

UNITED STATES DEPARTMENT OF LABOR

FRANCES PERKINS, Secretary

WOMEN'S BUREAU

MARY ANDERSON, Director

Women's Employment in the Making of Steel, 1943

By

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BULLETIN OF THE WOMEN'S BUREAU, No. 192-5

UNITED STATES
GOVERNMENT PRINTING OFFICE
WASHINGTON : 1944

For sale by the Superintendent of Documents, Washington 25, D. C. Price 10 cents

336.4

Letter of Transmittal

UNITED STATES DEPARTMENT OF LABOR,
WOMEN'S BUREAU,
Washington, January 10, 1944.

MADAM: The shortage of man labor has led to the employment of women in plant jobs in the basic iron and steel industry, a heavy industry hitherto employing practically no women except in the administrative offices. The Women's Bureau study of women's occupations and of the conditions under which they are at work was made in order that the industry may employ women increasingly in such capacities as the labor shortage requires and experience shows to be suitable for women.

The survey was made by Ethel Erickson, industrial supervisor, assisted by Frances E. P. Harnish, May Bagwell, and Marie M. Wright. The report has been written by Miss Erickson.

Respectfully submitted.

MARY ANDERSON, *Director.*

HON. FRANCES PERKINS,
Secretary of Labor.

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Women's Employment in the Making of Steel, 1943

INTRODUCTION AND SCOPE OF SURVEY

Steelmaking traditionally has been men's business. Steelmaking is a heavy and dirty business and women workers have been taboo. Iron ore, coal, and limestone, the basic raw materials for steel, are earthy, bulky, and heavy. Steel mills spread over wide areas and intense heat and massive equipment are necessary in processing. These marked characteristics of the industry and inherent hazards have tended naturally to shut out women, with their lesser strength and endurance.

In peacetime about the only job within the mills on which women were found was sorting and inspecting tinplate. As assorters, women were considered more efficient than men in flipping the mirrored tin sheets, inspecting for surface flaws, grading and judging the thickness and weight with their touch sensitivity. As assorters, however, women have constituted only a fraction of 1 percent of the employees in the steel industry. Women clerical workers, of course, have been employed in the administrative offices of the companies for many years, but plant-office and pencil jobs of a semiclerical nature within the mills were held almost exclusively by men.

Not until months after Pearl Harbor did the steel industry feel the shortage of manpower sufficiently to consider women as a source of labor for augmenting their force and replacing men. Steelmen—both managers and workers—generally did not welcome the advent of women into their mills and feared that women would not be able to do a full job and would be a disrupting element and liability. The heaviness of the raw materials, the weight of steel products, the massive equipment, the spatial spread, the heat, fumes, and hazards do not offer employment possibilities that normally would be considered desirable or attractive to women. Also, there was a deeply rooted prejudice and tradition against women workers in the steel mills similar to that which prevails in the mining industry.

During 1942 a small number of women began to appear in the laboratories and plant offices of some of the mills, and by the end of the year, in a few mills, there were women on the lighter cranes and on labor gangs around the yards. Most mills, however, did not take on women until 1943, and though by the closing months of 1943 women are working in most of the country's steel mills, their numbers and proportions are small and their utilization is restricted generally to the lighter and least skilled jobs. In some of the mills, however, they are found in almost every department. There are women working at the ore docks, in the storage yards for raw materials, on the coal and ore trestles, in the coke plants, the blast furnaces, the steel furnaces, the rolling mills, and the finishing mills that are doing fabricating on shells, guns, and regular products such as nails, spikes, and bolts. On the whole, management, realizing that much of the work requires strength

or exposure to special hazards, has been cautious in the selection of jobs for women and has provided better service and welfare facilities for women than for men. In old mills, where working conditions are poorer than the prevailing standards, and service facilities are most meager for men, there has been less employment of women than in the more modern mills.

During the late summer and fall of 1943, agents of the Women's Bureau visited steel mills in the principal steel-producing areas. One mill in Colorado had been visited as early as May. The occupations of the women, the hours worked, rates of pay, working conditions, and other factors affecting their employment were included in the inquiry. Data on jobs filled by women were collected for 41 steel mills. The proportion of women in the total force in the 41 mills was 10.6 percent, in the production areas 8.1 percent, and in the administrative offices and on salaried pay rolls 35.2 percent. The proportion of women in production work varied by plant from 3.2 percent to 16.1 percent. The scope of the survey is set forth in the following tabulation:

Area	Number of mills	Employees								
		In all employment			On production			In office and other work		
		Total	Women		Total	Women		Total	Women	
			Number	Percent of total		Number	Percent of total		Number	Percent of total
All areas visited	41	278,986	29,498	10.6	253,024	20,369	8.1	25,962	9,129	35.2
Pittsburgh-Youngstown area	19	119,509	12,073	10.1	107,459	7,952	7.4	12,050	4,121	34.2
Buffalo area	3	15,450	1,318	8.5	13,830	1,014	7.3	1,620	304	18.8
Chicago-Gary area	9	68,285	8,914	13.1	60,644	6,125	10.1	7,641	2,789	36.5
West Virginia	7	21,498	3,312	15.4	20,346	2,676	13.2	1,152	636	55.2
Other	3	54,244	3,881	7.2	50,745	2,602	5.1	3,499	1,279	36.1

1 One mill in Colorado, one in Sparrows Point, Md., and one in Bethlehem, Pa.

While all the major divisions of steelmaking have women employees, it seems true that the more closely a job is associated with the handling of basic raw materials, the less suitable the job is deemed to be for women. The ore docks, the receiving and storage yards, the coke and by-products plants, the blast furnaces and the steel furnaces—the open-hearth, Bessemer-converter, and electric furnaces—offer an extremely limited field for the employment of women and actually the proportion of the women in these divisions is small. In the rolling mills there are more possibilities of employing women, and there are still more in the fabricating and finishing divisions. The laboratories, the maintenance, service, and clerical divisions, with a large number of jobs that might be considered incidental rather than related directly to steelmaking, probably offer the most in possibilities for the effective utilization of women. The laboratories and plant offices seem to afford opportunities for their continued post-war employment.

The steel industry is highly technical and specialized and the visitor going into the plants to observe the work of the women is unable to comprehend many of the intricacies and technologies of the industry. The job terminology used in the plants varies, as does the scope of the duties ascribed to a job. Conditions vary with the size, the modernity, and the product of mills. The objective of the Women's Bureau in the present study of the steel industry is not an exhaustive treatise of the possibilities of employing women in the industry, but a report on the conditions under which women are employed and the suitability of the work for women, since this industry has always been in the category of a heavy non-woman-employing type.

WORK OF WOMEN IN THE STEEL PLANTS

Only basic steel mills were included in this survey. The extent or degree of integration of types of furnaces and mills varied. Some of the plants were fully integrated, with coke ovens and by-products plants; blast furnaces; sintering plants; steel furnaces—open hearth, Bessemer converter, and electric; rolling mills—blooming, billet, slab, rod, wire, plate, skelp, strip, sheet, and tin-plate units; and finishing and final-fabrication departments. Quite a number of the plants visited did not have coke plants, and some did not have blast furnaces or steel furnaces, but all had rolling mills.

Handling of raw materials.

Receiving departments for handling ore, coal or coke, limestone, and other raw materials usually are in or adjacent to the blast-furnace area. Plants on the Great Lakes receive most of their ore supply by boat. Only one plant had women working at the ore docks. The boats are unloaded by electric ore bridge cranes which scoop up 15 to 20 tons in each bucket load and empty a boat in a few hours. The grab-buckets cannot clean up around the sides and edges, so labor gangs go down into the bottoms of the boats and sweep and shovel up the leavings of ore into little piles for removal by special hoists. A crew of women—chiefly Negro—with a woman gang leader has been employed for several months, going from boat to boat as needed. When there are no boats ready for cleaning, they are employed around the docks and stock yards as a part of the general clean-up labor gang. Only the strong and husky woman who does not mind close association with dirt can be placed on such work. Ore, coal, and limestone are heavy to handle even when using a small shovel.

Women were seen in rail receiving yards as car dumpers and car washers working on railroad platforms and trestles. Car dumpers with lever controls release mechanisms which tip cars or drop bottom gates so that the contents can be dumped into hoppers, cars, or chutes for storage or transfer to the stock houses. After the cars are dumped, women climb inside and with shovels push remaining materials through the bottom. In some cases this last job requires an awkward stance on a slanting footing and necessitates the wearing of safety belts. Car washers—women—working from trestle-high platforms wash the cars out with a heavy

force hose. Mixed labor crews of men and women carry on all sorts of general clean-up work around the tracks and yards and women are reported as helping with the repair of road beds, laying tracks, and tamping the earth up around the rails. As transfer-car and dinkey operators, a few women in several mills are moving materials around the yards from stock piles to bins and furnaces. Comparatively few women are found in these sections because in many cases management does not consider the work or conditions fit for women. Generally the jobs in the yards have a slow tempo and in good weather are not too bad, but in cold weather the exposure to all degrees of wind, rain, snow, and low temperatures changes the conditions of the job and also increases the effort required in clean-up work as materials freeze fast to the insides of cars, around the tracks, and on the roadways.

Coke plants.

At most mills there is a marked hesitancy to employ women or even to consider them for employment on jobs around the coke plant. Only 7 of the 41 plants have women workers in the coke-oven section. The deterrents to the employment of women are the same as in the steel processes—that much of the work for which recruits are needed is of a heavy nature, all-round labor, and is accompanied by exposure to heat, dirt, and fumes, and the worst kinds of weather. Laborer is the only job designation on which any sizable number of women are reported, and their work is the usual clean-up. Steel is a dirty business and yard and plant clean-up is never ending. Types of coke ovens vary; some have self-sealing doors on the pusher side and others must be calked around the opening with a special fire-clay mud known as "lute." Where the doors must be luted, a mud car travels from oven to oven and has an elevator mechanism for lifting the worker up and down along the doors. A few women as lutermen and luterman helpers are breaking the jam around the doors, chipping off carbon and old lute between charging operations. They also mix the lute in a basement section below the coke ovens. Lute was reported as made of fire clay, coke dust, ashes, and water. Mixing it and spreading it out to dry is a wet and dirty job.

No women were found as chargers of coke furnaces, as "pushers" on the ramming mechanism that pushes the coke into the quenching cars, nor on the quenching cars. Such jobs are considered too heavy or too hard for women. One plant was contemplating the employment of women on the top of the coke ovens to close the doors after charging, a job accompanied by some exposure to carbon monoxide fumes. Two plants reported having tried women as "wharfman" in the coke plant. The wharfman opens iron gates to release coke that has been dumped from the quenching car through a screening process onto conveyors below that carry it to the blast-furnace stock house. Wharfmen are reported as opening the gate controls hundreds of times in a turn of 8 hours. The women who were tried on the job found it too hard and after a short time either quit or were transferred to lighter work. Another job on which women were reported in the coke plant was that of "apron-conveyor operator," an inspection job of watching pulverized coke as it moves by and sorting out pieces of iron or wood

that may cause difficulty in later processes. These are outside jobs in the coke-oven section and most of them are heavy labor.

