UNITED STATES DEPARTMENT OF LABOR
FRANCES PERKINS, Secretary
WOMEN'S BUREAU
MARY ANDERSON, Director

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EMPLOYING WOMEN IN SHIPYARDS

By
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Contents

LETTER OF TRANSMITTAL

United States Department of Labor,
Women's Bureau,
Washington, April 27, 1944.

Madam: I am submitting herewith a report setting forth the conditions that should govern the employment of women in shipbuilding, the field that presents more difficulties than any other in which considerable numbers of women have been taken on.

Based on the Women's Bureau standards of many years and the findings of its field investigators in visits to 41 yards in 1943, 35 of which were employing women on production, the report covers the most vital of the employment problems, from a thorough job analysis and plant changes in preparation for the advent of women, through their selection and placement, their induction, indoctrination, and training, their counseling and oversight, measures for their safety and comfort, to efforts to prevent separations and so lessen turn-over in the case of the unadjusted.

The report was written by Dorothy K. Newman of the Editorial Division. Jennie Mohr, of the Research Division, wrote the recommendations on safety.

Respectfully submitted.

MARY ANDERSON, *Director.*

HON. FRANCES PERKINS,
Secretary of Labor.

Women's Occupations in 35 Shipyards, Distributed by Place of Work, Shop, or Department

Occupation	On board ship or on hulls	Shop or department: Blacksmith and forge	Electrical[1]	Foundry and pattern	Joiner, carpenter, shipwright	Machine[2]	Paint	Pipe and copper	Print	Rigger[3]	Sail and flag	Service and maintenance[4]	Sheet metal	Ship fitting[5]	Toolroom[6]
Acetylene-burner operator and helper (hand burner)	*		**			*		*					**	*	
Arbor-press operator			**										**		
Asbestos filler and sewer								***							
Asbestos layer-out and cutter															
Assembly worker, bench and other			**			*		***					**	*	
Band-saw-machine operator			***	*				*					*	*	
Battery filler and tester			***												
Battery reader	*		**												
Bead-machine operator													*		
Bench-lathe operator			*			*									
Bench worker			**			*		*					**	**	
△Bending-roll operator (cold press and mangle roll)		*	*										*	*	
Binder									*						
Blacksmith helper		*													
Blade straightener						*									
Boatbuilder helper					*										
×Boiler builder						*									
Boilermaker helper						*									
Bolt-cutting-and-threading-machine operator						*									
Bolt-threading-machine operator						*		*							
Bracket-tipping-machine operator									*						
Braiding-machine operator										*					
△Brake-machine operator													**	**	
Brazer			*					*					**	**	
×△□Bucker-up (sheet metal and *steel*)	*												*	*	
Cable finisher			*												
Cable stripper, hand and machine			*												
×□Calker (on wooden boats), trainee	*													*	
Canvas worker											*				
Carpenter or shipwright helper					*										
Castings cleaner (with grinding wheel)				*											
Chain-ladder maker													*		
Chromium plater			*												
Circular-saw-machine operator					*										
×△□Cleaner (*ship*, shop, *tank*, yard)	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*
Clerical worker, shop	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*
Coppersmith helper								*							

Core cleaner				*												
△*Coremaker* and helper				*												
Crane operator, electric overhead and electric portable			*	*	*	*		*		*			*	*	*	
Crane safety watcher										*						
Cushion man											*					
Cut-off-saw-machine operator (metal bar stock, bolts, cable)			*	*		*								*		
Cut-off-saw-machine operator (wood)					*											
Cutter, hand (sheetmetal)													*			
Cutting-machine operator (cloth)											*					
Cutting-machine operator (metal)			*			*							*			
×Deckhand	*									*						
Die-sinking-machine operator						*										
Dipper			*				*									
Do-all-saw-machine operator						*							*	*		
Drill-press operator, single and multiple spindle			*		*	*		*					*	*		
Driller, hand			*		*											
□Driver (automobile, *bus*, jitney, *truck*; panel, mail, or station wagon)		*										*		*		
Drop-hammer operator								*								
Elbow maker						*										
×Electrician, *journeyman* and helper	*		*													
Elevator operator												*				
Embossing-machine operator			*					*					*			
Engine-lathe operator			*			*										
Engraver, flatware			*													
Engraving-machine operator			*			*										
Escort												*				
Fire watch	*									*		*				
Flag maker; beading preparation and sewing											*					
△Flanging-press operator and helper														*		
Folding-and-perforating-machine operator									*							
×Forelady									*							
Forming-press operator			*			*							*	*		
× △Furnace tender														*		
Garage service attendant												*				
Gardener												*				
Gasket cutter								*								
Gear-cutting-machine operator						*										
Generator operator			*			*										
Glasscutter and grinder							*									
Grinding-machine operator (dry and wet; cylindrical, internal or surface with magnetic chuck)			*			*							*	*		
Grinding-machine operator (portable)	*															
Guard												*				
Hydraulic-press operator (automatic)														*		
Inspector						*										
×Jointer-machine operator														*		
Kick-press operator													*			
Labeler, hand							*									

For footnotes see end of chart.

Women's Occupations in 35 Shipyards, Distributed by Place of Work, Shop, or Department (continued)

Occupation	On board ship or on hulls	Shop or department													
		Blacksmith and forge	Electrical[1]	Foundry and pattern	Joiner, carpenter, shipwright	Machine[2]	Paint	Pipe and copper	Print	Rigger[3]	Sail and flag	Service and maintenance[4]	Sheet metal	Ship fitting[5]	Toolroom[6]
Laboratory assistant			*				*								
Laborer, miscellaneous process	*		*	*	*	*	*		*	*		*	*		
Laborer, service and maintenance												*			
Laundry service attendant															*
Layer-out and helper	*		*			*					*		*	*	
Lead liner								*							
Lead-press operator						*									
×Leadwoman	*											*			
Loftsman helper														*	
×Machinist, *journeyman* and helper	*					*								*	
Masker	*						*								
Milling-machine operator			*			*									
Milling-machine operator (portable)	*														
Net maker										*	*				
△Nibbler operator														*	
Nipple-machine operator			*					*							
Oxyacetylene-cutting-machine operator (machine burner)						*								*	
Packer						*	*								
Paint grinder							*								
Paint maker							*								
Paint-shop attendant							*								
Painter, brush and helper	*		*	*			*								
Painter, radium dial						*									
Painter, sign and poster							*								
Painter, spray and helper	*		*			*	*			*		*	*		
Pantograph operator			*			*								*	
Pattern maker helper				*											
Pickling operator			*												
Pipe bender, machine and hand, and helper								*							
Pipe coverer and helper	*							*							
Pipefitter and helper					*			*							
Pipe tapper								*							
Pipe tester								*							
Pipe-threading-machine operator			*			*		*							
Planer operator (metal)			*											*	
×Planer operator (wood)				*	*										
Plumber, helper	*													*	

× □Pneumatic-drill operator			*			*								*	
Powerhouse engineer helper															
△Power-shear operator												*			
Punch-press operator			*			*	*	*					*	*	
Putty chaser							*						*	*	
×Quarterman															
Radial-drill operator			*			*		*			*				
Repairman			*	*		*		*			*	*	*	*	
Rest-room attendant													*		
× △Rigger helper	*										*				
Rivet catcher	*														
Rivet heater and passer	*													*	
× □Riveter and helper	*													*	
Rod straightener				*											
Rope worker															
Rope-machine tender											*	*			
Salvage man											*				
× □Sandblaster	*		*										*		
Sander, hand					*						*				
Sander, machine				*	*										
Scaler, hand	*														
□Scaler, machine	*							*			*				
Scraper, hand						*									
Screw-machine operator, automatic			*			*		*				*			
Sewer, hand								*				*			
Sewing-machine operator												*			
Shaper operator						*					*				
Shearing-, punching-, and cutting-press operator (combination)								*							
Sheet-metal worker and helper	*					*								*	
Shipfitter and helper (none are journeymen)	*													*	
Slitting-machine operator														*	
Slotting-machine operator						*									
×Snapper (working supervisor)	*													*	
Solderer			*					*							
Splicer, rope or cable										*				*	
Stapler									*						
Steel checker															
Steel-storage-shed attendant														*	
Stenciler			*		*		*					*		*	*
Stockroom attendant			*											*	*
Tapper, hand						*									
×*Template maker* and helper and learner (hull, pipe, and electrical)			*			*		*						*	
Tester and helper			*			*									
Threading-machine operator						*									
Toolroom attendant	*	*	*	*	*	*	*	*		*	*			*	*
Tool grinder		*	*			*									
Tracer															
Trimmer, rubber								*						*	
Tufting-machine operator											*				

For footnotes see end of chart.

Women's Occupations in 35 Shipyards, Distributed by Place of Work, Shop, or Department (continued)

Occupation	On board ship or on hulls	Shop or department													
		Blacksmith and forge	Electrical[1]	Foundry and pattern	Joiner, carpenter, shipwright	Machine[2]	Paint	Pipe and copper	Print	Rigger[3]	Sail and flag	Service and maintenance[4]	Sheet metal	Ship fitting[5]	Toolroom[6]
Turning-lathe operator (wood working)				*	*										
Turret-lathe operator			*			*									
Turret-punch-press operator													*		
Upholsterer											*				
Unscrewing-machine operator			*												
Varnisher							*								
Vulcanizer					*	*		*							
×Watchman	*									*					
Weld checker	*													*	
Weld chipper						*								*	
Welder, acetylene														*	
Welder, arc (production, tack, helper and trainee)	*		*			*		*					*		
Welder, spot							*						*		
Welding-machine operator (Union melt and other)														*	
Winder, coil and armature			*												
□Wire brushman	*						*			*					
Wire-stripping-machine operator			*												
Wood finisher							*								
Wood-plug-making-machine operator					*										
Total number of occupations 189	35	7	58	17	19	55	24	36	8	22	18	17	38	51	7

Note.—Occupations in italic are those to which symbols refer.

× Some unusual occupations for women.

□ Occupations of questionable suitability except for women specially selected and specially qualified to meet the physical, emotional, and maturity demands of the job.

△ Occupations partially suitable. Only parts of the job, usually those requiring less strength, are recommended for women.

[1] Includes instrument, optical, and plating shops.

[2] Includes boiler shop.

[3] Includes laborers and erectors.

[4] Includes garage and transportation, power, public works, and plant protection shops or departments.

[5] Includes mold loft, fabricating, welding and burning, and riveting shops.

[6] Includes supply department.

Employing Women in Shipyards

THE NEED FOR GUIDANCE NOW

Recent and unprecedented employment of women.

Just a little over 2 years ago the subject and purpose of this bulletin would have been considered as fanciful as a tale from the Arabian Nights. That American women should take active part in the man's job of building and repairing ships was almost inconceivable. As recently as July 1941 an outstanding periodical made sport of the extreme anti-feminine attitude of what is now one of the most publicized woman-employing ship building and repair corporations in the country. At that time, nearly 2 years after war began in Europe and but 5 months before Pearl Harbor, women were not accepted by the firm even as office secretaries, and the lone women telephone operators were, as it was facetiously reported, "kept under lock and key."

Times have changed with lightning speed. By late 1943, thousands of women along both coasts and on the Gulf, Great Lakes, and inland waterways were actively engaged in almost every phase of ship building and repair work, and it is anticipated that it will be necessary to recruit thousands more before the war is over. Though the introduction of women into the shipyards did not begin in earnest until the fall of 1942, by January 1943 as many as 4 percent of all the production wage earners in the industry were women. The proportion had risen to a little over 5 percent by March, and by September to 9.5 percent. In January 1944 it was 10 percent. These figures include the 8 navy yards engaged in ship construction and repair, in which women have made extensive gains and comprised in September nearly one-fourth of the women wage earners in the industry.

Many adjustments required in an expanding industry.

The unprecedented influx of women into the shipyards has been the inevitable accompaniment of this country's tremendous war shipbuilding program, for which it has been necessary to recruit hundreds of thousands of additional workers since Pearl Harbor. The first 17 months of wartime production witnessed an increase of 189 percent in shipyard personnel. Old-established yards employing from 3,000 to 10,000 workers in 1939 and 1940 had 5 to nearly 8 times that many late in 1943, and there are some shipyards for which ground had not even been broken in 1940 that employed 20,000 to 40,000 workers in the spring of 1943 when the peak had not yet been reached. Expansion on so gigantic a scale in competition with other war industries and Selective Service

brought shipbuilders face to face with the necessity of employing women to help to produce the enormous tonnage so urgently needed.

Such rapid development alone carries with it innumerable problems of administration and plant adjustment, but coupled with the necessity for drawing on a labor element never before tried in the industry, the problems became extremely numerous and complex. Organized training programs had to be set up within the shipyards to provide instruction for the thousands of workers, men as well as women, who had never held tools before, much less seen a ship under construction. Special training was necessary for the supervisors who had never had so many workers under them, many having themselves only recently been promoted from the ranks. Rapid upgrading of men into the skilled and leadership jobs became a practical necessity for the most economical utilization of labor. As the nucleus of skilled and experienced workers has become dispersed and proportionately smaller, the training structure has grown in size and importance. In many yards now the training director helps to control the rate of accession and allocation of the labor force.

Personnel, medical, and safety programs have had to be enlarged and modified to accommodate the mass hiring, placement, and protection of inexperienced workers. Effective selection of thousands of employees in short periods of time has required careful study of procedures and change in methods and policies. Alarming turn-over and labor scarcity have resulted in the introduction in many places of transfer bureaus and exit interviewing.

If the administrative offices have been affected by the magnitude of the war shipbuilding program, those planning and supervising the actual work have had to make even more fundamental and drastic adjustments. Under normal circumstances, ship construction is custom work; each vessel, whether a "sister ship" or one of a kind, differs from every other in detail if not design and requires a complete set of templates of its own. Now, however, hundreds of ships of the same kind, particularly cargo vessels, are being made with standardized materials according to a single pattern. Consequently, mass-production techniques involving assembly-line and prefabrication methods have been sought and developed. Even in the case of the many ships that still are built to individual plan, the work has been broken down to meet the dearth of all-round craftsmen, thus allowing introduction and training of specialists to perform one part of a process, operate one machine, or concern themselves with but one section of the ship. Making all this more possible, the speedier and easier assembly technique of welding has almost replaced riveting wherever feasible and hand welding and burning are giving way to machine methods in some yards and on larger jobs. Automatic assembly fasteners are being used here and there instead of tack welding.

Such examples of the effect on the industry of the tremendously accelerated shipbuilding program could be multiplied. In their broader aspects most of the changes are similar to those made in

other industries under like pressure. Many have eased the way for the employment of women, especially those changes developed to meet the need for training and employing inexperienced men in great numbers and for building many ships of the same design. Others, however, have been required only because women were employed.

Lack of preparation for women's employment.

But the need to draw from the woman labor force often was not realized and accepted till the very last moment, leaving little time for study and planning. In many cases the management plunged headlong even before essential and obvious provision had been made to accommodate the newcomers. This was not surprising in view of acute manpower shortages in shipbuilding areas, yet it was nothing less than daring in an industry so bound in the tradition of dirt, sweat, and rough and tumble, so thoroughly male that any woman who ventured into a yard was greeted with hooting and whistling. The physical and administrative adaptations that should be introduced to insure women's efficient performance and necessary comfort on the job frequently are as nothing compared with the mental hurdles that must be overcome. Problems that are brought to the attention of those interested in women's success often stem as much from attitudes toward women workers in the man's world of shipbuilding as from the actual situation. Yet women frequently were taken on before the human or psychological adaptations necessary to avoid confusion, discontent, and waste, much less the physical and sometimes administrative changes necessary, had been attempted.

When field representatives of the Women's Bureau made visits to 41 shipyards between the beginning and the early fall of 1943, few yards had employed women for as long as a year; many had begun hiring women to do production work only a few months before; 6 had not yet hired any women for production work. Though the yards with women workers still were feeling their way, over half already were employing hundreds of women, some of them thousands, and in many cases expecting to hire hundreds or thousands more. While building more ships than ever before and servicing the Fleet, not a few were functioning under inadequate arrangements, hoping gradually to arrive at a satisfactory solution of their personnel problems with women. To be sure, some had already made excellent progress. Most had forged ahead in at least some phases, such as securing good safety observance, satisfactory rest- and wash-room facilities, and productively efficient distribution of the women on jobs; others were struggling with these aspects of the situation but had mastered other aspects. Many, aware of inadequacies, sought advice. Women's Bureau field representatives were asked in several of the yards visited to submit formal recommendations based on analysis and study of individual yard conditions and problems.

It is clear, then, that the shipyards are charting new seas in the utilization of the woman labor force, and the mistakes or successes that result may have a profound effect not only on the production and repair of ships, but on the cost and efficiency of such production and the health, work, and life histories of thousands of women. It is important to take stock now. Misconceptions should be dispelled, well-founded facts pooled, and the fund of information available from industries with longer histories in the employment of women disseminated. It is with these objects in view that the present report is submitted. It is the aim of the Women's Bureau through the recommendations and suggestions made here to promote conditions for the woman shipyard worker conducive to her most efficient and productive employment and her well-being as a member of society and the labor force.

Scope of the survey.

The material included here is based in large part on information secured from a comprehensive study of women's employment in American shipyards representing almost every kind of situation and located throughout the country's major shipbuilding areas. Drawn upon extensively also are the standards for women's employment recommended by the Women's Bureau and derived over its quarter-century of fact finding and reporting in the field of women in industry. An Act of Congress creating the permanent Bureau in 1920 outlined its duties as follows: "It shall be the duty of said bureau to formulate standards and policies which shall promote the welfare of wage-earning women, improve their working conditions, increase their efficiency, and advance their opportunities for profitable employment. The said bureau shall have authority to investigate and report to the said [Labor] department upon all matters pertaining to the welfare of women in industry." In performing these duties the Women's Bureau has collected and disseminated a wealth of factual material that has both general and specific application to the employment of women in shipyards. Selected additional sources of information and guidance are listed after each general topic discussed.

Among the questions it is hoped this report may help to answer are the following: What work in shipyards can women do safely and successfully? What plans should be made before more women are taken on? How should women be selected and placed on jobs? How should they be supervised under various yard conditions? Many of the suggestions offered in reply to these questions may be irrelevant in well-managed yards that have been hiring numbers of inexperienced men, for many of the problems issuing from the employment of women in shipyards are no different from those that arise from hiring any inexperienced workers. Recommendations are made also that emphasize good administrative technique and personnel policy that are effective with all workers but especially important in the employment of new workers or women. In addition, of course, are the various innovations and adjustments that affect only women.

Of the 41 shipyards visited by agents of the Women's Bureau, 35 had women on production work, these women comprising an estimated two-fifths of all women so employed in March 1943. Most of the yards (32) were on the North and South Atlantic coasts, 4 on the Pacific coast, 3 on the Gulf coast, and 1 each in the Great Lakes and Inland regions. Seven of the eight navy yards engaged in new construction and repair of ships were covered in the survey; each employed women on production. This was true also of all but 6 of the 34 commercial yards visited. Though ship-repair work is one of the least standardized, least predictable enterprises in wartime, women were employed in laboring, helper, and mechanic classifications in the 4 companies engaged wholly in repair work and in 11 of the 12 yards repairing and converting ships as well as building them.

GUIDES TO EMPLOYING WOMEN SUCCESSFULLY IN SHIPYARDS

Planning can prevent many problems from arising or at least can prepare for meeting those that are inevitable. It is best to make and to develop plans for assimilating and efficiently utilizing the woman labor force before any women are hired, but if some arrangements were not made, or by reason of haste could not be made, beforehand, steps should be taken to prepare for them and introduce them as soon afterward as possible. This is most important in the following procedures that will be discussed in detail below.

1. Secure the cooperation of men supervisors and workers.
2. Select and place women carefully.
3. Employ women only in jobs found to be suitable.
4. Pay women and upgrade them on the same basis as men.
5. Schedule an 8-hour day and a 48-hour 6-day week; allow a lunch period of at least 30 minutes, and rest periods of 10 to 15 minutes in each work spell of as much as 4 hours. Rotate shifts no more frequently than every two months.
6. Set up an effective woman employee counselor system.
7. Give new women workers preliminary induction into the work and environment of the shipyard before putting them on the job.
8. Provide personal-service, food, and medical facilities that meet approved standards of adequacy and quality.
9. Study and expand the safety program to adapt it to women workers, and instruct women thoroughly in safe work practice.

1. Secure the cooperation of men supervisors and workers.

Permeating all planning for the introduction of women into the work force and continuing for as long as necessary through the period of their employment, management should work to develop and preserve a friendly, businesslike, and cooperative attitude toward the new women workers on the part of the entire male personnel.

The men must be assured of their own job security; they must also understand the seriousness of the labor shortage and how profoundly their successful cooperation with the new women

workers will affect the Nation's ship production. The attitude of the men is particularly important since so many women are assigned to men journeymen for orientation and initial training and, in yards having no formal training program, the entire burden of instruction lies with experienced and skilled workmen. Under these circumstances a resentful and uncooperative male force can sabotage the women's program in many ways.

In large part, however, the first fears over women's adaptability to the unfeminine industry of ship building and repair have dissipated. Men workers and supervisors who were opposed to the employment of women in shipyards are finding women adaptable and capable. The opinion is now widely found among men supervisors that women should be allowed to do any work that men do, as soon as they are capable and providing the work is not beyond their physical strength.

To foster this attitude and secure the help of experienced workers, supervisors should be represented on and consulted by any committee, body, or group studying the work program for women, making job analyses, or gathering information on assignment of women to jobs.

Many yards, finding that their success with women lay largely in the hands of the lower level of supervision, have inaugurated definite planned training programs for supervisors. The most successful have been those with emphasis not on women as women but on women as employees. One training officer said very aptly, in reference to his methods of training supervisors to handle women, "Women *must* be supervised as men *should* be." Many of the successful supervisors' courses are predicated on the idea that women are simply new employees and that special consideration should be given new employees with no previous background or training.

