the Appendix.)

There was considerable variety in the plants visited in the extent to which parts were made of sheet metal or of cast iron, and there appeared to be an increasing tendency to make the entire stove of sheet metal with the exception of the grids. This would result eventually in the elimination or marked decrease of the exposure to lead, since sheet-metal enamels contain little or no lead.

The women interviewed generally knew whether they worked on cast iron, sheet iron, or both cast and sheet iron. It was found that the proportion of women with one or more symptoms was almost one-half (48.6 per cent) for the women working on cast iron, much higher than for those working on sheet metal. As many as 21 per cent of the women working on cast iron reported five or more symptoms, compared to less than 5 per cent of the women working on sheet metal.

Metal worked upon	Women reporting on whether or not they had symptoms	Women with 1 or more symptoms		Women with 5 or more symptoms	
		Number	Per cent	Number	Per cent
Cast iron ¹	138	67	48.6	29	21.0
Sheet iron.....	532	131	24.6	24	² 4.5

¹ Includes those working part of the time on cast iron and part on sheet iron.

² 2 women not reporting as to 5 or more are excluded from base.

Sprayers and brushers.

The percentage of women reporting that they had symptoms was considerably higher among the sprayers than among the brushers. Almost two-fifths (38.2 per cent) of the sprayers reported one or more symptoms and about one-eighth (13.7 per cent) reported five or more.

The fact that the work of the brushers, although dustier than that of the sprayers, was less likely to involve use of enamel containing lead, was shown in the lower proportion of brushers reporting one or more symptoms. Less than one-fourth (24.7 per cent) of the brushers reported one or more symptoms, and only about one-twentieth (5.5 per cent) reported five or more. When the number of women reporting symptoms is divided into the aggregate of all symptoms reported, it appears that sprayers averaged 4.1 symptoms per woman where the plant used a lead enamel and 2.9 symptoms per woman where there was no lead or it was unknown. For the brushers, however, the corresponding averages are 3 and 3.1.

Occupational group	Women reporting on whether or not they had symptoms	Women with 1 or more symptoms		Women with 5 or more symptoms	
		Number	Per cent	Number	Per cent ¹
Sprayers.....	233	89	38.2	32	13.7
Brushers.....	291	72	24.7	16	5.5

¹ Per cent based on total number.

² 2 women not reporting as to 5 or more are excluded from base.

The higher percentage of sprayers than of brushers reporting suspicious symptoms was due largely, without doubt, to the difference in the kind of iron worked on. This is clearly shown by the proportion of the sprayers, nearly two-fifths, and of the brushers, less than one-tenth, who worked all or part of their time on cast iron. Furthermore, when the total number of symptoms is averaged among the women reporting them, it is found that they average 5 symptoms per sprayer working on cast iron and only 2.7 per sprayer working on sheet iron, and they average 3.7 symptoms per brusher working on cast iron and only 2.8 per brusher working on sheet iron.

Occupational group	Women reporting on whether or not they had symptoms		Women with one or more symptoms		Women with 5 or more symptoms	
	Number	Per cent	Number	Per cent	Number	Per cent
Sprayers.....	233	100.0	89	100.0	32	(1)
Working on cast iron.....	91	39.1	48	53.9	24	
Working on sheet iron.....	142	60.9	41	46.1	8	
Brushers.....	291	100.0	72	100.0	16	(1)
Working on cast iron.....	27	9.3	13	18.1	4	
Working on sheet iron.....	264	90.7	59	81.9	12	

¹ Not computed; base less than 50.

Other occupations.

The other occupational groups were composed of fewer women. The summary following shows the number in each group reporting on symptoms, the number reporting one or more, and the number reporting five or more.

Occupational group	Women reporting on whether or not they had symptoms	Women with 1 or more symptoms		Women with 5 or more symptoms	
		Number	Per cent	Number	Per cent
Dippers.....	41	10	(1)	2	(1)
Grainers and patchers.....	34	10	(1)	2	(1)
Other occupations.....	71	17	² 23.9	1	² 1.4

¹ Per cent not computed; base less than 50.

² Per cent based on total number reporting whether or not they had symptoms.

As will be seen from the foregoing, the proportion reporting one or more symptoms in this residual group is about one-fourth. This is about the same proportion as was found for the brushers, and a considerably smaller one than for the sprayers. Only 1 of 71 reported 5 or more symptoms.

Types and frequency of symptoms.

Doctor Hamilton has already been quoted as saying that "the diagnosis of lead poisoning can not be based upon any one clinical finding," and Naegeli declares that "too little emphasis has been laid on the variability of lead poisoning, on the fact that many cases are 'monosymptomatic' and the diagnosis must depend not on objective findings but on the word of the patient." As explained previously, the findings of the Women's Bureau in this study have been based on the word of the patient as to her symptoms. Although about two-thirds of the women reporting number of symptoms had more than one, the relative frequency of the specific symptoms varied considerably.

Symptom	198 women reporting 1 or more symptoms	
	Number	Per cent
Loss of weight.....	98	49.5
Headache.....	87	43.9
Metallic or sweet taste.....	82	41.4
Indigestion.....	79	39.9
Loss of appetite.....	70	35.4
Constipation.....	65	32.8
Dizziness.....	55	27.8
Menstrual disturbance.....	43	21.7
Nervousness.....	28	14.1
Pains in joints.....	23	11.6
Tremors.....	19	9.6
Loss of sleep.....	18	9.1

The foregoing summary gives some idea of the frequency of the various symptoms among the 198 women who reported one or more. Loss of weight, headache, metallic or sweet taste, indigestion, loss of appetite, and constipation were reported in one-third to one-half of the cases, while the three symptoms reported least often, in about 10 per cent of the cases, were pains in joints, tremors, and loss of sleep. Constipation, although sixth in rank in the list, shows less than its real prevalence because of the fact that often this trouble had occurred before as well as during the enamel period, and in such cases

it was not listed as a symptom occurring during the enamel period of employment. (For details see Tables IV and V in the Appendix.)

In no case was the percentage reporting any single symptom as high as was found by Naegeli, who in 200 cases of lead poisoning found constipation present in 90 per cent and colic in 89.5 per cent. These percentages showing constipation were higher than that found by Apfelbach in his series of 72 cases, where constipation was the most frequent symptom, occurring in 81.9 per cent of the cases. Both these examples, however, were among established cases of poisoning, while the women in the present study were given no physical examination, and the symptoms here recorded are those reported by the women themselves that would be classed under the United States Public Health Service term "suspicious symptoms" when combined with exposure to lead.

In this study no one symptom was reported by the women so frequently as in the studies of Naegeli and Apfelbach, quoted above, but the number of women reporting three or more symptoms was high. Of the women reporting number of symptoms, a little more than one-half had three or more; and of these cases, loss of weight, indigestion, and metallic or sweet taste were the three occurring most frequently.

Symptom	104 women reporting 3 or more symptoms	
	Number	Per cent
Loss of weight.....	67	65.7
Indigestion.....	66	64.7
Metallic or sweet taste.....	61	59.8
Headache.....	60	58.8
Loss of appetite.....	59	57.8
Constipation.....	58	56.9
Dizziness.....	49	48.0
Menstrual disturbance.....	33	32.4
Nervousness.....	24	23.5
Pains in joints.....	19	18.6
Tremors.....	18	17.6
Loss of sleep.....	18	17.6

A very marked difference was found between the percentage of sprayers and the percentage of brushers reporting three or more symptoms. About one-fourth (24.1 per cent) of the sprayers, in contrast to a little over one-tenth (11.1 per cent) of the brushers, reported three or more symptoms. These percentages confirm the findings in the other correlations of symptoms and show the result of the greater exposure of the sprayers to lead in the enamels with which they work.

There was considerable difference in the relative frequency of certain symptoms among the sprayers and among the brushers. The proportions having constipation, indigestion, nervousness, menstrual disturbance, metallic or sweet taste, and loss of appetite were much larger among the sprayers than among the brushers. The only two symptoms more common among brushers than among sprayers were loss of weight and headache, which greatly outranked all others among the women engaged in brushing. Among the sprayers, on the other hand, indigestion, metallic or sweet taste, and loss of weight, in the order named, were reported most frequently.