Again, in the by-products plants connected with coke ovens the representation of women workers is decidedly limited. The processing and tending of large retorts and stills require training and experience over long periods. Also, the number of jobs and workers needed is relatively small. Occasionally women are found serving as pump attendants and stillman's helpers, watching the gages, taking readings, starting and stopping pumps as directed. Women on platforms level with the tops of tank cars on railroad sidings fill the tanks with by-products. This job is merely one of opening and closing valves and inserting and removing the hose. Another job typical of work assigned to women in the coke and by-products plants is the bagging of sulphates, which is the customary process of filling bags, sewing the tops, and shoving them along on roller conveyors to a railroad car pulled up to the loading dock. A few girls in one mill listed as "efficiency girls" are working on charts and collecting coal and coke samples and serving as test girls. Women are not employed on the primary processes in the by-products section, and the jobs they are doing seem not beyond their strength and endurance.

Blast-furnace division.

No women were seen by Women's Bureau agents on jobs directly concerned with the charging, tending, or tapping of the blast furnaces. Of the women in the industry in the late months of 1943, indications are that less than 5 percent are assigned to the blast-furnace sections and few of these work in close proximity to the actual furnaces. Most of the women are on the clean-up crews, shoveling spilled ore into piles and carting it away in wheelbarrows, and serving as helpers on labor gangs cleaning up around the furnace yard and tracks. Some women as stove-repairman helpers are handing tools and supplies to the workmen, running errands, and assisting with the cleaning out of ashes and soot from the honeycombed flues. The air blasts are cut off and the stoves are cooling, but the work is extremely dirty, sometimes hot, and involves the hazard of stumbling and falling on the rough footing.

Other jobs on which a small number of women are reported in the blast-furnace area are larryman and larryman's helper, panman, filterman, topman, and castings and cinder crane operators.

The larryman operates a small electric car that carries raw materials—ore, limestone, and coke—from the stock house to the skip car. The latter hoists them to the top of the blast furnace. The larry shuttles back and forth in a tunnel-like passageway below the ground level of the furnaces. The operation and dumping of the car are by simple electric controls and not strenuous, but the car vibrates, and in collecting the load of raw materials the operator must handle bin doors in the stock house which, though provided usually with special mechanisms for opening and closing, sometimes stick and require considerable effort to manage them. The larryman's helper closes the bin doors that do not function properly and cleans up around the tracks. In one plant where several women had been tried out as larrymen, the foreman reported that only one of the women had been able to carry on the

work to the full job standards. Drafts, fumes, and dust are definitely present and strenuous struggles with balky doors possible if not probable. The job of larryman does not seem suitable for women.

Women as topman, cleaning off the tops of blast-furnace stoves 50 or more feet above ground, have been reported in only one plant. Twice a day a crew of 6 or 7 women climb to the top of the blast-furnace stoves and for about an hour shovel up the soot and accumulated ore dust. Special one-hour breathing apparatus, a respirator, is provided for protection against toxic gases and fumes. The "topwomen" are equipped with goggles and with hard hats for protection against flying particles and falling objects. Most plants do not consider top cleaning a suitable job for women. The topman is exposed to all types of weather, and working at dizzy heights in wind, sleet, and snow is not a job to be relished by any woman, least of all by those new and inexperienced.

No women are employed on cranes that carry molten metal. In one plant a woman cinder-crane operator tends the controls that scoop cinders from a pile near the blast furnace and dump them into a nearby railroad car, and in another a woman controls the crane that moves and stacks "pigs" in the storage shed.

The job of a filterman reported for women in the blast-furnace area is one of tending water valves and watching gages in a small enclosed room.

In a couple of plants a woman "panman" mixes the fire clay—shoveling the materials into a mixing mill—for sealing the casting hole that seals the blast furnace. The work is carried on in a blast-furnace shed. Mud mixing is not a full-time job and is incidental to other labor.

One husky woman is a most effective blacksmith's helper in a maintenance shop, and in the larger mills where there are separate maintenance shops for the blast furnaces women are bench workers, oilers, and helpers on the machines.

Jobs around a sintering plant are all dirty and chiefly of a labor grade. The sintering plant salvages ore dust and blast-furnace flue dust by mixing it with water and spreading it on moving conveyors that carry it under gas flames for baking into clinkery masses known as sinters, which are charged back to the furnace. Quite a number of women in sintering plants work on dumping the cars of ore and dust, inspecting along the sides of the conveyor to remove lumps of slag and foreign matter, shoveling up spills along the conveyor lines, screening coal and dust, carrying tests to the laboratory, and so forth. All the work is classed as labor. Most of the women are Negro and they are reported as moving as much dirt and materials as men. Everything around a sintering plant is covered with iron dust. Siderosis from exposure to such dust may cause pulmonary difficulties, but the workers seen were not wearing respirators; nor did they wear goggles.

As a whole, the blast furnaces and their immediate surroundings offer little opportunity for the satisfactory utilization of women. Though heavy materials are lifted and moved by mechanical equipment, the controls may be heavy to handle. Unskilled-labor jobs, where the need for manpower is a problem, usually require an employee who can do heavy as well as light

work. Employees working anywhere near the blast furnaces are exposed to heat and to sudden changes in temperature in going from one section to another in the yards and open shed-like buildings; to carbon monoxide fumes; to burn hazards; and with the many semi-dark passageways and smoky interiors, uncertain footings of brick and tamped earth, the possibility of stumbling and falling on tracks, materials, and equipment is always present. Unless there is a critical shortage of male labor, the inexperienced, unhardened woman who comes to the steel mills as a war worker for a temporary period, with little probability of remaining long enough to be eligible for the better jobs, should not be given strenuous or hazardous work. From the practical standpoint, it would seem that the services of women in most of the labor jobs of the area can be of only marginal value because of the heavy nature of the work.

Steel furnaces.

The numbers and proportions of women in the open-hearth, Bessemer-converter, and electric-steelmaking furnaces are small. In 17 mills showing numbers of women by department in the fall of 1943, only 5 percent of the women were employed in the steel-furnace area. About 90 percent of steel is processed by the open-hearth method, which takes the pig iron from the blast furnaces, with scrap iron, alloys, and other ingredients, and cooks them into commercial steel. Most of the open-hearth furnaces are surrounded by a seeming jumble of tracks, broken floors, piles of brick, cars of scrap iron, overhead cranes carrying hundreds of tons of molten metal, charging machines, ingot trains, and smoking locomotives. Whistles and bells are signaling operators to their posts or warning workers to move from the path of approaching objects. One of the chief hazards of working in the open-hearth section is the environment—a worker must be watchful and agile in avoiding moving objects. Women are not employed on jobs hazardous in themselves, but the surroundings are hazardous.

In the open-hearth as in the blast-furnace division, mill officials tend to be careful about the jobs on which women are introduced. Women are not employed as charging operators, melters, tappers, pourers, or helpers on jobs where molten steel is involved. Handling controls that open and close the furnace doors from a position 25 to 30 feet back from the furnace heat is about the closest a woman comes to being a steelmaker. Women like the job of door operator or door puller. Usually women's jobs are largely of a related or an auxiliary service type. As laborers, they do general yard and track clean-up work, unload and stack brick for the use of the bricklayers, unload hot-top rings for ingot molds, hand bricks and balls of clay to masons relining ladles and repairing furnaces. In one instance noted, women were allowed to place the bricks in position on the last few rows of the ladle relining—were actually serving as bricklayer learners and liked it.

Checker-chamber cleaning is one of the hard and disagreeable jobs that women are assigned to. Every two or three weeks the bottoms, the lower levels, of the open-hearth furnace must be rebuilt. The furnace is down and the checker chamber usually has been hosed out before the clean-up crew goes to work tearing

out the bottoms and cleaning the flues. The temperature has dropped thousands of degrees but it may still be from 100 to 120 degrees when the laborers begin working. Men break up the bottoms and women pick up the pieces either by tongs or by hand and load them into wheelbarrows to be pushed out in the yards. The place is dusty, windy, sooty, and may be hot. Some of the bricks weigh 7 pounds or more and about 5,000 bricks may be knocked out in the course of cleaning the checker chamber. The women wear gloves to protect their hands and some of them wear woolen work clothes. Women usually do not work continuously at this job—in some cases three days a week of this and the other three at general labor. Women share in the bonus or incentive rate and like the earnings but not the conditions of work.

Another job of a labor status on which women may work in the open hearth is knocking off the hot top. Special varieties of steel are poured into ingots that have a superstructure of bricks or hot-top rings on the molds. Before this type of mold is stripped from the ingot, the ingot train is pulled past a high platform on which men and women stand and knock off the "hot top," using a long iron bar that rests on the top of a metal-apron heat shield. With one or two sharp blows the hot top is removed. It is a hot job but not a continuous one; it may take less than an hour daily. Women have done as well as men on this job and like it.

As scrapmen women assist with the loading of scrap into the charging cars. Crane operators convey the scrap to the car by magnets. At the proper spot the women signal the operator to release the magnetic force and drop the load into the car. Some of the scrap steel may project over the sides of the charging car and the women climb or work from a platform, pushing the scrap into a compact load. They serve also as hookers, adjusting the hooks for the crane operator to pick up loads of scrap. Women using an oxyacetylene burning torch are employed in the scrap yard to cut scrap into manageable-sized pieces. In the stock yard or ingot shed women act as hookers, placing the cables around the ears of the ingot mold for stripping the ingots.

Many of the jobs for women in the open-hearth division are semiclerical in nature, soft-collar jobs, which entail no physical strain but some of which expose women to the work surroundings of a furnace region. A woman noted by the Women's Bureau agent whose job designation was "ingot shipper" was responsible for ordering the proper ingot molds for dispatch to the pouring platform. She received the orders as to the weights of ingots to be poured and transmitted the instructions to the pourers. It was responsible clerical work that required considerable walking. Test carriers convey small sample pourings to open-hearth laboratories and check carbon content on carbometers. Using spectrographic equipment and pyrometers, sighting instruments for determining heat, women work in close proximity to the furnaces. In some mills women using pyrometers go to the platform where metal is being poured from ladles into the ingot molds and observe the reactions of metal.

Near the Bessemer converter, women observe the color of the flame during the "blow" and signal to the melter when the moment has arrived to stop the blow. The melter also is watching and has

the final responsibility. Women are doing a number of miscellaneous jobs as observers and recorders, clerks keeping tallies of delays, time checkers, tracers of orders and heat numbers, alloy clerks keeping records of alloys dispensed, and weighers working in enclosed cabs, close to the furnace, recording the weights of unfilled and filled ladles. The job last mentioned is hot while the metal is being poured. Except for work on the checker chambers, what is being done by women is not heavy. The tempo of the work is not fast, and compared with most woman-employing industries the women have more leisure than on line-production jobs and there is less monotony. The chief hazard to women in the steel-furnace division is that of the environment.

Rolling mills.