Women workers in shipbuilding are analogous to a new tool. A measure of the success of a worker or a supervisor lies in his ability to use new or unaccustomed tools.

2. *Select and place women carefully.*

A good deal of complaint is being made these days of wasted labor in the shipyards. With proper selection and placement much well-deserved criticism could be avoided. The need for haste and the lack of a trained labor supply from which to pick and choose have led to haphazard hiring policies that result in human and material waste. The very lack of choice makes it imperative to consider each person's ability more carefully and to assign him to the task he can learn to perform.

The fundamental principles of good selection and placement are the same for all workers, men and women; the criteria by which women are selected and placed in some jobs and men in others depend on the principles that look toward hiring only those who can do a good job and placing each worker in the occupation for which he or she is best fitted. It is recognized that individuals

differ in their capacities and aptitudes and that there are in addition fundamental differences between men and women that affect the capacity of each to do certain types of work with maximum efficiency over a period of time. However, even in shipbuilding, a heavy industry and one ordinarily manned entirely by male workers, this leaves a broad occupational field in which women may be placed very satisfactorily, one in fact that has as yet been only partially explored in most yards. This makes it not only unnecessary, but grossly inefficient and economically wasteful, to place any woman in a job for which she is not suited. Furthermore, to place a woman, or a man for that matter, in a job beyond such person's normal physical ability is a social extravagance for which this and future generations will pay dearly.

Whereas the next section of this report considers in detail the shipyard occupations in which women as a group can be and are safely and successfully employed, this section deals with techniques of selection and placement of individual women to assure employment of each woman worker in one of the jobs, among those available and suitable, in which she can give her most efficient service.

There are several effective means and procedures available to those responsible for selection and placement. When used together by individuals having suitable experience in their operation and knowledge of their functions and interpretation, they will not only prevent serious error but in a positive way will affect immeasurably the economical and productive utilization of the labor force. They are worth both the time and the money they cost, especially in a period of labor shortage when the quality of applicants is lowest. They are worth the cost even when hundreds, perhaps thousands, of workers must be employed on short notice in a period of great expansion. To put these great numbers to work in haphazard fashion is to court serious future dislocation, absenteeism, and high turn-over, all costly ills. It is far better to foot the preventive cost of good selection and placement.

The means just referred to include, first, complete job analysis, then a good application blank, preplacement physical examination, properly standardized and administered tests, and an objective and comprehensive interview.

Job analysis.

Job analysis in this connection is not to be confused with the type of analysis that is made specifically for rate setting and employee evaluation. The job analysis in question here is a thoroughgoing job description to aid in selection and placement of the work force and in transfer and upgrading. It outlines exactly what the work entails as regards procedure, duties, and responsibility; the specific conditions under which it is performed (that is, workplace, hours, wages, hazards, exposures); the education, experience, training, tools, degree of skill, and physical effort needed to perform it; the opportunities and specific line of advancement and job progression involved; and the relation to other jobs, specially as regards transfer.

Such a job description or analysis has many uses in selection and placement of women workers. It breaks down the job into its component parts, thus making it possible to see whether or not the work is such that the average woman can or should perform it, and where dilution, reengineering, or rearrangement of the job will make it a more acceptable one for women. In other words, it can be used in the original allocation of jobs for women and in the procedure of getting jobs ready that originally may not have been suitable. Often this makes possible more efficient performance by both men and women.

The following are examples of modifications made in some of the shipyards visited by representatives of the Women's Bureau:

> In order to eliminate stretching to get at the work in the very large Covell Hanchet surface grinders, small platforms were built for women operators.
>
> Acetylene tanks weigh 450 pounds. After women burners were hired, gas was piped to all work locations to eliminate handling of the heavy tanks.
>
> The wooden tool boxes in which welders lock their equipment weigh 40 to 50 pounds. They are sent to women's workplaces. Their lines are hoisted onto hulls, eliminating carrying from docks.
>
> Steps have been built along the walls and a runway around the walls, so that women crane operators do not have to climb ladders to the overhead and bridge cranes.
>
> Wherever tools or parts to be machined must be fastened into chucks or tool heads, installation of pneumatic or hydraulic equipment has been made to eliminate the need for strong wrists, which many women lack.

A number of jobs would be more efficiently performed if good seating were provided, ventilation and lighting improved, and manual weight lifting eliminated.

All these modifications and many others may be suggested by the job analysis.

The analysis is also an invaluable guide to the interviewer, tester, and physician, in determining job fitness. It shows them at a glance what the requirements are, and consequently aids them in making their recommendations for placement. The examining physician should secure from the job specifications the physical exertion, finger dexterity, and special skills required; exposure to moving machinery or point-of-operation hazards involved; whether the job requires constant sitting or standing; if exposure to toxic dusts, fumes, gases, vapors, or mists is involved; the required vision; and whether the job must be performed in close cooperation with others. With this information and that gained from the physical examination, the physician can make invaluable recommendations for advantageous placement from the standpoint of health, safety, and production.

At least 4 of the yards visited, one a navy yard, prepared and used job analyses to aid in the selection and placement of women. The practice should be extended.

The application blank.

A carefully drawn application blank helps to simplify the selection procedure. It is of great assistance to the interviewer in conjunction with the job-analysis sheets, test results, and physical examination data. The blank should, above all, be easily filled out and, in addition to requiring the usual information such as name, address, age, education, training, work history, and the like, should save the interviewer's time by providing for addition of such data as marital status, number and ages of children, other dependents at home, permanent residence if from out of town, name and occupational status of husband, and expected mode of transportation to work. If no tests are given, it is desirable also to inquire about interests, hobbies, and special skills.

The extent of women's home responsibilities and the arrangements made to meet them should be ascertained, to judge whether or not they will be able to swing a job in industry in addition to their homemaking. It must be decided too whether their transportation problem can be met satisfactorily, and whether special arrangements must be made to place them on a particular shift to meet home or health needs. Inmigrants present still other problems. Since the application blank provides a permanent record, it is well to have these matters on paper, not only to help in selection and placement but to aid the personnel officers in assisting new women workers with their preliminary and permanent adjustments.

The preplacement physical examination.

Absolutely essential for adequate selection and placement of women in shipbuilding production is the preplacement physical examination. Many of the occupations now performed by women in the shipyards are physically demanding. It is important for this and the next generation that the ability of individual women employed to do such work has been properly assessed. The preplacement physical examination makes this possible. Not only does it prevent the employment of the few unable to meet shipyard demands at all or prevent placing someone on a job for which she is not physically suited, but in a positive way it makes possible placement of a worker on the job or kind of job that she can perform with greatest efficiency.

In addition, the preplacement examination reveals such communicable diseases as tuberculosis and syphilis. People with active pulmonary tuberculosis and with syphilis in its infectious stages are a hazard to others. It is important that the employment of such people be delayed until they have undergone treatment and a recheck shows that they will not infect their fellow workers. In three of the shipyards visited, applicants showing a positive Wassermann or active tuberculosis are sent immediately to the city clinic or to their own doctor for treatment; on evidence of continued doctor's care and control of the disease, they are placed. This is a socially and economically constructive procedure. One of

the shipyards visited, on the other hand, did not even give preplacement examinations though located in an area with an especially high death rate from tuberculosis and with high incidence of venereal disease. The health of many workers was endangered in this yard, not only because of contagion but by improper placement of those not in robust health; further, it was reported that, though needed, many women were loath to apply here for work under such conditions.

There are many other advantages of the preplacement examination. Though discussion regarding the special placement of a worker is based on the applicant's limitations and not on the basis for such limitations, the applicant herself should be advised of the presence both of remediable and of irremediable defects or impairments. In the first of these, impairments such as infected tonsils and bad teeth may soon disappear with prompt attention. Follow-up through the medical office to aid in rehabilitation is recommended. Such a policy promotes the health of employees, thus insuring continued working capacity and cutting down on absenteeism. In the case of irremediable defects, such as a cardiac condition, the applicant can be wisely placed and here also will be informed of the limitations of effort her defects impose. Thus she will be protected from injury and her fellow workers from possible accident; at the same time, she is employed where she may contribute most. Further, the great supply of marginal labor, comprising not only the physically handicapped but older persons as well, can thus be assimilated by the labor force and in work within their capabilities.

The preplacement physical examination makes possible complete utilization of labor. Recent surveys show that there are very few rejections, illustrating that the modern emphasis in the use of the examination is intelligent placement rather than escape from undue liability under the compensation laws. Thorough preplacement examination for all workers is strongly recommended by the United States Public Health Service, the Council on Industrial Health of the American Medical Association, in various of the States by the labor department or industrial commission, by the National Industrial Conference Board, the National Safety Council, and the United States Navy Department and Maritime Commission.[1] Any of these responsible groups may be consulted for advice and aid in organizing a suitable examination program for women in shipbuilding.

Such a program cannot be carried out without close cooperation among the workers, the unions, and management. This has already been achieved in thousands of industrial establishments, and especially in those employing 500 workers or more. It has been accomplished also in many of the shipyards. Of the 35 yards visited by representatives of the Women's Bureau that had women on production, 28 gave a preplacement physical examination to women

[1] See *Minimum Requirements for Safety and Industrial Health in Contract Shipyards.* Approved 1943 by the U. S. Navy Department and U. S. Maritime Commission, 35 pp.

workers. Almost all these gave the examination to men also, the approved practice. Sixteen had collective bargaining agreements, 6 with the AFL and 10 with the CIO.

It is earnestly recommended that the unions now preventing the introduction of the preplacement physical examination in certain shipyards reconsider their stand in the light of the facts and in accordance with their social responsibility. Let them consult with their affiliated organizations elsewhere that have cooperated in an examining program and discover the basis on which satisfactory agreements have been reached. In this connection it is important that the UAW-CIO has announced a 9-point program of health and safety clauses to be demanded in all its contracts. Among the main points are the following:

1. Free physical examinations must be given to all new employees before hiring and annually to each regular employee. The employee shall be given a copy of the physician's report.
2. No applicant shall be refused employment because of alleged ill health or disability if capable of performing an available job.

These raise the issue of the fundamental need for making certain that the physical examination will not be used as a method of exclusion rather than primarily as a means of good placement. One yard, for example, reported that it "will not employ anyone with any tendency to lung trouble." This is unnecessary and arbitrary policy. It should be clear also that the physical examination will not be used as a means of prejudicial selection, to refuse people active in the union, for example; that the manner in which the examination is given and the information is used will meet the highest professional standards; and that the applicant will be informed concerning causes for rejection, about physical defects that should be corrected and treated, and about irremediable defects and the limits they place on physical effort. The active cooperation of labor should be invited in setting up the program to aid in its proper organization, smooth operation, and most effective functioning.

Tests.

A large proportion of the women entering the shipyards lack industrial experience and even more have had no mechanical background of any kind. It is extremely difficult to evaluate the ability of these women to do the job, or to do one job better than another, merely from the data on their application blanks and reports of physical fitness from the physician. It is for this reason, as a matter of fact, that companies long employing large numbers of women have been pioneers in the development of aptitude and performance tests. Such tests have proved the only way of predicting with any accuracy whether a person without related work experience could do a particular job. Tests are given also with marked success to measure intelligence and to secure some objective indication of personality or individual characteristics that will affect adjustment to the job.

One of the shipyards visited reported high correlation between test results and successful placement. The company was using several mechanical aptitude tests, a tool-recognition test, a vocational test for industrial-training classification, and a quick-scoring mental-ability test. The management bases the fact that women have been successful and well accepted in the yard on the excellent selection made possible by means of tests.

It should be emphasized, however, that the use of tests is not without serious consequence if the proper precautions are not observed. Most important, the testing program must be set up and directed by someone trained and experienced in industrial testing techniques. Such a person knows how to choose the tests that will meet the needs of the particular company, can direct and control the experimental process through which tests must pass before their results can be accepted, and is acquainted with the dangers to which tests are liable and the misinterpretations that may be made of their results. This officer knows that tests, though not the sole basis for selection and placement, do provide important objective material to assist and illuminate the interviewer's appraisal of the applicant. Tests do not and cannot take the place of all other selective procedures, nor do they replace the personnel officer. Rather do they increase her effectiveness. It should be thoroughly understood, finally, that the selection or placement tests used and found satisfactory in one organization may not be equally or perhaps at all satisfactory in another. The properly selected officer for introducing the testing program will, of course, be well aware of these facts and also of how important are the conditions under which tests are given.

When properly standardized for validity and reliability in the particular firm and for the specific jobs to be filled, however, testing lends much greater accuracy to the total work of placement than can be secured by the other, more usually employed, methods alone. No matter how mature the judgment and shrewd the insight of the final interviewer, the results of a well-standardized and scientifically prepared and administered battery of tests add considerably to the reliability of her selection and placement activities. They are a check on educational background and on reported occupational experience. They aid the interviewer in comparing the candidate with the workers already on the job and, if the applicant is above or below the level of the group, help to indicate her capacities for more suitable placement. They show particular abilities or comprehension that are an aid to placement and can offer a clue as to temperament and personality characteristics that may be checked in the interview. This information is very helpful in placing women in manual labor or work that is dirty and disagreeable.

In view of the results, testing is an economical adjunct to the usual techniques of selection and placement. Tests are inexpensive to administer and score. Their cost is significant only in the first year of their introduction when the validity of each test is being determined.

Both technical and general information concerning how to introduce and use testing procedures may be secured from the selected references listed at the end of this section.

The interview.

The interview is usually the final and decisive stage in the hiring process. In most shipyards it is the only technique used. It should not be hasty. To the interview should be brought all possible background data for making careful selection and recommendation for permanent placement.

It is preferable in the shipyards especially, where so many inexperienced women are securing employment in an entirely alien field, that the interviewer be a woman. A woman is more successful in securing personal data that are essential to successful placement, and a woman is better able to present the work of the yard and the requirements of the job to another woman. She is more understanding of the interpretation and emphasis that are required in making women understand what will be expected of them and in putting them at ease with the new terminology and occupational alinement of shipbuilding.

The interviewer should be equipped with good knowledge of yard procedure and policies, detailed familiarity with the jobs to be filled, and ability to evaluate and interpret test scores. She should have a cordial manner, ability to establish and inspire confidence in the applicant, adaptability, and mature judgment. She must be capable of making the important selection and placement decisions with objectivity and in a relatively short time, basing such decisions on information secured from the application blank, the physician, and the testing program as well as on special information acquired during the interview.

It should be her duty to tell applicants about the available openings they can best fill, describing all phases of the work with some emphasis on the more difficult, less glamorous aspects. It is fully as important for the worker to take the job with complete realization of its drawbacks as for her to be fitted technically for it.

The interview should be held in privacy and the applicant should be given ample opportunity to talk freely and ask questions. It is during the interview that information should be secured and referral made to insure the care of young children and other dependents during the woman worker's employed hours. It is of course best not to employ women with children under 14 years of age when no permanent and acceptable plan for the care of the children has been made.

Selection and placement based only on the impressions of the applicant formed during the interview, with only the application blank as a guide, is somewhat of a risk. The findings of a thorough physical examination and the job analysis are the minimum accompaniments to the successful interview. Test scores are exceed-

ingly helpful. But, in addition, it is recommended that data secured in the interview itself be evaluated and recorded on a graduated rating scale of some kind that has been carefully devised.[2] This will lend a measure of objectivity to this most subjective yet practically universal selection technique.

Existing selection and placement techniques.

Though one of the most important phases of the woman-utilization program, few of the yards visited were doing a thorough and completely effective job in the selection and placement of women workers. Most of them employed no objective ratings, such as tests; the job analysis was a customary placement tool in very few of the yards; and even in those places where a physical examination was given, the results were not always used effectively, sometimes not at all, to aid in distribution of the woman work force. In many yards even the interview was cursory. A few of the yards, however, reported a thorough interview by a woman who attempted careful rating of the applicant. The same yards used job analyses in addition. When the physical examination was given, its results were employed in placement. These yards had made strides in labor utilization and were reaping the benefits.

In contrast, some yards were using the worst possible hiring methods. The results of such a policy as that described in the following report are poor efficiency, low production, depressed morale, and high turn-over:

> . . . the people were treated like a bunch of cattle at the hiring hall. . . . There was a battery of typists who stood at a counter and typed out a personnel card for each person, after the applicant had cleared with the union. No inquiry was made into the applicants' background, and they were merely hired by the wholesale for the particular craft in which there was a demand for workers on that particular day. As a result of this procedure, the women's personnel supervisor had encountered many women doing sweeping and other laboring work who had had factory experience qualifying them for much more skilled work.

The following is a report of equally poor technique:

> . . . the facilities at the employment office were very meager. There was a small porch with a roof over it. A number of windows opened onto this porch from the employment office and these were heavily screened. Persons being interviewed for jobs stood on this porch and talked to the interviewers through the screened windows. . . . If the women being interviewed and selected for work were interviewed in this same way it appears likely that results were not always the best.

Some of the obstacles to setting up sound selection and placement programs arise from insufficient coordination and cooperation of the shipyards and labor unions to that end. A number of problems need to be ironed out. These are suggestions for dealing with a few of them. For example, when the unions recruit workers for the yard, they should have a voice in setting up good standards of selection, but then should allow the final placement

[2] Help in doing this may be secured from the Psychological Corporation, listed among the selected references for this section.

to be done by the yard personnel office on the basis of those standards. The unions, in the interests of good labor relations and efficient labor utilization, should participate in and encourage better selection and placement techniques.

Where seniority is a factor in the allocation of jobs, the least agreeable and heaviest jobs ordinarily being apportioned to beginners, the lighter, cleaner, more skilled jobs to those with most seniority, a satisfactory policy should be devised by management and unions together so that women beginners unable to perform the heaviest work may skip a rung on the seniority ladder. Women could then be placed in jobs more suitable to their capacities without disrupting labor-management relations and with full understanding by all of the safeguards that have been set up.

It is important in yards with AFL agreements to facilitate transfer from one craft to another so that necessary reassignments can be made without penalty to the worker in the way of having to submit to a rehiring process and an additional initiation fee. When it is found that a woman is unsuitably assigned, transfer should be a simple procedure without cost or red tape. This is especially important, to cite the most obvious situations, in cases of industrial poisoning, pregnancy, or other physical handicap. In one of the west coast shipyards visited that had a closed-shop agreement with the AFL, some of the crafts already allow the transfer from one craft to another and either transfer their initiation fees or make some allowance on them.

Though Negroes comprise a significant proportion of the labor force in some of the large shipbuilding regions, comparatively few Negro women are employed in the shipyards except as laborers, sweepers, and cleaners. Of the 32 shipyards employing women operatives visited by representatives of the Women's Bureau and reporting on the race of employees, only 14 employed Negro women as production workers; these included 7 United States Navy Yards, 2 of which were in the South. Negro women should be selected and employed according to the same criteria as white women and should be given the same opportunity for training and upgrading. It is up to management with the aid of the unions to introduce the Negro workers in a manner that will overcome resistance and encourage maximum cooperation and production among white and Negro workers. It is notable that several of the shipyards visited were working Negro and white men and women together, side by side, with no apparent difficulty. Numbers of Negro women were welders or machine operators with helper and mechanic ratings.

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Personnel Journal, published by Personnel Research Federation, 60 E. Forty-second St., New York, N. Y.

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Consult also the United States Employment Service in your locality and the Bureau of Placement of the War Manpower Commission, Washington, D. C.

3. Employ women only in jobs found to be suitable.

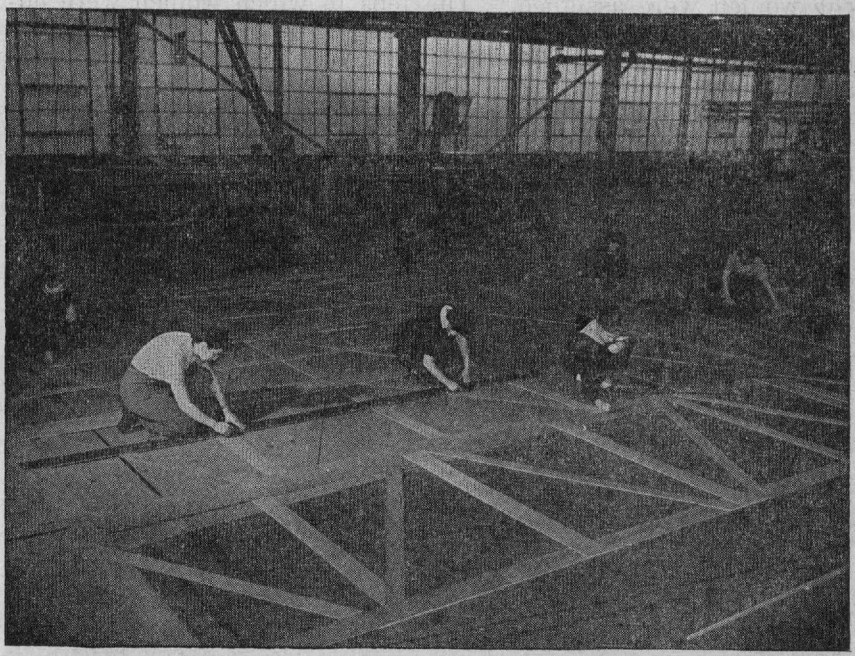
The jobs women do well.

Practically the only shipyard jobs women held before the war were hand and machine sewing in the sail and flag lofts of 2 navy yards. In a third navy yard with a sail and flag loft even the sewing was done by men before August 1942. By July 1943 women held nearly 200 different jobs in the 7 navy yards and 28 commercial shipyards visited in which women were employed as wage earners.

Many women have already achieved full journeyman's status, some in a period of as little as a year. The majority of course are either in unskilled work or in helper classifications, but many of the latter are nevertheless doing skilled work independently. To mention but a few examples,[3] they are setting up and operating a variety of machine tools to close tolerance on short lots of work; cleaning, repairing, reassembling, and calibrating technical instruments; making from the templates without assistance such sheet-metal items as water tanks and ventilators.

[3] See the *Appendix* for brief description of other jobs women hold in the shipyards.

