

UNITED STATES DEPARTMENT OF LABOR

FRANCES PERKINS, Secretary

WOMEN'S BUREAU

FRIEDA S. MILLER, Director

Women's Wartime Jobs  
in  
Cane-Sugar Refineries



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## LETTER OF TRANSMITTAL

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UNITED STATES DEPARTMENT OF LABOR,  
WOMEN'S BUREAU,  
*Washington, February 14, 1945.*

MADAM: I have the honor to transmit a report on women's war-time occupations and working conditions in cane-sugar refineries.

Employment of women in this industry has increased sharply during the war, and data secured by the Women's Bureau in a number of large refineries indicate that this increase reflects chiefly the utilization of women in work formerly done only by men.

The report summarizes the Bureau's findings on women's occupational shifts, wages, and other conditions of employment in the plants visited, and gives a somewhat detailed description of the operations performed by women. It also analyzes briefly other Department of Labor data relating to industry-wide trends.

Ethel Erickson, Field Supervisor, obtained most of the data on which the findings are based. The report has been written by Caroline A. De Caux.

Respectfully submitted.

FRIEDA S. MILLER, *Director.*

HON. FRANCES PERKINS,  
*Secretary of Labor.*

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## SUMMARY

1. **Scope of survey.**—The five refineries visited by representatives of the Women's Bureau employed approximately 30 percent of the industry's wage earners. The proportion of women on their pay rolls was more than three times as large as in 1939 and 1941, and about one in every four workers was a woman.
2. **Occupational shifts.**—Before the war, the refineries employed a small proportion of women almost exclusively on packing jobs where 1- to 10-pound containers were handled, but women were not employed on refining processes, warehousing, shipping, or heavier packing jobs. When the refineries were visited, from 32 to 75 percent of the women were on jobs from which they were generally excluded before the war.
3. **Additional job opportunities for women.**—However, it was found that even in the refinery employing the highest proportion of women there still were men employed on some relatively light jobs that women could easily do.
4. **Wages.**—All refineries had lower rates on jobs customarily performed by women. But all or most of the women in four refineries who were on jobs formerly performed by men were getting the same rates as the men. The sex job differentials ranged from 5 cents to 15 cents an hour, and the basic rates on women's old and new jobs ranged from 43 to 73 cents an hour. Women on weekly rotating and late shifts had a 2-cent differential.
5. **Work schedules.**—In four refineries women worked 48 hours a week and a considerable proportion were on shifts rotating weekly. One refinery had a 40-hour 5-day week. Most of the workers had a half hour for lunch, but many had to eat during working hours and then time taken out for eating was paid for. Most women had two 10- to 15-minute rest periods daily, informal and paid for.
6. **Personnel policies.**—The refineries did not discriminate against married women or mothers with young children and had no formal maximum age limit, but on many jobs only fairly husky women could be used, and in at least four plants all workers had to pass physical examinations by company doctors when hired. No training except on the job was provided in any of the refineries. Two reported mechanical and other adjustments to facilitate the employment of women. In two refineries all or almost all the women on industrial jobs were Negro, but in two others white women almost exclusively were doing the same work.
7. **Absenteeism and turn-over.**—One refinery reported that both absenteeism and turn-over were higher among men than women; one that turn-over was lower but absenteeism higher for women.
8. **Labor organizations.**—Four refineries had collective-bargaining agreements that covered all industrial workers.
9. **Postwar.**—All refineries planned to employ women in the postwar period on jobs they performed before the war, but none had definite plans for using them on jobs customarily filled by men.

# Women's Wartime Jobs in Cane-Sugar Refineries

## INTRODUCTION

In 1943, cane-sugar refineries were producing supplies for military and civilian use as well as for Lend-Lease with a smaller labor force than they employed in 1939, and women were playing an important part in meeting the wartime production schedules of the industry.

Normally, refineries employ a small proportion of women. But because most of them are situated in coastal areas where acute labor shortages have developed during the war, and have been unable to secure men to replace those who joined the armed forces or left to work in other industries, they have had to employ women on many jobs that in peacetime were considered suitable only for men.

To obtain information on what jobs and to what extent women were or could be used in this industry, representatives of the Women's Bureau visited five refineries—four in 1943 and one in 1944. In these establishments information was secured on the number of women employed, the type of work they were doing, their wages, working hours, and other employment conditions that affected or reflected the ability of women to perform the industrial jobs available to them in this industry during the war.

## CHARACTER OF INDUSTRY AND SCOPE OF SURVEY

### NATURE OF INDUSTRY

Cane-sugar manufacturing establishments are classified by the United States Bureau of the Census into two groups: (1) Those engaged primarily in producing raw sugar from the sugarcane are grouped in the "Cane Sugar—Except Refineries" industry, though these establishments may also produce such consumable products as granulated or clarified sugar, molasses, syrups, and so forth; and (2) those that buy the raw sugar after it has been processed from the sugarcane and refine it are classified as the "Cane-Sugar Refining" industry.

Production of the raw sugar is highly seasonal and follows the harvesting of the sugarcane. Operations of the cane-sugar refineries, on the other hand, are geared to meet the current sugar market needs and do not fluctuate much during the year. The average number of workers employed in cane-sugar refineries during 1939 (latest available census figures) was more than three times as large as the number employed by the establishments producing raw sugar.

## GENERAL CHARACTERISTICS OF REFINERY WORK

Refinery operations fall roughly into four subdivisions: In the first may be included all the work connected with receiving, unloading, and storing the raw sugar; in the second, the refining operations; in the third, the packing operations; and in the fourth, the work connected with storing and shipping the refined sugar.

The principal work in the refineries proper consists of operating the refining machines and equipment. This work requires various degrees of expertness in regulating the refining process, and various degrees of skill in operating the mechanical equipment, but it does not involve much handling of heavy weights, nor does it, in most cases, require unusual physical strength.

There is work in the refining sections that is too heavy for women, but operation of the refining equipment consists primarily of regulating machine valves and levers and watching or controlling the process in order to secure the desired consistencies, grades, or types of sugar.