(For comparisons of other occupations see Tables IV and V in the Appendix.)

Symptom	89 sprayers reporting 1 or more symptoms		72 brushers reporting 1 or more symptoms	
	Number	Per cent	Number	Per cent
Loss of weight.....	43	48.3	36	50.0
Headache.....	39	43.8	35	48.6
Metallic or sweet taste.....	44	49.4	23	31.9
Indigestion.....	47	52.8	22	30.6
Loss of appetite.....	37	41.6	25	34.7
Constipation.....	38	42.7	17	23.6
Dizziness.....	27	30.3	19	26.4
Menstrual disturbance.....	26	29.2	13	18.1
Nervousness.....	15	16.9	8	11.1
Pains in joints.....	13	14.6	8	11.1
Tremors.....	10	11.2	5	6.9
Loss of sleep.....	10	11.2	5	6.9

As indicated previously, the percentage of women reporting symptoms was much higher among cast-iron than among sheet-iron workers. The difference is equally striking when specific symptoms are considered.

Symptom	67 cast-iron workers reporting 1 or more symptoms		131 sheet-iron workers reporting 1 or more symptoms	
	Number	Per cent	Number	Per cent
Indigestion.....	43	64.2	36	27.5
Metallic or sweet taste.....	37	55.2	45	34.4
Constipation.....	33	49.3	32	24.4
Loss of weight.....	33	49.3	65	49.6
Headache.....	33	49.3	54	41.2
Loss of appetite.....	29	43.3	41	31.3
Dizziness.....	25	37.3	30	22.9
Menstrual disturbance.....	17	25.4	26	19.8
Nervousness.....	16	23.9	12	9.2
Pains in joints.....	13	19.4	10	7.6
Tremors.....	11	16.4	8	6.1
Loss of sleep.....	10	14.9	8	6.1

For all these symptoms but one the proportion of women affected is higher in the group working on cast iron than in the group working on sheet iron, the differences in per cents ranging from 5.6 to 36.7 points. The one exception is loss of weight, the symptom reported most frequently by the brushers. The most important symptoms—that is, those occurring most frequently—among women working on cast-iron enamel were indigestion, metallic or sweet taste, and (third in rank and of equal importance) constipation, loss of weight, and headache, followed by loss of appetite. For women working on sheet-iron enamel the same 6 symptoms were the most important though not in the same sequence. All but one of these symptoms—loss of weight—showed a much lower percentage for sheet-iron than for cast-iron enamel workers. (For further detail see Table V in the Appendix.)

According to Walko, who studied 43 cases of acute gastric plumbism in a hospital in Prague (*Die Erkrankungen des Magens bei der chronischen Bleivergiftung*, München med. Wehnschr. 1907), the symptoms first observed are loss of appetite, metallic taste, nausea,

vomiting, constipation, and pain in the region of the umbilicus. Three of these symptoms—loss of appetite, constipation, and metallic taste—were reported by two-fifths to well over one-half of the women working on cast iron, but by very much less proportions of the women working on sheet iron.

Symptoms and length of service.

Owing to the well-attested fact of considerable differences in susceptibility of individuals to lead poison, it is not surprising to find in the summaries next presented wide differences that only X, or the unknown quantity of susceptibility, can account for. This varying degree of individual susceptibility is shown by the very wide differences in the length of service reported by the women with one or more symptoms. At the two extremes of length of service were approximately the same number of women who reported symptoms, 10 women who had worked less than a month—4 less than two weeks—and 9 with from 5 to 10 years' experience. (See Table VII in the Appendix.)

Length of service	664 women reporting length of service and whether or not they had symptoms			
	Total women		Women with symptoms	
	Number	Per cent	Number	Per cent
Total.....	664	100.0	196	100.0
Less than 1 year.....	345	52.0	99	50.5
1 and less than 2 years.....	115	17.3	39	19.9
2 and less than 3 years.....	58	8.7	13	6.6
3 and less than 4 years.....	63	9.5	22	11.2
4 and less than 5 years.....	35	5.3	14	7.1
5 years and over.....	48	7.2	9	4.6

Perhaps the most striking fact in the foregoing summary is that one-half (50.5 per cent) of the women reporting symptoms had been employed in the industry less than a year. This proportion reporting symptoms after less than a year's experience is almost equal to the proportion with less than a year's experience among all the 664 (52 per cent). It is much higher than was found by Tanqueral in a study of 112 cases of palsy caused by lead exposure. (Lead Diseases, translated by Samuel L. Dana, 1850.) He found only 19.6 per cent of the cases to have had less than a year's experience, but all his cases were advanced enough to show palsy and not merely suspicious symptoms that would indicate only the early stages of poisoning.

One in five of the women with symptoms had been 1 and under 2 years in the industry and 1 in 9 had been there 3 and under 4 years.

The smallest proportion in any experience group who reported that they had symptoms is the 9 women so reporting after 5 or more years in the industry. These comprise less than 1 in 5 (18.8 per cent) of the total of 48 with such experience. This comparatively small proportion of women reporting symptoms in the longer-service group is without doubt due to the elimination of the workers more susceptible to lead poisoning, so that those remaining would be a picked group compared with workers in the shorter-service periods.

In view of the fact that many women gave up the work when they felt ill, there is more correlation between length of service and the symptoms reported than might at first appear. It is well to remember in the correlation of symptoms and length of service that the latter was not necessarily the period in which the symptom was first felt. One woman might have been suffering for several years before the interview, while another might only recently have felt the ill effects she described.

It is clear from the summary next presented that the sprayers had had more years in the industry than had the brushers. Almost 30 per cent of the sprayers, in contrast to 17 per cent of the brushers, had been at least 3 years in the industry.

Of the sprayers and brushers who reported symptoms and the length of time they had been in the industry, the groups with experience of less than a year show 42.6 per cent of the sprayers, in contrast to only 23.3 per cent of the brushers, as having one or more symptoms. Of those reporting symptoms, a larger proportion of the brushers (56.9 per cent) than of the sprayers (49.4 per cent) had worked less than a year, and a much larger proportion of the brushers had worked 1 and under 2 years. (See Table VII in the Appendix.)

Length of service	229 sprayers reporting length of service and whether or not they had symptoms				290 brushers reporting length of service and whether or not they had symptoms			
	Total		Women with symptoms		Total		Women with symptoms	
	Number	Per cent	Number	Per cent	Number	Per cent	Number	Per cent
Total.....	229	100.0	87	100.0	290	100.0	72	100.0
Less than 1 year.....	101	44.1	43	49.4	176	60.7	41	56.9
1 and less than 2 years.....	37	16.2	12	13.8	48	16.6	17	23.6
2 and less than 3 years.....	25	10.9	6	6.9	18	6.2	4	5.6
3 and less than 4 years.....	30	13.1	17	19.5	24	8.3	3	4.2
4 and less than 5 years.....	14	6.1	4	4.6	11	3.8	5	6.9
5 years and over.....	22	9.6	5	5.7	13	4.5	2	2.8

Symptoms and age.

As noted previously, in the records of exposure to lead and other poisons young workers have shown themselves more susceptible than older persons, and several countries, because of such findings, have prohibited the employment of young persons on processes involving even slight exposure. The International Labor Bureau advocates that certain occupations involving the use of lead should be forbidden to women and to lads under 18 years, and the American Public Health Association advises against the employing of workers under 21 years of age in any occupation where lead is used.⁹

Little definite information is available as to the relative susceptibility to lead poison of young workers and of older workers. In the present study the degree of exposure varied greatly with the kind of enamel and the metal worked upon, and with this in mind the following figures regarding age and number of symptoms are presented.

⁹ Report of Committee on Lead Poisoning, presented to the industrial hygiene section of American Public Health Association, October, 1929. New York, 1930, p. 30.