Numbers of women are already first-class arc welders and acetylene-burner operators whose work may take them anywhere in the yard or on the hulls and ships. A few are doing the entire job of making full-size wooden templates in the mold loft. Some women have achieved the rating of snapper, leadingman, and journeyman machinist. In fact, the plan of job progression in many shops calls for relieving the skilled workmen of more and more of the intricate work.



Official U. S. Navy photograph

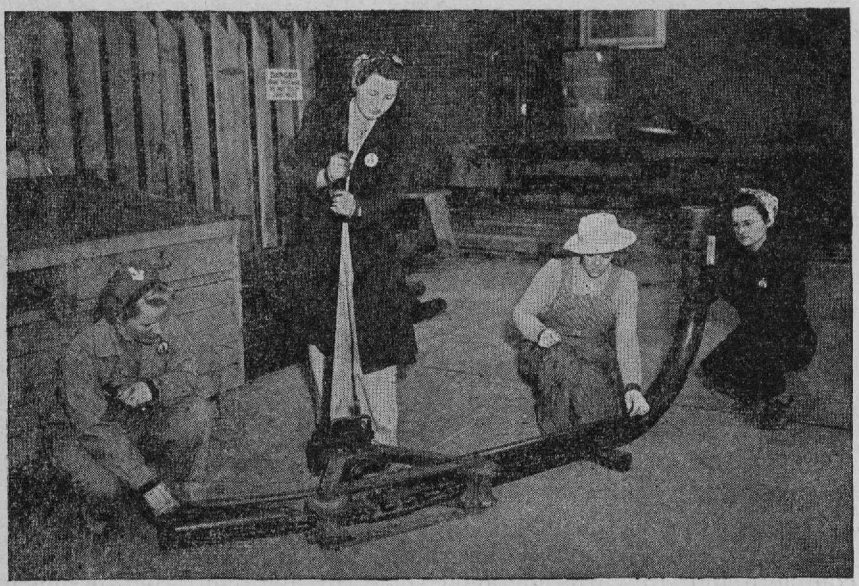
Women at Work in Mold Loft of a Navy Yard. While One Girl at Right Reads Plan, Other Five Work on Bulkhead Templates.

The most common practical problem involved in employing women or new workers is the number of skills necessary to do a complete job. In yards engaged solely in new construction most jobs can be broken down into component parts and inexperienced men or women can be trained to do one or more of these parts in a comparatively short time. As they learn more operations they increase in skill until they can do many of the complete jobs independently.

This is not so easily accomplished in repair yards. The custom nature of the work demands a more general knowledge of craft fundamentals. However, many women are successfully employed in repair yards. In-service training courses are widely offered and some yards utilize the training programs given by outside organi-

zations. Women are taught to read blueprints, as the nature of much of the work makes this ability practically a necessity.

To aid in determining the jobs women do well, the table on pages vi-x at the beginning of this report is presented, showing the complement of women's production jobs in 35 shipyards employing women on production that were visited by the Women's Bureau in the period from January to August 1943. The jobs are distributed according to the shop or department in which they were performed or, in a few cases, according to the shop to which the women were assigned.[4] The jobs in which women were engaged on board ship or on hulls are given special attention. Occupations differentiated in the following ways are marked with the appropriate symbols: Those found infrequently X, those not recommended by the Women's Bureau as suitable except perhaps for women specially selected and specially qualified to meet unusual demands □, and those jobs only parts of which are recommended as being suitable for the average woman worker Δ.



Official U. S. Navy photograph

By Use of a Hydraulic Press, Four Women Electricians in a Navy Yard Bend a Conduit to Conform to the Curve of the Trench in Which It Is To Be Inserted.

Among the most common occupations for women in the shipyards at the present time are arc welding, gas burning (acetylene-burner operator), helping shipfitters, painting, tending toolcribs,

[4] In a very few instances workers hired for one shop—for example, crane operators assigned to the electrical shop—did their work in various other shops or departments, but these could not be differentiated.

operating machine tools, sheet-metal fabrication and assembly, and bench and assembly work, especially on electrical equipment.

The following tabulation shows the departmental distribution of women wage earners in 24 shipyards that reported numbers of women by department. Of special importance is the large proportion of women recorded as welding, burning, riveting, fabricating, drafting, and working in the mold loft as participants in shipfitting operations.

Distribution of Women Wage Earners by Department in 17 Commercial and 7 Navy Yards, 1943

(Women's Bureau survey)

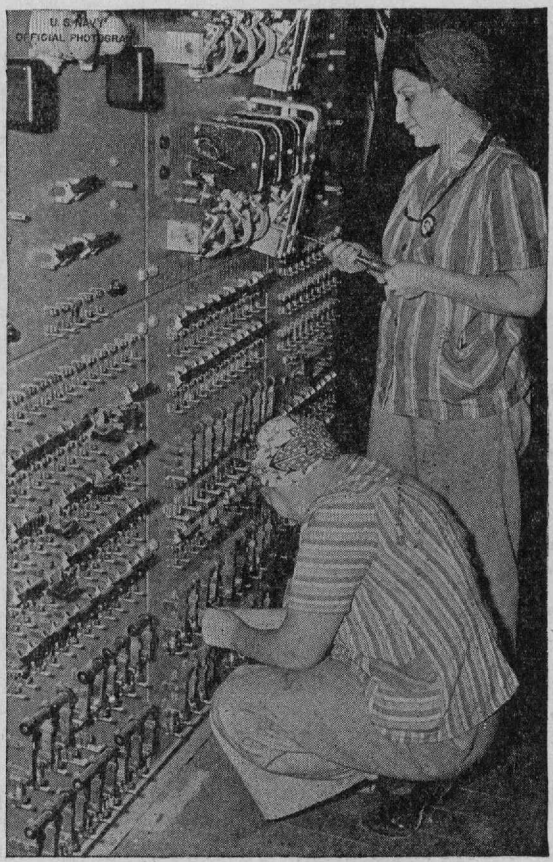
Department	Women wage earners	
	Number	Percent
Total	28,097	100.0
Blacksmith and forge	60	0.2
Electrical [1]	2,855	10.2
Foundry and pattern	171	.6
Joiner, carpenter, shipwright	304	1.1
Machine [2]	4,090	14.6
Paint [3]	798	2.8
Pipe and copper	1,096	3.9
Print	15	.1
Rigger [4]	1,690	6.0
Sail and flag	1,031	3.7
Service and maintenance	2,700	9.6
Sheet metal	2,009	7.2
Shipfitting [5]	10,108	36.0
Toolroom	1,170	4.2

[1] Includes electrical manufacturing.
[2] Includes boiler.
[3] Includes paint manufacturing.
[4] Includes laborers and erectors.
[5] Includes welders, burners, riveters, mold loft, fabricating, drafting.

The Women's Bureau survey has revealed that employment of women in the shipyards went ahead most quickly in the fields where workers were most urgently needed, without due regard for meeting the requirements of the job with the properly qualified person. Furthermore, where masters in the navy yards or foremen in other yards were opposed to the employment of women, though their shops or departments may have been a logical entrance point, women were hired first to do other work not so suitable, to which, under good planning and labor relations, well-qualified men should have been transferred.

There is no longer any excuse for this, now that enough time has elapsed to prove women's effectiveness and to profit from hard-won experience. It should be clear from this experience in the shipyards and from comparison on the part of shipyard man-

agement with the long practice in other industries, what ship construction and repair work women can do best. It should be equally clear that it is wasteful of labor to hire women to fill jobs for which there is sufficiently objective reason to doubt their suitability.



Official U. S. Navy photograph

Electrical Workers Wiring Large Switchboard Panels for Ships.

More women should be hired to do electrical manufacture, assembly, and installation work, to operate machine tools and carry on bench and assembly work, and to carry through sheet-metal operations. Women can make the lighter cores in the foundry, can paint, and can work with cloth, canvas, and rope in the riggers'

shop and the sail and flag loft. They can clean shop and yard and help with the servicing and maintenance of yard and shop equipment. They give excellent service in the toolroom and can keep tools in proper condition. Their ability at lay-out in the fabrication department has been proved, and, given time, there is no limit to their capacity to succeed in the mold loft either as template makers or as loftsman helpers.

In fact, the extent to which women may be employed effectively in the inside shops is limited for the most part only by the time required to gain skill. Few of the jobs require heavy work for which movemen or handling and lifting devices have not already been provided, not especially for the women but for all the workers, to increase their efficiency and productivity. Women's employment should be extended inside the shops wherever possible and any men that are thereby displaced should be properly selected for other jobs in fields where the average woman is not so easily introduced.

To be sure, because of variations in types of work and in equipment and plant facilities, all shop work is by no means suitable for women any more than all work in the yard or on the hulls and ships. Some shop work is very heavy, as for example a few of the jobs on pipe and copper, some foundry and blacksmith work, and some fabricating jobs. On the other hand, to give but a few illustrations, certain types of electrical installation work on board ship, and welding and burning on flat platforms in the yard just a foot or so above the ground, are jobs women find easy to do.

In some yards, shops are open on one or more sides to the weather, to allow convenient hoisting of material in and out. In others, especially navy yards, a good deal of subassembly work is done completely under cover. In most yards, however, subassembly is performed on slabs or platens out of doors, exposed to wind, rain, heat, and cold. Consequently, there are instances in which work on the top decks of hulls is a good deal less demanding physically than work on major subassemblies in the yard.

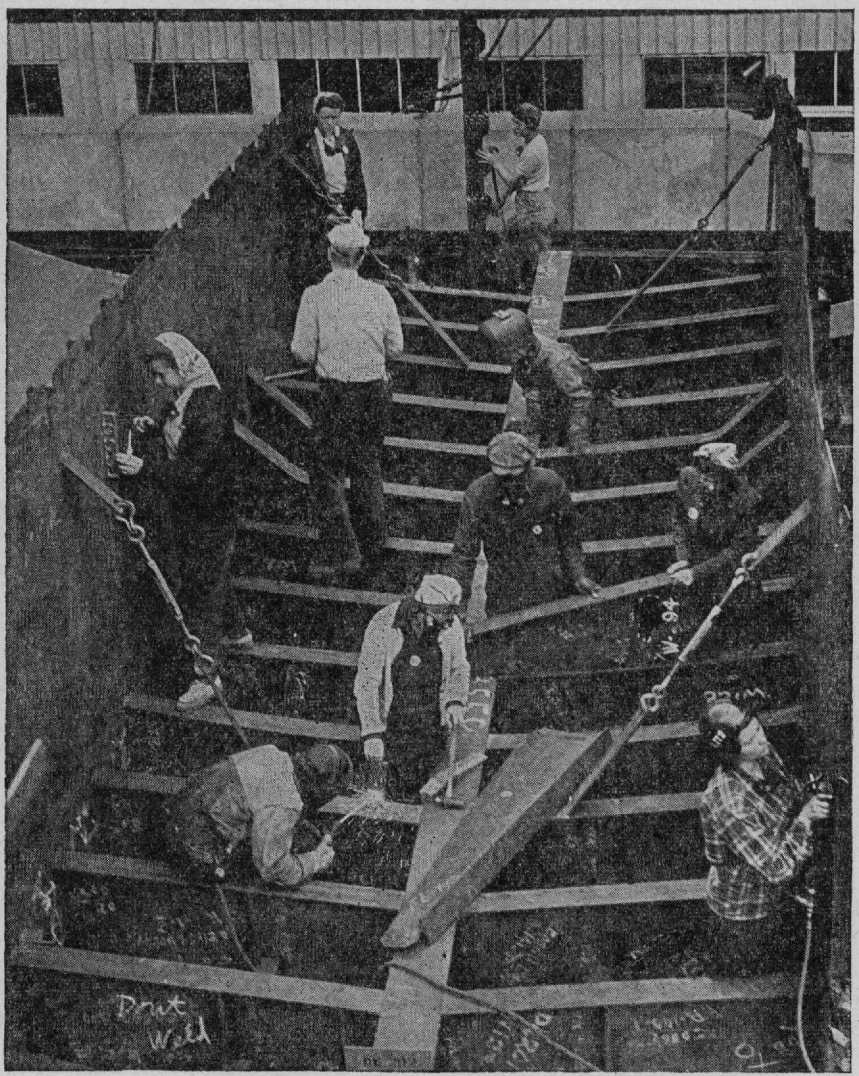
It is clear, then, that necessary generalizations made here concerning work on the platens or slabs and on the hulls and ships may not fit every case. The discussion and suggestions made, however, are appropriate in the large majority of cases.

Work on the platens and on the hulls and ships.

The differences between women and men as they affect capacity for doing various kinds of work must be taken into account realistically in evaluating the ability of the average woman to perform effectively certain jobs in a shipyard.

For example, it is important to the placement staff looking for workers to be employed on board ship that the frame of a woman is such that it is more difficult for her than for a man to maintain her balance; that a woman's blood has a higher water content than a man's and contains up to 20 percent fewer red corpuscles; that her heart beats about 8 times more a minute; and

her muscles, proportionately longer and thinner, allow her a squeeze only about three-fifths, and muscular strength only about one-half, that of the average man. Physiology shows, therefore, that a woman is not only less strong muscularly, but, because of the blood and heart difference, she tends to tire more quickly than a man. Besides these considerations, persons responsible for placement will want to take into account that women's average height is 5 inches less than that of men; their reach is less; their



Official U. S. Navy photograph

Members of an All-Woman Crew Aiding Men at Work on a New Destroyer Escort.

fingers and hands are smaller; and because they are more likely to get varicose veins and tire more quickly, constant standing is more difficult and harmful for them.

Much of the work in the yard on slabs or platens to some extent, but especially on the hulls and on board ship, requires constant standing and climbing and walking about where footing is precarious. It requires carrying loads while climbing; holding tools and equipment while working on scaffolding; climbing down through hatches and using ladders between decks; bending, crouching, and kneeling in confined places. Such activity is not only hazardous for the average woman, but it is fatiguing, and is accompanied frequently by circumstances that in themselves add to the strain of the work; for example, the confusion of hose, cable, and other equipment lying about, workmen swarming everywhere, the din from chipping, scaling, and riveting, and exposure to extremes in the weather.

For the most part, the work that women are doing under these conditions is in itself suitable. Women make good welders, burners, and helpers for shipfitters, sheet-metal workers, and electricians. This is the work that most women employed on the platens, the hulls, and on board ship are doing. The question here is not the work, but the conditions under which it is performed. These conditions require steady nerves, good health, strength, endurance, and unusual ability to move quickly, nimbly, and easily under fairly heavy burdens and in awkward places. The average woman cannot meet these conditions with the same degree of efficiency as the average man.

It is essential, therefore, that when women must be employed for work on the platens under conditions described above, or on the hulls or ships, certain precautions be taken:

1. The women should be selected carefully on the basis of a thorough physical examination and complete employment interview, so that those unable to withstand or adjust to the physical and emotional strains imposed by the conditions of work may be employed on other work.

2. Special orientation for work on board ship should be provided in addition to the usual shipyard induction.

   One yard was already making plans to install such a program at the time of the Women's Bureau visit. In Oakland, Calif., furthermore, a vocational school cooperating with a large woman-employing drydock is providing such preplacement introduction to the work environment as conditioning exercises and training in how to climb ladders and work on scaffolding. Women are given short periods of training in several jobs under simulated working conditions. In this way each woman's aptitude and her reaction to operational factors is determined as a basis for placement. The woman herself is allowed to choose the craft that seems most to her liking.

3. Supervision of women should be much closer under the more severe and unusual environmental conditions of work on board ship or on the hulls. It should include special attention to safety and fatigue factors.

Employing women to work on the hulls or on board ship involves still another problem, besides that of the limitation in strength and stamina of the average woman to meet the unusual circumstances. That is the problem of maintaining good work conduct under the special conditions imposed. Among these conditions is the large amount of independent activity of the workers on the ships and hulls whereby one or two people may be required to attend to a welding, shipfitting, or installation job in an isolated place. Often groups must wait around for a part of an operation to be finished before they can get to work on their section of it, thereby giving them time and opportunity for social gathering.

To be sure, by no means all the yards visited employing women on the ships feared or mentioned a so-called "moral problem." In some yards the question appeared never to have come up; in others it was a matter of much concern, though no more grounds for this were evident than exist in any office or industrial establishment where men and women have been working together without serious incident for years. There need be no problem in the shipyards if certain conditions are met:

1. The women selected to work on board ship or on the hulls and docks and even in the yard on the platens should be mature individuals with a conscientious attitude toward work. They should be specially selected for these attributes as well as for strength, agility, and physical well-being.

2. Whenever possible, women should be assigned to work in groups.

3. The more careful supervision of women already mentioned in connection with work on the platens and on the ships and hulls should guarantee also good allocation of work so that there is as little waiting as possible.

4. A woman counselor should be available on each ship or in the various sections of a ship where a significant number of women are working. In this way problems peculiar to work on the ships may be attended to immediately on their arising and ways of preventing them in the future can be ascertained and put into effect. The women counselors so assigned should be free to cross craft lines in the interests of economy and efficiency.[5]

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[5] See discussion of the duties of women counselors, pp. 40 to 48.

Occupations only partially suitable for women.

By reason of the strength required to do parts of certain occupations, the average woman is capable of performing efficiently on only one segment of some jobs or on the whole job while using the lighter materials. Usually in such cases, physical strength is the only criterion outside of the factors mentioned in connection with some work on platens, and on ships or hulls, for determining how much of the work a woman can do. Thus, women nibbler, bending-roll, brake-machine, flanging-press, and power-shear operators for the most part operate the levers or automatic stops on the machines and ordinarily, if they have anything at all to do with feeding the metal into the machines, they act only as helpers. When they feed the machines as well as operate them, their activities in this regard are limited by the weight of the pieces or by the ease with which available mechanical handling equipment can be used. Furnace tending is in about the same category.

The amount of helpers' work that women can do, especially on the hulls, is limited also by the weight and size of materials to be handled. This is true more of shipfitter and sheet-metal-worker helpers than of electrician helpers. The job of helping crane riggers too is only partially suitable for women because of the extensive climbing necessary, the weight lifting involved, and the degree of strength needed to fasten snorters and slings to materials. Women can help and are helping, however, where only moderate lifting, and not undue exertion, is necessary. It is recommended [6] that special attention be paid to teaching women how to lift weights and that all jobs for women in which the question of weight lifting is involved be specifically investigated to determine the maximum weight, height, and frequency of lift that shall be allowed the women employed for the job, and the provision that should be made for rest pauses.

Coremaking has been a woman's job for many years, but women have been making only the lighter cores. The large cores require considerable strength to lift and handle. Women cannot work on these successfully unless good provision has been made for easy handling and this is not often done.

Some ship and tank cleaning, especially the work that involves hauling heavy buckets of material and using a wire brush or scaling gun, is too heavy for the average woman, though most shop and yard cleaning ordinarily is suitable for women.

Very little ship riveting and bucking-up can be recommended as a good job for women. Most of the rivets are large and the steel plates are thick and heavy. Riveting under such conditions requires considerable strength and endurance besides the stamina for withstanding the deafening noise and penetrating vibration. It is even questionable whether for sustained production women are the best choice for the lightest riveting on steel, though the type of riveting and bucking-up done on sheet metal appears suitable.

[6] See p. 53.

Occupations of questionable suitability for women.

For any job, no matter what its nature, the best criterion for good placement is not one of sex but of the individual's ability to do the work successfully and without injury under the conditions imposed. There are, for example, many men less capable of performing arduous or hazardous work than many women.

However, when consideration is given to the differences between men and women that affect the average individual's ability to do a job well and adjust to its conditions, it becomes obvious that there are certain occupations in shipbuilding for which only the exceptional woman and even the above-average man can qualify. And there are some others for which it is questionable whether any woman should be employed because the risk of injury is greater for a woman than for a man.

Jobs in the category first named that should be mentioned here are steel bucking-up, calking, heavy bus and truck driving, and heavy and dirty ship and tank cleaning. In the last of these the problem in finding a woman worker derives not only from the heavy nature of the work but from the exceptionally unpleasant conditions under which it is performed. It necessitates crawling down into the holds of ships and going inside the large tanks. Water and refuse are everywhere, and, in addition, a tangle of hose and other equipment. It was said in one report of ship cleaning that "it is so unpleasant that workers are kept inside only two hours at a time and after two days are changed to another job. Some workers get panicky." The psychological or emotional factors involved cannot be overlooked. Though many women in industry have for years been doing heavy and disagreeable work without serious effects, women, by and large, are spared the heavy and dirty work in industry as a matter of American custom. Many women, because of tradition, look askance at such work and find it even more difficult to adjust to its conditions than to meet its physical demands.

The occupations in shipbuilding for which it is questionable whether any woman should be employed are those requiring the use on steel of sandblasting equipment or other pneumatic tools such as the riveting gun, power brush, scaling and chipping hammer, and the pneumatic drill. Operation of these tools in the shipyards, and especially the use of the larger and heavier models, involves risk to any worker, man or woman. Among the pathological conditions that may and do result are vascular disturbances and injuries to the joints. In the first of these a local anemia of the hand supporting the tool occurs, making the hand stiff and awkward and unfit for work. This condition, which may affect only the fingers or finger tips, is known as "dead fingers" and is attributed to the shock and vibration of the pneumatic tool acting on the blood vessels and nerve trunks. At the end of an attack the fingers suffer from a burning sensation. "Dead fingers" is of frequent occurrence and is especially prevalent in cold weather. It is most likely to affect workers who, like the women only lately

introduced into the shipyards, have not yet acquired skill in manipulating tools. Injuries to the joints are much less common, but when they do occur they tend to be more serious and are frequently permanent in character. They include such conditions as necrosis, chondromatosis, arthritis, osteochondritis, and bone cysts. The elbow and especially the arm holding the tool are most frequently affected. When the pneumatic tool is held in an unnatural position, other locations of injury, such as the hip, are found.