Rolling mills employ more women than the earlier processes of steelmaking. About 2 of every 5 women plant workers are in rolling mills. More women are found in the wire, tin-plate, merchant, bar, and strip mills than in the bloom, billet, rail, structural, slab, and plate mills, the latter group having heavier products. Women are working at hot jobs but most of them are on the later cold processes and on the auxiliary jobs of inspection, checking, observing, tool-room attending, crane operating and hooking, and clean-up. The majority of the women in the rolling mills, as elsewhere, are classed as laborers, with plant-housekeeping and "helpers" duties.

The bloom, billet, and slab mills are the rough basic rolling mills. Ingots, usually hot from the steel furnaces, are carried by heavy cranes (men operators) to large pits where they are soaked in heat to temperatures of over 2000° F. Women are being employed as cover operators to open and close the doors of the soaking pits. The levers that control the doors are handled either on a shuttle-like carriage that travels the length of the pits or from elevated platforms on the sides. The worker is exposed to radiant heat but it is not a direct or especially intense heat. No women are reported as heater helpers, bottom makers, croppers, butt pullers, rollers, or manipulators. Rollers and manipulators are craftsmen with years of experience in steelmaking and women could not qualify for these jobs. Cropping off the butt end of the ingot before it goes into the rolls and pulling off the butts with heavy tongs into the scrap chutes are heavy and very hot jobs, decidedly unsuitable for women. Marking hot blooms, billets, and slabs with a blow from a hammer that has a die sunk in its head is hot and strenuous, but a woman was reported as working on this job. A few women scalers were throwing salt on hot slabs, a noisy and dangerous job because of the hazard of flying sparks and scale, and a few women were quenching the heat of slabs and washing off the scale with an ordinary water hose. In one plant a woman on each turn stands on a platform near the slab-heating furnace and sweeps scale off before the slabs are pushed into the furnace. Women observers, recorders, heat chasers, while not doing any work of a strenuous nature, are exposed to heat and the general hazards of the room. One woman observer was indicating to the crane operator the pits from which ingots were to be withdrawn for rolling after checking the heat with an optical heat-checking device.

In the conditioning of billets, blooms, and slabs in the storage yards or docks, a relatively small number of women compared to men are scarfers, grinders, and billeter operators on conditioning jobs. Snags and surface imperfections on blooms, billets, and slabs are removed by chipping, grinding, and scarfing. No women were found on chipping at the time of the survey, though some plants had tried women. Chipping with pneumatic tools on steel is too heavy a job for women, who are not able to stand the vibration. Women are using portable hand grinders and fixed swing grinders—the latter sometimes known as Mexican grinders. Most of the work with grinders is heavy and requires arm pressure and other muscular strains. Where the work assignment requires continuous application of grinders, it has proved too heavy for women.

In some mills women mark surface defects part of the time as a change from grinding. In one plant where women had been tried on swing grinders the management took them off after a short try-out as the women could not stand the back and arm strain. Scarfing, burning away defects with an oxyacetylene torch, is done occasionally by women. Scarfing is not such heavy work as grinding but there is danger of burns and the fumes from the burning metal are a gastric irritant. Sparks cascade from both grinders and burning torches, but the burning hazard is considerably less from the first. On scarfing women wear protective clothing similar to that worn by welders. Turning the billets, blooms, and slabs even with mechanical aids is heavy work and women require extra labor assistance. If this is not available the work is too strenuous. The women like the scarfers' and grinders' earnings, but for most of them the job is too arduous and demanding physically. Billeter machines that gouge the surface with revolving chisel-like tools are tended by women in a few plants. The work is placed by hoists and the tending does not seem strenuous.

The utilization of women, being still in the try-out stage, varies markedly from plant to plant and within the mills in the same plant. Women are shifted around from day to day over a wide area, so in some instances it is difficult to get a clear idea of the full extent to which women are employed, the hazards, and the special job arrangements made for them. Crane operating, crane following and hooking, checking, marking and painting identifications on all kinds of steel, inspecting, and weighing are jobs common to all types of rolling mills. Usually only the lighter cranes—10- or 15-ton types—are handled by women and they are not over hot furnaces. Some of the older cranes have controls that are difficult to manipulate, but the new cranes are all suitable for women, who have been found to be as good crane operators as the men. As chainmen, hookers, and crane followers, women follow the cranes, wrap chains around the ends of steel products or attach the hooks and signal the operator for the lifting or release of the load. Usually this job is suitable for women, but it is not desirable if the hooker is required to lift, turn, or push the products to attach the chains or hooks. Instances were reported where women hookers have been unable to do the job because the heaviness of the work required too much extra assistance for effective woman utilization.

Women checkers and recorders keep tallies of the sizes, process and heat numbers, and weights, check shipping orders, and do floor clerical work. Women loaders are really checkers, checking shipping invoices and counting pieces. Sometimes the loader signals the crane operator, but the loader's work does not involve any physical strain.

Painting the end of billets, bars, marking blooms, slabs, plates and other products with identifying marks is a paint-brush or crayon job and is done as well by women as by men. In an armor-plate mill women were stepping out on a hot plate as it came along on the cooling bed, inspecting it, and marking defects and identification. The women wore heavy wood-soled shoes, as the plate was still hot.

Women hot-bed operators were not common. The hot-bed operator sits in a raised pulpit above or at one side of the cooling beds and operates levers to move bars and strips of steel to the proper tracks on the conveyor. The job can be done by women and occasionally is, but the tendency is to reserve such jobs for older men who have long service records and are no longer able to do strenuous work. A similar controlman's job is tending the "screws" in bar mills and is sometimes done by women. The screwman regulates the distance between rolls.

In the merchant and bar mills, some women are tending the shears or saws that cut bars into prescribed lengths and more are working as helpers, raking the hot bars down into cradles, banding them with wire or narrow metal strip, attaching the chains and signaling the crane operator to remove them.

Women were operating straightening machines for flat-surface bars, but the straightening of rods or rounds where a rotary straightener is used is too strenuous and hazardous for them, as the round bars whip around at the feeding end and there is marked vibration as well as a decided danger of being struck by the bar.

Some bars are finished by turning in a centerless grinding machine, and these are tended by women satisfactorily. Visually inspecting the bars by rolling them along on skids is another job quite often assigned to women in merchant and bar mills. Merchant mills make thousands of steel products to buyers' specifications and the work varies in type and heaviness.

In one of the strip mills visited, one-fourth of the workers in the finishing department were women. Besides the usual auxiliary jobs, small numbers of women operate the levers of the speed regulator controlling the movement of the strip through some of the rolling mechanism. It is a pulpit job, watching dials and pulling levers. In one mill a woman looper operator was working along in the same pulpit with the speed regulator handling the levers that retard the speed of a length of strip by throwing the strips in slight arcs when a momentary slow-down is needed to synchronize movement of strip in the rolls. A few women serve as shear and slitter operators, but as yet women are chiefly helpers on these jobs. On leveling machines, women are operators' helpers and catchers of the small-size sheets. As scrapmen, women collect scrap, cut it with burning torches and shears, and bale and tag it for furnace charging. In the pickling, the branning, and the bonding sections, women are used as helpers and sometimes as

operators at machines such as those feeding sheets into the scrubbers, wiping and piling them as they come out of baths and off machines. Hot coils of strip and hoop steel are banded, marked, and tagged by women directly as they are dispatched from the coiling machine and still very hot. The work is not heavy but there is danger of burns and the heat is intense when exposed to several coils. Frequent spells are a necessity, and in one mill where the workers (men and women) had worked 15 minutes and spelled 15 minutes, the periods had been changed to 40 minutes of work and 20 minutes of spell time, which the men felt was insufficient for themselves and especially so for the women. The largest number of women on any job in the light plate, strip, and sheet mills are still the assorters in the tin-plate mill.

In the rolling of heavy plate, considerably more than half the women were laborers. Other women were grinding, scarfing, shot blasting, and cutting plate with oxyacetylene torches, and piling plate. Weighers read scales and record weights. The weigher's job sometimes requires ability to use a slide rule and when many grades of steel are coming through is complicated.

In mills specializing on manufacturing tubular products, tubes, pipes, and cylinders of many kinds, some of the direct production jobs that women are filling are cutting or sawing lengths of pipe, blowing the scale from the inside, distributing pipes or tubes to designated furnaces by platform controls, straightening, threading, marking, and testing the pipes.

In the wire mills where coiled rods are drawn through a succession of dies, annealed, spun, twisted, braided, and woven into a great variety of products, women are employed on some of the direct production processes of drawing, cutting, spooling, welding, and fabrication on the finer and lighter wires.

Possibilities of effective utilization of women workers in the rolling mills seem more auspicious than in the earlier steelmaking processes. Exposure to extreme heat is a deterrent to the use of women on some of the jobs near reheating and annealing furnaces, and special efforts to safeguard inexperienced women workers must be observed, as must sufficient rest periods. Heavy lifting does not seem to be an acute problem as the products are handled by mechanical devices.

In all the rolling mills there are many opportunities for the employment of women in clerical work, weighing, shipping, inspecting, tool-crib and storeroom tending, plant maintenance and protection, and laboratory testing, which are much the same in steel as in other industries.

Fabrication.

In addition to such basic rolled products as billets, plates, rails, structural steel, rods, bars, tubes, and wire, many of the rolling mills are carrying on further fabrication in their foundries, forges, press, machining, and finishing departments on normal products. Examples of these are wheels, structural parts, nails, spikes, bolts, nuts, and woven-wire products. During the present war period these plants have been working also on disks for ammunition, heavy projectiles, gun forgings, propeller shafts, landing mats, torpedo nets, and other items for the combat services. The war

products generally were new, the possibilities of employing and placing women were explored earlier than in the basic steel processes, and the proportion of women employed is greater than in the older departments; in some, one-fourth to one-third of the employees are women.

Jobs that in many cases had been filled by boys in the nail and spike mills, such as operating tumblers polishing and cleaning nails, packing them in kegs, threading bolts and screws, tapping nuts, forming the heads of nails and spikes on upsetting machines, operating tractors and lift trucks, inspecting, making kegs and boxes for shipping, weighing, and loading cars, are employing women, though in normal times these jobs were not considered desirable for women because many of them involve the handling of heavy materials and the operating of machines not customarily assigned to women. Additional labor service is provided on some jobs and in many cases conveyors and hoists have been installed. Foremen and management representatives are almost unanimous in reporting that the ability and output of women in replacing men have been satisfactory.

On the munitions products of many kinds that are being manufactured by the steel mills, women are found in the forge, heat-treatment, foundry, machining, and final assembly and finishing departments. In the machine shops and assembly departments women's work is similar to that in shops not connected with steel mills doing heavy metal fabrication. Women are operating all types of machine tools, drills, and boring machines, lathes, milling machines, grinding machines, punch presses, saws, and special-duty machines. The work is heavier and usually slower in its timing, since in much of the work heavy hoists and hand cranes are used by both men and women in setting up the work. In some places set-up men serve both men and women; in others, women often set up the machines. Women are working with the men on lay-out work, following blueprints, and on templates, using scribing tools and center punches. In an armor-plate mill where parts are fabricated for combat vehicles, women are doing the major part of the lay-out, are doing most of the cutting of contour parts with single-torched oxyacetylene burners, and are cutting long straight parts with gang or multiple fixed-position burners. The work is not heavy but requires skill in directing the burners along contour lines. There is an ever present hazard of burns and glare from the torches. The women wear goggles, have leggings or spats, a work garment with a high buttoned shirt, and sleeve protectors; their hair is covered with both a cap and a scarf to restrain any locks that may be a fire hazard. Beveling and conditioning the edges of cut surfaces also is done with torches.