Age	Total women reporting on symptoms and age		Women with symptoms	
	Number	Per cent	Number	Per cent
Total.....	669	100.0	197	100.0
Under 20 years.....	182	27.2	46	23.4
20 and under 25 years.....	231	34.5	70	35.5
25 and under 30 years.....	115	17.2	42	21.3
30 and under 40 years.....	96	14.3	30	15.2
40 and under 50 years.....	37	5.5	7	3.6
50 years and over.....	8	1.2	2	1.0

Taking all the women, regardless of occupation, the age distribution of those reporting symptoms differs in no striking way from the distribution of the total 669. The total has a somewhat larger proportion under 20 years and the group with symptoms a somewhat larger proportion 25 and under 30 years; 1 in 4 of the women under 20, 1 in 5 of those 40 or more, and about 1 in 3 of those in the age groups between reported the presence of symptoms.

It is when the sprayers and brushers are distributed according to age that interesting contrasts appear. Of all the sprayers, 25.8 per cent were under 20, but of the sprayers with symptoms of poisoning 27 per cent were under 20. As many as 31.4 per cent of all the brushers, but only 25.4 per cent of those with symptoms, were under 20. The greater hazard for the sprayers is indicated further by these striking figures:

Of the sprayers under 20 years, 40 per cent had symptoms of poisoning; of the brushers in this age group, 19.8 per cent had symptoms.

Of the sprayers 20 and under 25 years old, 38.3 per cent had symptoms; of the brushers, 23.7 per cent.

Of the sprayers 25 and under 30 years, 40.8 per cent had symptoms; of the brushers, 37 per cent.

Of the sprayers 30 years or more, 32.6 per cent had symptoms; of the brushers, 23.2 per cent.

These figures for the sprayers, who composed the occupational group most exposed to lead, would appear to confirm the belief that young persons are more susceptible to lead poison than older workers.

Age	Sprayers				Brushers			
	Total reporting on symptoms		Women with symptoms		Total reporting on symptoms		Women with symptoms	
	Number	Per cent	Number	Per cent	Number	Per cent	Number	Per cent
Total.....	233	100.0	89	100.0	290	100.0	71	100.0
16 and under 18 years.....	19	8.2	8	9.0	22	11.0	6	8.5
18 and under 20 years.....	41	17.6	16	18.0	59	20.3	12	16.9
20 and under 25 years.....	81	34.8	31	34.8	97	33.4	23	32.4
25 and under 30 years.....	49	21.0	20	22.5	46	15.9	17	23.9
30 and under 40 years.....	31	13.3	11	12.4	38	13.1	9	12.7
40 years and over.....	12	5.2	3	3.4	18	6.2	4	5.6

ABSENCES AND SEPARATIONS

In most studies of absence and labor turnover great emphasis has been laid on their cost to the employer. Nevertheless, Professor Slichter, in his book *The Turnover of Factory Labor*,¹⁰ shows that labor turnover is costly both to the workers and to the public. The workman usually undergoes a period of unemployment and frequently must learn a new job. There is a loss to the public of social income and an increase of cost due to the greater accident frequency during the learning period on the new job. If to these is added another hazard, that of exposure to a poisonous substance, the burden which they and the management already bear becomes heavier.

Excessive absence has been called incipient turnover, as it is indicative of unrest and dissatisfaction and frequently results in a final separation. Both turnover and absence may be an indirect result of the work, but may be affected also by many other factors. Unrelated to cause, therefore, the mere figures for excessive absence and turnover mean little.

In figures on turnover collected by the Bureau of Labor Statistics over a period of years there was found a noticeable decline in voluntary quitting when the lay-offs increased.¹¹ It is reasonable also that voluntary lost time should be less when work is scarce and there is much unemployment. These facts being true, rates alone of either separations or absences are of little significance; therefore, figures are used in this report only in connection with the cause of such separation or absence.

The general depression beginning in the fall of 1929 was felt in the enameling industry and resulted in many lay-offs and much short-time work in the various plants. It also rendered difficult the obtaining of work in other industries, thus making voluntary separations extremely low and lay-offs so high as to overshadow all other causes of separation. The reasons given for absences also were affected by the irregularity of work. Short lay-offs were so numerous and so impressed the workers that again and again their reports read, "I never lost time last year when there was any work; all my absences were because I was laid off." Many of the women who suffered a separation had left because of lack of work and would have been glad to return to their enamel work had it been possible.

Records were copied for all absences from work in the year immediately preceding the visit to the plant and the causes of absences or separations were secured so far as possible from the women at time of interview.

The women for whom data were obtained from pay rolls and who were interviewed later in their homes have been classified in three groups: (1) Women who were reasonably permanent, that is, on the pay roll at the beginning and end of the year and with no absences of as much as a month; (2) women who, although still employed by the company, had worked intermittently and had been absent for a month or more at a time; and (3) women who had left during the year and had not returned, that is, who suffered a separation.

¹⁰ Slichter, Sumner H. *The Turnover of Factory Labor*. New York, 1919, pp. 5, 6.

¹¹ See *Monthly Labor Review*, June 1920, pp. 36-56.

Employment	All women	
	Number	Per cent
Total.....	686	100.0
Continuous.....	273	39.8
Intermittent.....	68	9.9
Terminated.....	345	50.3

It should be noted that these figures considerably underestimate the proportion of those leaving to those still at work, because many of the former had moved away and could not be interviewed. However, from the summary it is clear that more than one-half of the women interviewed had lost their employment during the year for which records were taken.

Though in most plants absences of a month or more are termed separations, the 68 women with such absences in the present study are not classed as separations but as intermittently employed.

Separations and length of service.

Among the 345 women who had terminated their employment, 342 reported the time worked in the enameling industry. (See Table VIII in the Appendix.) Of these, 70.8 per cent had worked less than a year and over one-half (56.7 per cent) had worked less than 6 months. A high percentage of women leaving with less than a year of service is not peculiar to this industry. It was found in a study of four textile mills made by the Wharton School that the employees leaving with less than a year of service varied from a low of 52.9 per cent in one mill to a high of 88.4 per cent in another mill.¹² From these figures it is apparent that the per cent leaving after a short term of employment in the enameling industry was not unusually great. However, it would appear when separations are correlated with cause (see page 37) that many of the women leaving after less than a year of service were laid off.

In all, 349 women, slightly more than one-half of the number visited, reported less than a year of service. Of these 349, only 26.4 per cent were still employed at the end of the year, as compared with about 70 per cent whose employment was terminated and slightly more than 4 per cent who were intermittently employed. Of the women one and under three years in the industry, more than one-half (about 53 per cent) were continuously employed and only about one-third were separated; while of those five years or more in the industry, three-fifths were continuously employed and only one-fifth were separated. (See Table VIII in the Appendix.)

Separations and age.

The influence of age on separations is difficult to ascertain because so many other factors affect the turnover rate. It is interesting to compare the youngest and oldest groups in the matter of separations and long absences.

¹² Four Years of Labor Mobility, by industrial research department, Wharton School of Finance and Commerce, University of Pennsylvania, 1925, p. 67.

Age	Number of women	Per cent—		
		Continuously employed	Separated	Having had long absences (a month or more) but returned
16 and under 18 years.....	56	35.7	60.7	3.6
18 and under 20 years.....	126	41.3	50.8	7.9
20 and under 25 years.....	239	45.6	45.6	8.8
25 and under 30 years.....	116	31.0	56.9	12.1
30 and under 40 years.....	98	38.8	52.0	9.2
40 years and over.....	50	34.0	42.0	24.0

Age	All women reporting age		Women terminating employment	
	Number	Per cent	Number	Per cent
Total.....	685	100.0	345	100.0
Under 20 years.....	182	26.6	98	28.4
20 and under 25 years.....	239	34.9	109	31.6
25 and under 30 years.....	116	16.9	66	19.1
30 and under 40 years.....	98	14.3	51	14.8
40 and under 50 years.....	41	6.0	20	5.8
50 years and over.....	9	1.3	1	.3

Somewhat more of the women terminating employment than of the whole group were under 20 years, but the opposite is true of the age group next above.