To be mentioned also among known possible effects from using pneumatic equipment are hardness of hearing and deafness brought on by the excessive noise that accompanies the operation, and silicosis, pneumonia, or other dust-produced illness that may occur when inadequate precautions are taken against the dust that commonly attends the work. The effects of noise and vibration on the nervous system are less well known but may be equally serious.

Few data of a reliable sort are available at present showing conclusively that women's reactions to work with pneumatic equipment are different or more serious or pronounced than men's. This is because women have not used such tools in the past to any extent and those who are operating them now have been doing so for only a relatively short time. Little objective evidence exists also because inadequate attention has been paid to watching women's progress and performance in the work and studying and reporting on their medical history. However, from knowledge of the operations and of women's physiology and pathology, a group of medical authorities consulted by the Women's Bureau [7] agree that no women with menstrual difficulty or with a history or clinical diagnosis of pelvic disorder, especially pelvic congestion, should use vibratory equipment even of the rotary type. They recommend also that pneumatic tools should not be used by pregnant women, by women who have had repeated pregnancies or abdominal operations, or by women with unusually large breasts. Furthermore, it is advised that even women without any of the complications mentioned be kept from operating the heavier pneumatic tools.

When any pneumatic tools at all are used by women, certain conditions should prevail. First, the women chosen should be above average in stature and muscular development and of the phlegmatic, hypothyroid type. Second, though a sitting posture is preferable to upright posture, if standing is necessary it is advantageous if rest periods are taken in the prone or knee-chest position. Third, women should not brace their tool against the chest, since such practice may aggravate the tendency among women to develop cancer in the breast.

For all pneumatic-tool operators it is essential that a preplace-

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[7] Dr. Philip Drinker, Chief Health Consultant, U. S. Maritime Commission; Dr. Leonard Greenburg, Executive Director, New York Division of Industrial Hygiene; Dr. Alice Hamilton, Medical Consultant for the U. S. Department of Labor; Dr. M. H. Kronenberg, Chief, Illinois Division of Industrial Hygiene.

ment physical examination be given to bar from the work anyone with symptoms of constitutional arthritis and anyone unable to withstand the rigors of the job—the torque, vibration, noise, heights, and so forth. Periodic examination is necessary and should include X-ray, particularly of the elbow, to detect changes in bony structure. Those showing vasomoter disturbances, nervous or arthritic changes, or signs of respiratory disturbance should be transferred to other work. Rest periods are important, as well as a reduction in the hours at which the operator continues to use the tool, perhaps by means of a change in job from time to time. The escape of air should be from the front, not the side, of the tools and the air pressure should be as low as possible. Counterbalance, suspension, or propping of the tool should be introduced whenever possible to relieve the operator of the weight and vibration. In all cases the worker should be taught the best method of holding and maintaining the tool in position. Wherever dust is a factor, as in sandblasting, wirebrushing, scaling, and chipping operations, every precaution should be taken in the way of good ventilation and exhaust equipment to prevent the contraction of respiratory disease.

Where women have been employed to operate pneumatic tools in shipyards, indications are that adequate attention has not always been given to protecting the operators and making the operations as safe as possible. Even the general precautions recommended above to be taken for all pneumatic-tool operators are not being observed, much less those that apply specifically to women. For example, in one yard women were using wire brushes varying in size from 2 to 15 pounds. They were wire-brushing in the holds of the ships and yet no blowers were supplied to draw off the dust and metal particles. In addition, not all the women workers were wearing respirators and goggles, equipment that is absolutely necessary for safety in this work.

Though in another yard a woman using a 15-pound chipping gun had lost 20 pounds in weight since being put on this work, and was developing tenosynovitis (an inflammation of the tendons), she would have remained at the job had not a woman counselor happened on the case by chance. Only then were the three other women operating chipping guns in this yard examined. They were judged husky enough to stand the work, but it is hoped that examinations will be given them periodically so that they may be transferred should any ill effects develop.

Another instance should be cited, that of women operating large portable pneumatic drills. The drills were so large and the torque so great during the operation of drilling holes in the bands on the outside of torpedo tubes, that three women were engaged in this work instead of the two men previously employed. The drills could not be held low, in line with the pelvis, as they should have been, but because of their size had to be held breast high, braced against the chest. Furthermore, small and slight women instead of women who could more easily stand it were chosen for the job because the same women had to crawl into the tubes to counter-

sink the holes from the inside. This is a clear case of serious error in placement.

If women must be employed in occupations about which there is such grave question of suitability, it is inexcusable to employ them under conditions of haphazard selection and placement and inadequate precaution for their protection on the job. The safety and health divisions, with the cooperation of the work supervisors and women counselors, should give the women workers in such occupations their most careful and continued attention and should make those jobs as well as any others that involve hazard as free from hazard as is possible under the circumstances.[8]

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4. Pay women and upgrade them on the same basis as men.

Entrance rates.

The principle of "equal pay" for women has been gaining in strength[9]. In this wartime period many thousands of women are

[8] See especially *Minimum Requirements for Safety and Industrial Health in Contract Shipyards,* issued by the U. S. Navy Department and U. S. Maritime Commission in 1943, 35 pp.

[9] See *"Equal Pay" for Women in War Industries.* Bulletin 196 of the Women's Bureau, Washington, D. C. 1942. 26 pp.

in the type of jobs men formerly held and are receiving the same rate. This is the policy recommended by the Women's Bureau, and it is followed, by and large, in the shipbuilding industry as far as the entrance rate is concerned.

It is significant, however, that this has not been true in each of the navy yards. The Assistant Secretary of the Navy, in a circular letter dated August 28, 1942, when few women were yet employed, emphasized the principle of "equal compensation for equal work irrespective of sex." This principle has in general been followed, but inequity has crept into some of the yards by way of the hiring rates, probably because of the unequal supply of men and women in the area and the desire to draw as many men as possible.

Thus, in one yard at the time of survey, all women, regardless of previous experience, were hired as "mechanic learners" at 58 cents an hour, whereas men with no experience were taken on as "classified laborers" at 74 cents. A woman who had worked for 6 months as a drill-press operator in a war plant was hired to do drill-press work at 58 cents, whereas a man with similar background was given the third-class helper's rate of 77 cents. To be sure, the woman was eligible for speedy upgrading into the helper's classification, but by the time she reached that class the man would be one or more steps ahead. She had to prove herself; a man offering similar qualifications did not.

In another navy yard all women were taken on as "mechanic learners" or "classified laborers," the former to learn a trade and advance, the latter (with few exceptions) to remain in laboring work. Men, on the other hand, were engaged from the start on the same or similar work as helpers and all had the opportunity to receive training in a trade. Therefore, though the women "mechanic learners" were upgraded with fair speed, men hired at the same time for the same work remained several steps ahead, though they may originally have submitted no additional qualifications.

It is urgently recommended to the navy yards that the entrance rate for workers who have neither previous work experience nor training be the same for men and women, and that any variation in such rate be based on the job. If women are hired as "mechanic learners," men with the same qualifications also should be so hired. When men or boys cannot be secured at the rate for "mechanic learners," women beginners should be taken on at the higher rate offered men beginners.

It is recognized, of course, that many if not most of the women now employed in the shipyards will not remain after the war. This is true also of a large, but not equally large, proportion of the men. Certainty of such a future situation does not preclude equitable wage-setting now. Every effort to avoid break-down and inconsistency in present wage standards makes fewer the wage problems that will arise and require adjustment in the future. It should be borne in mind that if one group is paid arbitrarily a lower rate than another group for the same work, the

group first named is free to underbid the one better paid and thereby to depress wages in a period of an expanding labor market.

Upgrading.

The Women's Bureau survey of 35 shipyards employing nearly 61,000 women indicates that discrimination is common when it comes to upgrading women or to giving an upgraded woman the rate for the job. Except for the trade of electric arc welding, case after case could be cited either of women working as group leaders or skilled craftsmen with only helper's ratings, or of resistance on the part of foremen, management, or the unions to allowing women equal opportunity with men for supplementary training, upgrading, and supervisory work.

This situation arises in large part from a very real problem, that of alarm over the break-down under war conditions of the apprenticeship system. Before the war, mechanics in the shipyard trades usually reached full journeyman's status only after passing through 3, 4 or even 5 years of training in class and on the job. During this apprenticeship period they were to have mastered their trade in thorough all-round fashion and become eligible for maximum pay as first-class skilled mechanics.

The needs of the war emergency, however, have made it necessary to introduce literally thousands of inexperienced men and women into the waterfront and shop trades without ceremony and with speed. Many of the experienced mechanics have been rapidly upgraded to assume supervisory duties, while the new workers have been pushed through relatively short training courses and after a year or a year and a half, with regular upgrading, are at top grades and rates. Consequently, they are getting the same pay as the skilled journeymen who have taken special long-term training and ordinarily can do a much greater variety of work. If there has been resentment on the part of the seasoned workers, foremen, and the unions about the men who, though "upstarts," may at least have had industrial experience of some kind, the feeling has been even stronger toward the women who in most cases are completely new to industry. The "90-day wonders" of the shipyard trades are viewed with alarm as a serious threat to status and job security.

Yet the new workers, men and women, have been building ships and doing a good job. The amazing tonnage produced since Pearl Harbor could not have been turned out without them; much more will have to be built before the war is won. The question is, what constitutes fair promotion policy and equitable rate setting in their case?

Most of the new men, women, and boys who have only lately been introduced to the shipyard trades cannot achieve, under the specialized training many are given and the necessary dilution practiced, the all-round proficiency of the old-time mechanic. In the inside machine shop of some of the navy yards one solution

has been the utilization of an intermediate grade called machine operator. This classification covers jobs requiring an employee more skilled than a helper but not so skilled as a mechanic. It is especially appropriate for much of the work men and women newcomers are learning to do. For example, the turret-lathe department of the inside machine shop in one of the navy yards has lately been employing over 300 women as lathe operators. These women are doing a fairly skilled job, but obviously they are not full mechanics. They are given the rating of machine operator as they qualify. If given further training these workers should eventually achieve mechanic's status.

Supplementary training for upgrading into the journeyman classification for workers other than welders and burners is given in the navy yards and some women are enrolled. To make maximum use of the woman labor force, it is essential that every woman capable of doing a skilled job be encouraged to enter such training in any of the fields open to men that appeal to her. Classifications such as "machine operator" then would apply only to those who are upgraded into and remain in diluted or specialized jobs and who do not want to or have not the ability to acquire further, more rounded experience and instruction.

The difficult problem of upgrading in the private yards is complicated by the many classification systems used and variations in union agreements where they exist. Progress is now being made, as a result of recent Coast agreements, toward establishing wage brackets for the first 3 classes of helper and for laborer as well as for journeyman. This will help to make possible more uniform policies of upgrading women workers, most of whom are in the laborer and helper status.

There has been little resistance to accepting women into full journeyman status in the electric-arc-welding trade. The secret of this situation lies, first, in the fact that welders predominate among the kinds of skilled workers of whom there now is serious shortage in the shipyards; and, second, that for ship welding there is an objective and standard performance test, preparation for which does not ordinarily require more than a few months of training and experience on the job. The test is given under the supervision of a representative of the Navy, and the size of the testing specimen and procedure for obtaining it are prescribed by the Navy. Many yards give full first-class journeyman's wage and status immediately or shortly thereafter to those who pass the Navy test. Thus, acquiring the journeyman's classification in the case of welding does not depend on the qualitative judgment of a work supervisor nor does it require the diversity of information and skill needed for some other trades that can be learned only after many months on the job. But actually women have also proved their mettle in welding. In a significant number of yards women welders comprise as much as a fourth or more of all the women on production.

This is not to say that women are attaining journeyman's rates only in the welding trade, but that the acceptance of women as

journeymen in that trade is more general and their progress in it is speedier. As a matter of fact, some women have already achieved skilled burner, craneman, painter, pipe covering, and shipfitter ratings. There will be others.

In some places and especially on the west coast, the exigencies of a very tight labor market have made it necessary to upgrade inexperienced men and women much more quickly than elsewhere to get the work done, to prevent turn-over, and to compete with other industries for workers. In such cases, those receiving the skilled rating after less than the usual time are accepted by one of the unions only as specialists and not as mechanics. In one yard, inexperienced workers are called "special apprentices," to distinguish them from the regular apprentices, but both groups may achieve journeyman's pay. One union was not giving people cards as journeymen till they had had 5 years of experience, though they now may reach the journeyman's rate long before that.

These are safeguards set up to protect the apprenticeship system and more or less to regularize trade standards that doubtless will come back into their own after the war. Good trade standards can and should be preserved, but it is recommended strongly that there be no discrimination in so doing. Every effort should be made to avoid the situation frequently found, that of women acting as snapper, as group leader, crane operator, spray painter, and the like, without recognition in either wage rate or title. Such a situation is not only unjust; it is damaging to morale and therefore to optimum performance.

5. *Schedule an 8-hour day and a 48-hour 6-day week; allow a lunch period of at least 30 minutes, and rest periods of 10 to 15 minutes in each work spell of 4 hours. Rotate shifts no more frequently than every two months.*

Years of study and experiment indicate that if certain standards regarding hours, work shifts, and rest and lunch periods are observed, women workers are more likely to give their best performance. These standards, recommended for sustained efficiency in wartime shipbuilding, follow.

Hours.

Hours not in excess of 8 a day and 48 a week are recommended; also not less than 1 day of rest in 7.

Though both the Navy Department and the Maritime Commission are among the eight United States Government agencies that strongly recommend an 8-hour day, a 48-hour and 6-day week, for maximum and sustained production, a good many of the shipyards are not complying. About a third (11) of the 35 shipyards visited that employed women had a regular weekly schedule averaging longer than 48 hours. In one the workweek was 60 hours for

women. Five yards had a 9- or 10-hour day. Three provided no day of rest and in three others there were extended periods when this was true, women being obliged to work week in and week out with no break. In addition, at least 11 yards with scheduled hours of 48 or less required overtime above the schedule from time to time, in some cases frequently and for long periods.

The data available indicate that the efficiency of the shipyard workers cannot be maintained under long work schedules; that such schedules do not solve the problem of production, and yet they are costly because of the time-and-a-half and double-time overtime pay.

Results of studies relating to hours of work, fatigue, and output in other industries also are not without significance in shipbuilding. Several of such studies are among the references at the end of this section or are described there. They show in general that under most conditions women's optimum schedule is below men's, and that in production not controlled by the speed of a machine, hourly output rises with reduction in hours of work to approximately 8 a day. All available sources indicate that at least 1 day of rest in 7 is essential to productive efficiency.

There are several reasons why long hourly schedules and overtime are in practice in the shipyards in the face of evidence against their efficiency. Two are especially important.

First, in some cases a sufficient number of skilled workers cannot be secured to man a third shift effectively, and a compromise of two long shifts is made. It is significant in this connection that in one of the yards visited by Women's Bureau field representatives where the scheduled hours had recently been changed from 10 to 8, the management stated that the efficiency of all the workers had materially increased since the adoption of a shorter workday.

Second, longer hours and overtime are, of course, a concealed means of increasing employees' pay and thus competing with other shipyards or war industries for labor. This situation is difficult to meet except by firm insistence of the Navy and Maritime Commission and agreement on the part of all yards that the 48-hour week be maintained without overtime except in bona fide emergencies. The Maritime Commission issued orders early in 1943 and again in December that official hours be cut from 10 to 8 a day, yet it was found in the yards of one area of the South Atlantic that permission was asked frequently by management and granted by the Maritime Commission for thousands to work on Sunday. On the Sunday preceding the field representative's visit, overtime had been granted for several thousand workers in one yard alone. A neighboring yard under Navy contract attributed its 10-hour day and 60-hour week to the need for holding its workers in competition with the Maritime Commission yards, supposedly on an 8-hour day and 48-hour week.

There is danger that by setting the pace too high now, the available human energies will peter out before the home stretch. Women especially are handicapped under the pressure of long

hours, since they not only suffer fatigue from the work itself, but the fatigue may become chronic, and anxiety result as well from having to plan meals, shop, clean house, pay bills, arrange for the care of children and so on in the all-too-few hours left them after work. Under heavy work schedules, homemakers will be absentees much more frequently than when employed within the recommended workday and workweek. More and more married women are entering the shipyards. These women are needed to take the place of men who leave for the armed services, so the question of hours becomes increasingly acute. It is by far the better policy to place and keep women initially on a schedule that is good for the long stretch, thereby promoting their efficiency as workers, insuring their regular attendance, and making certain of their sustained energy for building ships through the war period and remaining healthy citizens afterward.

Lunch period.

A lunch period of at least 30 minutes in the middle of each shift should be allowed.

If 30 minutes is too short a time in which to leave the workplace, wash, and secure and eat a hot and well-balanced meal, the lunch period should be lengthened or the food service and facilities should be extended. A few shipyards have been using mobile canteens very successfully as a supplement to central cafeterias to send and dispense food to remote parts of the yard. In this way, employees on the hulls and ships may secure proper nourishment in the minimum of time.

More than two-fifths of the women on production work in the shipyards visited had 30 minutes for lunch. A few had as much as 45 minutes or an hour. At least a third, however, had but 15, 20, or 25 minutes, though few of the yards with short lunch periods had facilities that would provide adequate service and hot food in the limited time assigned. Many did not maintain facilities that were adequate even for a 30-minute period.[10]

Night work.

Night work should be required of women only as an emergency measure; and when it is necessary, all possible steps should be taken to protect the night workers' health and foster their efficiency and morale.

Night work should be assigned only after careful investigation to make sure that the woman worker's health will not be endangered thereby and that her transportation situation and home responsibilities are such that work on such shifts will not bring about undue hardship.[11]

It is advisable that employees having a history of anemia,

[10] See pp. 59 to 66 for discussion of food service and facilities.
[11] See p. 16 for statement regarding seniority arrangements.

respiratory disease, digestive disease, or nervous disorder be not assigned to a night shift. Results of the physical preplacement examination will be of service, therefore, in making assignments to shifts. Since loss of regular sleep is more serious for young workers who have not attained full growth, girls under 20 should not be placed on a night shift. Convenient transportation should be available at the time of shift change. The yard may have to provide transportation if the public utilities cannot maintain service to the extent or at the times required.

The personnel counselor or interviewer should ascertain early, before assignment to shift has been made, that problems of home management will not interfere with the woman's ability to maintain efficiency on the night shifts or that work on the night shifts will not interfere with her essential home responsibilities. Actually women with heavy duties at home should be discouraged from night work, since performance of these duties during the day makes women tired before their shift so much as starts. Continuous employment at night under such circumstances leads inevitably to chronic fatigue.

Facilities provided for the night shifts should equal if not surpass those available during the day because night work is more demanding on the individual. It should be possible to secure a hot and nutritious meal in the middle of the shift; the hours and day-of-rest standards should be preserved; medical, safety, and work supervision should be completely adequate; lighting should be well planned and distributed. These conditions are important, yet in many of the shipyards facilities were less adequate at night than during the day. In certain yards this was especially true of food facilities.

Rotation of shifts.

Shift rotation is recommended to distribute the burden of night work and to avoid the chronic fatigue that sets in after a long period of employment on night shifts.

Night workers seldom get sufficient sleep during the day, and consequently their health is undermined if they are placed permanently on night schedules. Yet most of the shipyards visited did not provide for rotation of shifts. In two of the yards with permanent shift schedules as many as 15 percent and 17 percent of the women employees were on the graveyard shift.

Shift rotation should not be so frequent as every 2 or 3 weeks, thus making it difficult to adjust eating and sleeping habits, nor at intervals so long as to develop chronic fatigue. A period of from 2 to 3 months on either of the night shifts is within the limits most frequently recommended by health authorities and found most satisfactory in the experience of women workers. Rotation on such a schedule was being practiced with satisfactory results in 3 of the shipyards visited by Women's Bureau representatives.

Rest periods.

A period of 10 or 15 minutes in each work spell of 4 hours should be set aside for pause and relaxation.

Women tire more quickly than men, but their energy is renewed more rapidly. Wherever women are employed, therefore, the regular rest pause is particularly effective for maintaining the speed and quality of production. The pick-up after a few minutes of rest away from the workplace preserves and even heightens the rate of production, prevents accidents and spoilage, and promotes the health and efficiency of the worker. Objective studies have proved the efficiency of the official rest period even when the work is intermittent, necessitating pauses in routine.

Women's work in the machine, sheet-metal, electrical, pipe and copper, and other inside shops in the shipyards is similar to the work women are doing and have done for years in other industries where rest periods already have proved their value to management and the worker. Welding, burning, the various jobs under the general heading of shipfitter's helper, and some others performed on the platens, hulls and ships are, on the other hand, new for women, so there is no consistent evidence for or against the efficacy of rest pauses for women in this work. However, because these are jobs whose continuity of performance depends largely on the rate at which co-workers in related jobs may proceed, and thus work is intermittent, it is generally assumed by management that regular official rest periods are unnecessary. It should nevertheless be emphasized here that even though the nature of the process and the jobs do not require continuous activity, the workers engaged in them must be constantly on the alert for their assignments, and must in many cases remain in uncomfortable workplaces where seats are not available, and in an environment of noise and confusion. If they are in the yard, on the slabs or platens, or on the hulls, many are exposed throughout their waiting as well as their working time to extremes of weather—to dampness, cold, and heat. The official rest period allows them to take as their right some minutes of respite from their work and work environment.

It is not necessary that all the women leave work at once, for the rest pauses may be staggered. Nor is it necessary that any one group stop at exactly the same time each day. Such matters can be arranged to accommodate the work situation. The important thing is that over and above necessary personal time out, a period of time be provided each woman worker exclusively for rest and relaxation. In many factories rest periods are granted to all employees, men as well as women.

If in this pause the women rest, smoke, take a snack to eat, go where they may warm themselves in the winter and cool off in the summer, they will return to their jobs refreshed. When regular and official rest pauses are provided to those whose work is neither continuous nor routine, as well as to those whose work is continuous and routine, there are indications that not only is less personal

time taken, but the benefit derived is greater than that experienced from informal rests of short duration now and then, either surreptitiously or openly as needed.

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6. Set up an effective woman employee counselor system.