In the heat-treat departments visited, women are working as preheater-furnace attendants, charging and tending special rotary furnaces for shells, dipping shells in molten-lead pots, and starting and controlling heats and timing the large furnaces and annealing ovens in which propellers, gun barrels, and armor-plate parts are being conditioned. Heater helpers keep records of cold materials going into furnace, heat time, and temperatures. Tending furnaces is hot work, but the periods during which the worker is exposed to high degrees of heat are short and fully as much or more time is

spent in watching gages and controls in booths apart from the furnaces. None of the work of the women furnace attendants is strenuous from the standpoint of weight handled.

Women are doing inspection, quality-control checking, and observing and recording furnace temperatures with sighting instruments such as the pyrometer. They are found also on the usual incidental jobs of cleaning-up, crane operating and following, tractor and lift-truck operating, and painting with spray guns and brushes.

Quality-control and laboratory workers.

In the research, metallurgical, and chemical laboratories of the steel plants, there are many jobs of a professional, routine, clerical, and manual nature that can be filled as well by women as by men. In some of the mills the laboratories were the first department to induct women workers. In a few the numbers of women employed exceed those of men.

The number of women who are professional chemists and metallurgists doing research and analyzing steel is small, and the number of jobs of this type, too, is limited. Most of the testing is routine and repetitive work that requires little scientific background on the part of the employee but does require ability to follow instructions and careful laboratory techniques. Testing processes have been broken down. Women are found to be at least as good and often better than men in following detailed procedures under supervision. The praise of women as laboratory aides in steel is spontaneous and unsolicited.

Preparing tests of steel for microscopic inspection and testing involves machining, and women are operating various kinds of machine tools—drills, lathes, grinders; using polishing wheels, saws; and doing such hand bench operations as etching, burring, and grinding. Some of the tests are heavy—weighing from 50 to 80 pounds—but most are small and can easily be handled by women. One mill at least had a new installation of roller conveyors in its laboratory so as to expedite the work of the women test preparers.

Routine hardness testing on all types of devices such as the Rockwell, Brinnell, and Scleroscope is a common job for women. Carbon content for some testing is checked by women using the carbometer. Women tend miniature heat-treat furnaces. Spark testers observing the color of sparks on test operations determine the properties of tubes being cut. Records of tests, of course, must be precise and detailed, so laboratory workers generally are selected from women with at least a background of a high-school education if not more formal training.

Women laboratory aides not only work in the central laboratories, but in the large plants are found in specialized laboratories in the coke-oven, blast-furnace, open-hearth, and rolling-mill areas.

Beginners in the laboratory often start as test carriers or messengers between the operating location and the testing divisions. On this job the messenger may be exposed to all the hazards of the areas to which the work carries her.

In some plants all laboratory work and most of the inspection stem from a centralized quality-control department. With such organization, observers, pyrometer readers, and inspectors in the basic mills all report back to a central office. Few women as yet know enough about steel processing to take over much of the highly technical work, but the utilization of women in this type of job has already made strides and it would seem to be one of the places where there is a definite post-war possibility of employing women.

Maintenance shops and miscellaneous services.

Women are workers in the maintenance shops of most of the plants. The large mills where there is greater feasibility of job specialization and break-down have a greater proportion of women, as the lighter jobs not requiring an experienced mechanic can be assigned to them. The electrical repair shop in steel mills has been considered one of the most satisfactory and effective spots to employ women. They repair and wind armatures, tape wires, dip coils in insulating varnishes and bake them in ovens, clean and inspect bearings and brushes, and do assembly, inspection, and miscellaneous bench-work jobs. One woman was seen splicing cables. Even in the electrical shop, work that would be suitable for women in a light industry is out of the question because of the size and weight of the heavy-duty equipment used in the steel industry. Then too, in all maintenance shops the possibilities of having line-production methods, conveyors, hoists, and so forth are limited because of the variety of work.

In blacksmith and boiler shops, a few women are helpers tending hammers, following the blacksmith's signals, welding, being "stick-in" men setting hot rivets into holes for the riveter, and doing lay-out and fabrication of sheet metal. The making, pasting, and cleaning of cores and the acting as molders' helpers are new women's jobs in foundries of the steel industry.

Women machine operators on lathes, drill presses, milling machines, shapers, grinders, and saws, and bench jobs cleaning and burring small parts, are found to a limited extent in the machine shops. Much of the machine-maintenance work is on very heavy equipment requiring the use of large machines and tools in handling and setting up, and, as in the electrical shop, the possibilities of employing women are limited by the nature of the job. Grinding, polishing, and lapping tools and dies are tasks that have proved very satisfactory for women.

Women are helpers in the shops where rolls are repaired for rolling mills.

Cleaning chips and scraps out of machine pits—a shoveling job that is dirty and greasy; housekeeping and general clean-up; tending tool cribs and storerooms; operating tractors and cranes; running errands and carrying messages, are among the incidental jobs held by women in the maintenance shops.

In the matter of skill the women in the maintenance shops vary from the unskilled clean-up worker to machine operators who are carefully following lay-outs and blueprints, doing their own set-up and diversified work on lathes. Giving preference for shop women to those who have had vocational training in machine-shop techniques and standards was reported in several cases.

Blast-furnace gas is frequently used for driving turbines for electric power and generating steam, and the power plant is likely to be close to the blast-furnace area. Where a blast furnace is not a part of the plant, the power plant is like that of any heavy industry. About one-fourth of the mills had women in their power plants and in at least one the women were one-third or more of the oilers and greasers. The oiler wipes the machinery, turns down grease cups, and crawls around watching turbines and engines while they are in motion. Women clean the flues of boilers with compressed air hose. Where blast-furnace gas is used, a leak in an intake pipe lets loose the hazard of carbon-monoxide poisoning. The plants train workers in gas prevention and rescue techniques, and generally the rules require that employees so arrange their work as to be at all times within close call and eye reach of a fellow worker for aid and quick action in case of gas leaks. Clerical engineering aides, recorders, air-compressor operators, water-softener helpers, and power-station tenders are other jobs in the power area reported for women. The work of the women in the power plants is light, requires considerable intelligence, and seems suitable for the few women that it is possible to employ.

Bricks are continuously on the move in a steel plant. Hundreds of kinds of brick, varying in size and refractory characteristics, are used to repair and rebuild furnaces, checker chambers, soaking pits, and coke ovens and in general maintenance. The handling of bricks as stores or supplies is a labor job and is one to which a good many women have been assigned. Women unload the incoming bricks in sheds or yards, stacking them by size and type. Weights of the individual bricks vary from a pound or two to more than ten pounds. Roller conveyors, tow and lift trucks, are used to push them around and the tempo of the work is not speeded, so there appears to be no marked physical strain for women of average strength. The women fill orders, loading according to specifications on trucks or railroad cars, and sometimes following on foot or by truck to deliver and unload the bricks in piles at their destination. Women are reported as liking very much to be on the loading and delivery gang, as the work has variety and takes them around the plant area. In one plant a woman group leader in masonry was enthusiastic about her job and her knowledge of the many kinds of brick and stacking techniques. In the steelmaking and other areas women distribute the bricks in small piles near the spot where needed, and often hand the bricks one by one to the bricklayer as his helper.

The yards of a steel mill are a meshwork of tracks, high lines, and roads for receiving goods, moving materials and products around the area, and shipping. Women laborers act as part of the road gang on highways, cleaning, oiling, and spreading crushed rock for highway repairs. They work also as cleaners-up on the tracks and helpers on track repair. Women drive trucks and serve as chauffeurs for company cars in and outside of the area, for the plant transportation and delivery system. Women brakemen and switchmen are not common, but several plants are using them and the women are riding on the fronts of the engines throwing the switches and coupling and uncoupling cars according

to the orders of the crew chief. A few women are working in the railroad repair shops attached to the mills, and are doing work similar to that of women in the shops of the regular carriers. Throwing switches and setting brakes are dangerous jobs, requiring individuals who are agile and sure-footed. Women probably are less sure-footed than men and more prone to falls. In general, most of the jobs in the yard and transportation services are heavy, subject the women to the specialized hazards of the areas, and can hardly be recommended as suitable for women.

Some plants have women gardeners caring for the administrative building lawns, flowers, and shrubbery.

About one-fourth of the plants have women as guards, most of them armed and serving as military auxiliary police on gate and patrol duty. The women receive the same training as men in handling firearms and usually have proved better than men in hitting the target. Women guards are no longer unusual in war plants.

Women have been stenographers, typists, and record and general clerks in the administrative offices of the steel plants for many years, but inside the gates of the mill yards few women were employed before the war. The induction of women into factory or plant clerical work has been more marked than their induction into production and service jobs. Women are now employed as production record, stores, billing, accounting, timekeeping, personnel, and general plant clerks. Observers and recorders in the mill are doing clerical work that takes them away from desks and the usual office environment. Messengers in many cases are girls. Women have been able to familiarize themselves with steel terminology and records with much less difficulty than management anticipated. In some plants the number of women on plant clerical work exceeds that on industrial jobs.

Conclusion.

Women are now working in most divisions of the steel industry but their proportion is small, about 8 percent. The need for new workers is at the labor level and most of the women are recruited at this classification. Some of the jobs that would seem most appropriate for women are closed to them because of the seniority system. In the basic processes of the blast furnaces and steel works, most of the jobs other than those of a labor classification expose the worker to high temperatures and other strains inherent in a heavy industry. The possibilities of employing any significant proportion of women in the preliminary processes seem slight.

More women are employed in the rolling mills and fabrication departments, but these too have more heavy jobs than light ones. The work in the laboratory and quality-control sections appears especially suitable for women, and this would seem to be a place where a large proportion of the force could be women in normal as well as in war times.

Women are not able to work where marked spurts of strength and energy are necessary at times. Most of the women are employed on the labor gangs or the auxiliary jobs, such as crane operator, crane follower, laboratory aide, inspector, controlman and pumpman tending levers and valves, and as general helpers

in the maintenance divisions. Management does not anticipate that women will form any large proportion of the steel-mill workers, but more can be employed. To secure effective employment of women—most of whom are inexperienced—management has given and must continue to give consideration to the lesser strength, the lack of industrial experience and familiarity with heavy industry, and the short-time viewpoint of women's employment in the industry. It appears to be generally agreed that women's employment in steel is a temporary war expediency and that men returning from the armed services will have seniority and priority on the jobs in the industry after the war, so it seems hardly fair to ask women to do extremely heavy labor and dangerous jobs and dissipate their strength on employment that is of a temporary nature.

HOURS, RATES, WORKING CONDITIONS, AND PERSONNEL RELATIONS

Working hours.

The basic hour schedule of the steel industry is an 8-hour day and a 48-hour week. Until the summer of 1943, the 5-day 40-hour week had prevailed. The shift to the longer week had been made in all departments engaged on war products, but due to the curtailment of civilian products rolled in the merchant mills, some of the latter were still on a 40-hour week.