The proportion of separations among the young workers appears to be rather high when compared with figures recorded by the Wharton School.¹³ In one cotton mill, according to that study, the separations among workers under 20 years of age during a 4-year period never exceeded 11.8 per cent, and in a second plant in no year was it above 24 per cent. However, in the mill first mentioned there was a much smaller proportion of workers in the low-age group than was the case in the enameling industry.

In the various age groups the highest proportion leaving their employment was 56.9 per cent in the group 25 and under 30 years of age, and the second highest was the 53.8 per cent in the group under 20 years of age. The proportion of separations is high in each age group but it is lowest (42 per cent) in the group of women 40 years of age and over. (For further details see Table IX in the Appendix.)

Separations and marital status.

In a period such as that of the past two years, when there has been a scarcity of work and an oversupply of workers, figures on separations according to marital condition are influenced by the policy of the employers regarding lay-offs and by the need of work existing among the married women that would affect resignations. Whether the work itself is more harmful to married women and therefore raises the proportion of turnover in that group is not possible to determine.

As will be seen from the summary following, there were more married women and fewer single women separated from employment than their proportions in the whole group.

¹³ Ibid., pp. 124-125.

Compared from another angle, 60.1 per cent of the married women, in contrast to 43.2 per cent of the single women and 40.7 per cent of those with broken marital ties, were no longer employed.

Marital status	All women		Women terminating employment	
	Number	Per cent	Number	Per cent
Total.....	686	100.0	345	100.0
Single.....	329	48.0	142	41.2
Married.....	298	43.4	179	51.9
Widowed, separated, and divorced.....	59	8.6	24	7.0

Cause of separation.

In most labor-turnover studies the classification of quits, discharges, and lay-offs is made according to records obtained from the plant, the purpose being to show general industrial or plant conditions. In this study the object was to obtain from the women themselves the reasons for the separation, whether it was occasioned by the management, by the worker herself, or by general conditions beyond the direct control of either. Too little work may result in a lay-off or in voluntary leaving, if a full-time job can be found elsewhere. A dispute with the foreman may cause voluntary leaving or dismissal. Thus, voluntary separations may be caused by either plant or personal reasons, and dismissals or lay-offs by relationships between the management and the worker or by conditions over which neither of them has any control.

For the purpose of this study the reasons for leaving jobs—that is, the causes of separations—have been grouped under three general headings, industrial, personal, and other. (See Table X in the Appendix.) This classification differs from that in many labor-turnover reports because of the method of collection of the facts and of the reason for their collection. It must be remembered that all the information on causes of leaving was obtained from the women and none from the management, which might give a slight bias, in that a doubtful case would be termed a lay-off or quit rather than a discharge. During the period of the study the vitreous-enameling industry, like many others, found it necessary to lay off workers on account of the depression.

Cause of separation	335 vitreous-enamel workers		944 cotton-mill workers ¹	
	Number	Per cent	Number	Per cent
Total.....	335	100.0	944	100.0
Industrial.....	208	62.1	242	25.6
Lay-off.....	136	40.6	33	3.5
Poor working conditions.....	44	13.1	35	3.7
Other.....	28	8.4	174	18.4
Personal.....	112	33.4	667	70.7
Illness of self.....	43	12.8	120	12.7
Pregnancy and confinement.....	13	3.9	70	7.4
Home duties.....	32	9.6	173	18.3
Other.....	24	7.2	304	32.2
Other.....	15	4.5	35	3.7

¹ Lost Time and Labor Turnover in Cotton Mills, U. S. Department of Labor, Women's Bureau Bul. 52, p. 194.

In this summary the causes of separations are classified as industrial, reported by almost five-eighths of the women, personal, reported by about one-third, and other, reported by less than one-twentieth. The causes as given by the 335 women working on enameling, compared with those given by 944 cotton-mill workers in a previous study, make an interesting contrast. Most important among the causes classified as industrial are lay-offs, reported by two-fifths (40.6 per cent) of the women enamel workers. This is a very large proportion, even in adverse times, when it is compared with the 3.5 per cent of women separated from cotton-mill employment for this cause in normal times.

Not so great a difference, though one very important, is noted when this proportion is compared with a total of 28,105 terminations of employment in 33 establishments in varied industries reported by Professor Slichter, where less than one-tenth (9.5 per cent) of the separations were due to lay-offs.¹⁴ This proportion of lay-offs, Professor Slichter states, "is probably considerably below the normal, in spite of the fact that the establishments were from varied industries and the data were for different years." However, they probably give an indication of the average proportion of lay-offs in miscellaneous industries, even though they are only one-fourth as frequent as in this vitreous-enameling study.

The next most important cause of separations, also classed as industrial, is "poor working conditions." These do not include such factors as low wages or long hours or short time, but chiefly such reasons as "too much dust," "too hot," "too hard standing all day on cement floor," and "too dirty." These types of complaints were given as the cause of leaving by about 1 in every 8 women (13.1 per cent). In the Women's Bureau study of cotton-mill workers, poor working conditions were given by only 3.7 per cent of the women as the reason for quitting, although heat and dust also are present in that industry.¹⁵

In a good many cases the vitreous-enameling worker appeared to combine a fear of the work with a criticism of the working conditions. Some said, "The work is dusty and unhealthy," or "So much dust to breathe all day isn't good for you," or "The dust gets in your stomach and makes a hard lump; it isn't healthy." The dust itself was the cause of the fear in most cases, but a few women mentioned lead as a danger; these usually were cases where they had been ill and had had a physician, otherwise they laid all their ill feelings to the dust.

The proportion who left their jobs because of personal illness, exclusive of pregnancy and confinement, was about the same in the present study as among the cotton-mill workers; that is, 1 in every 8 women. This figure is very similar also to that for 182 women in the dressmaking trades in a Bureau of Labor Statistics study and is greater than was found among women in a bookbinding survey some years ago, where 1 in every 11 left because of illness.¹⁶

¹⁴ Slichter, Sumner H. *The Turnover of Factory Labor*. New York, 1919, pp. 86, 87.

¹⁵ U. S. Department of Labor, Women's Bureau. *Lost Time and Labor Turnover in Cotton Mills*, Bul. 52, p. 194.

¹⁶ U. S. Bureau of Labor Statistics: *Dressmaking as a Trade for Women in Massachusetts*, Bul. 193, 1916, p. 107; *Women in the Bookbinding Industry*, by Mary van Kleeck, 1913, p. 112.

Separations and specified occupations.

In considering the two principal occupational groups, a larger percentage of the brushers than of the sprayers reported separations from their jobs, while women engaged on work other than spraying or brushing showed the greatest permanency and the lowest per cent of separations. (See Table X in the Appendix.)

From the summary following, the probable effect of lead exposure on sprayers and brushers, as shown by those leaving because of illness exclusive of pregnancy and confinement, is clearly seen.

Occupational group	Total women reporting reason for leaving last job in enamel department	Per cent leaving because of illness other than pregnancy or confinement
Sprayers.....	108	18.5
Brushers.....	170	8.8

This marked difference in the proportion of sprayers and of brushers leaving because of illness coincides with the previous figures of the relatively greater number of sprayers than of brushers who reported suspicious symptoms, and again illustrates the results of working with enamels containing lead.

Absences.

Of those reporting illnesses and whether or not suspicious symptoms, caused by exposure to lead, were present, more than one-third (35.8 per cent) reported one or more suspicious symptoms. In describing their illnesses, women would comment thus: "Awful pains and vomiting," "Headache and so nervous I just couldn't go to work." As would be expected, a larger proportion of the sprayers, who worked much more with an enamel that contained lead than did the brushers, had lost time due to illness, the figures being 32.9 per cent and 23.9 per cent, respectively. Furthermore, they reported more illness with lead symptoms, 39.7 per cent as compared to 26.8 per cent.