Employment of large numbers of women with no previous shop experience at a time when foremen are overwhelmed with production problems necessitates the development of a group of women personnel workers who can initiate women unaccustomed to industrial work into the complexities of the shipyard and assist shop supervisors with the problems that arise through their employment.

Of the 35 yards employing women on production and visited by Women's Bureau representatives, all but 9 had women per-

sonnel workers in some capacity. Five of the 9, unfortunately, employed each between 700 and 2,200 women wage earners and were sorely in need of more adequate attention to women's problems for the sake of raising morale and increasing production. One was conspicuous for the poor spirit of its workers and for deplorable working conditions, features usually found together. The yard's reputation caused reluctance on the part of the women in the town to heed the call for workers. Consequently, many of the women taken on came from out of town, complicating community and management problems immeasurably and leading to the employment of women who ordinarily would be unacceptable. A good many of the shipyard's difficulties might not have arisen had adequate selection of women been made at the outset and their adjustment and supervision been placed under the direction of a capable head of women's personnel. A belated effort was being made at time of visit (February 1943) to find a woman to accept the post. Since that time a woman interviewer and a counselor have come to the yard and already have been able to do a great deal to benefit the selection and adjustment of women workers. But their job has been extremely difficult because of the poor beginning.

The women's personnel divisions in active operation in other yards varied considerably from yard to yard, differing chiefly in the freedom from rein and the well defined authority given the women counselors and the approach to the personnel function, whether administrative and positive or disciplinary and negative. Only a few effective plans were in force at the time of visit by Women's Bureau representatives. Two were in United States Navy Yards. One of these was organized late in 1942, but another was set up in response to a circular letter issued in May 1943 by the Assistant Secretary of the Navy establishing the positions of "personnel assistants" for women shop employees in Naval Shore Establishments. The positions were set up in 4 grades, beginning with Junior Personnel Assistant at a $2,000 annual salary and allowing at the top for a Principal Personnel Assistant at $3,200.

Actually, the size and lay-out of the yards and the extent of women's employment influenced the plan of the counseling system and the functions of women personnel officers. Whatever the set-up and functions, the counselors' status should be well defined. Job supervisors and union representatives should be consulted when delimiting and outlining their functions, and all the workers, men and women, should understand them thoroughly.

Because of their full-time attention to the special needs of women workers, the women personnel counselors can be of particular assistance not only to job supervisors but to shop stewards. It is important that both work closely with the counselors and use the service they can render the better to increase their own effectiveness and to give the women workers greater opportunity for good adjustment.

Experience has indicated that an effective employee-counseling system requires a head of women's personnel who works within

the main personnel or industrial relations office. In a yard employing as many as 500 or more women, the head of women's personnel should have under her women assistants who work directly with the women and production supervisors or masters in the shops. These assistants should have desks in the shops to which they are appointed. In most yards it is best that at least one woman assistant be assigned to every shop where women are employed to a significant extent. In some yards there may be shops requiring several such assistants. When numbers of women are working on the hulls, on board ship, or out of doors on slabs, forms, or platens, personnel assistants should be available on specific ships or in specific sections of the yard who may cut across shop lines, thus affording more direct counsel and assistance for women from different departments cooperating on a piece of work in a limited area. The women's personnel organization should include women employment and exit interviewers when the head of women's personnel or the women assistants do not assume these duties.

In yards with relatively few women, the head of women's personnel may be able to handle all matters herself with perhaps the aid of a woman interviewer and one or more roving field representatives or assistants who keep in close contact with the women workers and with the women's production supervisors.

The functions and qualifications of the head of women's personnel and of her assistants that experience has proved effective are described in the pages that follow.

The head of women's personnel.

Her functions.

Certain duties are fundamental to the position of head of women's personnel if the individual in the post is to have sufficient responsibility for effective action. She should be called upon to assist and advise the chief officer in charge of personnel in the over-all planning and coordination of employee relations work affecting women production workers. In this way she will help to formulate the general policies that will prevail in the selection, placement, induction, and supervision of women as well as in their counseling and personal adjustment to the job. Uniform policy with respect to the general steps to be taken when problems arise from the employment of women should be established in the central personnel office and maintained through the office of the head of women's personnel.

It should be the duty of the head of women's personnel to foster and maintain the correlation and cooperation of the various shipyard departments with the women's program. This should involve discussion, interchange of ideas, and development of policies regarding such matters as women's medical examination and care, their safety, training, and occupational dispersion and work progress. In this way each department of the yard is apprised of the

aid it can give in furnishing valuable information to the women's division and at the same time can learn of ways to extend and improve their programs with respect to the women workers.

It is recognized that in occasional instances proper and effective placement of women on certain shifts or types of jobs will invade established seniority rights and privileges. Procedure in such cases should be made clear and should be decided in consultation with labor and management. The women's personnel head should also have considerable direct responsibility in planning and supervising the setting up of toilet, washroom, rest-room and any other facilities, such as the cafeteria or other lunching arrangements, that women must use.

If the head of women's personnel does not do the interviewing herself, she should help to select, guide, and train, and should work closely with, the intake and exit interviewer of women, both to seek ways of improving women's selection and placement and to determine, and if possible eliminate, causes of their separation.

Where women personnel assistants are employed, the head of the women's program should choose the candidates in consultation with the shop masters or supervisors with whom they will work and subject to the approval of the chief personnel officer. She should, however, have sole responsibility for the assistants' training and direction and be available at all times to answer their questions and help them with their problems. When there are a number of assistants it is helpful to hold regular meetings with the group for interchange of ideas, threshing out of problems, and review of policy. From these meetings the head of women's personnel may select pressing matters that require quick administrative action, or situations of larger scope requiring study and careful approach with the cooperation of the entire administrative staff, perhaps even outside agencies.

The women's personnel head should supervise the setting up and maintenance of an efficient, complete, and up-to-date record system covering every woman employee. Background facts such as experience, education, age, marital status, number and ages of children and the like should be secured at the time of the intake interviews. Each woman personnel assistant, under the head of women's personnel, should help to keep the records current and be provided with a duplicate of the complete record of each of the women in her charge. Data the personnel assistants can supply relate to the job and its performance, wage status, absences, transfers, grievances and their settlement, and so forth. There should be periodical transfer to the master file of medical, accident, and training data. The material on each record and correlation of the data can be tremendously illuminating in all phases of the work with women, including, for example, job placement, transfer, promotion, and investigation into absence and turn-over.

The shipyard is not located in a vacuum, nor do the affairs of its workers begin and end with the 8-hour shift. There are many ways in which outside influences aid the worker on the job or lead to discontent, absenteeism, turn-over, and other production sabo-

teurs. The lack of adequate housing, transportation, recreation, and child care is among outside influences that affect women workers the most. It should be the responsibility of the women's personnel officer to work with the community agencies that have jurisdiction over such matters in the effort to promote introduction of community facilities that may be lacking, or reorganization, perhaps extension, of those not serving adequately if at all the important needs of significant numbers of women workers.

Careful survey of the women shipyard employees may reveal, for example, the need for more nursery schools in some areas, while there are too many in others; for their earlier opening and later closing; or for an after-school-care program. The chief of women's personnel can be influential in making the facts known and securing action. In conference with the USO, YWCA, directors of Federal Government housing projects, and others, she can lend her assistance in the expanding of existing recreation facilities to include activities and programs suitable for women and adjusted to their hour schedules. By the enlistment of civic support, the merchants of the town may be persuaded to sacrifice a morning and keep their doors open one evening a week to accommodate the busy day shift. These are examples of some of the community affairs with which a women's personnel officer can profitably concern herself to help secure better adjustment of her women workers to their jobs and consequently more nearly maximum production. She may also learn from the outside agencies with which she maintains contact ways in which the yard itself can make accommodations and introduce facilities that will temporarily relieve community limitations or serve effectively to supplement them. Rationing bureaus and room registries are examples of such services.

Her qualifications.

To perform these duties ideally, the women's personnel executive should have had experience in industrial work and labor relations affording her some practical knowledge of personnel management and labor and factory economics. In yards with union agreements it would be well if she were acquainted also with the organization, functions, and activities of unions in general and particularly with those prevailing in the yard where she is to accept an official post. Actually few women have such experience, so good fundamental education and personality and leadership qualities may have to be the basis of choice. Special education and a thorough knowledge of work operations in the yard and the conditions under which they are performed are important but may have to be gained after employment.

The most important personal qualifications to be sought are such rare and precious traits as good common sense and judgment, leadership, and organizing ability, initiative, imagination coupled with practicality, equable temperament, humor, ability to work well with others, and the faculty of persuading management to make changes that employee conferences indicate are needed.

The personnel assistants.

Their functions.

In an organization as widespread as a shipyard decentralization of the personnel staff is essential to make possible good attention to the needs of the women and to the difficulties of foremen with women workers. While in the shops, the personnel assistants work in close conjunction with the work supervisors, taking off their shoulders matters that do not pertain to the performance of the work itself. Their function is advisory to the job supervisors but authoritative as regards the women.

Whether they conduct the intake interview themselves or receive applicants selected by the central personnel office, it should be the function of the personnel assistants to aid the work supervisors in determining the suitability of women applicants for specific jobs. They should help also in completing the hiring and placement process, arranging for the workers' starting date, and similar details.

The induction and orientation of new women employees is an especially important aspect of the personnel assistants' job. A more complete detailed description of what induction should entail for new women shipyard workers will be given in a later section. When the training division is not organized to accept the induction program, part of the work of the woman personnel assistant should require, briefly, acquainting the women with yard and shop geography and with shipbuilding processes and terminology, introducing them to their fellow workers and their work supervisors; making them cognizant of shop rules, safety regulations, and proper work clothing; informing them about wages, hours, and policies that cover training, promotions, transfers, and dismissals; telling them about means of securing transportation to the yard; and many other matters. Even if there is a manual covering these points, each item bears reviewing, and sufficient time should be given to the answering of new employees' questions.

Even when formal induction has taken place, the work of the women personnel assistants should by no means be considered over with respect to orienting the women to their new job experience. This should be a continuing process. It involves careful follow-up of the new workers to help them make a satisfactory adjustment, develop good work habits, a constructive work spirit, and an attitude and sense of belonging in a cooperative enterprise. The personnel workers can be most effective also in helping supervisors to educate the women early in safe habits of work, including especially the conscientious wearing of proper work clothing. By being in the shop they are also in a position to encourage women on the job, follow up transferred employees on a new job, and watch closely employees whose work or conduct is or has been unsatisfactory.

Assistance in arranging department and interdepartment transfers of women workers should be given by the women personnel assistants. They should also cooperate with the job supervisors

in the reassignment of employees in cases in which such factors as physical disability, vocational maladjustment, lack of suitable work and the like may be involved. They are to lend aid to foremen and others in selecting women for promotion, upgrading, and retraining for new work. When employees are available for transfer who cannot be placed within the shop under their jurisdiction, the personnel assistants should refer them to the central personnel office and advise the office concerning the type of work for which they have shown aptitude. Their knowledge of work processes and women's capabilities makes the women personnel assistants especially helpful in finding ways of extending women's employment through the shop and advising the supervisors and personnel office accordingly. They are particularly well equipped to check on new jobs proposed for women by others and to assist in determining their suitability. In this general connection, the women's counselor should be on the alert for ways in which the jobs women already hold could be planned, rearranged, or reengineered to reduce fatigue and contribute to more efficient performance.

The women workers should be encouraged to take to the women personnel assistants any problems they may have that affect their relation to the job, whether the matters involve yard, personal, or family situations. To perform their function in this regard, the personnel assistants should be available for consultation at all times during normal working hours. If the professional attention of physician or social worker is required, the counselors should refer the women to qualified persons or agencies in the community for help. They should not themselves attempt to deal with deep-seated problems requiring personal and professional attention. Their function is that of detecting such problems and knowing where and how the individuals concerned can secure help.

When valid complaints or grievances about the work, shop, or yard are voiced, the personnel assistants should interpret the needs and viewpoint of the women workers and act generally as liaison between the women and their foremen or other supervisors, or help the union stewards in this. The personnel assistants should, in fact, be equipped to make recommendations and in other ways assist in arriving at a satisfactory adjustment of women's requests or grievances.

The personnel assistants should concern themselves also with giving constructive aid to the women workers in situations that, though much less directly related to the yard, nevertheless are very important to morale and work performance. This aspect of the duties may involve, among other things, helping to secure day care for children when regular arrangements have failed, aiding in the search for living accommodations, setting up car pools, or finding a nursing home for an ill relative. Assistance of this kind makes it immeasurably easier for the women workers to assume and carry out the dual role of worker and housewife and to adjust to the strange environment and work of the shipyard. Where the personnel assistant is equipped to do an intelligent job of this kind, knowing when and of what agencies to ask assist-

ance, she can bring to the women under her a sense of security, relieving them of strains and anxieties that frequently affect very seriously their production, interfere with their attendance, and cause them to leave their jobs.

Though maintenance of the women's facilities should be the function of the division of public works or a similar department, occasional suggestions to and from the women's personnel office are of course in order. But the personnel assistants should not be charged with a policing function nor should they have to clean or tend in any way the wash or rest rooms. Both capacities would detract from their status in the eyes of the women in their charge. Policing the wash and rest rooms is wholly unnecessary under a wise personnel program beginning with good selection [12] and involving careful induction [13] and orientation of women, attention to their special needs, and effective counseling.

Finally, the women's personnel assistants should be free to offer suggestions to the chief of women's personnel and refer to her any cases on which advice is needed or on which action should be taken from the main office.

Their qualifications.

It is obvious that, to do their job well, women personnel assistants should be thoroughly acquainted with the work in a shipyard and especially with the jobs in the shop or division to which they are assigned. This knowledge may be acquired as a worker in the ranks, if only for a few weeks. In any case, acceptance of the personnel job should involve also sufficient preliminary training in production work to provide first-hand understanding of processes, personnel problems, and production details.

Very early, if the personnel assistant has not already acquired the knowledge from employment in the yard in another capacity, she should become thoroughly acquainted with yard organization and policies. Here again it is important that she bring to the shipyard practical experience in either industry or business, preferably in work involving supervision. In this way she will have acquired some facility with the problems of personnel and the techniques of supervision. General academic theoretic understanding of the work also is desirable.

The personality traits that have proved desirable in a personnel assistant have a wide range. They include emotional stability, the quality of leadership without officiousness, tact, resourcefulness, versatility, adaptability, good judgment, patience, a genuine interest in and understanding of people, good insight, a sense of humor, and a knowledge of when and how to compromise.

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See also the following publications of the U. S. Department of Labor that will be helpful to counselors wanting information on standards relating to working conditions.

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Women's Bureau. Special Bulletins:

2. *Lifting Heavy Weights in Defense Industries.* 1941. 11 pp.
3. *Safety Clothing for Women in Industry.* 1941. 11 pp.
4. *Washing and Toilet Facilities for Women in Industry.* 1942. 11 pp.
5. *Women's Effective War Work Requires Time for Meals and Rest.* 1942. 4 pp.
6. *Night Work for Women and Shift Rotation in War Plants.* 1942. 8 pp.
9. *Safety Caps for Women in War Factories.* 1942. 4 pp.
10. *Women's Effective War Work Requires Good Posture.* 1943. 6 pp.
14. *When You Hire Women.* 1944. 16 pp.
16. *The Woman Counselor in War Industries: An Effective System.* 1944. 13 pp.

7. *Give new women workers preliminary induction into the work and environment of the shipyard before putting them on the job.*

All new and inexperienced workers, men or women, benefit from some more formal introduction to a strange job and work environ-

ment than the brief hiring process itself affords. Women who are entering the shipyards for the first time with little if any experience even in lighter industries are especially in need of orientation. The noise and confusion of the typical yard is frightening to one new to industry; the myriad activities and specialized terminology are strange. It is no wonder that labor turn-over is highest in the first 2 to 4 weeks of employment. Anything that can be done to ease the woman employee's adjustment to her new job and work environment in this period will reduce this turn-over considerably and at the same time increase the level of efficiency and productivity in the yard.

Induction and orientation of the new woman worker actually begins with her first interview as an applicant and continues with all her contacts in the hiring process. It is important that these contacts help her to feel at ease and begin to give her some information about the shipyard and its work as they assess her ability and qualifications for employment. A woman counselor can do much to establish friendly contacts for her.

Organization of the induction program.

The organization of the formal induction process varies considerably from place to place. Most of the yards visited that had an orientation program were giving only a few hours or at most a day to it, and both content and administration seldom were satisfactory. There were a few yards, however, effectively organized for the indoctrination of new women workers; their programs gave excellent results. In most cases the training department was actively engaged in it. It was said of one of these yards that the induction procedure there had much to do with the success with which women had been quickly adapted to many unusual types of work. Women were employed here on repair work as well as new construction.

The plan in shipyards particularly successful with their indoctrination program consisted usually of a preliminary group of lectures and discussion lasting from 1 to 3 days and covering such matters as safety education, the wage system, opportunities for industrial education and upgrading in the yard, shipbuilding terms and naval nomenclature. The new workers were then assigned to their various departments. In one of the yards, formal placement in a job did not take place until the preliminary indoctrination course was completed. Their plan included also extension of the orientation program into the various shops or departments where the women were assigned. Consequently, after general indoctrination the new recruits received in addition from several hours to days of instruction in the shops, covering such things as shop rules, rest periods, vacation or sick leave, punching of time cards, and the like, and in some instances formal classroom introduction to the elements of the department's work, including the use of tools, safe ways of handling them, and simple operations.

One yard was making plans at time of visit for providing a spe-

cial induction program for women who will work on board ship. This is an excellent idea, since many of the problems of climbing, weight lifting, and accommodation to unusual conditions occur more frequently on the hulls and ships. A summary of the preliminary indoctrination course already held in this yard follows. It is among the best encountered in the war industries by the Women's Bureau field representative reporting it. Each of the shops where numbers of women are employed conducts in addition a short indoctrination program of its own, instruction being given by the women personnel assistants or the master, quartermen, or foremen, depending on shop set-up.

Summary of Indoctrination Program

First day:

- Experience record—instruction for filling in (1 hour).
- Introduction—"Womanpower in Industry" (1 hour).
- School rules and regulations—hours, time cards, smoking, conduct, safety and health, lunchroom and lockers, property passes.
- Information handbook—
  - Purpose of handbook.
  - Musters.
  - Tardiness and absence.
  - Leave (annual and sick).
  - Safety rules and regulations—
    - Attention to the job.
    - Common sense.
    - Type of clothes worn.
    - Fire hazards and smoking.
    - Injuries.
    - Personal health.
  - Responsibilities—tools, materials, and workmanship.
  - Discharge.
  - Consulting officials—organizational procedure.
  - Housing and transportation—
    - Explanation of facilities.
    - How and where to apply.
  - Industrial education—
    - Apprentice school.
    - Trainee school.
  - (Test on above.)

Second day:

- Aptitude test (2 hours).
- Safety lecture (1 hour).
- Definition of ship terms (1½ hours).
- Nomenclature of naval vessels (1 hour).
- (Mathematics test—1 hour.)

Third day:

- Simple arithmetic (1½ hours)—
  - Value of mathematics.
  - Rules involved.
  - Whole numbers.
  - Fractions.
- (Test in arithmetic.)
- Moving pictures (1 hour).
- (Nomenclature test—1 hour.)
- Fire-chief talk (1 hour).
- (Information Handbook test—45 minutes.)
- (Assignment to shops for most women.)

Fourth, Fifth, and Sixth days:
(For a selected group.)

Tool equipment and supplies (explanation of use of tools and identification of tools and equipment).

Electricians' tools and equipment.

Shipfitters' common hand tools.

Sheet-metal-workers' tools—hand tools, machine tools for sheet metal, including: squaring shear, power circular shear, lever-slitting shear, nibbler, high-speed shear (large), bar folder, brakes, forming machines or rolls, grooving machines, bench machines.

Burring machines.

Beading and crimping machines.

Machinists' bench-work equipment: use of vises, chisels, wrenches, hand reamers, hack saws, shears, pliers, nippers, hand taps, files, hand dies (thread cutting), babbiting (lining bearings), scarfing (pushing off metal to give finished surface, using venetian red or prussian blue to mark high spots), portable and pneumatic hand tools (air drills, chipping hammers, air grinders).

Machinists' lay-out tools: center punch, prick punch, lay-out table or bench plate, scriber, dividers, machinist's scale, calipers, square, bevel protractor, parallels, angle plate, surface gages, etc.

Machinist's tools: scales, calipers, squares, protractors, micrometers, height gages, surface gages, thickness gages, center gages, screw pitch gages, ring gages, etc.

Pattern-shop tools: band saw, circular saw, cut-off saw, jointer (hand planer), surface planer, woodworking lathe, sanding machine, "Oliver" oilstone grinder, type-embossing machine, chisels, gouges, etc.

This program includes most of the topics needed to give new women workers effective introduction to the shipyard. It is well to discuss some of these and to mention some not included that have been found especially helpful.

Content.

One of the first needs is to acquaint the new employees with a brief but graphic description of the shipbuilding process so that they may see the relation of their work to the whole. They want to know how their job fits into the picture. Presentation of this information offers also an opportunity to give the new workers a sense of pride in their war job. There has been too little morale building in many places.

Very early, the women require an informal introduction to enough shipbuilding terminology and naval nomenclature to enable them to feel at home in the new environment, understand directions, and find their way about. "The new employee who is told to report to port tank 4 or poop deck starboard will be glad she learned the difference." [14]

A preliminary tour of the yard is recommended, so that the new employees will learn the important landmarks. At the same time they can be shown the sorts of ships they will help to build and repair. Not only must they know their own workplace and how to find it, but where their rest room and lockers are, where to secure and eat their lunch, where to go for first aid, how to find

[14] U. S. Office of Education. *Report on Welding Training and Shipyard Employment,* by Augusta H. Clawson. 1943. p. 9.

the industrial relations office, and so on. Posted maps of the yard are helpful; they may be used as explanatory charts during one of the induction lectures, thus preventing their being left to explain themselves.