Blast and steel furnaces are continuous processes, usually stopping only when the furnace is down for rebuilding or for repairs. Workers customarily have one day in seven off. Only one mill reported a 7-day week as a regular schedule for women; this was in its tin mill. Another mill had occasional 7-day weeks for women workers. Overtime beyond the 8 hours daily was rare for women. Even for men the overtime demands have not been marked. Curtailment of Government orders had temporarily reduced the hours of some departments to less than 48 for at least part of the workers.

The traditional plan of rotating shifts or changing turns in the steel industry is weekly. On continuous processes the weekly shifting has become an institution, and though some of the company and union officials feel that a longer period between changes might be advisable for the health of the workers, the general consensus seems to be that any change in the period of rotation would not be desired by the workers, since the men have become accustomed to the practice. Approximately 20 to 25 percent of the employees work on the day shift continuously—on maintenance and service jobs largely—while the rest are on shifts that rotate weekly. Women with home responsibilities and child-care problems find the adjustment of their work and outside-of-work schedules harder than that of men, and the difficulties are apt to be a contributing factor in absenteeism and turn-over. Some of the mills have recognized this condition and have tended to assign women to day-shift jobs to a much greater extent than men.

Lunch and rest periods.

In the steel mills—especially in the furnace and rolling-mill divisions—the traditional and customary practice is for men to

eat their lunch and take their rest periods in "spells" from their work. On a hot and heavy job, men are scheduled to work for a definite time and then have a specified period off that is known as a "spell." A worker may have a cycle of 40 minutes of work and 20 minutes of spell time. On some strenuous jobs the spell time may be as long as the work time. As a result, there has been little in the way of regular lunch periods in the steel industry. To a visitor in the steel mills the lunch period appears to be continuous. Coffee is always being made on hot billets, slabs, and plates of steel, and men on spell time are always to be seen having a snack from their lunch pail, or a cigarette, with a large cup of coffee as a bracer. Lunch counters are used primarily as a source of food to be carried back to the workplace for spell periods.

The advent of women in the steel mills brought to the fore the problem of a definite lunch period for them, especially in States that have statutory regulations covering women's lunch periods. Such statutory regulations in States where steel mills were visited in the Women's Bureau survey are as follows:

New York—60 minutes but may be relaxed.

Indiana—60 minutes but shorter time may be permitted.

Maryland—30 minutes after 6 hours.

Ohio—30 minutes after 6 hours during war.

Pennsylvania—30 minutes after 5 hours except in continuous-operation manufacturing processes; may be suspended during war.

Colorado—No regulation.

Illinois—No regulation.

West Virginia—No regulation.

Most of the steel mills have a policy of a half-hour lunch pause for women, and they have provided tables and chairs and in some cases electric plates in the women's rest rooms. Actually, however, on continuous processes women tend to follow the men's routine, taking their lunch and rest periods as spells allow, and often the women's lunch periods are on the job and as indefinite as those of the men.

Where lunch periods have not been formally designated in the steel mills, the usual practice is to pay for the over-all work period. A few mills in Pennsylvania, Ohio, and Maryland, claiming that since the law requires definite lunch pauses for women a deduction of a half-hour must be made from their work time, give the men 8 hours' pay and the women 7½ hours' pay. While it is not the practice in most industries to pay for lunch periods, in an industry where men are paid for their spell time it seems unfair to pick women out for different treatment. On day shifts where the over-all hours are not limited to 8 by rotation practices, an 8½ hour spread of work time with a half-hour lunch period is customary. Some of the mills, of course, treat women as men and pay them on the same basis for their lunch period.

Spell periods are rest periods in steel, and though in most of the mills it is not usual to set aside definite and formally designated rest periods for women, allowances of 10 or 15 minutes in the first and the second half of the shift are made for rest and refreshment.

Rates of pay—Equal pay.

A highly virtuous feeling seems to imbue managers when they pay the same rates to women as to men on the same, similar, or comparable work. They report with pride that women are treated the same as men, or that they have agreed with the union that women shall receive men's rates of pay when they replace them. All the steel mills visited have accepted the equal-pay policy—at least in part. On all regular jobs the rate has been set by the job, and as soon as a worker qualifies on seniority and merit he is paid the established rate. When women have replaced men as laborers or on jobs carrying a low degree of seniority for which they can qualify, they have almost universally received the same rates as men. Organized labor has insisted that women shall not compete unfairly with men by taking their jobs at lower prices. On jobs that traditionally have been women's, however, such as the as-sorters in the tin-plate mills, the beginning rate sometimes is below the established minimum for inexperienced men. In some plants the women beginning at these jobs are paid 62½ and 63 cents, while if they began on a man's job in the same plant their rate would be 78 cents. The beginning rate for the women as-sorters largely reflects the general attitude toward women's wages.

In a few instances it is claimed that women are not performing the full job as formerly done by men, and that for this reason a slight differential in the rate paid is justified. In some such cases the difference in the duties is questionable. In one plant visited the hourly rate for women crane operators is 11 cents less than that for men because women are not supposed to oil or make repairs on the cranes they operate. Inquiry by Women's Bureau agents revealed, however, that it is not customary for men either to oil or to repair cranes, as regular maintenance crews take care of this servicing. In the same plant, since the State law requires that women be allowed a half-hour for a lunch period, this time is deducted and the women are paid for 7½ hours while the men are paid for 8. The men are not allowed a specified period for lunch but have "spells" during which they eat their lunch, and this time is reported as about half an hour. The woman crane-operator's lunch period is regarded as one of her "spells," and actually she usually has no more time off than the man operator.

On some of the new war work of a fabrication nature on ammunition components, learners' rates have been established for jobs held by women, with periods of several months' progression before they reach the minimum rate at which men start on laboring jobs. Men also must be trained on the job, but there are no similar learners' rates below the basic minimum for them. Further, for women clerical workers the traditionally lower rates paid women are reflected frequently in the wage policies, and as these workers ordinarily are not covered by collective-bargaining agreements, women who replace men do not always receive the same basic pay. In general, however, for most of the plant workers the equal-pay policy is practiced on jobs held by women.

Rates paid to women plant workers.

The lowest starting rate paid to a woman plant worker in the steel mills covered in the survey was 62½ cents an hour; women

on plant clerical work, however, had starting rates of 50½ cents on jobs formerly held by men at much higher rates. The highest starting rate paid to a woman was 84½ cents—the minimum both for men and for women in some plants. A large majority of the plants had a beginning rate of 78 cents, which is the lowest rate recognized in most of the union contracts for basic steel. Since most of the women have been employed in the steel industry for only a short time, it is not surprising that the usual starting rate and the prevailing rate are the same, 78 cents. In some of the mills the 78-cent minimum applies only to workers who do not rotate on shifts. Turn laborers who rotate weekly receive 79½ cents, but otherwise there are no differentials for night work. The range of women's wages is limited and very few have reached jobs with hourly rates of more than 90 cents.

Automatic wage increases are not customary. Seniority rights of workers are recognized in most of the steel mills. Progression and upgrading are dependent on seniority combined with merit. Since the tenure of women in steel is short and since the women are regarded as temporary substitutes, upgrading has been limited. Seniority regulations sometimes bar women from certain of the lighter jobs. It has been customary for many years for men to begin in the steel mills as laborers and advance with experience to better-paid and usually less strenuous jobs. Some of these jobs are better suited to women than others on which they are employed, but men who have served their turn at heavy labor, and probably now beyond draft age, rightly have a claim to such jobs. When vacancies occur above the labor level, seniority is a factor, and while the unions recognize the seniority of women they do not want to give them special privileges. A small number of women are now securing some seniority and will be eligible for promotion. All workers who have been taken on as replacements of men in the armed services and for increased production have been employed for the emergency period, and they are not expected to attain seniority that will give them precedence over steelmen in the service.

A large proportion of the jobs in this industry have tonnage or other incentive basis of payment. Group work and group bonuses are more usual than individual piece work or task systems. Actual earnings of many of the men are increased materially by the bonus payments but the proportion of women who have been assigned to work that carries bonus rates is small. In some plants all the women are on a time basis.

Occupational rates.

Multitudinous job rates are characteristic of steel mills. Several of the steel personnel men estimated that their companies had thousands of job rates, which had been established by negotiation between management and labor. Rates for jobs covered by the same terminology vary not only among departments but within a department. Most of the women, however, are on beginning jobs rated in the lower brackets of skill that concentrate at the under-80-cent levels, with relatively few women on rates of 90 cents and more. The lowest rates for women who were industrial workers—62½ and 63 cents—were for beginning assorters in some of the

tin-plate mills. This has long been a woman's job and the rates reflect the traditional attitude of evaluating women's jobs on a lower plane. Some of the tin-mill assorters, however, start at 78 cents, the most common rate for women.

This survey of women in steelmaking did not include the copying of pay rolls and job classification by individuals. Instead, the job rates were secured from personnel and other company officials. In the appendix of this report is a list of hourly rates paid women at time of survey. It is not exhaustive but is indicative of the typical rates being paid to women in the principal plant divisions in the eastern and midwestern steel plants. Most women were on the lowest-priced jobs.

Rates for office workers.

Clerical workers in the plants often are paid less than the industrial operatives. Few women were employed in the steel plant offices before the present war, and when women replace men the tendency is to assign rates comparable to those paid women in the administrative offices and not on a par with those formerly paid to men. Women with clerical experience were reported as being taken on at \$90 a month to carry jobs in plant offices for which men had received \$150 and \$160. Clerical workers have not always been included in union negotiations. Even with overtime payment for hours over 40 a week, many of the women on a monthly basis were earning less than \$125 a month on office work.

Labor supply.

Steel is a basic raw-materials industry for both civilian and war goods and its expansion has been largely in the increased use of existing facilities and staff. Weekly hours had been 40 or less until the spring and summer of 1943. Steel communities tend to be made up of steelworkers' families who have been rooted in steel for more than a generation. Many of the retired workers came back when labor was needed. In some of the steel communities Negroes were recruited or came of their own volition to work as laborers in the mills. The manpower problem was not generally so acute as in the newer war industries, even in areas where other industries were experiencing an acute shortage of workers. When it became necessary to recruit women, the local supply, with a steel background, has proved adequate. Wives and daughters of steel families have been given preference and also were the first to apply. Most of the women employed in the steel mills have not come from other manufacturing plants but are housewives or former workers in the service industries. None of the mills report any difficulty in recruiting women. Some of them say that they have only to make it known round the mill that additional women are being considered for employment, to have more women apply than are needed.

Employment policies.

Age.

The usual minimum hiring age for women in the production area of steel mills is 18, but in two mills no women under 21 are employed, and in one mill girls of 16 are taken on. Girls 16 to 18 are employed as messengers and office workers in some of the

administrative offices, but are not allowed to go into the plants. In most of the mills some boys of 16 to 18 are working. While women under 40 are preferred, as stronger and more agile for heavy work, there is no fixed maximum age. Occasionally a grandmother on a production job is pointed out, but women in their 50's and 60's are few. Usually they are janitresses.

Marital status.