Throughout the refining operations the handling of the sugar itself is completely mechanized and involves no manual lifting. From the time the raw sugar is emptied from sacks until it emerges in a completely refined form, it is carried, pumped, or transferred from one refining machine to another and to or from storage tanks and bins by conveyors, through hoppers, chutes, or pipes.

Some of the refining-process operations are decidedly within the power of women accustomed to heavy work, but this is not to say that the jobs are "easy." Control of some levers and valves requires a good deal of physical effort; some of the machines radiate considerable heat, making the work locations warmer than is comfortable; and on most refining jobs no seats are or can be provided. In the heavier types of work, in the packing, cube-making, warehouse, and shipping departments, there are jobs that involve a good deal of weight lifting or other physical strain, but in all these sections there is some light work.

## SCOPE OF SURVEY

The five establishments visited by representatives of the Women's Bureau are cane-sugar refineries. They receive the raw sugar after it has been processed from the sugarcane, and through a highly mechanized process that removes all the impurities, moisture, and color, transform it into the refined products that reach the ultimate consumer.

The *Manual of Sugar Companies for 1943*<sup>1</sup> lists 24 cane-sugar refineries in the United States. These had a daily melting capacity of 54 million pounds. The industry as a whole, according to Bureau of Labor Statistics estimates, employed an average of 13,900 wage earners in 1943.

The total daily melting capacity of the five refineries visited by the Women's Bureau was 15,700,000 pounds, or close to 30 percent of the production capacity of the cane-sugar-refining industry.

The 5 refineries had 4,156 employees, of whom 3,740 were industrial workers. This was about 30 percent of the industry's average employment. The numbers of employees in the individual plants ranged from 475 to 1,220.

The plants visited represented just over one-fifth of all the cane-sugar refineries in the United States, but their location was very con-

centrated. Four were in the North Atlantic States, and one was in the South. The Manual of Sugar Companies for 1943 indicates the following geographic distribution of refineries: Louisiana, seven; New York, four; Pennsylvania, three; Massachusetts and California, two each; New Jersey, Maryland, Indiana, Wisconsin, Georgia, and Texas, one each.<sup>1</sup>

## TRENDS IN EMPLOYMENT OF WOMEN

### INDUSTRY TREND

Cane-sugar refineries have employed women for many years, but in peacetime women constituted less than 10 percent of the personnel and were generally restricted to light packing and a few other nonproduction jobs. A few refineries did not employ any women in non-clerical jobs and in the others the actual refining operations were performed exclusively, or almost exclusively, by men.

Between 1941 and 1944 the employment practices of this industry changed sharply. The proportion of women among the workers trebled, and information secured by the Women's Bureau indicates that this increase reflects largely the induction of women into jobs from which they had been barred in earlier years.

Available data indicating the sex of wage earners in the industry show that in 1939 women constituted only about 7 percent and in October 1941 only about 8 percent of the industrial workers. By October 1942 such proportion had increased to 16 percent and by the end of 1943 to 24 percent.

Though by February 1944 cane-sugar refining still employed only about half as many women per 100 wage earners as did all nondurable manufacturing industries combined, the development represented a 200-percent increase since 1941 in the proportion of women employed by the cane-sugar industry, while the proportion of women wage earners in the total nondurable group increased by only 10 percent in the same period.

### EMPLOYMENT OF WOMEN IN REFINERIES VISITED

#### Labor Supply.

All the five refineries visited by representatives of the Women's Bureau were in labor-shortage areas where they had to compete for labor with industries that had higher manpower priority ratings. Refinery officials reported difficulties in getting or keeping male labor, but stated that they were able to secure all the women workers they needed or could use. These manpower conditions were reflected in the proportion of women employed and the work they were doing.

#### Number of Women Employed and Variations Between Refineries.

The proportion of women employed in the 5 refineries corresponded fairly closely to the industry average. Practically 1,040 employees, or 25 percent of all in the 5 refineries, were women, as were about 900

All the refineries visited produced sugar for civilian use and for the United States Government.

<sup>1</sup> Farr's Manual of Sugar Companies, 1943, p. 82.

(24 percent) of all plant workers. Women also held about half the office jobs. However, considerable variations still were found between establishments. In the 4 visited in 1943 the proportion of women among all industrial workers ranged from 10 to 28 percent; in the refinery visited in 1944 more than 40 percent of the jobs were held by women. The percentages of women in the 5 refineries are indicated here.

<i>Plant</i>	<i>Percent women among all industrial workers</i>	<i>Plant</i>	<i>Percent women among all industrial workers</i>
Total.....	24.0	3.....	17.5
		4.....	16.7
1.....	40.3	5.....	9.7
2.....	27.5		

### Wartime Increases in Employment of Women.

Four of the five refineries employed approximately four times as many women in industrial jobs at time of visit as in October 1941. The other had about three times as many women early in 1943 as at the beginning of 1942.

Available earlier data on total employment in 4 refineries show that less than 200 industrial jobs, that is, less than 9 percent, had been filled by women both in 1930 and in 1941. On the other hand, when 4 of these refineries were visited in 1943 and 1944 close to 800 workers, or about 24 percent of the total industrial force, were women. In 3 establishments where employment figures were secured during the fall of 1943, 15.3 percent of the wage earners were women. In 1, where the employment figures for June 1944 were obtained, more than 40 percent of the industrial jobs were filled by women.

In the fifth refinery, where close to 28 percent of the industrial workers early in 1943 were women, they had held only about 10 percent of the jobs at the beginning of 1942.

### Old and New Occupations of Women.

All five refineries employed women before the war, but, like most of the industry, restricted them largely to light packing and a few other miscellaneous unskilled jobs. (One of the refineries may have employed women on some refining-process jobs before the war.) But when the refineries that reported new jobs for women were visited in 1943 and 1944, well over half the women were on jobs from which they had been generally excluded before the war.