This is an example of what can happen when the new woman worker is given no preliminary guidance in yard geography:

> The ways are so large and cover so much ground that one is conscious only of confusion at first. I could not find checking station No. 1 and no one seemed to know its location. After wasting perhaps 15 minutes, I found it, received a badge, and was turned over to a new welder who knew the yard from her days as a laborer. We went in quick succession to a shop under one of the ways for rod boxes, to a lunch room to leave our lunch boxes, to a tool crib for stinger and brush, to a rod shop for rods and glass, and to the welders office to be assigned a day off. My guide, perhaps by way of being perverse, took me through the skids to get from one way to another. I could get no sense of direction out of it, with the result that at night I returned my equipment to welders lunch room 14 but got the wrong way and found it was the men's lunch room. I traced down the women's but was 5 minutes late getting there, so could not get my lunch box. . . . By then I had delayed too long and the last bus had left.[15]

Within the first few days the new women workers should be made acquainted with the various rules and regulations of the yard. Many of the shipyards issue a handbook that provides this information. Some of the handbooks cover, in addition, such important matters as the location of community services available for securing care of children, medical care, recreation, transportation, food, and so forth. Most of those seen by Women's Bureau agents have been written simply and arranged well. They make further discussion of the points covered more easily and effectively accomplished, and if presented to the worker when she is hired they provide a handy reference. The handbook cannot be relied on entirely, however, to put the information across. The most important items, such as safety regulations, proper work clothing, rest and lunch periods, time-clock and clock-card regulations, the wage system, social-insurance plans, passes, opportunities for training and upgrading, and the like, need careful reviewing, and it pays to give ample opportunity for questions.

Especially should complete and emphatic safety instruction have a prominent place in the orientation program. It is essential that the specific dangers and hazards that the women will encounter in the yard be clearly presented. Careful instruction should be given also concerning how prevention of accident and illness from these sources is handled in the shipyard by management and what must be done as a necessary part of the program by the individual worker. It cannot be emphasized too strongly that preliminary instruction of this kind should be well planned and organized and effectively presented. Women new to industry know little if anything about industrial conditions and hazards. They must be given information if accidents are to be prevented, work time saved, and production schedules met.

[15] Ibid., p. 4.

Part of the safety section of the induction program or part of job-training time could be devoted profitably to active demonstration of how to lift weights and how to climb, especially on the platens and on the hulls where temporary staging makes footing none too steady. Many of the hazards to inexperienced women involve danger from improper weight lifting and climbing in precarious places. It is best to give clear instructions beforehand concerning the various situations that will arise and ways of meeting them. Visual aids and demonstration are especially helpful in making such information part of the employee's knowledge.

It has been recommended also by a shipyard physician that women welders receive instruction in their training course, if not in the preliminary induction period, in methods of coiling their lines, carrying them, and climbing with them. The lines alone weigh about 35 pounds and women have been found to suffer ill effects from pulling, lifting, and climbing with them, especially when several other heavy lines may be stacked on theirs. Instruction in weight lifting is of course basic here.

Physicians recommend in addition that for a period beginning with their first day and continuing through the first few weeks of their employment the women workers who will hold such jobs as welding, burning, and shipfitting, especially on the hulls and ships, be given a period each day of physical conditioning. Few women have back or stomach muscles adequately developed for work in the heavy industries. Wherever necessary, however, they can be conditioned gradually by means of systematic muscular reeducation. Those receiving such training will then be able to meet safely the unusual stresses that occur frequently in the shipyards, where women may be required to enter almost inaccessible places to weld from a variety of difficult positions, and to climb handicapped by heavy garments and equipment that throw them off balance. It is of course to be preferred that women be given shop work first, even when they are to be placed later on in the yard, on the hulls, or on ships, to accustom them more gradually to the noise and strangeness. Physical education could be carried on in this period.

Careful attention to getting the women workers off to the right start with safe and sensible work clothes will prevent confusion, expense, and needless risk. It is distinctly advantageous, therefore, for the induction program to include description of each article of clothing and of protective equipment recommended. Every safety feature requires explaining. The new women recruits, unused as they are to industrial work, usually have many questions about clothing, proving the need for an adequate period in which the regulations may be discussed so that they are thoroughly understood. Helpful also is a display of sample work garments, properly labeled, wherever women applicants, trainees, and inductees congregate.

These are some of the queries one welder had to answer by herself when she bought her initial equipment: Should overalls fit snugly or be loose? Should one purchase the kind with straps

for tools? Should one buy short or long socks, cotton or wool? She writes further: "We were given no advice on clothing and many of us had flash burns and slag burns on our necks. Our slacks were perforated with small burns and some caught fire and burned sizeable holes. Those who wore low shoes frequently had ankle burns. My glasses were well pitted by slag before the matron in the rest room told me to ask for goggles in the office. We still had many questions unanswered and would have welcomed a chance for class discussion." [16]

Good health is fundamental to the steady and efficient worker. A part of the women's induction program could profitably be given over to the medical department for instruction in personal health and hygiene and in nutrition. Those women who have heard the myth that infertility may result from exposure to welding rays should have their fears dispelled. All women would benefit from instruction in proper pacing of their work to avoid overfatigue in the first weeks of employment. Those subject to regular monthly dysmenorrhea should be encouraged to seek help from the medical department and information concerning corrective exercises. All the women should be informed of first-aid and rest facilities and of regulations regarding rest for temporary discomfort. The pregnancy policy of the yard also could be discussed.

It is recommended that in yards with a closed-shop agreement facts about the union be presented by a union representative as part of the women's induction program. Most women workers come to their war jobs with no practical knowledge of labor organization but with considerable misinformation. A great deal could be done for smooth functioning of labor-management relations and for the early adjustment of the women workers if the status of the union in the yard and its objectives and activities were made known in the first few days of the women's employment.

Administration.

The methods by which the induction program is carried on will depend largely on the organization and facilities of the yard. It is to be expected, however, that those responsible for the program will be well posted on women's needs and problems and know something of effective teaching methods. In some yards the training department alone conducts the induction, in others the personnel assistants. In some, various departments in the yard—personnel, safety, medical training, and production—cooperate in the procedure, lending capable representatives to participate.

Visual aids such as films, slides, models, and the like are especially effective in a short orientation program. Films that have been made for plant use by Government and private agencies are listed in the following bulletins with instructions for borrowing or purchasing selections:

[16] Ibid., pp. 2 and 3.

National Industrial Conference Board, Inc. *Visual Aids in Industrial Training.* New York, 1943. 60 pp. This includes also discussion of current use and evaluation of visual aids in training.

U. S. Office of Education. A Partial List of References. Vocational Training for War Production Workers. *Visual Aids.* Washington, October 1943. 109 pp.

U. S. Office of War Information. *A List of U. S. War Information Films.* Washington, April 1943. 28 pp.

Close follow-up of the new women workers after formal induction is especially necessary during the first few weeks of employment. The more women workers a yard can pull through this orientation period successfully, the lower its turn-over and the less costly its training program. The speed and efficiency of the production schedule itself may depend to a significant degree on the quality of the introduction process.

The following agencies may be consulted on the matter of an induction program:

National Industrial Conference Board, Inc. 247 Park Avenue, New York, N. Y.

U. S. Department of Labor, Women's Bureau. Washington, D. C.

U. S. Office of Education, War Production Training Division. Washington, D. C.

U. S. War Manpower Commission, Bureau of Training, Training-Within-Industry Division. Washington, D. C.

8. Provide personal-service, food, and medical facilities that meet approved standards of adequacy and quality.

Washing, toilet, locker, and rest-room facilities.

When women are employed in any industrial establishment for the first time, almost the first consideration is the provision of separate facilities for their personal needs. This is something that practically every employer recognizes as essential. In every yard visited where women were employed, facilities for them existed, but in many cases such facilities had become inadequate by the time of the Women's Bureau survey.

It was obvious that in not a few instances facilities were overtaxed because very early the accession of women workers far exceeded expectations and reached the saturation point of the facilities before priorities, materials, and cost affirmations or fund approvals from Navy Department and Maritime Commission could be secured. Some of the trouble was ineffectual planning, and planning that did not take place far enough ahead of the time women were to be hired; in a few cases it was sheer negligence.

Practically all the shipyards now employ women if they intend ever to do so, and now that new hires of women workers to replace men are made according to an established schedule submitted to the War Manpower Commission, there is no longer any excuse for failing to anticipate women's needs in the way of such service facilities as washrooms, toilets, lockers, and rest rooms.

It is advisable for all shipyard managements employing women to make an over-all review as soon as possible of their facilities situation, and in the light of accepted and authoritative standards make such necessary additions and adjustments as are indicated. This would, incidentally, help to effect more uniform standards and provisions in the navy yards where the autonomy of the shop masters has prevented it. In one navy yard some shop masters had secured or allowed provision of soap and towels in the women's washrooms, while others were unable to secure or did not allow these essentials, requiring the women to furnish their own and keep them in their lockers.

In another navy yard, at one juncture the master of the shop employing the largest number of women workers had the toilet doors removed in the women's washrooms because of suspected lingering. When the women protested, doors only 3 feet high were put on, allowing only semiprivacy. This is below the State legal requirements for that yard and far below the standards recommended by the Women's Bureau, which stipulate that the top of partitions on each toilet unit be at least 6 feet from the floor and the bottom not more than 1 foot from the floor. Such matters are not properly within the jurisdiction of shop masters, but belong in the hands of the sanitary engineer or public works or service department and under general surveillance of the women counselors and head of women's personnel. Good supervision of women workers and a knowledge of minimum standards in the matter of personal-service conveniences should not be expected of the shop master himself. His work is in the production field.

In the interest of the over-all review and adaptation of facilities recommended, it is necessary that the Navy Department and Maritime Commission cooperate by systematizing and speeding up the machinery for passing on, and authorizing funds for, women's personal-service conveniences when such authorization is sought. Industrial establishments of course do not have to seek authorization except when the matter of reimbursement involves a reconsideration of the contract. Many manufacturers consult the cost accountants of their contracting agency before making most expenditures for facilities, for assurance that these expenditures will be reimbursed under their contract. Those on a fixed-price contract must pay for new facilities out of their profits.

No matter what type of contract the shipyard has, good toilet, washroom, locker, and rest-room facilities for women are an excellent investment because of the saving in time they afford and the direct effect they have on women's morale and adjustment to the job.

Minimum standards that should govern the location, number, size, type, ventilation, lighting, sanitation, and materials to be used for workers' washrooms, toilets, and dressing rooms have been formulated by authorities and presented clearly and concisely in bulletins by the Women's Bureau and the Division of Labor Standards of the Department of Labor, and by the National

Safety Council and the American Standards Association.[17] These should be complied with in the shipyards.

Various States have enacted legislation to cover one or more of the features mentioned. Wherever legislation is in effect, the shipyards are for the most part complying, but the regulations are incomplete and inadequate in many of the States where yards are situated.

The general standards recommended by Government and other authorities will not be repeated here. It is important, however, to relate those standards to the special needs in a shipyard.

Location.

The matter of convenience of location of personal-service facilities is paramount in the shipyards, where acres of ground may be covered and shops and ways may be far apart. When women are working on the hulls and ships, convenience of location is especially to be considered, for not only is distance a factor, but the amount of time and effort necessary to climb up or down from the workplace and make one's way over and around obstacles in order to reach the facilities.

For this reason, in large yards with little room for additional building, temporary facilities that meet accepted standards should be placed near the ways where women are working. These facilities may be in the form of trailers or demountable houses and need not contain more than the necessary number of toilets and washbasins with soap and towels and other usual accommodations. Locker, shower, and rest-room needs can be more centralized, and with adequate toilet and washing facilities can serve the women in nearby workplaces throughout the shift and serve the women in outlying areas and on the ships and hulls at entering and closing time and during rest periods.

Provisions.

Because much of the work the women are doing in the shipyards is heavy and dirty, it is recommended that 2 or 3 showers with accompanying dressing booths be provided in each large washroom, especially when women are employed out of doors or on the ships and hulls or are working with bitumastic, paint, solvents, or preservatives. Women appreciate such a convenience, especially those who must travel a long distance after putting in a day of hard and dirty labor.

Important to women is the provision in each toilet room of a vending machine for sanitary supplies, well filled and in order, and a covered receptacle. Sanitary and disposable toilet-seat covers also are desirable equipment.

Women in shipyards, especially those who work out in the yards and on the ships and hulls, have a good deal of gear, such as leathers, gloves, safety shoes, and so forth, as well as slacks and

[17] See references at end of this section.

caps. Many would prefer changing to their work clothing after arriving at the yard rather than wearing it from home in crowded buses and on the streets. It is recommended that each woman worker be given a locker of good size to hold her street clothes during working hours and her work clothes and equipment at other times. For sanitary reasons metal lockers are preferred, but wood is acceptable under present conditions. Provision for ventilation is important.

According to the American Standards Association,[18] rest rooms separate from workrooms should be provided in all workplaces where 10 or more women are employed. The recommendation reads that "The number of such beds or couches required shall be as follows: 10 to 100 women, one bed; 100 to 250 women, 2 beds; and one additional bed for each additional 250 women employed." A fairly generous standard for the average industrial establishment probably is the *minimum* necessary in a shipyard where much of the work is physically demanding and is unfamiliar to women. Often a few minutes of relaxation in the prone position will allow a woman to function adequately for the remaining hours of her shift, whereas otherwise she would be inefficient on the job or have to go home, thus sacrificing wages and adding to the man-hours lost through illness. A brief period of rest on a couch is all that many women need to help them over a period of dysmenorrhea. Lacking this, some must take longer time and others prefer to stay at home a day when they know they are going to be uncomfortable.

Attention should be paid to the location of rest facilities in the shipyards. If women who merely need a few minutes of rest must walk for 10 or 15 minutes to get it or must report ill and go to the central first-aid room some distance away, they will be deterred from seeking it. Therefore, cots for women should be conveniently located in rest rooms close to the ships and hulls, as well as in the yard or shops.

Of 24 yards that reported on the matter of rest rooms, 17 provided rooms for that purpose though 3 of these had no cots. In 4 yards the only place to lie down was in the toilet rooms, and 3 yards had no rest-room provision of any sort. A few excellent facilities were seen. For example, one yard with only 140 women on production had a well-equipped rest room with leatherette couch and easy chairs with footstools. It was separate from the toilet, wash, and locker room. The leatherette used in the rest room is particularly effective, for it can be washed easily and does not show slight soiling as do so many fabrics. These are important advantages in view of the dirt and grease that accumulate on the women's work clothes.

It is necessary that the rest rooms be heated to afford women working out of doors in the winter a place near their work where they may go to get warm. This convenience is especially to be

[18] American Standards Association, *Safety Code for Industrial Sanitation in Manufacturing Establishments.* New York, 1935. pp. 16-17.

stressed in the case of shipyards in the North Atlantic area, where women often work outside in below-zero weather.

Food service and facilities.

The case for good feeding.

The tin lunchbox is still part of most shipyard workers' gear because adequate and convenient food service and facilities are not available in the vast majority of yards. Even the new yards, built and organized for war production, are seldom equipped with satisfactory facilities for providing good and sufficient food to production workers.

Yet the production army, fully as much as the military army, travels on its stomach. The food of the production army has a telling effect on output, efficiency, health, attendance, and freedom from accident. Objective study in Great Britain has shown that improvement in workers' diets that were not up to standard for good health is followed by increased effort and by reduction in the number of accidents. Nutrition workers have known for many years that vitamin-deficient diets result in greater fatigue, lassitude, and loss of interest in work, in depressed mental states, soreness of muscles, backache; while even more important, because general and less evident, is the lowered resistance to illness and decreased efficiency that result. It has been said that nutritional deficiency, "hidden hunger" as it is called, constitutes "our greatest medical problem, not from the point of view of deaths, but from the point of view of disability and economic loss."

Lack of facilities and opportunity to buy nourishing food in the shipyards is serious, but it would not be quite so serious if the majority of workers were known to secure an adequate and well-balanced diet through meals bought at other places or prepared at home. This is not the case, however. In fact, a comprehensive survey made by the Bureau of Home Economics of the United States Department of Agriculture in 1936 showed that fewer than a fifth of America's families had diets that met the National Research Council's recommendations for each of the seven nutrients considered (protein, calcium, iron, vitamin A, thiamin, riboflavin, and ascorbic acid). Furthermore, practically all dietary surveys of industrial workers agree that the diets of women employees are not even so good as those of men, though women tire more easily than men and require food more frequently.

Thousands of the women in shipyards are breadwinners and homemakers too. They should eat well to play their dual role successfully. Yet their work schedule and transportation to and from the yard, frequently absorbing as much as half of each 24 hours, leave little time to prepare an ample and well-balanced dinner even when good nutrition is understood and practiced. Breakfast more often than not is missed entirely or consists of such nutritionally deficient foods as doughnuts or pastry and coffee. The food supply in the stores, limited at best under wartime scarcity and rationing, is lowest after working hours, when most of the ship-

yard workers must shop; the point system adds to the time required for shopping and to the complexity of the food-preparation problem.

Single women living away from home, of whom there are great numbers in the shipyards, must overcome still other difficulties. In the areas where large shipyards are located eating facilities have not kept pace with the extraordinary population increase. In some of them only the most inferior accommodations are available for workers who must get their meals out.

Night workers are particularly at a disadvantage, since even in normal times facilities for proper eating are limited at their hours of need. But most serious of all is the actual lack of food in some shipbuilding areas due to breakdown in distribution to these places that require now so much more in the way of outside fresh produce than in normal times.

Added to the situation just described, making adequate nourishment difficult for shipyard workers and especially for homemakers, is the fact that rules of nutrition are not generally known, much less practiced. Even where food is plentiful, not too expensive, and of sufficient variety, and there is ample time to buy, prepare, and eat it, many workers do not select a balanced diet and few pack a lunch box that meets nutritional requirements.

To sum up, the food situation is one that cries for constructive and immediate action. It has come to the attention of the Maritime Commission and that organization is now working to develop feeding plans in the approximately 70 yards with which it has contracts.[19] These plans will be made in each case with the active participation of the plant engineer, the director of the yard's medical department, and the industrial relations adviser or his representative in the region. Labor is to have a voice in the operation of any feeding accommodations proposed and set up. The Commission has assured management and labor of its readiness to provide all needed facilities for the type of feeding found most suitable for each yard's individual needs. Because of particularly pressing need in the San Francisco Bay area, action there will be taken first. This interest and attention of the Maritime Commission to the food situation in shipyards is an important step forward. It is to be hoped that the Navy Department, with contracts in about two-thirds of the private commercial yards constructing new vessels, will follow suit.

Shipyards without good food service are as a matter of fact missing an excellent opportunity to make an investment guaranteed to pay high dividends in increased efficiency, greater resistance to disease, fewer accidents, better attendance, and higher morale. Numerous firms in other industries have for some time been reaping the benefits of good eating facilities and sound nutri-

[19] See memorandum *Report and Recommendations on Shipyard Feeding* issued by Horace D. Willis, Chief Feeding Consultant, to Daniel S. Ring, Director of Division of Shipyard Labor Relations, U. S. Maritime Commission, dated Sept. 27, 1943. See also Memorandum to all Regional Directors of Construction about *Plant Feeding Policy* from Daniel S. Ring, dated Nov. 26, 1943, and a memorandum dated Oct. 23, 1943, to the U. S. Maritime Commission from Daniel S. Ring on the same subject.

tion education for workers, and several have gone so far as to promote and help carry on community nutrition programs. These programs in a few cases now include national dissemination of literature advising about industrial feeding and instructing in proper diet. Such literature may be secured by shipyards interested in installing food facilities and in developing nutrition programs.[20]

Recommendations for food service.

To meet the problem of inadequate diet among workers and to alleviate somewhat the conditions arising from the difficulty of purchasing and preparing food in the time away from the yard, private, State, and Federal agencies and organizations concerned with industrial nutrition and equipped professionally to recommend and advise urge strongly that adequate food service and facilities be made available or expanded within the plant itself. Such service and facilities should afford opportunity for workers on all shifts to obtain and eat a complete, well-balanced, mid-shift meal in the time allotted them and at a price they can afford to pay. When a cafeteria already available cannot accommodate an expanded work force or employees in remote sections of the yard on the hulls and ships, and additional cafeteria space or materials cannot be allotted, mobile canteens or rolling kitchens are found very successful as supplementary feeding facilities. Stationary canteens scattered throughout the yard may be necessary also. All should provide hot and nutritious food rather than the more common cold sandwiches, pies, candy, and carbonated beverages. Furthermore, effort should be made by staggered lunch periods, provision of benches in cleared locations outside or indoors, to seat as many employees as possible, so that they may lunch away from their workplaces and in pleasant, comfortable and quiet surroundings.

One of the largest shipyards visited has comfortable benches placed here and there throughout the yard for workers to use at lunch time in good weather. The largest shop in this yard has a room furnished with tables and chairs and devoted entirely to the use of employees who carry their lunch or buy food from nearby canteens. A comfortable place under shelter is especially necessary in inclement weather or when it is excessively hot or cold.

Food services owned and operated by the plant are to be preferred to food concessions because of the more direct control that can be exercised over food selection, preparation, and cost to the worker. But in many cases management by a concessioner offers the more practical solution to the shipyard's food-service problem. When this is true, it is recommended that the shipyard employ a trained dietitian or secure the advice of the State or local committee on nutrition, and not only control the prices that can be charged the workers but take responsibility for the nutritional adequacy of the meals and other food provided by the concessioner.

[20] See selected references at end of this section.

A wide choice of a la carte dishes is to be avoided in favor of one or two complete meal combinations, each containing at least one-third of the worker's nutritive requirements for the day. In this way, cost is kept at a minimum and the women workers will select and come to know and enjoy a proper diet.

For women who continue to carry their lunch even when the time and facilities for eating a hot lunch in the yard are available, hot foods should be provided in easily accessible places to allow supplementing the box lunch at low cost.