	Sprayers		Brushers	
	Number	Per cent	Number	Per cent
Total sprayers and brushers reporting on absences.....	237	100.0	297	100.00
Women losing no time due to illness.....	159	67.1	226	76.1
Women losing time due to illness.....	78	32.9	71	23.9
Women losing time.....	78	100.0	71	100.0
Illness due to lead symptoms.....	31	39.7	19	26.8
Illness not due to lead symptoms.....	38	48.7	47	66.2
Cause of illness not reported.....	9	11.5	5	7.0

During the year, the most important—that is, the most frequent—cause of absence for personal reasons was illness. The women reporting absence for this cause over a year's period were 27.8 per cent of the total number who reported on such absences. The actual number of days lost by women could not be computed because of the lack of complete data.

APPENDIXES

APPENDIX A—GENERAL TABLES

APPENDIX B—SCHEDULE FORMS

PHOTOGRAPH

RESEARCH LABORATORY OF THE
BUREAU OF CHEMISTRY

APPENDIX A—GENERAL TABLES
TABLE I.—Age, by occupation

Occupation		636 vitreous-enamel workers																			
		Reporting age																			
		All women	Total		16 and under 18 years		18 and under 20 years		20 and under 25 years		25 and under 30 years		30 and under 40 years		40 and under 50 years		50 and under 60 years		60 years and over		Not re- port- ing
			Num- ber	Per cent	Num- ber	Per cent	Num- ber	Per cent	Num- ber	Per cent	Num- ber	Per cent	Num- ber	Per cent	Num- ber	Per cent	Num- ber	Per cent	Num- ber	Per cent	
All occupations.....	686	685	100.0	56	8.2	126	18.4	239	34.9	116	16.9	98	14.3	41	6.0	8	1.2	1	0.1	1	
	Sprayers.....	239	239	100.0	19	7.9	41	17.2	85	35.6	50	20.9	31	13.0	9	3.8	4	1.7			
	Brushers.....	297	296	100.0	32	10.8	59	19.9	100	33.8	46	15.5	38	12.8	17	5.7	3	1.0	1	.3	
	Dippers.....	44	44	(1)	1		8		15		7		10		2		1				
	Grainers.....	34	34	(1)	1		5		12		4		7		5						
	Grainers and patchers.....	72	72	100.0	3	4.2	13	18.1	27	37.5	9	12.5	12	16.7	8	11.1					
Other.....																					

¹ Not computed; base less than 50.

TABLE II.—Number of women reporting symptoms according to whether or not lead was present in the enamel, by occupation

ALL WOMEN

686 vitreous-enamel workers																	Not reporting on symptoms	
Occupation	All women	Reporting on whether or not they had symptoms																
		Having symptoms																
		Total		Having no symptoms		Having 1		Having 2		Having 3		Having 4		Having 5 or more		Not reporting num-ber of sym-p-toms		
Num-ber	Per cent	Num-ber	Per cent	Num-ber	Per cent	Num-ber	Per cent	Num-ber	Per cent	Num-ber	Per cent	Num-ber	Per cent	Num-ber	Per cent			
All occupations.....	{ 686	670	100.0	472	70.4	198	29.6	66	34.0	24	12.4	24	12.4	27	13.9	53	27.3	14
						1194	100.0											
Sprayers.....	{ 239	233	100.0	144	61.8	89	38.2	23	25.8	9	10.1	8	9.0	17	19.1	32	36.0	6
Brushers.....	{ 297	291	100.0	219	75.3	72	24.7	23	24.7	9	13.2	11	16.2	5	7.4	2	23.5	84
Dippers.....	{ 44	41	(3)	31	70.5	10	24.4	4	9.8	2	4.9	1	2.4	1	2.4	2	4.9	3
Grainers and patchers.....	{ 34	34	100.0	24	70.6	10	29.4	3	8.8	2	5.9	2	5.9	1	2.9	2	5.9	1
Other.....	{ 72	71	100.0	54	76.1	17	23.9	9	12.7	3	4.2	2	2.8	2	2.8	1	1.4	1

WOMEN EMPLOYED WHERE LEAD PRESENT IN ENAMEL																		
Occupation	All women	Reporting on whether or not they had symptoms															Not reporting on symptoms	
		Having symptoms																
		Total		Having no symptoms		Having 1		Having 2		Having 3		Having 4		Having 5 or more				
Num-ber	Per cent	Num-ber	Per cent	Num-ber	Per cent	Num-ber	Per cent	Num-ber	Per cent	Num-ber	Per cent	Num-ber	Per cent	Num-ber	Per cent	Num-ber	Per cent	
All occupations.....	{ 498	490	100.0	336	68.6	154	31.4	47	31.3	19	12.7	20	13.3	21	14.0	43	28.7	24
						1180	100.0											
Sprayers.....	{ 177	174	100.0	98	56.3	76	43.7	17	22.4	8	10.5	7	9.2	13	17.1	31	40.8	3
Brushers.....	{ 211	207	100.0	156	75.4	51	24.6	21	24.6	15	7.3	8	11.6	3	14.5	10	4.8	4
Dippers.....	{ 33	32	(3)	25	78.1	7	21.9	7	21.9	1	3.1	1	3.1	2	6.3	1	3.1	14
Grainers and patchers.....	{ 27	27	100.0	20	74.1	7	25.9	2	7.4	2	7.4	2	7.4	1	3.7	1	3.7	1
Other.....	{ 50	50	100.0	37	74.0	13	26.0	6	12.0	3	6.0	2	4.0	2	4.0	1	2.0	1

WOMEN EMPLOYED WHERE LEAD NOT PRESENT IN ENAMEL OR UNKNOWN

	188	180	100.0	136	75.6	44 (4)	24.4 (4)	19	5	4	6	10	8
All occupations.....	62	59	100.0	46	78.0	13 (4)	22.0 (4)	6	1	1	4	1	3
Sprayers.....	86	84	100.0	63	75.0	21 (4)	26.0 (4)	6	4	3	2	6	2
Brushers.....	17	9	(3)	6	—	3	—	2	—	—	—	1	2
Dippers.....	7	7	(3)	4	—	3	—	3	—	—	—	1	1
Grainers and patchers.....	22	21	(3)	17	—	4	—	3	—	—	—	1	1
Other.....													

¹ Excludes those not reporting number.² Two had fewer than 5, but exact number was not reported.³ Not computed; base less than 50.

TABLE III.—Number of women reporting symptoms according to metal worked upon, by occupation

ALL WOMEN

686 vitreous-enamel workers

Occupation	All women	Reporting on whether or not they had symptoms																	Not reporting on symptoms
		Having symptoms																	
		Total		Having no symptoms		Total		Having 1		Having 2		Having 3		Having 4		Having 5 or more			
		Number	Per cent	Number	Per cent	Number	Per cent	Number	Per cent	Number	Per cent	Number	Per cent	Number	Per cent	Number	Per cent		
All occupations.....	686	670	100.0	472	70.4	198	29.6	66	34.0	24	12.4	24	12.4	27	13.9	53	27.3	16	
Sprayers.....	239	233	100.0	144	61.8	89	38.2	23	25.8	9	10.1	8	9.0	17	19.1	32	36.0	6	
Brushers.....	297	291	100.0	219	75.3	72	24.7	27	30.7	9	13.2	11	16.2	5	7.4	16	23.5	6	
Dippers.....	44	41	()	31	76.1	10	24.7	4	30.7	2	13.2	1	16.2	2	7.4	2	23.5	3	
Grainers and patchers.....	34	34	()	24	70.6	10	29.4	3	30.7	2	13.2	2	16.2	1	7.4	2	23.5	1	
Other.....	72	71	100.0	54	76.1	17	23.9	9	30.7	3	13.2	2	16.2	2	7.4	1	23.5	1	