In these four plants women operated or helped to operate the machines used for refining sugar, and were on other jobs in the refineries proper, in the cube-making sections, in the packing and shipping departments, and in the warehouses from which they were barred in peacetime. Only the establishment with the smallest proportion of women did not employ them on refining operations.

The old and new jobs on which women were employed in one or more of the refineries visited are listed below, arranged as nearly as possible in the order in which the work was performed.

#### *Women's Jobs, New and Old, in 5 Cane-Sugar Refineries, 1943-1944*

Raw-Sugar-Warehouse Jobs.....	New
Sweepers.....	New
Bag and sling sorters.....	New
Draft hookers.....	New
Truck hookers.....	New

*Women's Jobs, New and Old, in 5 Cane-Sugar Refineries, 1943-1944—Continued*

Bag-Reclamation Jobs:		
Turning, shaking, washing, drying, repairing, etc.....	Old and New	
Refining-Process Jobs.....		New
Minglers.....	New	
Centrifugal operators—Raw sugar.....	New	
Melters.....	New	
Blow-up tank operators.....	New	
Filter-press operators.....	New	
Liquor-gallery attendants.....	New	
Sugar-boiler helpers.....	New	
Centrifugal operators—Refined sugar.....	New	
Tankmen and pump operators.....	New	
Granulator operators.....	New	
Learners—On mingler and filter press.....	New	
Cube-Making Jobs.....		New
Sugar feeders, cube machine.....	New	
Plate feeders, cube machine.....	New	
Cube stovers, in and out of ovens.....	New	
Plate truckers.....	New	
Packing-Department Jobs:		
Packing 1- to 10-pound containers.....	Old	
Packing-machine attendants.....	Old and New	
Packing small units in larger boxes or bags.....	Old and New	
Cube packing—25-pound cartons.....	New	
Packing 25- and 100-pound bags.....	New	
Lining and filling barrels.....	New	
Powdered sugar finishers.....	New	
Sugar feeders, packing machine.....	New	
Stencilers.....	Old and New	
Truck loaders and pushers.....	New	
Storing-and-Shipping-Department Jobs:		
Loaders, hand or trailer trucks and boxcars.....	New	
Stackers.....	New	
Elevator operators.....	New	
Miscellaneous Jobs:		
Sewers—filter screen covers.....	New	
Cleaners, sweepers, other miscellaneous.....	Old and New	

**Extent of Wartime Occupational Shifts.**

In four plants reporting on new and old jobs almost a fourth of the industrial workers were women, and close to 62 percent were on jobs customarily held by men. In the fifth refinery, where this specific information was not obtained, more than half the women were on work customarily performed by men. The summary following shows the proportion of women among all employees and the proportion on men's jobs in the four refineries where data on old and new occupations were secured.

<i>Plant</i>	<i>Percent of women among all industrial workers</i>	<i>Percent on men's jobs</i>
All plants.....	23. 5	61. 6
1.....	16. 7	32. 0
2.....	17. 5	50. 9
3.....	9. 7	55. 6
4.....	40. 3	74. 7

The striking change in the employment practices of the refineries is indicated also by a comparison of the data secured by the Women's Bureau in the present survey with occupational and wage data in two prewar surveys.

A 1930 study of the cane-sugar-refining industry, made by the U. S. Bureau of Labor Statistics, has a detailed job classification by sex. These occupational data show that the four refineries listed in the table just presented employed about 97 percent of the women on various packing jobs and about 3 percent on other miscellaneous work. But not a single woman in these four refineries—nor in the entire industry—was employed on any of the refining-process jobs.

A 1941 survey, made by the Division of Public Contracts, indicates a similar occupational pattern. This study, covering 20 refineries, also groups the four plants included in the present and the 1930 studies. The 1941 survey contains a wage rather than an occupational breakdown by sex. However, since these four refineries are covered by collective bargaining agreements under which job rates have been strictly enforced, these wage data provide a fairly accurate indication of the extent to which women were employed on jobs customarily regarded as men's. The figures show that of approximately 200 women employed in the four refineries in October 1941, only 4 (2 percent) were on jobs carrying men's rates. In 1943, on the other hand, three of these plants indicated that from about one-third to more than one-half of their women wage workers were on jobs paying men's rates.

### OCCUPATIONAL SHIFTS DURING WORLD WAR I

Available data on the occupations of women in one California refinery during 1917 and 1918 show similar but less extensive occupation shifts in the First World War. This sugar refinery was covered in a 1918 study of labor turn-over that included an occupational breakdown by sex. The data show that only 5 percent of the working force in the refinery in May 1917, in contrast to 14 percent in May 1918, were women. Practically all the women were on small packing and other closely related work in 1917, but in 1918 nearly three-fifths were on refining processes and on heavier packing and other jobs from which they had been excluded a year earlier. The table following shows the occupational distribution of workers in this refinery by sex for the two dates.

*Changes in the working force of a California sugar refinery during 1917-18, by sex and department*<sup>1</sup>

Department	Number of full-time workers for month ending—			
	May 31, 1917		May 31, 1918	
	Male	Female	Male	Female
Total.....	946	47	1,040	148
Sugar boiling.....	26	—	25	—
Steam boiling and refinery mechanics.....	43	—	58	—
Centrifugals.....	91	—	107	8
Char and mechanical filtration.....	99	—	89	7
Char house.....	33	—	33	—
Container.....	18	23	16	38
Cubes.....	10	—	3	30
Operation, repair, and upkeep.....	129	—	193	—
Pack room.....	75	—	102	24
Powder mill.....	9	—	8	—
Raw-bag laundry.....	18	—	9	9
Sanitation (cleaners).....	17	—	29	—
Small pack.....	5	22	1	21
Washing station.....	37	—	39	—
Clerical and administrative.....	15	2	14	4
Laborers.....	279	—	253	—
Miscellaneous.....	42	—	61	7

<sup>1</sup> U. S. Department of Labor, Bureau of Labor Statistics, Employment Policies and Labor Mobility in a California Sugar Refinery, by Paul F. Brissenden. Monthly Labor Review, December 1919, pp. 138-160.

