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WOMEN AND HEAVY WAR WORK

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THE American traveller in continental Europe a few years ago often was amazed to find women at work upon tasks which in his own country would have been thought impossible through their severity, and degrading in their nature. The French peasant woman was seen behind not only the hoe but the plough. The Tyrolean peasant girl was met staggering under the weight of heavy boards fresh from the sawmill, and the German woman was found unloading canal-boats laden with briquets of peat, which she carried in huge baskets upon her back or head. Thus the traveller, making superficial observations from his car-window, would give pharisaical thanks that his country-women were not as other women are, and muse upon the "chivalry" which holds the saucepan mightier than the shovel, and the perambulator more appropriate than the wheelbarrow, for woman's share of the world's work. But now, how this point of view is changing through the economic and industrial upheavals of the war! The heaviest farm labor, such as ploughing and loading hay, is no longer the exclusive work of the farmer and his hired man, who finds his fields invaded by a "Woman's Land Army," ready and keen to help in any task and, much to his surprise, making good.

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We have forgotten the hard labor of the women among the first settlers of the country, who, while their husbands and brothers were felling forests and fighting off the Indians, often were left to do everything to "keep the home fires burning," chopping the wood and barricading the doors themselves. With increasing prosperity came the period when the work of women was more and more restricted within the limits of household cares, or in the constant but relatively not arduous work in the factory and mill. They thus were more and more withdrawn from the heavy manual labor which has come to be regarded exclusively as "a man's work."

With the beginning of the war came a great change which, originating in England and France, is now involving this country—namely, the determination of how far women can replace men in the heavy industries, *i. e.*, those in which the hardest kind of continued physical exertion is called for. These industries are, at present, almost entirely war industries, which are concerned with the production and manufacture of high explosives, munitions, chemicals, and all manner of appliances for warfare. They involve the lifting of heavy weights, such as large shells or the plates for large electric furnaces, the assembling of machinery parts, etc., and they involve the handling of heavy tools—the pick, the shovel, and the barrow.

The combination of great shortage in labor with the urgency of "speeding up"

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war contracts is leading the managers of large industrial corporations seriously to consider the employment of women, and in a number of instances the trial is being already made upon a limited scale. In fact it may be said to have passed the experimental stage, although in this country the experience has practically all been derived within the past few months.

In making industrial hygiene inspections for the United States Public Health Service during the past summer, I have had opportunity to observe the women laborers in a number of large manufacturing plants concerned with the output of munitions, chemicals, and other war materials upon a very great scale. I have watched women at work shovelling ore, wheeling heavily laden barrows, shovelling sand and earth into carts, unloading heavy acid carboys from freight-cars, standing upon ladders and painting the outside of big iron tanks, running ore-crushers, lifting heavy steel shells, sorting very large pieces of scrap-iron (boiler fragments, old iron piping, broken machinery, etc.), lifting the cumbersome heavy plates for electric furnaces, etc.

Women are astonishingly adept in wielding the pickaxe. One whom I watched for some time unobserved, was plying fifty-six strokes to the minute in picking off congealed tar from a flooring, which was nearly double the rate at which a stalwart man near by was working. This job is both extremely dirty and monotonous, and I was told that it is much easier to get women to undertake it than men. In an oil-refinery it became necessary to clear out the oily muck in