Most of the steel mills are not concerned with the marital status of their women employees. One mill is reported as not hiring married women except the wives of steelmen in the armed services; others give preference to such women but beyond that are not concerned with marital status.

There is no general policy with reference to the employment of women with young dependent children. Most mills accept them. Usually inquiries are made as to provision for the care of the children in the mother's absence, and women whose plans seem inadequate are not employed. Two of the mills investigate to make sure that the provision for child care is satisfactory, and one makes special investigation when the interviewer feels that the plans of the mother are inadequate or questionable. Another mill does not hire any woman with a child under 12 months. Little interest was expressed in child-care centers, primarily because the hours of the steel industry with rotating shifts do not fit in with the hours during which child care can be obtained at a nursery. The proportion of women in the industry is too small for much concern along these lines.

The same is true of policies and practices in regard to handling cases of pregnant women; few plants have formulated a definite policy and most plants handle each case individually. In one mill—the one with the most definite plan—any woman reported as pregnant is interviewed by the company doctor and the period of time she is permitted to remain is determined from this interview plus a statement as to her condition from her physician. A woman worker who left because of pregnancy may be reinstated from 2 to 6 months after the birth of her child if she furnishes a statement from her own physician that she is fit for work and passes a check by the company's doctor.

Negro women workers.

Negro women are employed in most of the steel mills. The majority, like the white women, are working at labor jobs. The proportion of Negro women in the masonry and outside-labor gangs is large. Where women are employed in the sintering plants, they are chiefly Negroes.

Work clothing.

Women working on heavy jobs in the steel mills usually are dressed suitably for their jobs. The necessity for suitable clothing soon becomes apparent to women as well as men even if management does not set the standards. Women working in the yards, the stock houses, furnaces, and many of the rolling mills soon discover that they need sensible shoes, heavy slacks or overalls, a working man's shirt, and a visored cap or turban that covers the hair and keeps the dirt out. Except in the tin-plate sorting rooms,

laboratories, and plant-office jobs, trim garments in pastel colors have little place. In tin-mill assorting, where light-colored uniforms are reported, the girls constantly see their reflections, and perhaps uniformity and trimness aid production.

Many women wear men's work garments and boys' ankle-high shoes, and as one approaches a labor gang on the trestles, in the yards, in the blast-furnace area, the sex of the workers cannot be determined by the clothing worn. They all look pretty much alike. During cold weather the women have found wool trousers, long underwear, and extra sweat shirts or woollen shirts as necessary and desirable for them as for the men. Uniformity in the sense of special "wow" suits is not characteristic of the steel industry. Personnel and safety officers determine standards for suitable and safe clothing. Safety has been actively promoted by the steel industry for many years and safe clothing in a steel mill may be not only insurance against maiming and disfigurement but a matter of life and death. Wherever special accessories are required, such as hard hats for protection against falling objects, asbestos leggings, protective jackets, helmets and shields for oxyacetylene burning, scarfing, or welding, they are supplied by the company. Workers usually provide their own gloves.

Head covering in the steel mills is needed not so much for protection from whirling machinery as from dirt, sparks, and burns. Many women wear men's visored caps. Turbans or closely woven caps are preferred to keep out dirt. In the assorting of tin plate and in some of the other jobs there is no apparent need of caps. Wherever there is a hazard of burns from sparks or hot metal, compliance with or enforcement of safety-headgear standards is good.

High shoes are more satisfactory than low shoes for heavy work of a manual-labor nature, as they afford more support and protection against dirt and injuries. In several mills comments were made by safety representatives that women of their own volition had adopted the wearing of boys' or men's high-cut safety shoes because they found them to be better wearing, more comfortable, and more satisfactory than the women's safety shoes. Men have been urged to wear safety shoes in the steel industry for many years and the same policy has been followed with women, but it has been difficult to secure satisfactory women's work shoes of a safety type, and women in most mills have been allowed to wear any shoe that apparently was suitable. A steel mill with its dirt, its tracks, uneven floors, and brick footing does not tend to the wearing of light, high-heeled, and open footwear. In one of the mills visited, whenever a shipment of either men's or women's desirable safety shoes was received, a truck with the shoes and a fitter made the rounds of departments offering its stock.

Job training.

War production, with the hordes of new workers in the last two years, has focused a great deal of attention on training. Most plants are now training-conscious. All but a very few of the steel plants have training classes of some sort for foremen and key personnel to teach them to instruct on the job and to supervise the workers assigned to their departments. A few women who

are to be instructors or group leaders are trickling into these courses, but most of the training is done by men. The various courses and methods that have been developed by the Training-Within-Industry Service of the War Manpower Commission are the basic primers for developing job instructors.

In the home office of one of the companies a central training department develops plans and coordinates courses of instruction, methods of training, films and exhibits to be used by all the plants. Each plant has its own training department with representatives working in all other departments.

Training for steel occupations is almost entirely on the job. Some women have been recruited from those who have had pre-employment vocational courses in machine-shop practice, welding, inspection, and drafting, but the needs and opportunities for women workers along these lines are limited. Most of the jobs for women are of a labor type and little training is needed beyond that which can best be given on the job, such as handling shovels, cleaning equipment, piling bricks. In one plant new women are given several hours of classroom training in the proper methods of lifting, carrying, handling shovels, and loading and moving wheelbarrows. Correct methods are demonstrated and each recruit is required to demonstrate and have her application of the instruction criticised.

Crane operators are given very careful instruction before being put in charge of cranes. In one plant when the decision was made to employ women instead of men in a new mill, the women selected for crane operators were given 40 hours of intensive training by key crane operators, using the cranes in a division of the company that was experiencing a temporary lull in operations. When the women crane operators were placed in the new mill they were able to operate the new cranes, which tended to minimize the objections of the superintendent and foremen of the division to women operators. Where women crane operators are employed in Pennsylvania, it is necessary to have the crane and the ladders or steps used in climbing to the cab approved by the State Industrial Commission, and the women must work as trainee operators with an experienced operator in the cab for at least 30 days. This is a longer period than is given to training men operators, and it is considered longer than necessary for women and may have tended to deter their employment. Plants in other areas reported training men and women as crane operators in 10 days or 2 weeks.

Laboratory aides or technicians are in some cases considered as trainees on the job for various periods. In one mill the women are not paid the rate for the job until able to perform four basic tests satisfactorily. Before that they are classified as "wash-house attendants," at a rate of about 10 cents an hour less than the going rate.

In some mills plant clerical workers, even those with considerable office experience, are classified as learners for various periods and are paid rates considerably less than those formerly paid to men. Their learning period is devoted not to formal training but to becoming familiar with practices and policies of the plant. Since there had been no such plan for men, this constitutes a wage discrimination toward women.

Women in personnel work.

Old-established plants taking on appreciable numbers of women for the first time, as well as the new war plants, have accepted fairly generally the idea that there should be women personnel workers—counselor, matron, welfare adviser, and social worker being some of the titles—whose duties are to lessen in some way the impact on both women and management of the new employment status of women. In normal times in woman-employing industries there have been women personnel directors, interviewers, and welfare workers concerned especially with women personnel, but in the last two years their numbers have mushroomed. Often the duties of the position are not well defined and the work done depends on the resourcefulness of the counselor in making an effective place for herself in the organization. In some plants the woman personnel workers are little more than police matrons, who patrol the toilets and rest rooms, supervise the wearing of work clothing—a time-consuming job—and represent management when disciplining appears to be in order. In others the duties seem to be only quasi-personnel and largely welfare, with emphasis placed on advising on child-care, home, and personal problems. In still others women personnel workers study the jobs, the working conditions, and other factors of women's employment; interview, select, place, and induct; help with the training and follow up the women on their job performance—a real personnel job.

Most of the steel plants have women attached to the personnel department to serve in some capacity. In one of the large companies the main office has a woman consultant who advises and coordinates employment policies and practices for women throughout the many plants in the organization. In one of the largest plants of this company a separate employment office for women has been established, with a woman in charge. This woman has women assistants who interview and place the women applicants, using mental and aptitude tests as an aid. The woman in charge worked for many years in one of the plant offices and is steeped in knowledge of the conditions and jobs. In addition she has the most essential attribute of good judgment, and has a sympathetic appreciation of the possibilities and problems of the women as well as the needs of the company. Plant policies, hours, wages, safety program, work-clothing regulations, and so forth are explained to the applicants before they leave her office. She is at all times available to the women to talk over their jobs and personal problems, and she serves as a liaison person on special difficulties of women workers, at the request either of the women or, on the other side, of foremen or superintendents. This company tended to select women for the new women's-counselor jobs from their nursing force, from foreladies in the sorting departments of the tin mills, or from office workers whose past records indicated suitability and adaptability for such work. A person who has a background in the industry and who is known to the foremen as an old employee inspires confidence and acceptance by both workers and foremen.

Usually in the steel mills there are only a few women—1 to 4—assigned to the special women's personnel work, but in 1 plant a women's division that has been made a part of the industrial rela-

tions department is composed of a supervisor, an assistant supervisor, 9 senior matrons, and 46 shift matrons. This department is not concerned with the initial employment and placement of women, but advises on suitable jobs and types of women to be hired.

Though the matrons here have their desks in the women's rest rooms and keep a close supervision of the service facilities for women, they are not "matrons" in the usual sense of this job title. They are given several days' training in safety, first aid, sanitation, work clothing, wage systems, job-instruction techniques, relations with foremen and supervisors, State laws covering women workers, and their general duties and responsibilities on the job. Women workers in the plant are supposed to bring their grievances and problems to the matron, who is required to know the women's jobs in her departments, to check on the women's performance on jobs, their observance of safety rules, clothing requirements, and misuse of rest periods, to answer questions about wages, tax deductions, and so forth. The matrons are expected to preserve order and maintain discipline among the women. Unfortunately, some of them are so conducting themselves as to be considered disciplinarians rather than counselors by the women workers and consequently are much resented.

The senior matrons supervise and coordinate the work of five or six matrons, supervise and train new matrons for 2 to 3 weeks, and make orientation and induction talks to new workers in the departments they cover. The senior matrons are stationed permanently on the day turn and the others rotate weekly, so all have the advantage of this senior counseling at regular periods.

Experience, judgment, and common sense in dealing with human beings seem to be the chief requirements for a woman counselor. Academic background is of only secondary importance. Women counselors who have no well defined status and are used only to police the women neither add to the morale nor increase the efficiency of women on the job. Unless the counselors are assigned duties that really relate to the effective employment of women, and authority to promote and enforce policies affecting the women's welfare, their positions as advisers on personal problems and as police matrons cannot be considered good personnel work.

Welfare facilities.