## DESCRIPTIONS OF WOMEN'S REFINERY JOBS

The principal operations involved in handling the raw sugar and processing it into the refined packed products, and such of these as are performed by women, are presented in the summaries following as nearly as possible in the order in which the work generally is performed. Minor variations from plant to plant in production procedure are not indicated. The number of plants that employed women in the various occupations is given wherever figures are available, but such figures, except for centrifugal operators, omit one establishment in which about a third of the workers in the refinery proper were women but no occupational break-down was secured.

### Receiving and Storing Raw Sugar.

The raw brown sugar, which generally arrives in sacks, is weighed, tested, and either stored in warehouses or transferred at once to the refineries. At the latter it is poured through hoppers into bucket conveyors that carry it to storage bins or to the minglers, where the refining process begins.

*Women's jobs in raw-sugar warehouses.*—Two refineries reported that they employed women in the warehouses where raw sugar was received and stored. In one, women were seen doing such simple tasks as sweeping up spilled sugar; attaching rope slings—on which several bags of sugar were stacked—to overhead

cranes that hoisted the sacks for storing; gathering up and straightening out the rope slings, and other similar light, unskilled jobs.

Most of the work in these warehouses involves manual handling of full sacks, weighing from 100 to more than 300 pounds each, and is too heavy for women. One employment manager stated that he tried to use women on 100-pound sacks, but even with two women to a sack they found the work too heavy and were taken off the job. This employment manager considers the warehouses an unsuitable place for women even on light work.

### **Mixing Raw Sugar.**

The actual refining operations begin when the raw sugar (after passing through pronged rolls that crush all lumps) enters a mingler, where it is mixed by a power-operated scroll with sweetened water, molasses, or syrup. This process transforms it into a thick, grainy, flowing mass called magma.

*Women mingler operators.*—In at least three refineries women operated or tended minglers. Their work involved largely control and regulation of valves that feed the raw sugar and sweetened water or syrup into the mingler, and watching the mixing and the fluidity to see that the liquid is fed in proper quantities and that the desired consistency is attained.

### **Washing Raw Sugar in Centrifugals.**

The next step in the refining process is to wash and purify the raw sugar (magma) in centrifugal machines. These machines, by a completely mechanized process, separate the sugar from the mother liquor (syrup), drain off most impurities, wash the sugar with a water spray, and leave it in the form of moist crystals, almost white and about 99-percent pure.

*Women centrifugal operators.*—Two refineries employed women on raw-sugar centrifugal machines; in a third it was stated that one woman had temporarily replaced a man operator, that her work was satisfactory, and that if an opening occurred she would be offered the job. In a fourth plant it was said that women could be used in this work if some mechanical adjustments were made in the valve controls.

The work on the centrifugal machine involves principally the following operations: Raising and lowering a gate-control valve that allows the sugar mass or magma to flow through a chute into the centrifugal machine basket; starting the machine by manipulating a lever, turning a valve, which operates a water spray that washes the sugar; lifting a plate from the bottom of the basket after the washing process is completed and cutting the washed sugar from the walls of the centrifugal basket by means of a hand- or power-operated mechanical device, and letting it drop through the basket bottom into a conveyor or hopper.

In one refinery where this work was observed, each of the women was tending three or more centrifugals and was working and moving about quite rapidly from one machine to another, since each operation cycle lasted only 4 or 5 minutes.

The principal exertion in this work was raising the valve control and "plowing" the washed sugar from the walls of the basket. In one refinery the levers that controlled the opening and closing of the "sluice valves" were lengthened on the centrifugals operated only by women, and seemed considerably easier to manipulate than the shorter levers on centrifugals operated by both men and women.

Both refineries mentioned employed only Negro women on these machines, and though the work involved did not seem beyond their strength, it required considerable physical endurance. This was due not only to the effort involved in the machine operations, but to the speed necessary in tending several machines at a time and to the heat generated by the centrifugals.

### **Melting and Blow-Up Processes.**

After the sugar is washed in the centrifugals, it is conveyed to melting pans or tanks where, with the addition of water, it is dissolved into a liquid called "massacuite" and mixed with ingredients that correct acidity. From the melt pans the sugar liquor is drawn off into blow-up tanks, where it is thinned by heating, agitated by currents of hot air, and mixed with lime and filter cell or other ingredients that aid in removing impurities during the filtering process that follows.

**Women melters.**—In two refineries women tended the melting pans. Their work involved primarily control of valves that regulate the temperature and feed the water into the melt tanks, and watching and regulating the density of the liquor.

**Women blow-up tank operators.**—Only one refinery reported that it employed women on the blow-up tanks. This also was primarily a valve-control and observation job. The operator admitted the liquor into the blow-up tanks; regulated the temperature by observing a thermometer and by opening or closing steam valves.

### **Filtering Operations.**

After the massacuite has been thinned and mixed with the filter ingredients in the blow-up tanks it is pumped into storage tanks and from there into filter presses. In these presses most of the insoluble impurities are removed by a mechanized process that forces the liquor through cloth-covered filter screens.

From the filter presses the sugar comes out in the form of a clear but colored liquid, and passes to char-filtration tanks. In these tanks all soluble impurities and most of the color are removed by a bone-char filtering process, from which the sugar comes out in the form of a clear, practically colorless liquid which is almost 100 percent pure.

**Women filter-press operators.**—Three refineries reported that they employed women on the filter presses. The women who operated these machines had to regulate the valves that control the flow of liquid to and from the presses, and watch the thermometers and gages and the color of the filtered liquid. In one plant it was stated that women also helped with the heavier work involved in removing the caked lime and impurities from the press frames.

No women were employed in any of the refineries on the char-filtration tanks.

### Grading Liquor.

From the char-filtration tanks the liquor passes through a "liquor gallery," where it is graded by color and its flow is directed, according to grade, either to vacuum pans where the sugar is again crystallized or to storage tanks.