Such protective foods as milk should be as cheap or cheaper than rival beverages of less nutritional value. In fact, it is recommended by experts that candy, soft drinks, and highly-milled non-enriched cereal products be replaced by foods and beverages of greater nutritional value. Serving soft drinks only in vending machines in the plant and not in the cafeteria has helped to increase the sale of milk by almost 25 percent in a prominent aircraft plant. It is unsound to run a cafeteria or other eating facilities with the purpose of "giving the workers what they want." Presenting them with a good choice and variety of foods such as they need to maintain health and efficiency has met with enthusiastic response in all cases where it has been tried. Furthermore, even without any additional effort good feeding promotes nutritional education that reaches beyond the gates of the yard and into the homes of the workers. Thus, the shipyard reaps benefits not only from good feeding in the plant but from the improved feeding in the home.

Supplementary feeding between meals in the middle of each work spell before and after lunch is an effective production aid. Mobile snack wagons are used successfully for this purpose in shipyards, for they may be wheeled in a minimum of time to all parts of the yard and docks and may be hoisted by crane onto a ship. Between-meal feeding is especially recommended for women, who tire more rapidly and require food more frequently than men. The rise in efficiency and in production that results from mid-shift feeding is especially notable when the foods supplied are such as to make a definite contribution to the day's nutritive requirements. Fruit juices, raw fruit, tomato juice, milk, and sandwiches (of whole wheat and enriched bread) have a more prolonged effect than pure carbohydrates such as soft drinks and candy bars.

The three breaks for refreshment, two of them in an official rest pause, have been shown to send employees off duty with less fatigue than is the case when they have a noon meal only. This is important to the many women who must travel long distances to and from work and then must shop and prepare a meal.

As a matter of fact, in some shipyard locations where the community eating facilities are inadequate to meet the needs of shipyard workers on all shifts or where housing and transportation present special problems, it is advisable that breakfast, lunch, and dinner be offered at the yard, thus making cafeteria or canteen service available on a 24-hour basis. This is not a visionary recom-

mendation. At the time of survey, one shipyard, a navy yard, far removed from outside food facilities, provided 24-hour service in 2 of its 3 stationary cafeterias and in 1 of its 3 portable canteens. A coffee shop operated just outside the yard gate by a concessioner was open from 6.30 a. m. to 12 midnight. These facilities together met some if not all of the demand for breakfast and dinner service on each shift by the many thousands who commuted long distances or had neither time nor place to prepare food or to eat it. Some employers are now preparing food in central kitchens to be taken home and reheated by women workers for family consumption.

Not one of the private shipyards in the Women's Bureau survey reported cafeteria service on a 24-hour basis, but one was planning such service. Actually, though several of the largest yards obviously needed some kind of day and night food service that would provide workers with breakfast and dinner as well as lunch, these yards were at that time not even equipped to serve lunch to more than a fraction of the day shift. Occasionally in such cases, arrangements can be made with commercial eating places, provided they meet accepted standards, to feed shipyard workers before and after shift change. Such arrangements require cooperation and good planning and supervision.

An employee-elected committee of workers to cooperate with management in solving problems that concern food service and facilities has proved an effective way of assuring the success of the feeding venture in other industries. Such a committee, when kept in touch with questions of finance, labor, and administration, constitutes a nucleus of well-informed employees to handle complaints and confer with the company on matters of policy.

An excellent opportunity is provided each shipyard for effective nutrition education along with its food service. Attractive posters in the yard and shops and on the cafeteria walls, articles in the employee or yard newspaper, leaflets, and short talks over the public address system are simple and effective ways of teaching the principles of good eating for good health. Emphasis on any particular food, unnecessary in recommending a balanced diet, should be avoided because of national and regional food folkways. Cooperation between the personnel, production, and medical offices in carrying on the nutrition education program will assure its effectiveness and help to bring about that favorable situation in which the workers will not only want to eat nutritionally adequate meals but will demand them in the plant and at home. It will be found of considerable benefit if the trained dietitian, preferably employed in the medical department and under supervision of the yard physician, besides controlling the menus and directing nutritional education is available to the employees for advice on diet.

For women who continue to carry their lunch even when the time and facilities for eating a hot lunch in the yard are available, hot foods should be provided in easily accessible places to allow supplementing the box lunch at low cost.

No shipyard need hesitate to plan good feeding for its workers because of lack of professional advice and direction. The Nationwide National Nutritional Program, and recently organized Inter-Agency Committee on Food for Workers, through the War Food Administration reach into every State and locality and can provide each yard, large or small, with expert assistance. Shipyards seeking aid should get in touch with their local nutrition committee or with their State representative of the Nutrition in Industry Division of the Food Distribution Administration. Many areas of assistance are available besides advice and help on setting up and securing service and facilities. These include such educational aids as posters, pamphlets, films, and nutrition news service. Some examples are given in the Selected References that follow. A more complete list of sources can be secured from the section "Sources of Information and Material" presented in the Manual of Industrial Nutrition issued in 1943 by the Food Distribution Administration, Nutrition and Food Conservation Branch, Washington, D. C.

SELECTED REFERENCES

Washing, Toilet, Locker, and Rest-room Facilities

Agencies.

American Standards Association, 29 W. Thirty-ninth Street, New York, N. Y.

National Safety Council, 20 N. Wacker Drive, Chicago, Ill.

U. S. Department of Labor, Division of Labor Standards, Washington, D. C.

U. S. Department of Labor, Women's Bureau, Washington, D. C.

Literature.

American Standards Association. *Safety Code for Industrial Sanitation in Manufacturing Establishments.* New York, 1935. 17 pp.

National Safety Council. *Drinking Water, Wash and Locker Rooms, and Toilet Facilities.* Chicago, 1941. 11 pp.

U. S. Department of Labor, Division of Labor Standards. Special Bull. 13. *Wartime Working Conditions: Minimum Standards for Maximum Production.* 1943. 25 pp.

——— Women's Bureau. Special Bull. 4. *Washing and Toilet Facilities for Women in Industry.* 1942. 11 pp.

Food Service and Facilities

I. Agencies that offer guidance to companies in developing nutritional programs.

American Medical Association, Council on Foods and Nutrition, New York, N. Y.

Food Distribution Administration of the War Food Administration, Nutrition and Food Conservation Branch, Washington, D. C. Also regional offices.

Metropolitan Life Insurance Company, Policyholders' Service Bureau, New York, N. Y.

National Association of Manufacturers, 14 W. Forty-ninth St., New York, N. Y.

National Research Council, Committee on Nutrition in Industry, 2101 Constitution Ave., Washington, D. C.

Nutrition Committees, Defense Councils.
State Extension Services.
State Health Departments.
U. S. Department of Agriculture, Bureau of Home Economics, Washington, D. C.
U. S. Public Health Service, Industrial Hygiene Division, Bethesda, Md.

II. Other organizations supplying materials such as films, pamphlets, and posters.

American Dietetic Association, 185 N. Wabash Ave., Chicago, Ill.
American National Red Cross, Washington, D. C.
Armour & Co., Chicago, Ill.
Bridgeport Gas Light Co., Bridgeport, Conn.
Evaporated Milk Association, 307 N. Michigan Ave., Chicago, Ill.
Florida Citrus Commission, Lakeland, Fla.
General Electric Co., Bridgeport, Conn.
General Mills, Chamber of Commerce Building, Minneapolis, Minn.
H. J. Heinz Co., Research Department, Pittsburgh, Pa.
Institute of Life Insurance, 60 E. Forty-second St., New York, N. Y.
Lily-Tulip Cup Corp., 122 E. Forty-second St., New York, N. Y.
National Association of Food Chains, 726 Jackson Place, Washington, D. C.
National Dairy Council, 111 N. Canal St., Chicago, Ill.
National Industrial Conference Board, Inc., 247 Park Ave., New York, N. Y.
National Livestock and Meat Board, 407 S. Dearborn St., Chicago, Ill.
Prudential Insurance Co. of America, Newark, N. J.
Servel, Inc., Evansville, Ind.
Standard Brands, 595 Madison Ave., New York, N. Y.
Swift and Co., Department A, Chicago, Ill.
Westinghouse Electric and Manufacturing Co., Mansfield, Ohio.

III. Publications containing helpful information on background, practice, and problems of industrial nutrition.

American Telephone and Telegraph Co. *Food Makes a Difference.* New York, 1943. 94 pp. A course in nutrition for women.

Borsook, Henry. "Industrial Nutrition and the National Emergency," *American Journal of Public Health,* vol. 32, May 1942, pp. 523-528.

Dodge, Quindara O. "Food for Production," *Industrial Medicine,* vol. 12, May 1943, pp. 297-301.

Factory Management and Maintenance. "Promoting Nutrition to Employees," vol. 101, January 1943, pp. 90-92.

Federal Security Agency, Office of Director of Defense, Health and Welfare Services, National Nutrition Conference for Defense. *Proceedings,* 1941, pp. 116-129. Washington, 1942.

Great Britain. Ministry of Labor and National Service. *Additional Meals at Factory Canteens: Breaks During Long Spells of Work.* London, January 1941. 2 pp.

Haggard, Howard H., and Leon A. Greenberg. "The Selection of Foods for Between-Meal Feeding in Industry," *Journal of American Dietetic Association,* vol. 17, October 1941, pp. 753-758.

Mayers, May R. "Kinds of Food for Proper Nutrition of War Workers Prescribed," *Industrial Bulletin* (New York), vol. 21, September 1942, pp. 300-302.

Mayers, May R. "Problem of Adequate Nutrition for War Industrial Workers," *Industrial Bulletin* (New York), vol. 21, June 1942, p. 232.

Milbank Memorial Fund. *Proceedings of Twentieth Annual Conference*, "Nutrition in Industry," pp. 9-43. New York, May 7, 1942.

National Research Council, Committee on Nutrition in Industry. *The Food and Nutrition of Industrial Workers in Wartime.* Washington, 1942. 17 pp.

Phipard, Esther F. "How Good Is Our National Diet?" *Annals of the American Academy of Political and Social Science*, vol. 225, January 1943, pp. 66-71.

Stiebeling, Hazel K. *Are We Well Fed? A Report on the Diets of Families in the United States.* U. S. Department of Agriculture, Bureau of Home Economics. Misc. Publ. 430. Washington, 1941. 28 pp.

U. S. Food Distribution Administration, Nutrition and Food Conservation Branch. *Manual of Industrial Nutrition.* Washington, 1943. 25 pp.

——— *Planning Meals for Industrial Workers.* Washington, 1943. 28 pp.

Urquhart, Lewis K. "Right Food for War Workers," *Factory Management and Maintenance*, vol. 100, October 1942, pp. 87-89.

9. *Study and expand the safety program to adapt it to women workers, and instruct women thoroughly in safe work practice.* [21]

The safety of women workers in shipyards depends on full protection of all the workers. It rests, therefore, on good yard maintenance and safety engineering; on thorough and periodic investigation into physical, chemical, dust, and other hazards and as early and complete control of these as possible; on concentrated and continuing education and careful supervision of every worker in regard to safe practice; on complete provision of the basic facilities for safety, such as impact and antiflash goggles, hard hats, respirators, portable ventilation equipment, easily accessible hot and cold water and soap and towels, and sterilization service for personal protective equipment passed from worker to worker.

A bulletin, *Minimum Requirements for Safety and Industrial Health in Contract Shipyards,* published early in 1943 under the authority of the United States Navy Department and Maritime Commission, covers the field thoroughly. If the simple, direct, and authoritative recommendations made in this bulletin were carried out in each of this country's shipyards, accidents and illnesses arising from shipbuilding employment probably would fall to an irreducible minimum.

A large share of the difficulty, of course, has been the need for putting good practices into effect under the weight of introducing great numbers of inexperienced workers to be guided by inexperienced supervisors in a fast expanding organization pressed for high production. The result has been ignorance of safety rules, methods, and procedures as well as sheer negligence and lack of observance of safety fundamentals all too well understood.

In order to control and work toward the remedy of this situation, it is strongly recommended that the services of the consultants on safety and health of the Navy and Maritime Commis-

[21] This section of the report was prepared by Jennie Mohr.

sion under Philip Drinker and John M. Roche be utilized fully, as well as the resources and special offerings of the National Committee for the Conservation of Manpower in War Industries. To be stressed particularly among these special offerings is the standard basic course on the fundamental principles and techniques of industrial safety and health sponsored by 116 colleges of engineering throughout the country through funds provided under the Engineering, Science, Management War Training Program of the United States Office of Education. The Division of Labor Standards of the United States Department of Labor prepares special text material for the classes and compiles other reference sources to be purchased by students or for them by management. National Committee agents and representatives of the sponsoring colleges enroll the students, on the recommendation of plant management. The standard basic course offered in evening classes for 96 hours over a period of 16 weeks is designed primarily for work supervisors and counselors but has proved very valuable also to line workers.[22] It is of course particularly important that men and women supervisors attend, for, as one safety engineer sagely remarked, "The greatest hazard in the industry is the lack of trained supervisors." But as many employees as possible, men and women, also should be encouraged to enroll in the nearest class, thereby affording those in the ranks as well as supervisors a good concept of fundamental principles on which safe practice depends, in addition to the rules and precepts derived from such principles.

Safety instruction.

The unfamiliarity of the women in shipyards with industry and with shipbuilding in particular makes it imperative that they be given as complete introduction as possible to the specific hazards of their unaccustomed employment and to the approved methods by which to meet such hazards.

The need for safety training during the induction period has been pointed out (see page 52). This training should be designed primarily to serve two purposes: to acquaint the women with the conditions they will meet, and to give them some preparation for meeting them. One successful experiment is the training course set up in Oakland, Calif., by the Vocational Training Division of the United States Office of Education, a job introduction course for women shipyard workers. (See page 25.) This 5-day (40-hour) course is carried on in an environment that duplicates certain of the conditions of a ship. Women learn here how to climb staging, how to lift and carry weights, and how to handle tools and equipment. The noise and the apparent confusion are like those they will later encounter on the job. By the end of the training period, they have some practical knowledge of what working in a yard may be like. By such means, the first sharp edge

[22] See pamphlet describing the program and course, *Training Safety Leaders*, U. S. Department of Labor, Division of Labor Standards. 1943. 18 pp.

of fear is removed. The women see the practical implications of safe and unsafe practices. They are in some degree ready to take their place on production.

Though such a comprehensive preliminary course may not be possible in all cases, the induction program still can be effective in preparing the women for the job. Visual aids such as safety films and posters help to make instruction more vivid and persuasive. Sources of such visual aids have been listed on page 55. In addition, the National Safety Council has a series of posters, sound films, and slide films that are extremely useful in safety education. Certain of this material pertains specifically to training women workers.

Safety instruction in the induction period, however, is only a beginning. It must be carried on constantly by those directly responsible for the supervision of the women. There is little dispute, among those familiar with the field and having a knowledge of shipyard needs and conditions, about the specific standards or techniques that should be stressed in safety training. But there are very great differences in the degree of success with which these standards and techniques are maintained in the ordinary course of work.

The basic training courses referred to previously are the first-line attack on the problem of creating a safety-trained supervisory force. Such preparation should, however, be followed up by further training programs and by continuing conferences between the yard safety engineer and the instructors and work leaders responsible for teaching safe work practices.

The need for supervisors trained in safety relates, of course, to all workers, men and women alike. But there is the additional question of the specific ways in which women's special needs are involved. The differences in strength and physical structure between men and women must always be remembered as possibly giving rise to differences in the extent to which a particular job is a hazard to the worker. Such variations should be called to the attention of the supervisors. The women counselors can be of assistance in this respect by pointing out problems as they arise, and helping in their solution.

Safety on the job and inspection.

There is much to be said for the adage that the best way to learn is by doing. Safety awareness should be part of every man's and woman's job, whatever that job is. To attain that universal safety awareness in the yard, all the workers should actively participate in the safety program. Listening to safety instructions and looking at safety posters are not enough. Women workers should take an active part in safety committees. They should concern themselves both with the general conditions that affect all the workers alike and with their own special safety needs. By taking on responsibility for the setting up of safety standards and for enforcing them among themselves, the women will develop

both understanding and experience in handling safety problems.

In an industry such as shipbuilding, in which hazards are great, a large proportion of workers are new to the work, and turn-over is high, it is not easy to obtain such self-discipline in matters of safety practices. It is not always possible to keep safety training of the supervisors and workers up to the necessary standards, in either number trained or quality of skill achieved. It may therefore be necessary, as an emergency measure, to enlarge the safety department by increasing the number of inspectors. These inspectors should be adequately trained, according to standards laid down by authorities in the field of safety training. They should be competent to recognize hazards, whether they are technical questions of plant and machine structure, inherent in the lay-out of the plant or work, condition of equipment, or growing out of the practices of individual workers; they should be able to indicate what corrections are needed, and to evaluate the changes made in order to be sure that the hazards are removed.

Women have proved their capacity for safety inspection if properly trained. They are acknowledged not only to be safety-minded, but to give considerable attention to detail. They should be trained as men are trained to take up the work of safety inspection. Like the men, they should be in the regular safety department, and they should be responsible for the same type of inspection as are the men.

It is not advisable to create a separate group of "women safety inspectors," as has been done in some of the yards, who are concerned with safety problems in the yard only as they relate to women. Such a practice makes a false distinction, in separating inspectors by function, by status, or by sex. It fails to integrate the women into the total safety program of the yard, and such integration is essential if the program is to succeed. Furthermore, it has been found in some yards that these special women inspectors take on some of the duties of women counselors, if the function of the latter is not clearly defined or they do not cover the yard. This, too, is inadvisable. While the closest cooperation must exist between safety inspectors and counselors, their functions should not be confused.

Seating.

In shipyard work, even more than in many other industries, the problem of constant standing confronts the woman worker. Many of the yard jobs also involve climbing, walking, and carrying. The general physical lay-out of the yard and the large amount of outdoor work seem to preclude the possibility of making shipyard work anything but a stand-up job.

It is recognized generally that constant standing is bad for women. Besides the fact that their feet and legs tire quickly (with brief periods of rest recovery also is quick), permanent and even serious effects may result. For this reason it is desirable that wherever possible seats should be provided for women.

There are several ways in which some measure of suitable seating can be achieved. A number of jobs that are frequently performed standing can be done seated just as well. Operation of drill presses, punch presses, and similar machines in the machine shop can be carried on either sitting or standing. Cleaning small parts for painting, coil winding, bench assembly work, grinding and finishing operations also can be done in either position. For all such jobs it is recommended that seats be made available, and that women be allowed to alternate sitting and standing. Such alternation is more desirable, and less fatiguing, than working in either position constantly.

Women on jobs that require standing or walking and cannot be done while seated should have a chance to sit down occasionally. When they are at machines that require standing, seats should be provided for occasional pauses. When they are working out-of-doors, on ships or hulls, they should be able to go in their rest periods to some place that has comfortable seats.

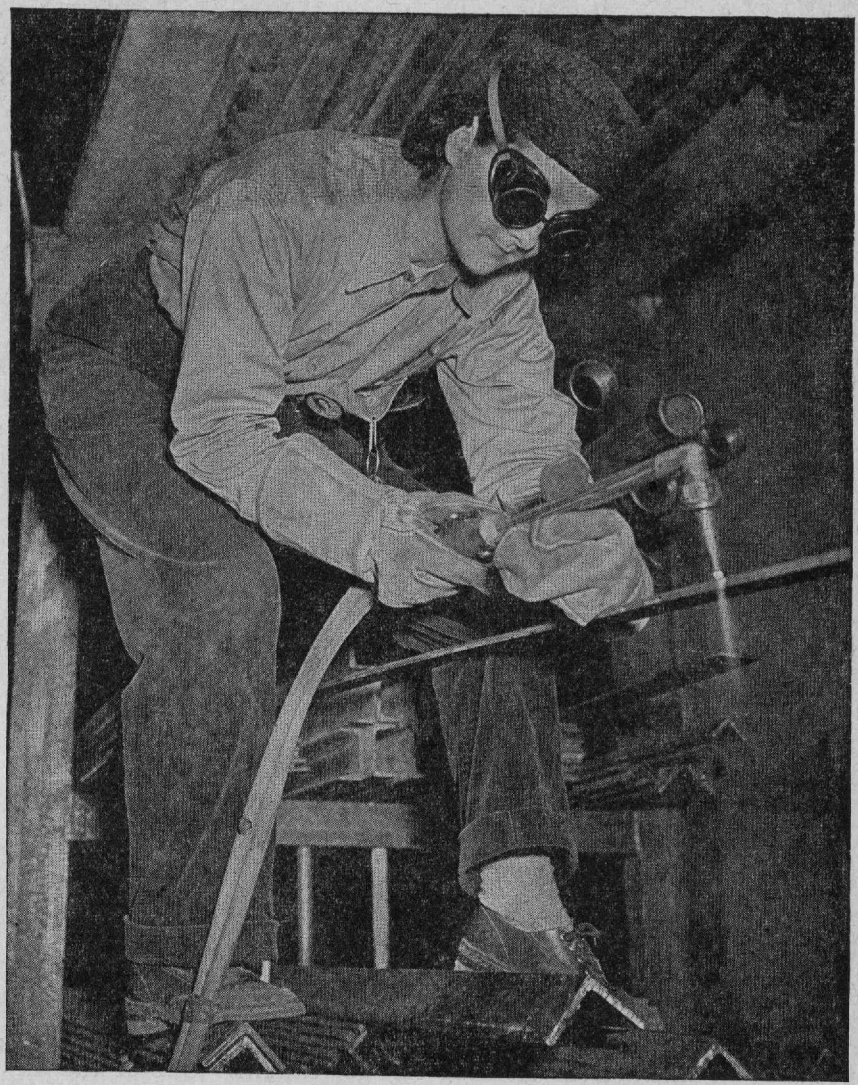
In a number of the yards visited there were seats for some of the women. For the most part, however, these seats filled none of the requirements for good posture chairs. Few yards even had stools—and fewer still had chairs with backs. For the most part women were sitting, if at all, on boxes, up-ended crates, barrels—anything around the place that could be used. Such seats were in some cases more tiring than no seats at all, especially if the job was done sitting all the time.