WOMEN WORKING ON CAST IRON

All occupations.....	{	140	138	100.0	71	51.4	67	48.6	13	19.4	4	6.0	10	14.9	11	16.4	29	43.3	2
Sprayers.....		93	91	100.0	43	47.3	48	52.7	5		2		7		10		24		2
Brushers.....		27	27	()	14	51.9	13	48.1	4		1		3		1		4		
Dippers.....		3	3	()	3	100.0	0	0.0	1		0		0		0		0		
Grainers and patchers.....		9	9	()	6	66.7	3	33.3	1		1		0		0		1		
Other.....		8	8	()	5	62.5	3	37.5	3				3						

WOMEN WORKING ON SHEET IRON

All occupations.....	546	532	100.0	401	75.4	131	24.6	53	41.7	20	15.7	14	11.0	16	12.6	24	18.9	14	14
Sprayers.....	146	142	100.0	101	71.1	41	28.9	18		7		1		7		8			4
Brushers.....	270	264	100.0	205	77.7	59	22.3	23	41.8	8	14.5	8	14.5	4	7.3	12	21.8	14	6
Dippers.....	41	38	(9)	28		10	100.0	4		1		1		2		2			3
Grainers and patchers.....	25	25	(9)	18		7		2		1		2		1		1			1
Other.....	64	63	100.0	49	77.8	14	22.2	6		3		2		2		1			1

1 Excludes those not reporting number.

2 Two had fewer than 5, but exact number was not reported.

3 Not computed; base less than 50.

TABLE IV.—Symptoms of women according to whether or not lead was present in the enamel, by occupation

Symptom	All women (198)										154 women employed where lead present in enamel										44 women employed where lead not present in enamel or unknown															
	All occu- pations		Sprayers		Brushers		Dippers		Grainers and patchers		Other		All occu- pations		Sprayers		Brushers		Dippers		Grainers and patchers		Other		All occupations		Sprayers		Brushers		Dippers		Grainers and patchers		Other	
	Number	Per cent	Number	Per cent	Number	Per cent	Number	Per cent	Number	Per cent	Number	Per cent	Number	Per cent	Number	Per cent	Number	Per cent	Number	Per cent	Number	Per cent	Number	Per cent	Number	Per cent	Number	Per cent	Number	Per cent	Number	Per cent	Number	Per cent		
Total number of symptoms.....	637	100.0	349	100.0	216	100.0	37	100.0	28	100.0	37	100.0	525	100.0	311	100.0	151	100.0	51	100.0	26	100.0	21	100.0	26	100.0	132	100.0	38	100.0	65	100.0	11	100.0		
Women reporting symptoms.....	198	100.0	88	100.0	72	100.0	10	100.0	10	100.0	17	100.0	154	100.0	76	100.0	48	100.0	17	100.0	13	100.0	17	100.0	13	100.0	144	100.0	113	100.0	13	100.0	14	100.0		
Loss of weight.....	98	49.5	43	48.3	36	50.0	7	70.0	5	50.0	7	70.0	78	50.6	36	47.4	28	58.3	5	55.6	4	44.4	3	33.3	3	33.3	20	14.6	7	19.5	1	2.6	2	5.3		
Headache.....	87	43.9	39	43.8	35	48.6	5	50.0	3	30.0	3	30.0	66	42.9	34	44.7	22	45.8	4	44.4	3	33.3	3	33.3	3	33.3	21	15.3	9	23.7	1	2.6	1	2.6		
Metallic or sweet taste.....	82	41.4	34	38.6	23	31.9	5	50.0	2	20.0	5	50.0	44	28.8	24	31.2	17	35.4	4	44.4	3	33.3	3	33.3	3	33.3	13	9.7	4	10.5	1	2.6	1	2.6		
Indigestion.....	79	39.9	47	53.4	22	30.6	5	50.0	2	20.0	5	50.0	43	28.3	24	31.2	17	35.4	4	44.4	3	33.3	3	33.3	3	33.3	13	9.7	4	10.5	1	2.6	1	2.6		
Loss of appetite.....	70	35.3	38	43.2	17	23.6	5	50.0	2	20.0	5	50.0	35	22.7	24	31.2	10	20.8	3	33.3	3	33.3	3	33.3	3	33.3	13	9.7	4	10.5	1	2.6	1	2.6		
Constipation.....	63	31.8	32	36.4	17	23.6	5	50.0	2	20.0	5	50.0	42	27.8	24	31.2	13	27.1	3	33.3	3	33.3	3	33.3	3	33.3	13	9.7	4	10.5	1	2.6	1	2.6		
Dizziness.....	55	27.8	27	30.7	19	26.4	5	50.0	3	30.0	4	40.0	38	24.5	23	30.3	11	22.7	2	22.2	1	11.1	1	11.1	1	11.1	6	4.4	2	5.3	1	2.6	1	2.6		
Menstrual disturbance.....	43	21.7	26	29.5	13	18.1	5	50.0	1	10.0	2	20.0	32	20.8	14	18.3	13	27.1	1	11.1	1	11.1	1	11.1	1	11.1	6	4.4	2	5.3	1	2.6	1	2.6		
Nervousness.....	38	19.2	15	16.9	8	11.1	3	30.0	1	10.0	3	30.0	22	14.3	13	17.1	16	33.3	1	11.1	1	11.1	1	11.1	1	11.1	6	4.4	2	5.3	1	2.6	1	2.6		
Pains in joints.....	23	11.6	13	14.6	5	6.9	3	30.0	1	10.0	3	30.0	17	11.0	9	11.8	4	8.3	1	11.1	1	11.1	1	11.1	1	11.1	6	4.4	2	5.3	1	2.6	1	2.6		
Fatigue.....	19	9.6	10	11.2	5	6.9	3	30.0	1	10.0	3	30.0	14	9.1	9	11.8	2	4.0	1	11.1	1	11.1	1	11.1	1	11.1	6	4.4	2	5.3	1	2.6	1	2.6		
Loss of sleep.....	18	9.1	10	11.2	5	6.9	3	30.0	1	10.0	3	30.0	15	9.7	9	11.8	4	8.3	1	11.1	1	11.1	1	11.1	1	11.1	6	4.4	2	5.3	1	2.6	1	2.6		

1 Per cent not computed; base less than 50.

TABLE V.—Symptoms of women according to metal worked upon, by occupation

Symptom	All women (198)										67 women working on cast iron						131 women working on sheet iron						
	All occu- pations		Sprayers		Brushers		Dippers	Grainers and patchers	Other	All occu- pations		Sprayers	Brushers	Grainers and patchers	Other	All occu- pations		Sprayers	Brushers		Dippers	Grainers and patchers	Other
	Number	Per cent	Number	Per cent	Number	Per cent				Number	Per cent					Number	Per cent		Number	Per cent			
	Total number of symptoms.....	667	100.0	349	100.0	216	100.0	37	28	37	300	100.0	240	48	9	3	367	100.0	109	168	37	19	34
Women reporting symptoms.....	198		89		72		10	10	17	67		48	13	3	131		41	59	10	17	14		
Loss of weight.....	98	49.5	43	48.3	36	50.0	7	5	7	33	11.0	24	7	1	1	65	17.7	19	29	7	4	6	
Headache.....	87	43.4	39	43.8	33	45.8	6	5	6	32	11.0	25	6	1	1	54	14.7	14	29	5	4	2	
Metallic or sweet taste.....	82	41.4	44	49.3	23	31.9	7	2	2	37	12.3	30	5	1	1	45	12.3	14	18	7	4	3	
Indigestion.....	79	37.9	44	52.8	23	30.7	2	5	3	43	14.3	36	3	2	1	36	9.8	11	18	3	3	3	
Loss of appetite.....	70	35.4	37	41.6	22	30.7	3	2	2	40	14.3	29	3	1	1	41	11.2	12	22	3	3	3	
Constipation.....	68	32.8	36	42.7	19	26.6	3	3	4	33	11.0	25	6	2	2	32	8.7	13	22	3	3	3	
Dizziness.....	55	27.8	27	30.3	17	23.6	3	3	3	33	11.0	18	6	1	1	30	8.2	9	13	3	3	3	
Menstrual disturbance.....	43	21.7	26	29.2	13	18.1	3	1	2	17	5.7	16	4	1	1	26	7.1	10	12	2	1	1	
Nervousness.....	38	14.1	13	14.6	8	11.1	3	1	2	16	5.3	12	4	1	1	12	3.3	3	4	1	1	1	
Pains in joints.....	23	11.6	13	14.6	8	11.1	3	1	1	13	4.3	11	1	1	1	10	2.7	2	3	1	1	1	
Tremors.....	19	9.6	10	11.2	5	6.9	1	1	3	11	3.7	9	1	1	1	8	2.2	2	3	1	1	1	
Loss of sleep.....	18	9.1	10	11.2	5	6.9	2	1	1	10	3.3	9	1	1	1	8	2.2	1	4	1	1	1	