*Women liquor-bridge attendants.*—In at least two refineries women worked on the liquor bridge or gallery, operating valves that control the flow of liquor, observing the color of the filtered liquor as it flows from the faucets or pipes, and directing its flow according to grade.

### Crystallizing Sugar.

The almost 100-percent-pure filtered and graded liquor is pumped into vacuum pans or boilers where the water is evaporated by a carefully controlled boiling process which transforms the liquor into a thick mass of crystals and syrup. (In some refineries the moisture is partially evaporated from the liquor in evaporators before it is placed in vacuum pans or boilers.)

*Women sugar-boiler helpers.*—Women were not employed as sugar boilers, a highly skilled job that requires expert knowledge of the crystallization process and of vacuum pumps, but one refinery reported that it employed a number of women as sugar-boiler helpers.

### Mixing and Washing Refined Sugar.

After the sugar is crystallized, the refined crystals and syrup are dropped from the vacuum boilers into mixing tanks. Here they are agitated and blended into different shades, and conveyed to another set of centrifugal machines where the syrup is again spun off and the sugar washed and partially dried. At the end of this process the sugar is completely refined but still moist.

*Women operating refined-sugar centrifugals.*—In one refinery women as well as men were seen operating the centrifugals used for washing the refined sugar. These machines were similar to those used for washing the raw sugar at the beginning of the refining process but their operation seemed to require more physical effort. The management considered the machines too strenuous even for the most husky women, planned to use chiefly men on them, and had made no adjustments in the mechanical controls to facilitate employment of women.

### Drying Sugar in Granulators.

After the refined sugar has been washed and partially dried in the centrifugal machines, it may be conveyed to wet-sugar storage bins or directly to granulators, which are long tubes or drums where the moist crystals are dried by currents of hot air. Some granulators are equipped with screens for sorting the dry sugar crystals according to size; in others the crystals pass down a chute to screens for sorting. After the dry granulated sugar passes through these screens it is ready for packing.

The end process naturally is different when sugar other than granulated is made. For example, in making powdered sugar the dry crystals have to pass through grinders or mills, and in making cube

sugar the crystals have to be moistened and shaped into molds or cubes and baked.

**Women granulator operators.**—In three refineries women operated the granulators. This work, too, was largely a control and observation job that did not involve much physical strain. The operators regulate valves that control the flow of sugar to and from the granulators, the speed of exhaust fans, and the temperature of the air that is forced through the granulators during the drying process.

**Tankmen or pumpmen.**—During the refining operations the sugar liquor is pumped from one processing machine to another or to and from storage tanks by power-operated pumps. In at least three refineries women were doing some of this work. These jobs did not involve much physical strain and consisted primarily of starting and stopping the power-driven pumps.

### Bag Reclamation.

The bags in which the raw sugar arrives are turned, shaken, brushed, and washed, in order to recover from them all the remaining sugar, and then are dried, sorted, repaired, and stored for future use or sale.

**Women's bag-reclamation jobs.**—Women were employed on some bag-reclamation jobs before the war, but in at least four refineries they were also doing part or all of the bag-reclamation work on which only men had been used. This included turning, shaking, washing, drying, and repairing bags by hand and by machine.

### Cube Making.

Refined sugar used for making cubes is moistened with syrup and dropped through hoppers into cube-making machines that deposit it in lump form or as damp cubes on metal trays or sheets. These trays then are placed in ovens for drying, and when the drying or baking is completed the ovens are unloaded and the sugar is dumped into hoppers that lead to packing sections on a lower floor. The trays on which the damp cubes are deposited move away from the cube-making machines on conveyors that run parallel to the ovens.

**Women's cube-making jobs.**—In at least three refineries women were employed in the cube-making sections. Their work consisted primarily of feeding the empty trays to the cube machine, lifting the filled trays from the conveyors over to the ovens, and placing them in the ovens. The empty trays weighed about 8 pounds, and the filled trays, which had to be lifted a few feet from conveyor to oven, about 14 pounds. In two refineries women also fed the sugar to cube-making machines.

Some women also helped to unload the ovens and dump the baked sugar into the hoppers. In one refinery this work was considered too heavy and hot for the women as a continuous job, and they were used only occasionally on unloading. In another, however, it was stated that the oven and cube-making jobs may be taken over 100 percent by the women.

### Packing.

Refined sugar is packed in various types of paper and cloth bags, boxes, or cartons of 1 to 100 pounds, and in barrels that weigh up to 300

pounds. The packing process is highly mechanized. The sugar is fed through overhead chutes, equipped with automatic weighing and dumping devices, through which required quantities of sugar drop into empty boxes or bags that are automatically fed or individually adjusted under the chutes. The open ends of the filled containers are folded, glued, and sealed or sewed by automatic or semiautomatic mechanical devices or by hand.

Many packing operations are light, since the filled boxes and bags generally move on conveyors from one operation to another. The chief work in these sections that requires considerable physical strength is the removal of the heavier containers from the packing line or the section.

**Women's packing jobs.**—Before the war women were employed largely, if not almost exclusively, in the small-package sections where 1- to 10-pound containers are packed. Heavier packing was considered exclusively men's work. When the refineries were visited in 1943 and 1944, women were on many other jobs in these departments in addition to the customary women's work. Some were operating machines on which formerly only men were employed; some, working in pairs, were loading 25- to 60-pound bags on hand trucks; some were packing cube sugar in 25-pound cartons; and in at least 1 refinery women were employed also (mostly on light work) in sections where sugar was packed in 25- to 100-pound bags and in barrels. In this plant women also replaced men as powdered-sugar finishers; as sugar feeders to packing machines, in small- and bulk-package departments; as samplers; as conveyor tenders; and on numerous other packing and cleaning jobs.