It is possible, of course, to sit correctly on anything. But this requires instruction in good posture, which is almost always lacking. It also requires considerable muscular effort, in itself fatiguing. The instruction should certainly be given, preferably as part of the induction program. But workers should also be given seats that enable them to sit correctly without unnecessary effort. Jobs should be studied to see whether it is possible for them to be done in a sitting position. Work materials should be arranged when possible to produce the most efficient techniques of handling, and avoid superfluous motions, such as reaching, stretching, bending.

The need for good seats and good posture is discussed in the Women's Bureau bulletin, "Women's Effective War Work Requires Good Posture." Many of the suggestions made there can be carried out even in a shipyard. And a constructive effort to give women opportunities for good seating will contribute noticeably to their efficiency and health.

Safe clothing.

The question of the right clothing—that is to say, the safe clothing—for women to wear in the shipyard is probably one of the major aspects of their safety needs. Nine percent of the injuries in 11 shipyards reported in 1941 to the Bureau of Labor Statistics occurred as a direct consequence of failure to use safe attire. When women were first employed to work in shipyards



Official U. S. Navy photograph

Women Burner Is Shown Burning Through a Steel Bar as She Helps to Build and Repair Ships for the Navy.

there was little in the way of precedent to follow in suggesting to them the safe clothing for the job. Extensive variation in their work, moreover, made uniform clothing regulations unfeasible. Clothing needs of welders are different from those of burners, and both differ from the needs of shipfitter helpers on the platens or the sheet-metal workers in the shop.

During the induction period women should be told what are the fundamental principles by which safe clothing may be selected.

A brief description of yard regulations and references to the handbook, where one is issued, is not enough. Instead, each safety feature of recommended types of work garments should be pointed out and related to work conditions. Samples of good selections should be shown and safety aspects especially pertinent to certain jobs described. With this information, women will be in a position to choose correctly, from a selection of garments, apparel that suits their individual taste and pocketbook and at the same time meets the safety needs of their jobs. They will learn also when and on what jobs to wear gloves and what kind, in what places and occupations steel-toe safety shoes are obligatory and where comfortable but substantial oxfords without safety construction may be worn. Such knowledge makes unnecessary more than a minimum of supervision and makes possible the maximum of conformity to basic safety standards.

Various models of suitable clothing have been developed for different types of work. Some of them have resulted from manufacturers' response to the general need; others have been produced by professional designers engaged by individual firms. The American Standards Association has recently established standards for a variety of women's work clothing, including shirts, jackets, shoes, slacks, dungarees, overalls, and coveralls.[23] Standards for welding clothes, for both men and women, are in process of development.[23] Clothing that is recommended to the women should be that made by manufacturers who follow American Standards Association specifications.

Both oxfords and high safety shoes that meet accepted standards are now made by a number of manufacturers. The high shoes are particularly necessary to welders to protect their ankles against burns.

Shipyard work raises some clothing problems that women encounter in relatively few industries. For one thing, much of the work is out-of-doors, and workers are exposed to the extremes of weather, ranging from the heat of a New Orleans summer to the intense cold of a Maine winter. Also, there is a good deal of climbing to be done on many of the jobs, and almost all the women encounter the confusing array of supplies and parts throughout the yard that offer innumerable bars, corners, pipes, and other hazards on which loose clothing can get caught. One of the difficulties in many yards visited by Women's Bureau agents was that of finding outdoor apparel that would be warm enough for protection but tight-fitting enough not to be a hazard in climbing staging or ladders, or working around piled materials in the yard. Another, still largely unsolved, is finding welders' and burners' apparel that while fully protective is cool enough for comfortable wear in hot weather.

In the induction period or as soon after as possible, it is necessary to teach the new women workers about the occasions and occupations for which special protective equipment is needed, and

[23] Consult the American Standards Association, 29 W. Thirty-ninth Street, New York, for further information.

why and how such equipment must be used. By the time they are ready to take an active part in production, therefore, the women should know when and where to wear goggles and where goggles are issued, where a hard hat is necessary gear, and, if necessary, when to use and how to secure and adjust a respirator. Those entering welders' or burners' training should receive, with their instruction in techniques, early and continuous indoctrination in the safe way to do their work—the precautions they must take to prevent injury to themselves and others, and the protective equipment they must wear.

Women welders and welder helpers.

A large number of women shipyard workers are welders. The tabulation on page 21 indicates that 36 percent of the women in 24 yards were in shipfitting. Most of these were welders or burners, or helpers in these skills. Thus the safety requirements in the field of welding are especially significant for women workers.

On the whole, the hazards to women in welding are not different from those to men. Numerous thorough analyses of these hazards have been made, and standards have been set up for controlling them. These standards, issued by such authorities as the Maritime Commission, the Navy, the National Bureau of Standards, the American Standards Association, and the Division of Labor Standards of the Department of Labor, cover welding equipment, conditions of work, protective clothing and apparatus, and working methods. They stress, for example, the need for suitable eye protection, helmets, and respirators to be furnished the worker, and the equal need for the worker to use them properly and consistently.

There are a few elements in the welding job that should be recognized as a particular concern of women. One of these is the weight of welding leads and other equipment carried around by women welders or welder helpers. The leads, which may weigh as much as 35 pounds, must be carried up and down ladders, through crowded areas, and into compartments often difficult of access. It is important, therefore, that the helper to whom this task is assigned should be chosen for her physical ability to do a strenuous job. She should be taught the most economical way in which to coil, lift, and carry the leads. (See page 53.) She should be a person with enough agility to get around in crowded places.

A difficulty sometimes reported by women welders with small hands is that of manipulating welding tongs. Some manufacturers of welding equipment have experimented with slenderizing tongs, so that the grip will be easier for a small hand. Such tongs, however, require increased pressure in order to open the jaws and release the rod, as must be done frequently in welding. Further experiments are being made in lengthening the tongs in order to increase the leverage and decrease the amount of pressure needed. These slender tongs are said to be too light for some welding jobs, though probably they could be used on many of the lighter jobs to which women are predominantly assigned.

The question has been raised whether or not women are more susceptible than men to the fumes, gases, and vapors of welding. No conclusive evidence on this point exists. However, a study now being made by the United States Public Health Service for the Maritime Commission will furnish data on many problems by sex of welder. If there is a difference in reaction between men and women, it may be expected that this survey will reveal it.

The rumor is rife in some shipyards that arc welding produces sterility in women, and in some instances women refuse to enter or remain in this occupation for that reason. Available medical opinion indicates that there is no foundation in fact for this rumor. An analysis of the subject published in the Journal of the American Medical Association in 1939 (Volume 113, No. 7, page 616) points out that neither the nitrogen compounds created in the welding process nor the ultraviolet rays of the arc—two factors that have been most responsible for the rumor—are capable of producing sterility. Industrial physicians who have been closely concerned with the health of welders, as well as physicians outside of industry, agree on this point.

Cooperation v. regimentation.

Every good safety program rests on the acceptance and understanding of the workers to whom it applies. Certain requirements, such as safe machinery, adequate guards, rails around cat-walks, and other plant equipment, can be built into the operating procedures. But many other requirements depend for their satisfaction on the workers themselves. Safety shoes, hard hats, and goggles must be supplied; but it does no good to supply them if they are not worn consistently where and when they are needed.

For many women new to industry, achieving a conviction about the need for safe practices and safe apparel is not simple. As far as clothes are concerned, they have inherited a long and firmly established tradition, which uses various criteria, among which safety is not numbered, in setting clothes fashions. The idea of safety as such a criterion must be accepted before adequate clothing standards will be adhered to. It can be instilled by means of a good educational program, but it cannot be forced upon them.

Clothing regulations can be most easily carried out if they deal with only those features having to do with safety and suitability on the job. It is not necessary to insist that all women be dressed exactly alike, in the same style and color, and many women resent the imposition of such regimentation on them while the men with whom they work are free of it. Rules such as one requiring the wearing of a hard hat, safety shoes, or goggles are applicable to every worker, regardless of sex, and if they can be made clear and unequivocal during the induction period, they will be taken for granted and followed.

Women are willing to cooperate when such regulations obviously are reasonable and necessary. But even a reasonable rule will appear arbitrary and will be resisted if its reason is not

explained. Moreover, when rules are imposed beyond the limitations of their need, as when women entirely removed from any machinery must take off their wedding rings, or when the entire force of women is required to wear a given color, they lose their value for building good safety awareness and the cooperation without which no safety program can succeed.

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——— Women's Bureau. Special Bull. 2, *Lifting Heavy Weights in Defense Industries.* Washington, 1941. 11 pp.

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——— ——— Special Bull. 10, *Women's Effective War Work Requires Good Posture.* Washington, 1943. 6 pp.

APPENDIX

Women's Occupations in 35 Shipyards

(Women's Bureau survey)

Acetylene-burner operator and helper (hand burner)
Arbor-press operator
Asbestos filler and sewer
Asbestos layer-out and cutter
Assembly worker, bench and other

Assemble valves, couplings, waterpumps, Diesel engines, manifolds, metal furniture, locks, water tanks, ammunition boxes, lockers, rifle cabinets, switchboards, stanchion parts, ammunition-hoist parts, stiffeners, parts for watertight doors and hatches.

Assemble also straps, hangers, fittings for electric-wiring systems, conduit pipe, brackets, lamps, drop lights, small switches, and telephones.

In one yard women assemblers file surfaces to true, fit gears to shafts, and make subassemblies. Some are so proficient as to make the assembly for an entire unit, such as the mechanism controlling the training of a gun.

Band-saw-machine operator
Battery filler and tester
Battery reader
Bead-machine operator
Bench-lathe operator
Bench worker

Perform such operations as filing, burring, hammering, brazing, soldering, hand tapping, dimpling, hand forming of metal into various shapes, heating metal with gas torch, and rolling metal into cylindrical shapes. Other work consists of making hangers for putting up wires and cables, engraving of dials, name plates, tags, etc., and removing parts from electrical connection boxes.

Women also calibrate instruments, hand-lap parts, and punch, stamp, bend, drill, grind, file, and polish parts in the sheet-metal shop.

Bending-roll operator (cold press and mangle roll)
Binder
Blacksmith helper

Hold and fetch tools; operate lever of a pneumatic press.

Blade straightener
Boatbuilder helper

Hold and fetch tools; hammer and saw.

Boiler builder
Boilermaker helper
Bolt-cutting-and-threading-machine operator
Bolt-threading-machine operator
Bracket-tipping-machine operator
Braiding-machine operator
Brake-machine operator
Brazer
Bucker-up (sheet metal and steel)
Cable finisher
Cable stripper, hand and machine
Calker (on wooden boats), trainee
Canvas worker
Carpenter or shipwright helper
Castings cleaner (with grinding wheel)
Chain-ladder maker
Chromium plater
Circular-saw-machine operator
Cleaner (ship, shop, tank, yard)
Clerical work, shop

Time clerks, dispatchers, expediters, material checkers, blueprint clerks, mail girls, messengers, materials-control clerks, storekeepers, shipping clerks.

Coppersmith helper
Core cleaner
Coremaker and helper
Women were making only the smaller and lighter-weight cores, but helping on the large ones.
Crane operator, electric overhead and electric portable
On cranes with capacity of from 3 up to and including 100 tons.
Crane safety watcher
Cushion man
Cut-off-saw-machine operator (metal bar stock, bolts, cable)
Cut-off-saw-machine operator (wood)
Cutter, hand (sheet metal)
Cutting-machine operator (cloth)
Cutting-machine operator (metal)

Deckhand
On 50-foot boat plying between yard and nearby repair base.
Die-sinking-machine operator
Dipper
Do-all-saw-machine operator
Drill-press operator, single and multiple spindle
Driller, hand
Driver (automobile, bus, jitney, truck; panel, mail, or station wagon)
A few women were driving electric trucks inside the shops. Most were operating gasoline vehicles outside.
Drop-hammer operator
Operate controls and hold dies in place. Do not lift metal stock.

Elbow maker
Electrician, journeyman and helper
Elevator operator
Embossing-machine operator
Engine-lathe operator
Engraver, flatware
Engraving-machine operator
Escort
Fire watch
Flag maker; beading preparation and sewing
Flanging-press operator and helper
Folding-and-perforating-machine operator
Forelady (print shop)
Forming-press operator
Furnace tender

Garage service attendant
Gardener
Gasket cutter
Gear-cutting-machine operator
Generator operator
Glasscutter and grinder
Grinding-machine operator (dry and wet; cylindrical, internal or surface with magnetic chuck)
Grinding-machine operator (portable)
Guard
Look over credentials at the gate; patrol yard and shops. Some are sworn in as Coast Guard auxiliaries and carry weapons.

Hydraulic-press operator (automatic)
Inspector (machine shop)
Jointer-machine operator
Kick-press operator
Labeler, hand

Laboratory assistant
Chemical analysis; materials testing; sand control in the foundry.
Laborer, miscellaneous process
Laborer, service and maintenance
Maintenance and repair on buildings and grounds, i. e., repair and maintain extension lights; change street-light globes; clean out manholes; put in telephone and light wires; oil electric heaters and fans in all buildings; clean, help install, repair, test switchboards and telephone instruments; cover pipes; make towel boxes; fill in ditches; fire watch in buildings; salvage and bale paper; clean smudge pots after air-raid alarms; wash heavy rubber cables and help roll them up; etc.
Laundry service attendant
Layer-out and helper
Lead liner
Lead-press operator
Leadwoman
Loftsman helper
Machinist, journeyman and helper
Masker
Milling-machine operator
Milling-machine operator (portable)
Net maker
Nibbler operator
Nipple-machine operator
Oxyacetylene-cutting-machine operator (machine burner)
Packer
Paint grinder
Paint maker
Paint-shop attendant
Painter, brush and helper
Painter, radium dial
Painter, sign and poster
Painter, spray and helper
Pantograph operator
Pattern maker helper
Pickling operator
Pipe bender, machine and hand, and helper
Pipe coverer and helper
Pipefitter and helper
Pipe tapper
Pipe tester
Pipe-threading-machine operator
Planer operator, metal
Planer operator, wood
Plumber helper
Pneumatic-drill operator and helper
Some women were operating pneumatic drills of large size.
Powerhouse engineer helper
Power-shear operator
Punch-press operator
Putty chaser
Quarterman (flag and sail loft)
Radial-drill operator
Repairman
Repair and assemble telephones; disassemble, clean, repair, reassemble, and calibrate such instruments and meters as tachometer motors, thermostatic contact makers, hydrogen detectors for submarines, shaft revolution indicators, heat and pressure gages, and compasses.
Repair lanterns, tools, motors, breathing apparatus for fire fighting, valves, chains, pulleys; disassemble, clean, repair, reassemble, and aline optical parts of telescopes, gun sights, binoculars, navigation instruments,

range finders; repair patterns after use in foundry; repair old life jackets. One woman repairs sewing machines.
Rest-room attendant
Rigger helper
Rivet catcher
Rivet heater and passer
Riveter and helper
Rod straightener
Rope worker
Rope-machine tender

Salvage man
Sandblaster
Sander, hand
Sander, machine
Scaler, hand
Scaler, machine
Scraper, hand
Screw-machine operator, automatic
Sewer, hand
Sewing-machine operator
Shaper operator
Shearing-, punching-, and cutting-press operator (combination)
Sheet-metal worker and helper
Shipfitter and helper (none are journeymen)
Slitting-machine operator
Slotting-machine operator
Snapper (working supervisor)
Solderer
Splicer, rope or cable
Stapler
Steel checker
Steel-storage-shed attendant
Stenciler
Stockroom attendant

Tapper, hand
Template maker and helper and learner (hull, pipe, and electrical)
Tester and helper
On valves, electrical equipment, buckets.
Threading-machine operator
Toolroom attendant
Tool grinder
Tracer
Trimmer, rubber
Tufting-machine operator
Turning-lathe operator (wood working)
Turret-lathe operator
Turret-punch-press operator

Upholsterer
Unscrewing-machine operator

Varnisher
Vulcanizer

Watchman
Shipkeepers, going rounds of ships.
Weld checker
Weld chipper
With light pneumatic chipping tool.
Welder, acetylene
Welder, arc (production, tack, helper and trainee)
Welder, spot
Welding-machine operator (union melt and other)
Winder, coil and armature

Wire brushman
Wire-stripping-machine operator
Wood finisher
Wood-plug-making-machine operator

Women's Occupations on the Ships and Hulls in 19 Shipyards

(Women's Bureau survey)

Acetylene-burner operator and helper (hand burner)

Bucker-up

In connection with cold riveting and sealing steel partitions in one yard. On small rivets in another.

Cleaner

In one yard women clean off tops of boilers on board ship, sometimes at a temperature of 140 degrees.

Ship cleaning may involve picking up or sweeping up bolts, screws, etc., putting them in pails and lowering them over the sides of the hull; sweeping, mopping, and washing the ship interior, preparatory to painting and after all fitting has been done; or cleaning up in holds, under engines, in bilges, tanks and the like. It requires a good deal of climbing, crawling in narrow places, working in pipe alley, shaft alley, galleries, bomb storage, etc. The cleaners may have to haul full buckets of scrap up and down several decks with ropes. Tank cleaners must climb into the holds of ships and submarines and use scaling guns and wire brushes, as well as cleaning solvents and water.

Clerical worker, ship

Take care of plans in ship offices. Run errands. Keep records of wiring systems being installed.

Electrician helper

Help electricians to install switches, lights, telephones, switchboards, instruments, fuse boxes. One woman is able to make entire telephone installation alone except for assistance of another woman who acts as her helper. It had taken her two to three months to learn this.

Follow up lay-out men, making sketches of how installations are to be made.

Cut wires for lights and switchboxes, skin armor off cables; put lugs on end of wires; run through cables and strap them up.

Stencil and put identification tags on cables.

Test wires, motors, thermometers of ventilating sets.

Help pack tubes.

Take battery readings on submarines.

Get material and supplies for electricians.

Fire watch

For welders and burners and on ships under repair, as well as construction.

The fire hazard to welders and burners is great on submarine and ship repair work because of the grease, oil, and old paint that are present.

The fire watch is assigned, therefore, to an individual welder or burner to put out any fires that may flare up, watch that something does not burn on the other side of a plate being welded, pick up any inflammable material lying around, and carry equipment and material for her mechanic.

The fire watch on new construction goes all over the ship checking for fire hazards, or she may be assigned to check the ways, scaffolding, and grounds. She does not work with any one welder or burner.

Grinding-machine operator (electric hand grinder)

One woman was grinding down surface of deck with this machine, preparatory to putting on armor plate. The tool used was heavy, requiring lying or sitting on deck.

Laborer, service and miscellaneous process

Shovel sand and residual material in bottom of drydock.

Sort temporary bolts, nuts, clips in bottom of drydock.

Measure lengths of cable and cut them by machine.
Take masking off doors and other fixtures in cabins.
File off edges of pipes installed as hand rails.

Machinist helper
Tighten small bolts; scrape flanges; clean parts; pass tools and equipment.
Assist machinists in installation work.
Perform small jobs with saws, files, drill presses.

Masker
Cover furniture, lights, etc., with masking tape preparatory to spray or brush painting.

Milling-machine operator (portable)
Operate portable milling machine to prepare bases for installation of machinery.

Painter, brush and helper
Brush paint on interior of ship after fitting is completed and ship has been cleaned.
Helpers mark parts for painting and clean surfaces preparatory to painting. Some pass "hot stuff" (bitumastic) to painters.

Painter, spray
In one yard women do some spray painting on the ships.

Pipe coverer
Wrap pipes with a spun glass tape that keeps asbestos covering tight.

Plumber helper

Rigger helper
Assist in putting up rope life lines and help in other ways such as fetching and carrying.

Rivet catcher

Rivet heater and passer
Use electric heater; pass the smaller rivets.

Riveter and helper
In one yard women riveted on steel partitions.
In another yard women helped riveters by carrying rivet guns.

Sandblaster
Women in one yard are sandblasting on the outsides of ships in drydock. They fill the sandblasting machines, operate the controls and hold the hose for the actual sandblasting operation. They wear oilskin suits, face shields, and respirators, all of which are provided by the yard.

Scaler, hand and machine
The scaling guns used in machine scaling require considerable physical strength to operate and produce various amounts of noise and vibration depending on the size of the tool. Scaling on ships and submarines when done below deck involves working in narrow quarters where the noise is accentuated. In one yard women were doing a great deal of scaling on submarines.
Hand scaling is done with a hand chipping tool. This is easier and more suitable work for women.

Sheet-metal worker helper
Assist men in the installation of ventilating systems, lockers, metal furniture, etc. They get material and supplies for the sheet-metal workers, drill holes, put in screws and bolts, buck small rivets, and hold parts in place that are being bolted up by men.
Check to be sure that the proper pieces of sheet metal are available at the right place on the boat and indicate to the sheet-metal workers where each piece is to be installed.

Shipfitter helper
Run errands for shipfitters; carry tools, equipment, and materials; bolt up plates; hold plates in place for welders; drive wedges to hold plates in place; mark parts to be taken off ship, indicating where they go (on repair jobs).

Snapper

A woman welder in one yard was bossing a group of 12 women doing overhead welding in a ship conversion job.

Toolroom attendant

Check air pressure for drillers and riveters and act as tool attendant for them.

Check motors in and out.

Pick up orders for ventilation in compartments and carry them to those who provide the ventilation.

Watchman

Go the rounds of ships, punching clocks. Some on both day and night duty.

Welder, arc, and helper (production and tack)

Women are known to be on all decks of ships on the hulls and at outfitting docks and deep in the holds as well. Women in one yard volunteer to weld from scaffolding on the sides of the hulls. Women hired as welder helpers roll up and sometimes carry around leads for welders.

Wire brushman

Brushes used vary in size from 2 to 15 pounds.

The work involves considerable vibration and torque and the necessity for working in awkward positions that sometimes require holding the tool at shoulder height.

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