1 Per cent not computed; base less than 50.

TABLE VI.—Symptoms of women reporting 3 or more symptoms according

Symptom	All women (104)							
	All occupations		Sprayers		Brushers	Dippers	Grainers and patchers	Other
	Number	Per cent	Number	Per cent				
Total number of symptoms.....	532		302		161	31	16	22
Women reporting symptoms.....	104	100.0	57	100.0	32	15	15	15
Loss of weight.....	67	64.4	37	64.9	20	4	3	3
Headache.....	60	57.7	29	50.9	21	5	3	2
Metallic or sweet taste.....	61	58.7	35	61.4	17	4	2	3
Indigestion.....	66	63.5	42	73.7	16	2	3	3
Loss of appetite.....	59	56.7	34	59.6	19	3	1	2
Constipation.....	58	55.8	35	61.4	15	3	1	4
Dizziness.....	49	47.1	25	43.9	18	3	1	2
Menstrual disturbance.....	33	31.7	20	35.1	12	1		
Nervousness.....	24	23.1	13	22.8	7	3		1
Pains in joints.....	19	18.3	12	21.1	6		1	
Tremors.....	18	17.3	10	17.5	5	1		2
Loss of sleep.....	18	17.3	10	17.5	5	2	1	

¹ Per cent not computed; base less than 50.² Includes 1 woman reporting 3 or more symptoms but not reporting kind.

to whether or not lead was present in the enamel, by occupation

84 women employed where lead present in enamel								20 women employed where lead not present in enamel or unknown				
All occupations		Sprayers		Brushers	Dippers	Grainers and patchers	Other	All occupations	Sprayers	Brushers	Dippers	Other
Number	Per cent	Number	Per cent									
434	-----	272	-----	110	23	16	14	98	30	51	9	8
84	100.0	51	100.0	21	4	4	4	20	6	11	1	1
56	66.7	23	64.7	15	3	3	2	11	4	5	1	1
48	57.1	26	51.0	13	4	3	2	12	3	8	1	1
52	61.9	34	66.7	11	3	2	2	9	1	6	1	1
56	66.7	38	74.5	12	1	3	2	10	4	4	1	1
48	57.1	30	58.8	14	2	1	1	11	4	5	1	1
45	53.6	31	60.8	8	2	1	3	13	4	7	1	1
38	45.2	22	43.1	12	1	1	1	11	3	6	1	1
29	34.5	18	35.3	10	1	-----	-----	4	2	2	-----	-----
18	21.4	11	21.6	5	2	-----	-----	6	2	2	1	1
16	19.0	11	21.6	4	-----	1	-----	3	1	2	-----	-----
13	15.5	9	17.6	2	1	-----	1	5	1	3	-----	1
15	17.9	9	17.6	4	1	1	-----	3	1	1	1	-----

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WOMEN NOT HAVING SYMPTOMS

All occupations:																			
Number.....	472	468	25	28	39	28	55	37	34	76	45	41	21	11	1				
Per cent.....		100.0	5.3	6.0	8.3	6.0	11.8	7.9	7.3	16.2	9.6	8.8	4.5	2.4	2				
Sprayers—																			
Number.....	144	142	6	5	11	5	13	9	9	25	19	13	10	6					
Per cent.....		100.0	4.2	3.5	7.7	3.5	9.2	6.3	6.3	17.6	13.4	9.2	7.0	4.2	2				
Brushers—																			
Number.....	219	218	12	20	23	17	28	18	17	31	14	21	6	3					
Per cent.....		100.0	5.5	9.2	10.6	7.8	12.8	8.3	7.8	14.2	6.4	9.6	2.8	1.4	1				
Dippers.....	131	31	2	1	1	1	5	3	5	3	3	3	1	1					
Grainers and patchers.....	124	23	2	1			3	4	1	6	1	1	1						
Other—																			
Number.....	54	54	3	1	4	5	6	3	2	11	8	3	3	1					
Per cent.....		100.0	5.6	1.9	7.4	9.3	11.1	5.6	3.7	20.4	14.8	5.6	5.6	1.9	1				

WOMEN NOT REPORTING AS TO SYMPTOMS

All occupations—Number.....	116	16	1	1	1					1	3	2	2	3	1				
Sprayers.....	16	6										1	1	2	1				
Brushers.....	16	6	1	1						1	2								
Dippers.....	13	3									1		1	1					
Other.....	11	1			1														

1 Per cent not computed; base less than 50.

TABLE VIII.—Absences and separations in past 12 months, by length of service

[illegible]

686 vitreous-enamel workers

[illegible]

TABLE X.—Cause of separation from job in past 12 months, by occupation

Cause	335 vitreous-enamel workers separated from job in past 12 months and reporting cause ¹								
	All women		Sprayers		Brushers		Dip-pers	Grain-ers and patch-ers	Other
	Num-ber	Per-cent	Num-ber	Per-cent	Num-ber	Per-cent			
All causes reported.....	335	100.0	108	100.0	170	100.0	20	12	25
Industrial.....	208	62.1	61	56.5	116	68.2	12	5	14
Laid off.....	136	40.6	36	33.3	82	48.2	6	3	9
Work slack.....	6	1.8	2	1.9	1	.6	1	1	1
Poor working conditions.....	44	13.1	15	13.9	22	12.9	2	1	4
Low wages.....	9	2.7	4	3.7	2	1.2	3		
Long hours.....	4	1.2			4	2.4			
Other.....	9	2.7	4	3.7	5	2.9			
Personal.....	112	33.4	43	39.8	47	27.6	8	5	9
Illness of self.....	56	16.7	25	23.1	23	13.5	3	3	2
Illness of others.....	8	2.4	1	.9	3	1.8	2		2
Home duties.....	32	9.6	13	12.0	10	5.9	2	2	5
Better job.....	5	1.5	1	.9	4	2.4			
Rest; vacation.....	5	1.5	2	1.9	2	1.2	1		
Removed.....	5	1.5	1	.9	4	2.4			
Other.....	1	.3			1	.6			
Other—Dispute.....	15	4.5	4	3.7	7	4.1		2	2

¹ 10 other women lost employment but did not report cause.

APPENDIX B.—SCHEDULE FORMS

SCHEDULE I

[Used for interviews with plant officials and for observations of working conditions]

WOMEN'S BUREAU, U. S. DEPARTMENT OF LABOR

Name of firm _____ Address _____
 Product _____ City _____
 Person interviewed _____ Position _____

	White	Colored	Total
Number employed:			
Men _____			
Women _____			

Occupations of women _____

How long has enamel been sprayed? _____

How long has enamel been sprayed by women? _____

Hours: _____

	Begin	End	Lunch	Rest	Total	Total weekly; number of days
Daily _____						
Saturday _____						

Seasonal or special hours (overtime) _____

Wages: _____

How do wages of sprayers compare with those of other women workers? _____

Method of payment: _____

Occupations	Time	Piece	Both	Vacation without pay	Vacation with pay

Employment policy: _____

Empl. mgr. _____ Other centralized method _____

Records kept _____

Physical examination on hiring _____

Physical examination at stated periods _____

Nurse in plant _____ Visiting nurse _____

Doctor in plant _____ Visiting doctor _____

Records of illness kept _____

Records of treatment kept _____

Uniforms for sprayers _____ Cleaners _____

Furnished _____ Required but not furnished _____ Where kept _____

How often changed _____ Cost of laundry _____ Paid by firm _____

Are the following required? Describe. How often changed?