After a steel mill decides to employ women, usually the next consideration is to plan for service facilities, or welfare stations as they are called in steel. Additional toilet rooms, washing facilities, cloak, rest, and lunch rooms are required. Steel being an old industry has many old buildings, with equipment designed and installed in the days when the workers' comfort and convenience were secondary considerations in most plans. Men's facilities in some cases provide only the meager essentials and are not too adequate in number, so men's welfare stations can not be cleaned up, remodeled a bit, and turned over to women because frequently there is nothing to convert. New locations must be found, priorities for equipment secured, and delivery and construction engineered and effected. Even with priorities the de-

livery of equipment may be slow, and in some of the mills the lack of service facilities delays the employment of women. When the new facilities are ready, they are in most plants far better than those provided for the men and will fill a need for the men even if women do not remain long in the industry. Occasionally, because of the uncertainty as to numbers of women to be employed and the temporary stay probable in their case, management has hesitated to spend a lot of money for special facilities and the provisions are crude and not always convenient. On the whole, however, the numbers of toilets, washing facilities, dressing and locker rooms are adequate. State requirements along these lines are met.

Washing facilities are equipped with hot water in most cases and the spray-fountain type of equipment is common. Difficulty in securing either paper or linen towels, soap and containers, is reported; further, in many plants it has been the custom for men to provide their own soap and towels. Paper towels are not too satisfactory for bathing, nor for drying larger body surfaces than the hands, so workers still tend to have their own towels and soap and keep them in their lockers. Some washrooms are adequately equipped with both paper towels and soap, but it is not general. Because of the dirty nature of the work, showers are provided more generally in steel than in other industries. Many adequate shower rooms were inspected and evidently are much used, especially in the summer months.

Lockers and dressing-room facilities usually are connected with the central toilet rooms. Floor racks and hooks on the wall are in a few cases the only equipment, but in most plants individual wooden or steel lockers are available for the women. Several mills have chain lockers—overhead racks with hangers and baskets for shoes and the miscellaneous odds and ends such as hats, purses, and gloves. Individual chains on pulleys raise and lower the hangers and baskets, and each worker padlocks her own chain for safekeeping of her possessions. This is a most satisfactory arrangement where space is too limited for standing lockers. Dressing rooms are sometimes extremely crowded during shift changes and the ventilation is poor.

Rest rooms, rarely provided for men, are a new feature for women in the steel industry. The facilities are not so adequate as the more essential ones—toilets and washrooms—and sometimes are entirely absent. There is a real need of at least a few cots, long sofas, or benches where women who are temporarily indisposed or fatigued can lie down for a few minutes. The elaborate clubroom type of furnishings is not essential, though in a few mills the new rest rooms provide a lounging-room atmosphere with rugs, draperies, and easy chairs and sofas.

Lunch rooms, tables and chairs, and in some cases a hot plate to heat soup and drinks usually are provided, this too an innovation in the mills, as men eat at their workplaces. Such facilities generally are a part of the welfare station. Food facilities in the way of restaurants, cafeterias, canteens, and so forth usually are poor.

Nourishing, well prepared food, hot or cold as required, milk and hot drinks, a place to sit down while eating in a clean ventilated

room should be the minimum standard of food provision for employees. The restorative value of the mid-shift break to the worker, both as a human being and as a cog in industry, is increased by a satisfactory lunch. Good lunches can be packed at home, but unfortunately many workers have no time themselves nor anyone to prepare their lunch. The steel industry—or so it seems in many plants—has a traditional conservative attitude that good cafeterias and lunch rooms are for the light industries. Steelmen grab a bite out of their lunch pail and a swallow of hot coffee whenever there is a lull.

Only a few of the mills have adequate or desirable lunch rooms. In most cases they are drab and dirty places run by concessionaires whose incentive is the profit motive, not food or service for the employees. Usually they are places where soft drinks and food—pies, cakes, and sandwiches—can be purchased to carry back into the mill. When an agent of the Women's Bureau commented on the unsatisfactory lunch rooms, the reply was that lunch periods are on company time and the plan is to avoid making the eating places comfortable or attractive loafing centers. Because of the wide expanse of the units that make up a steel plant, a central lunch room would be inaccessible to most of the workers. Food wagons or mobile canteens carrying food and drinks from a central kitchen and distributing them in wholesale lots to department lunch rooms or by direct sale from the mobile unit have been found feasible and satisfactory in many of the new war industries. There seems to be no reason to assume that steelworkers do not need and appreciate good food and eating facilities as much as other workers. By having tables, chairs, or benches and in some cases hot plates in their rest rooms, the women have more than the men, but eating facilities in the steel industry are not good.

Medical facilities.

First-aid and medical facilities are better in steel than in most industries. Health and safety programs are of many years' development. Most of the larger mills have hospitals with doctors on duty or on call at all times. All mills have arrangements for caring for first-aid cases at any time. In the large mills ambulances or special cars are on call to transport ill or injured workers.

All the mills visited have a preemployment examination and the nature of this preemployment physical screening varies from a quite superficial examination to a complete physical covering eyes, ears, heart, lungs, blood tests, a hernia check, and a listing of all disease and injury experience to serve as a basis for rejection or placement and for background data for future illness or injury.

Some of the plants have a program of follow-up examinations for certain occupations at intervals of from 3 months to a year. The employees for whom follow-up examinations are required are riggers, crane operators, all who do high climbing, operate railroads, drive tractors, or control equipment that involves the safety of others, and workers exposed to fumes from molten lead or lead products. On inspection jobs where perfect vision is required, periodic eye examinations are a part of the medical program in some plants.

Accidents and strains.

Accident-prevention and safety education, as already suggested, has been a crusade in the steel industry for many years, so in most of the mills the safety departments are consulted in determining and recommending jobs that are suitable for women. Generally women are placed on the least hazardous and strenuous jobs in the plants. Few severe accidents to women have been reported. Slight burns, minor cuts and lacerations, pinched fingers, foreign bodies in eyes, foot injuries from falling objects have been reported, but severity and frequency rates are lower for women than for men. At the time of the survey, none of the plants had calculated separate figures on accidents for men and women, but the concerted opinion of the safety men interviewed was that women were proving safe workers.

Of course women are not exposed to hazards and strains so severe as those of men. Exposure to outside weather conditions; heat and drafts inside many departments; burns and fumes from hot metal; dust; blast-furnace gas (carbon monoxide); the hazard of falling from trestles, from platforms, from slanting-bottom-hopper feeding cars, and from uncertain footing of rough floors; and strains from lifting, are the most usual accident possibilities. Safety meetings, safety posters, pep talks on careful work habits, and demonstration of the proper methods of lifting generally are part of the induction procedure. Arbitrary standards as to the weight limits to be lifted by women are not usually set, as safety men realize that the weight lifted is not the sole determining factor and that frequency, distances carried, and methods of lifting must be considered. Limits of 35 and 50 pounds as the maximum loads for women were reported in a few cases. In one mill, however, two women were observed constantly lifting together and turning flat pieces of metal that weighed 120 pounds. In several instances, company representatives told of trying out women on jobs not considered heavy for men that proved too strenuous for women. Women's utilization as scarfers and grinders is limited because women have not been able to do the lifting and moving of billets that are incidental to such work. Some of the older types of cranes have heavy lever controls and women cannot manipulate them without undue fatigue and strain. Swing grinding where there is considerable pressure and arm movement is found too heavy. In some instances women are provided with lighter and shorter-handled shovels for clean-up and labor jobs. Safety men in the mills are conscious of the need of special precautions for women and seem to be meeting the problems of strains and hazards to women constructively.

Turn-over and absenteeism of women.

Turn-over in terms of monthly percentages was reported by 15 plants. The 15 plants' monthly turn-over ranged from 2.04 percent to 5.4 percent. No separate figures were kept for the women. Some plants estimated that turn-over was less for women than for men, some that it was about the same, and some that it was slightly more. Apart from those going to the armed forces, men left for higher wages or to learn trades in other industries,

and a considerable group were reported as unstable employees with job-shopping tendencies. Women left less frequently for higher wages. Their terminations were in most cases attributed to home duties, child-care problems, or not liking the type of work offered them in the mills.

Only four of the mills had absenteeism figures separate for men and women. These are as follows:

<i>Percent absent</i>	
<i>Male</i>	<i>Female</i>
3.47	4.75
1.00	1.65
1.80	5.63
4.17	6.35

In all four of these mills the absence rate was considerably higher for women than for men. The chief reason given for women's absence was illness of self or other member of the family. For all employees, absence rates were reported as from 1 percent to 8 percent. Most of the mills were attempting to reduce absenteeism by conferences with supervisor and absentees, by requiring a written statement of reasons for lost time, by having company representatives visit or telephone the absentees. Some plants felt that these methods were beneficial, but others were doubtful that they had any real effect on absenteeism. A number of mills reported that absence was not a problem; in fact, there seemed little uniformity among the plants in attitudes, figures, and practices in the handling of absenteeism.

Employee organization and women's membership.

United Steelworkers of America (CIO), through its locals, had agreements with all but two of the steel plants visited. Independent unions bargained in the other two plants. The unions have welcomed the women steelworkers to their organizations and both management and local unions reported that women have joined the unions with fully as much alacrity as men. Two mills reported that 98 percent of the women plant workers were union members. In a number of mills women shop stewards are representing the workers, and a few women are serving on grievance committees. At least some of the local unions have not encouraged active participation in union affairs by the women. They are regarded as having tenure only for the duration of the war and so it seems hardly worth while to encourage their activities or develop leadership among them. No women were reported as members of labor-management committees.

One union local recently had brought to the Regional War Labor Board a case concerned with starting rates unequal for men and women and had received a decision that abolished the discriminatory learners' rates for women.

Women's seniority on the job is recognized for the duration of the war, but it is assumed by both the union locals and the management that in the post-war era women will return to their peacetime activities. Management representatives reported that the seniority provisions in collective-bargaining agreements have interfered with the full utilization of women on jobs that would be

suitable for them but which they cannot reach with their lack of seniority rank.

NOTE.—Representatives of the union made the statement that the steel firms have employed women for the purpose of filling a gap in their working force resulting from inequitably low wage rates for the starting jobs. Having reached the point of being unable to fill these jobs at the bottom rungs of the wage ladder with male workers, the steel firms resorted to the employment of female workers. In many instances these hard laboring jobs are not suitable for women, and the primary reason why women have been employed is that the firms became unable to secure men at the rates paid. Had the industry upped the wage rates for the lower jobs, men would have been available and women could have been employed for work for which they are better adapted.

APPENDIX

Occupations In Which Women Are or Have Been Employed,
41 Steel Mills, by Department

[Engineering aides, Clerks, Messengers, Guards, Nurses, Counselors, and Janitresses are not included. These are clerical or allied and service workers whose activities are not directly connected with production.]