**Small-package work.**—The actual operations performed by women in the small-package sections included such simple tasks as these: Opening empty bags and placing them under chutes for filling; weighing and watching the filled bags as they moved on conveyors toward automatic closing and sealing machines; guiding the open ends of bags through a sewing device; closing and sealing containers by hand; packing several smaller units into larger boxes or bags by hand or on mechanical devices that shoved the containers into the larger bag; tending machines that automatically opened cartons and filled, weighed, and sealed them; stenciling bags; and loading packed containers on hand trucks.

Most of the work in these sections was light and seats were provided on many jobs. However, there were operations that required constant attention and considerable speed. For example, women employed on machines that automatically filled 30 bags a minute had to open and place each bag under the chutes, which required quite rapid work to keep pace with the machine. The heaviest work in these sections consisted of loading and unloading packed containers that weighed from 25 to 60 pounds each, but ordinarily 2 women handled each box or bag and worked at a moderate pace.

**Cube-packing work.**—At least four refineries packed cubes into 25-pound cartons for Lend-Lease. This type of cube packing was new work and carried a man's rate, but all four refineries employed women on these jobs. Women set up the empty cartons and put in

liners; placed the cartons under the chutes for filling and shook them down; checkweighed them; glued them; sealed the filled cartons, strapped them with metal bands, and loaded them on hand trucks for storage or shipment. Practically all the operations were performed on conveyors; the strapping was done on or off the conveyors. Little weight-lifting was connected with this work, except when the packed cartons were removed from the conveyors for strapping or for loading. Though some of this work could have been performed in a sitting position, none of the refineries provided seats in these sections, and in one it was intimated that if seating provisions had been made the jobs might carry a lower rate.

**25-pound and heavier packing.**—Few women were employed in sections where sugar was packed in other types of containers weighing 25 pounds or more, though many operations in these sections did not involve weight-lifting, since mechanical filling and weighing devices and conveyors were widely used. Only 1 refinery reported that it employed women on packing barrels and 25-pound bags, and in this plant a woman was seen also filling 100-pound sacks on semiautomatic filling machines, where no weight-lifting was required. In this plant women who removed 25-pound bags from the packing lines worked in pairs, 2 handling each bag. In another refinery, however, it was stated that women who were tried out on packing 25-pound sacks of sugar complained of the weight-lifting and asked to be taken off this work. Though these women were rotated from lifting to filling operations, each had to lift about 1,500 sacks a day from the conveyor to nearby tables where men were stacking the bags, and they preferred the lighter, lower-paying jobs.

### Storing and Shipping Refined Sugar.

The packed refined sugar is stored in different storerooms from the raw sugar. The principal labor jobs in the warehouses and shipping departments are loading, unloading, and stacking. Hand trucks and motor trailer trucks and tractors were the chief equipment used for this work inside the warehouse and shipping departments of one refinery that employed women in those sections.

**Women's storage and shipping jobs.**—Storing and shipping was almost exclusively men's work before the war, but in at least one refinery quite a number of women were seen on such jobs in 1944. These women were loading and unloading 25- to 60-pound bags of sugar on and from hand trucks, pushing about full and empty trucks; hand-stacking bags in the storerooms, and helping with boxcar loading in the shipping department. Motor trucks or tractors were used in transferring strings of trailer-trucks to and from the shipping department, but these were operated only by men.<sup>2</sup>

In loading, unloading, and stacking, two women handled each bag, and they also worked in pairs when pushing hand trucks. These women worked steadily and at times had to lift the sacks

<sup>2</sup> In Army supply depots women have been used extensively for driving trailer-trucks in warehouses and on loading platforms and are considered safe workers.—“Employment of Women in Army Supply Depots in 1943,” Women's Bureau Bull. 192-8.

above their heads in stacking, but in general the work did not seem too strenuous for those employed on these jobs.

### **Miscellaneous Occupations of Women.**

Women replaced men in the various sections of the refineries as filter-screen cover sewers, elevator operators, loaders, sweepers, cleaners, and on other light unskilled jobs. One refinery employed a woman forelady in the small-package department.

No detailed information was secured about the clerical jobs of women in the refinery offices, but two-thirds of the office and administrative employees were men.

### **Additional Jobs Suitable for Women.**

Officials of the two refineries with the highest proportions of women stated that they had about reached the saturation point in the use of women. One employed a considerably larger proportion than the other, but even in that refinery men still were on packing and other jobs that women could do with ease. There were, however, factors other than suitability of work that prevented use of women on certain jobs. When questioned about such light jobs, one employment manager explained that men had been doing this work for a long time and were unwilling to give it up. Opinions of other officials in this plant indicated that management also preferred to keep men on customary men's jobs wherever this was possible. Only one of the refineries reported any mechanical or other readjustments or job realignments to facilitate the employment of women.

## **POSTWAR PLANS**

Three plants where information on future employment plans was secured indicated that they expect to continue the use of women in industrial operations, but they were indefinite as to the postwar employment of women on work customarily done by men.

In one of these plants women were considered more satisfactory on refining jobs than the type of men available under wartime conditions, and it was stated that some women may be retained on such jobs in the postwar period if it is found expedient and if the unions agree to such an arrangement.

In another refinery it was admitted that though some women in refining jobs were very good workers, in general the refining work still was considered unsuitable for them, and most likely they will be replaced by men as soon as manpower conditions make this possible. This refinery also plans to retain women on the usual small-package jobs.

The third refinery indicated that it would continue to employ women but did not specify whether they would be retained on jobs performed by men before the war.

## **WAGE RATES**

### **Beginning and Basic Rates of Women.**

Practically all workers were on an hourly-rate basis, and women's beginning rates ranged from 43 cents to 58 cents an hour on women's customary jobs. In three refineries the basic rate was 58 cents, but

the normal practice was to pay new employees 5 cents less than this for the first month and to increase the rate by 2½ cents at the end of the first and of the second month, bringing it up to 58 cents by the beginning of the third month. One of these three refineries reported that because of the labor shortage it was paying the 58-cent rate to women as soon as hired. In two refineries no differences were indicated between the beginning and the basic rate. The firm with the lowest rate had an annual bonus system. The maximum rate received by women was 73 cents an hour plus a 2-cent differential for work on weekly rotating and night shifts.