Head coverings _____

Hand coverings _____

Masks or respirators _____

Rules _____

Is spraying done in booth? _____ In room? _____

Pressure in gun _____

Exhaust in booth _____

Velocity _____ How tested _____

By whom _____ Frequency _____

Size of opening _____

Cleaning of booth: Method, fluid used, frequency, during working hours, by whom? _____

Conditions found, rebound of spray, other workers in same room, working near, etc. Changes in method, kind, and duties.

Kind of enamel used..... Number.....

Manufacturer..... Lead content..... Change of kind.....

Ventilation:

Natural—windows located in reference to spraying in cross draft, etc.

Artificial (other than in booth).....

Height of ceiling.....

Floors:

Material..... Condition.....

Sweeping—method, frequency, by whom.....

Scrubbing.....

Lighting: Describe—

Natural.....

Artificial.....

Seats: Do sprayers sit?..... Stand?..... Sit and stand?.....

Heating.....

Drinking facilities (sprayers): Bubbler (angle jet)..... Common cup..... Individual cup.....

Washing facilities:

Basin..... Trough..... Share with women..... Women and men..... Other.....

Clean..... Hot water..... Soap..... Brush.....

Towels furnished..... Individual..... Frequency..... Common..... Frequency.....

Rules.....

Toilets:

Kind.....

Condition..... Cleaned by whom?..... Frequency.....

Number of women using.....

Number of seats.....

Is cloakroom provided?.....

Describe—

Lunch room	Floor	Combined with	Clean	Artificial light	Outside window	Toilet ventilates into	Supervised	Cafeteria	Tables	Seats	Hot food	Hot drink	Cooking conveniences
Rest room								Cot	Chairs	Comfortable chairs	Bench		
Cloak room								Lockers	Shelves	Racks	Wall hooks	Seats	

Rules for lunch.....

Agent.....

Date.....

SCHEDULE II

[Used for interviews in the plant with women spraying with enamel]

WOMEN'S BUREAU, UNITED STATES DEPARTMENT OF LABOR

Conditions of work

Pressure in gun.....	Weight.....
How near is nozzle of gun to work?.....	Rebound of spray.....
Ventilation.....	
Does exhaust work well?.....	
Draft.....	
Who cleans gun?.....	Frequency.....
Who fills gun?.....	Frequency.....
Method of cleaning.....	
Material used.....	
Who cleans booth?.....	During work hours?.....
Frequency.....	
Method.....	
What fluid used?.....	
Do you wear a uniform?.....	Supplied by firm?.....
Who pays for laundering?.....	How often changed?.....
.....	
.....	

Rules for wearing protective clothing

Is head covering worn?.....	Comfortable?.....
Supplied by company?.....	Cleaned by company?.....
Rules.....	Frequency.....
Are hand coverings worn?.....	Comfortable?.....
Supplied by company?.....	Cleaned by company?.....
Rules.....	Frequency.....
Are masks or respirators worn?.....	Always?.....
Are they comfortable?.....	Occasionally?.....
How often cleaned?.....	Supplied by company?.....
Rules.....	How often refilled?.....
Is work steady?.....	Any overtime?.....
Do you do other work besides spraying?.....	Kinds.....
How much of time on other work?.....	
.....	
.....	

SCHEDULE III

[Used for recording, from plant pay rolls, the days worked and not worked by women in the enameling departments over a 12-month period for information as to causes of absence, work history, symptoms of lead poisoning, and other personal matters.]

[Front]

WOMEN'S BUREAU, U. S. DEPARTMENT OF LABOR

Worker..... Address..... City..... Factor
Occupation..... Hours: Daily..... Saturday..... Night..... Weekly..... Time,
Age beginning work..... Age entering plant.....

Month	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31
January.....																															
February.....																															
March.....																															
April.....																															
May.....																															
June.....																															
July.....																															
August.....																															
September.....																															
October.....																															
November.....																															
December.....																															

Absences (dates) causes:

Work history	Name of plant	Occupation	Duration	

[Back]

The worker:

1. Nativity (spec.)..... 2. Color..... 3. Speak English..... 4. S. M. W. S. D.....

If married, when? Births—Date Deaths—Date—Cause

.....
.....
.....

Is worker subject to any special kind of indisposition? (specify)

	Always	Recently		A
Indigestion.....			Pains in joints.....	
Headache.....			Constipation.....	
Loss of sleep.....			Menstrual disturbances.....	
Nervousness.....			Loss of appetite—breakfast.....	
Dizziness.....			Bad taste in mouth—sweet or metallic.....	
Tremors.....			Loss of weight.....	

Noon lunch—where eaten.....

Lunch between meals—where eaten.....

Wash before eating.....

Physical examination.....

Comparison of jobs.....

.....
.....
.....

PUBLICATIONS OF THE WOMEN'S BUREAU

[Any of these bulletins still available will be sent free of charge upon request]

- *No. 1. Proposed Employment of Women During the War in the Industries of Niagara Falls, N. Y. 16 pp. 1918.
- *No. 2. Labor Laws for Women in Industry in Indiana. 29 pp. 1919.
- No. 3. Standards for the Employment of Women in Industry. 8 pp. Fourth ed., 1928.
- No. 4. Wages of Candy Makers in Philadelphia in 1919. 46 pp. 1919.
- *No. 5. The Eight-Hour Day in Federal and State Legislation. 19 pp. 1919.
- No. 6. The Employment of Women in Hazardous Industries in the United States. 8 pp. 1921.
- No. 7. Night-Work Laws in the United States. (1919) 4 pp. 1920.
- *No. 8. Women in the Government Service. 37 pp. 1920.
- *No. 9. Home Work in Bridgeport, Conn. 35 pp. 1920.
- *No. 10. Hours and Conditions of Work for Women in Industry in Virginia. 32 pp. 1920.
- No. 11. Women Street Car Conductors and Ticket Agents. 90 pp. 1921.
- *No. 12. The New Position of Women in American Industry. 158 pp. 1920.
- *No. 13. Industrial Opportunities and Training for Women and Girls. 48 pp. 1921.
- *No. 14. A Physiological Basis for the Shorter Working Day for Women. 20 pp. 1921.
- No. 15. Some Effects of Legislation Limiting Hours of Work for Women. 26 pp. 1921.
- No. 16. (See Bulletin 98.)
- No. 17. Women's Wages in Kansas. 104 pp. 1921.
- No. 18. Health Problems of Women in Industry. 6 pp. Revised, 1931.
- No. 19. Iowa Women in Industry. 73 pp. 1922.
- *No. 20. Negro Women in Industry. 65 pp. 1922.
- No. 21. Women in Rhode Island Industries. 73 pp. 1922.
- *No. 22. Women in Georgia Industries. 89 pp. 1922.
- No. 23. The Family Status of Breadwinning Women. 43 pp. 1922.
- No. 24. Women in Maryland Industries. 96 pp. 1922.
- No. 25. Women in the Candy Industry in Chicago and St. Louis. 72 pp. 1923.
- No. 26. Women in Arkansas Industries. 86 pp. 1923.
- No. 27. The Occupational Progress of Women. 37 pp. 1922.
- No. 28. Women's Contributions in the Field of Invention. 51 pp. 1923.
- No. 29. Women in Kentucky Industries. 114 pp. 1923.
- No. 30. The Share of Wage-Earning Women in Family Support. 170 pp. 1923.
- No. 31. What Industry Means to Women Workers. 10 pp. 1923.
- No. 32. Women in South Carolina Industries. 128 pp. 1923.
- No. 33. Proceedings of the Women's Industrial Conference. 190 pp. 1923.
- No. 34. Women in Alabama Industries. 86 pp. 1924.
- No. 35. Women in Missouri Industries. 127 pp. 1924.
- No. 36. Radio Talks on Women in Industry. 34 pp. 1924.
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* Supply exhausted.

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