Occupation	Coke and by-prod- ucts	Blast furnaces	Steel works	Rolling mills	Other finishing and fabricating depts.	Laboratory and quality-control	Power and fuel	Shipping and ware- house	Shop maintenance	Yard, track, and transportation
Acetylene-generator tender					★					
Air-compressor op. and learner							★			
Annealer and helper				★	★					
Assembly—miscellaneous				★	★					
Assorter and helper and learner				★	★				★	
Bagging sulphates	★									
Banding, hand and mch. op. and helper				★	★			★		
Bending wire					★					
Billeteer-mch. op.				★						
Blacksmith helper										
Boilermaker helper									★	
Bolt-threading-mch. op.					★				★	
Bomb and shell machining					★					
Bonderizer and helper										
Brakeman and switchman				★						★
Branner-mch. op.				★						
Brickmason helper	★	★	★	★						
Bundler and helper and learner				★						
Burner and flame cutter and helper and learner		★	★	★	★	★				
Burrer		★	★	★	★				★	
Cable splicer									★	
Car-block learner								★	★	
Car bracer				★				★		
Car checker and loader and helper				★				★		
Car dumper	★									
Car-repair helper			★							
Carbometer (inspector)			★							★
Catcher—tin mill				★		★				
Chauffeur				★						★
Checker				★	★	★		★		★
Checker-chamber clean-up			★							
Chemist and learner	★		★			★				
Chipper—boiler shop						★				
Cleaning ore cars		★							★	
Controlman and learner	★			★						★
Coremaker and helper									★	
Cover op.				★					★	
Crane hooker and learner			★	★	★			★	★	
Crane op. and learner	★	★	★	★	★			★	★	★
Cut-off op. (pipe)				★						★
Dipper and dryer (coils)									★	
Door puller			★							
Drill-press op.				★					★	
Electric-locomotive op.			★							
Electric shop—bench work, and helper		★		★	★				★	★
Expediter			★	★						
Feeder		★		★	★					
Filterman		★								
Fire-clay mixer			★							
Flue blower										
Forelady and leadwoman				★	★	★	★	★		
Forming-and-crimping-mch. op.					★					
Foundryman helper									★	
Furnace charger and heater				★						
Furnace feeder				★						
Galvanizer				★	★					
Gear cutter				★						
Grinder and learner				★	★				★	
Heater helper				★	★	★			★	
Heat-treat man and helper	★			★	★				★	
Helper not elsewhere classified			★	★	★				★	
High-line laborer	★	★	★	★	★	★	★		★	
Hot-bed operator		★		★						★
Hot-top knocker				★						
Inspector and helper and learner			★	★	★		★			
Instrument-repair learner				★	★		★		★	
Keg and spool maker				★					★	

Occupations In Which Women Are or Have Been Employed, 41 Steel Mills, by Department—Cont.

Occupation	Coke and by-prod- ucts	Blast furnaces	Steel works	Rolling mills	Other finishing and fabricating depts.	Laboratory and quality-control	Power and fuel	Shipping and ware- house	Shop maintenance	Yard, track, and transportation
Laboratory aide; technician	★	★	★	★	★	★		★	★	
Laborer—clean-up	★	★	★	★	★	★	★	★	★	★
Laborer not elsewhere classified	★	★	★	★	★	★	★	★	★	★
Larry and skip-car op. and helper		★								
Lathe op., engine and turret										
Lay-out man and helper and learner				★	★				★	
Learner not elsewhere classified				★	★	★			★	
Leveler op. and learner				★	★				★	
Lithograph op.				★	★				★	
Loader	★		★	★	★		★	★	★	
Locomotive-repairman helper									★	
Looper				★						
Luterman and helper	★									
Machine op. not elsewhere classified and helper and learner	★	★	★	★	★	★			★	
Maintenance shop—bench work			★							
Mark, stamp, and stencil				★	★				★	
Metallographists						★				
Milling machine									★	
Millwright helper	★			★					★	
Misc. fabricating jobs					★				★	
Molder and helper									★	
Nail-machine helper					★					
Nailer and wrier—kegs					★					
Nipple man					★				★	
Nutting bolts					★					
Observer and learner			★	★	★	★			★	
Oiler and learner		★		★	★		★		★	
Pack and wrap				★	★				★	
Painter and helper				★	★				★	
Panman		★							★	
Pattern storage man									★	
Piler				★	★				★	
Pipe fitter helper	★			★					★	
Pipe cleaner				★						
Pipe coater				★						
Pipe reamer				★						
Platform girl				★						
Polisher				★		★				
Preheater learner				★						
Printing tags				★						
Pump and still attendant	★			★						
Pump tester				★						
Pyrometer—checker						★				
Recorder and helper		★	★	★	★	★	★			
Rigger helper				★						
Road repairman										★
Roll-turner apprentice									★	
Roundhouse laborer										★
Sandblaster helper				★						
Sandman				★						
Saw op. and helper				★	★	★			★	
Scale blower				★						
Scaler				★						
Scarfer and helper and learner				★						
Scrapman			★	★	★					
Screen-station op.	★									
Shaper										
Shear op. and helper				★	★			★	★	
Shipping and warehouse laborer				★	★			★		
Sinter labor and mch. op.		★								
Slag sweeper				★						
Solderer					★					
Sorter—nails					★					
Spark tester				★						
Speed regulator				★						
Spooling wire				★						
Stamper				★						
Steam-hammer op.									★	
Stocker helper				★						
Storeroom attendant				★	★					
Stoveman helper										
Straightener and gag-press		★		★	★					

Occupations In Which Women Are or Have Been Employed,
41 Steel Mills, by Department—Cont.

Occupation	Coke and by-prod- ucts	Elast furnaces	Steel works	Rolling mills	Other finishing and fabricating depts.	Laboratory and quality-control	Power and fuel	Shipping and ware- house	Shop maintenance	Yard, track, and transportation
Substation tender										
Sulphate-dryer op	★						★			
Test carrier	★	★	★	★		★				
Test driller						★				
Threading						★			★	
Tool-crib attendant and learner				★	★	★			★	
Topman		★								
Torch-repair helper									★	
Torpedo-net assembly					★					
Tracer, chaser			★	★	★	★				
Tractor-lift op. and learner			★	★	★			★		★
Track cleaner										★
Trainee—mill	★	★	★	★	★	★	★	★	★	★
Trainee not elsewhere classified									★	★
Transfer-buggy op.; tram op. and learner			★	★		★			★	
Transfer-car op		★								
Transfer-table op				★						
Truck driver and helper								★		★
Trucker, hand					★					
Tumbling nails					★					
Upsetter-mch. op				★	★					
Upset tester						★				
Water softener and helper							★			
Weigher and helper			★	★	★					★
Welder and helper and learner				★	★				★	
Welder apprentice				★	★					
Wharfman	★									
Whitewasher									★	
Wire cutter				★						
Wire drawer and helper and learner				★						

Percent Distribution by Department of 8,222 Women Plant
Employees in 17 Plants of a Steel Corporation

Department	Percent of women
All departments (8,222 women):	100.0
Ore docks	.8
Coke and by-products	2.6
Blast furnaces	4.5
Steel works	5.0
Rolling mills	39.8
Bar and rod	5.9
Bloom and billet	9.5
Plate	7.4
Sheet-tin plate and strip	9.1
Slab	.8
Structural	3.9
Rail	1.2
Other and not specified	1.9
Other finishing and fabricating depts.	9.0
Laboratory and quality-control	13.9
Power and fuel	1.4
Shipping and warehouse	1.1
Maintenance and service	19.8
Shop maintenance	14.4
Brickyard and masonry	1.3
Yard, track, and transportation	2.6
Plant protection	.9
Construction	.2
General	.4
Clerical, engineering, and accounting	1.2
Department not specified—labor	.9

Typical Hourly Rates of Women at Time of Survey, by Department

RECEIVING, COKE OVENS AND BY-PRODUCTS, AND BLAST FURNACE AREAS

Hourly Rates¹ (cents)

	Jobs
78 and 79½	Laborer such as clean up, topman, panman, car washer, sulphate bagger, bin stocker, luterman helper.
81	Panman, bricklayer helper.
81½	Stove cleaner.
82½	Larryman helper.
84½	Crane operator in cast house.
87	Cinder crane operator.
96	Benzol-still attendant.
97½	Larryman.

STEEL FURNACES—OPEN HEARTH, BESSEMER CONVERTER, AND ELECTRIC

78 and 79½	Laborer, ladle-liner helper, hot-top knocker, brick handler, test carrier, hooker, buggy operator.
81	Scrap burner.
82½	Hooker stock yard.
84½	Door operator, ingot-mold crane operator.
85½	Observer, spectroscope.

ROLLING-MILL DIVISIONS

62½ and 63	Assorter learner tin plate.
78 and 79½	Laborer, clean-up-gang member, pit cleaner, cover and door operator, heat number carrier, cut-off saw operator, hot-bed helper, hooker, slab-car operator, gag-press helper, learners (burning, scarfing, grinding, etc.), tin bundler, assorter, car blocker helper, painter helper, test carrier, car checker, stamper, billet painter, gag-press control man, test recorder, gager, assorter tin plate.
80	Hooker, weigher, straightener.
81	Burner helper, furnace helper, piler operator, furnace tender and heater.
81½	Cold transfer operator, stamper, shear operator, scarfer, painter, weigher, saw operator.
82	Gag-press control.
82½	Centerless grinder, scrapman, cold saw hooker.
83½	Cold steel recorder, steel tracer, buggy operator (tow trucks, lift trucks, etc.).
84	Transfer table operator, grinder.
84½	Crane operator, hooker, ingot-buggy operator, scarfer.
85½	Hot-bed operator, hydraulic-shear operator, screw operator.
86	Recorder, burner, furnace tender, hot-bed operator.
87	Straightener, weigher.
87½	Stamper, painter, piler operator.
88	Hooker.
88½	Billeteer operator, chisel grinder.
89½	Leveler operator, loader, expediter roller line, recorder.
90	Recorder.
91	Car checker, recorder, swing grinder.
91½	Crane operator, expediter-loader.
93½	Scarfer, hooker, heat-treater.
94	Loader.
95	Grinder.
96½	Test recorder.
97	Crane operator.
100	Grinder.
110	Contract recorder.

MAINTENANCE SHOPS

78	Laborer, matron, janitor, sandman, loader and unloader bricks, coil winder, helpers (blacksmith, boilermaker, coremaker, locomotive repair, welder, meter repair, babbittman, molder, pattern maker, machinist, die changer, die polisher).
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<i>Hourly Rates¹</i> <i>(cents)</i>	<i>Jobs</i>
78 to 89½	Machine operators (lathe, turret lathe, drill press, boring machine, shaper, gear cutter, grinder, etc.), lay-out and bench work.
79½	Oiler.
80	Repair helper, hooker, painter, tool-room attendant, electrical bench work.
80½	Sand-mixer helper.
82	Oiler.
82½	Helpers (bricklayer, etc.), safety-goggle repairman.
83½	Millwright helper, tool-room attendant, route and dispatch clerks, crane operator.
84½	Machinist helper.
85½	Hooker.
86½	Oiler.
87	Motor inspector helper.
88	Tool grinder.
89½	Machinist helper.
90	Die reamer, machine operator.
91	Crane operator.
91½	Truck operator.
95½	Crane operator.
97	Welder, planer operator.
102½	Acetylene tool repair.
105	Die polisher.

LABORATORY AND QUALITY-CONTROL

78	Inspector, test carrier, test reporter, observer, laboratory aide, helper, carbometer.
80½	Laboratory aide, test drilling and machining.
83	Test polisher, inspector, observer, pyrometer observer.
84½	Inspector and machine operator.
86½	Saw operator.
87	Laboratory aide.
90	Machine operator.
94½	Chemist.
97½	Milling-machine operator.
99½	Alloy inspector and tester.
108, 110, 115½, 126	Chemist and metallurgical technician.

¹ Many jobs have bonuses, which increase earnings above rates.