### **Sex- and Job-Rate Differentials.**

All refineries had sex-rate differentials based on prewar employment practices. Lower rates were paid on those small-packing and other light jobs on which women were employed before the war, and higher rates on jobs customarily performed by men. The sex differentials ranged from 5 cents to 15 cents an hour. The basic rates of women on jobs formerly performed by men ranged from 48 to 73 cents an hour. The plants with the widest sex differentials had the highest rates on both men's and women's jobs.

The collective-bargaining agreements of four refineries specified lower basic rates for "female" than for "male" labor, but actually the female rates applied only to those jobs on which women were employed before the war. All the agreements contained provisions that required payment of the job rates to workers upgraded or employed on the higher-paying jobs. These provisions were qualified by what may be described as equal-pay-for-equal-work requirements, but apparently most women on men's jobs were actually getting men's rates.

In three establishments where the rates paid to women were specified, all women on men's jobs were getting men's rates. In a fourth, where the rates on each job were not specifically indicated, the personnel manager stated that most of the women on men's jobs were being paid the higher rates.

The fifth refinery, which had no collective-bargaining contract, reported three beginning rates for men, and indicated that some women were getting the second-highest rate.

### **Narrowing of Sex-Rate Differentials.**

The four refineries with union agreements had provisions in their collective-bargaining contract specifying that existing job-rate differentials must be maintained. However, available data on wage rates of men and women indicate that historically the trend in cane-sugar refineries has been in the direction of narrowing the sex-rate differentials. A study in 1930 that lists the average hourly rates of male and female packers in such establishments shows that women's rates at that time were 58 percent of men's rates, a figure in striking contrast to the 81 percent found in the survey of 1943 and 1944.

### **Shift Differentials.**

Four refineries had a shift differential of 2 cents an hour, which was paid to all workers on regularly rotating weekly shifts; one of these paid the higher rate also to workers on the second and third shifts if they rotated less frequently, and one only to night workers not on regularly rotating shifts.

The fifth establishment had no night-work differential and did not indicate any differential for workers on regularly rotating shifts, all workers in the refinery proper being on such schedule.

### **Wage Advancement.**

None of the refineries visited had any wage advancement based on length of service, except the 5-cent automatic increase in the first 2 months in the plants that hired new workers at 5 cents below the basic rate. All rates were based on the job and not on length of service. The only form of advancement possible was through transfer to a higher-paying job. In four plants women who were transferred to men's jobs received 10 to 15 cents an hour more when working on a one- or two-shift basis and 12 to 17 cents an hour more when placed on weekly rotating or night-shift schedules. In the fifth plant women transferred to higher-paying jobs were getting 5 cents above the minimum rate.

### **Proportion of Women Receiving "Men's Rates."**

While actual pay rolls were not examined, management representatives in three refineries supplied information showing that 45 percent of the women employed in their plants (all those on men's jobs) were getting men's rates.

## **WORKING HOURS, SHIFTS, LUNCH AND REST PERIODS**

### **Scheduled Workweek.**

The standard workweek in the five refineries was 40 hours. At time of visit, however, this schedule had been maintained in only one establishment; in the others, wartime schedules of six 8-hour days, or 48 hours a week, were in effect for workers on all shifts.

### **Shifts.**

In all establishments the refineries proper operated on a three-shift basis. In two plants reporting, the cube-making sections also were on three shifts, and in three the packing departments were on a two-shift basis. In four plants the refinery shifts rotated weekly, and in one every 2 weeks. One refinery reported that because of labor shortage its swing shift for men was practically eliminated, and as a result many men were working 12 hours a day. Figures were not obtained for the number of women working on late shifts.

### **Overtime.**

With the possible exception of one department in one plant, women did not work more than 48 hours a week, but a great deal of overtime was reported for men, who at times worked 10 to 13 hours a day, and longer, as well as on Sundays. The principal causes of this excessive overtime were the inability to get sufficient men for heavy work, unexcused absenteeism, absence of skilled workers, and sudden rushes, the last-named especially when raw sugar arrived or when refined sugar was shipped out and had to be unloaded or loaded in a limited time.

### **Lunch Periods.**

Most industrial workers were allowed half an hour for lunch, but no regular time for eating was set aside for the workers on refinery

jobs and in some of the cube-making sections. In these departments workers took time out for lunch when the processing operations allowed, or when substitutes were provided.

In the packing departments of four refineries most of the workers had half-hour lunch periods and a regular time was set aside for eating, but in one of these plants packers on the second and third shifts ate in their working hours. In the fifth refinery all workers "spelled off" to eat in working hours. In all cases where no regular time was set aside for lunch, time taken out to eat was paid for.

### **Rest Periods.**

Information on rest periods was secured in four refineries. One had two 15-minute rest periods for women in each 8-hour shift, and two reported two 10-minute rest periods in each such shift. In the fourth establishment no definite time was set aside for resting, but the superintendent stated that women were permitted to relax whenever they got "too tired." All rest periods were paid for.

## **PERSONNEL POLICIES AND PRACTICES**

### **Hiring.**

All the refineries hired workers at the plant and through the United States Employment Service, also clearing all workers with the USES. Most of the recruiting apparently was done through advertising in newspapers and at the plants. None of the refineries had any special preemployment tests, except physical examinations.

### **Medical Examinations.**

In four establishments workers were given physical examinations by company doctors. Two specifically indicated that they required preemployment physical examinations of all workers, and one, which was self-insured, required periodic reexaminations. One refinery that required preemployment examinations stated that they were used only as a basis for employment and not for determining the type of work on which an employee should be placed.

### **Training and Induction.**

None of the refineries had any special training courses. All new employees and upgraded workers were shown how to perform their work either by foremen or by coworkers.

### **Age and Marital Status.**

In all plants the minimum age limit for women was 18 years. There was no maximum limit, though most women, except in the small-package departments, had to be of at least average or better sturdiness. One personnel manager expressed preference for women between 18 and 35, but stated that some women in the plant were over 40 and some over 50 years of age. These, however, were long-time employees.

None of the plants discriminated against married women either because of marital status or because of children under 16 years of age, and none had any policy regarding hiring or keeping pregnant women.

### **Race.**

All refineries employed both Negro and white women, but there were considerable differences in the types of jobs on which they were

working at the various plants. The southern refinery had only Negro women in plant operations. Of the four others, one employed Negro women exclusively on refining, cube-making, and warehousing jobs, but had white women in the small-package section; two employed only white women in refining and cube-making operations and restricted Negro women to bag-reclamation jobs; in the remaining plant, a few Negro women were on bag-reclamation work.

### **Personnel Welfare Programs.**

None of the refineries had any special program for, or special person to deal with, the personnel problems of women workers, but certain welfare activities, described in the paragraphs following, were found. One establishment had two women in the personnel department who handled some problems of both men and women and assisted Negro workers—both men and women—in securing living quarters at local community housing projects.

**Group insurance.**—This insurance system, to which apparently both the companies and the workers contributed, was the principal welfare activity reported by three refineries. One of these also had an old-age pension plan. The fourth plant had an annual bonus system; formerly it had quite a paternalistic system, with a pension plan, but except for a company housing project for the Negro workers, no particular welfare activities were reported at time of survey.

**Clothing.**—Most of the women were not required to wear uniforms or any special clothing on the job, though many in the refineries and warehouses wore slacks or overalls. The only apparent exceptions were two refineries where women in some of the packing sections wore a standard type of washable frock. In one of these it was stated that the frocks were provided by the management, but the women were responsible for their laundering.

**Eating facilities.**—Only one of the three refineries where information on eating facilities was secured had a cafeteria for industrial workers as well as for administrative and office employees. Another had a lunchroom for supervisors but none for plant workers. This plant permitted an outsider to sell cold box lunches, of sandwiches, milk, and so forth, in the plant. The third refinery was situated near a lunchroom where hot food was served, but had no facilities in the plant.

An administrative officer of the refinery that had a cafeteria stated that it was operated at a loss but was considered essential, especially for workers who had a good deal of unanticipated overtime, and for those on ship unloading, who at times had to work 13 hours a day or longer.

Hot food, as well as sandwiches and cold drinks, was served in this cafeteria. On the day of the Women's Bureau visit the lunch consisted of roast beef, mashed potatoes and spinach, and coffee. The desserts included cantaloupe and ice cream. The food was tasty and was reasonable in price. The cafeteria was managed by a middle-aged woman.

**Medical facilities.**—Four refineries where information on medical facilities was secured had doctors on call during working hours; in two the doctors also came to the plant every day, and in one twice a week. Two refineries had nurses in the plant, and two had specially trained first-aid attendants.

Information on other medical facilities was secured in only one plant. This refinery—which was self-insured—had a first-aid room furnished with an X-ray machine, cots, medical supplies, and other equipment essential in the handling of emergencies.

## ABSENTEEISM AND TURN-OVER

Most refineries did not supply statistical data on absenteeism or turn-over; the only exception was one establishment where weekly and annual records were maintained.

In this plant absenteeism was higher, but turn-over was lower, among women than among men. Rates for 1 week, which were said to correspond fairly closely to the average for the preceding year, showed absence rates of 14.4 percent for women and 8.5 percent for men, and turn-over rates of 3 and 5 per 100 employees for white and Negro women, respectively, as compared to 5 and 6½ per 100 employees for white and Negro men, respectively.

A refinery that did not furnish figures reported that both absenteeism and turn-over were higher among men than women, attributing this to the fact that men could more easily get other good jobs and were not afraid of being fired, while the opportunities of higher wages for the Negro women employed in this plant were much more limited.

Two other plants reported high absenteeism and turn-over, but neither indicated whether women or men had the better record.

## LABOR ORGANIZATIONS

Four refineries had collective-bargaining agreements with AFL or CIO affiliated unions, and in all plants women were members of the unions. Labor representatives were not interviewed on women's union activities, but in two refineries plant officials stated that some women were serving or had served as shop stewards. The provisions on rates, rate differentials, equal pay, and seniority that affected the job opportunities and rates of women workers were similar in all contracts and are summarized as follows:

1. *Job- and sex-rate provisions.*—All agreements specified lower basic rates for women than for men, but the lower rates in practice actually applied only to the light packing and other light jobs on which women customarily were employed.
2. *Provisions as to equal pay.*—All contracts required that workers promoted to higher-rate jobs should receive the job rate, but they permitted lower rates during the breaking-in period or to workers who did not perform the whole job. (In three refineries where rates paid to women were specified, all women on work formerly performed by men were getting men's rates.)
3. *Freezing rate differentials.*—All agreements provided that the rate differentials in effect at the time the contracts were signed were to be maintained.
4. *Seniority.*—All agreements provided for seniority on a departmental basis. Under these provisions women normally would have seniority only within the small-package departments.

## SOURCE MATERIAL

In addition to the schedules secured in visits to refineries by representatives of the Women's Bureau, the following Department of Labor reports have been freely drawn upon:

**U. S. Department of Labor, Bureau of Labor Statistics:**

Wages and Hours in the Cane-Sugar Refining Industry, 1930. Bul. 547, 1931, 27 pp.

Employment Policies and Labor Mobility in a California Sugar Refinery. By Paul F. Brissenden. Monthly Labor Review, December 1919, pp. 138-160.

**U. S. Department of Labor, Division of Employment Statistics:**

Wartime Employment of Women in Manufacturing Industries. Releases of Aug. 30, 1943, and Apr. 28, 1944.

**U. S. Department of Labor, Division of Public Contracts:**

Supplement to Report on the Beet Sugar Industry and Cane Sugar Refining Industry. Survey of Hourly Earnings, October 1941. Mimeographed, March 1942.

Official Report of Proceedings, Sugar Industry Hearing, Apr. 7, 1942 pp. 138, 154.