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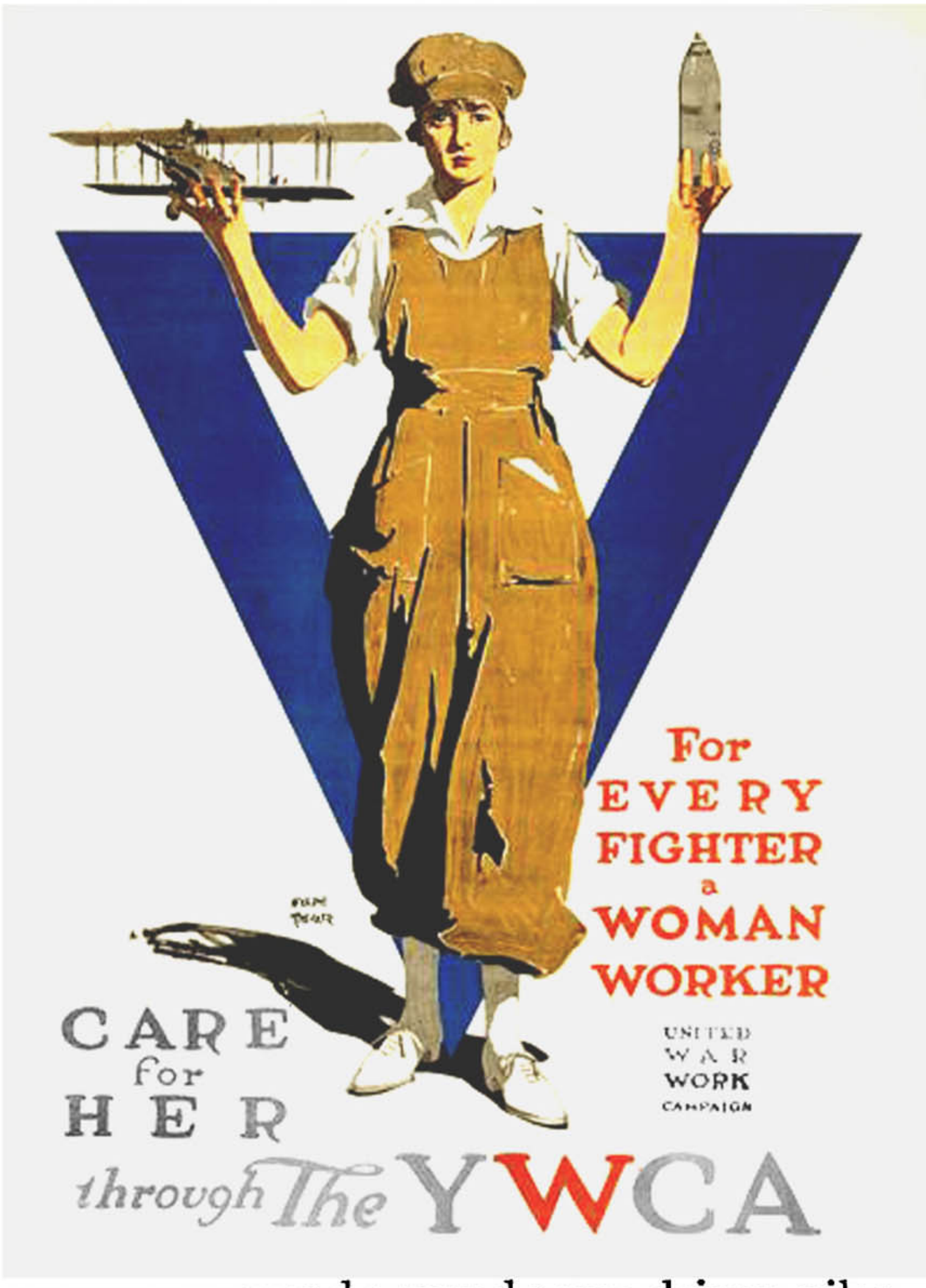

swampy ground around some driven piles, and here women were seen working vigorously with shovels and picks. It is a novel sight, indeed, to find a woman managing a large ore-crusher while enveloped in clouds of dust which make her almost unrecognizable.

Such are some of the many tasks of heavy labor upon which women are being employed to-day. Speaking with many of them, I found them uniformly cheerful and interested in their work, and I have yet to meet a manager or foreman who, after experience with women in these employments, did not testify to the success of their work and express the desire to secure more of them. One large oil-refinery in Pennsylvania began about six months ago by employing a few women in heavy yard-work, such as sorting great piles of scrap-iron, shovelling waste material into carts, and wheeling barrows of refuse. To-day it employs over three hundred and forty women and is looking for more, and so satisfactory has the experiment proved that the women who were at first taken on for short shifts of four hours are now employed steadily for eight hours, and given equal pay with men for equal work.

The output by women workers compares very favorably with that of men. There are, of course, certain variations. For example, it requires two women to carry a heavy sack of cement which one man would take over his shoulder; but, on the other hand, some tasks are performed better by women, as the tar-picking above mentioned. On the whole, also, the women are steadier workers. It is true they are new at the work and eager to earn high wages and make good, but

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they do not get drunk over Sundays or "lay off" for trivial causes, and the labor "turnover," that is, a constant tendency to shift to new employments (which is one of the greatest difficulties in the present labor situation), is far lower among women. Moreover, they do not often belong to labor-unions or go on strikes.

As to the ability of women to sustain heavy labor for long periods without detriment to health, the matter is of too recent trial in this country to offer statistics, but in England they have proved quite equal to the strain, and when properly selected originally, and properly cared for subsequently, they rarely break down. Among the three hundred and forty workwomen above mentioned only two or three left because they found the work too strenuous, and those periodic ailments which theoretically might be expected to impair their efficiency have not thus far proved a serious drawback. It should be remembered, however, that most if not all of the women so far employed belong to a class inured to hard work at home, such as carrying scuttles of coal, washing, and scrubbing. They are, many of them, of the peasant class, chiefly Poles, Russians, Italians, and Slavs, although a few are Americans, both white and negro, and they are usually the wives or relatives of men already employed in the same industry. In the great chemical industries in Niagara Falls many of the women thus far employed are Polacks.

In selecting women workers for the heavy industries certain precautions should be observed, and the United States

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Public Health Service is at present engaged in researches which will lead to the formulation of rules and standards for women workers. These standards are not yet available, but I may suggest the following as desirable:

1. The preferable age for the woman worker in the heavy industries should be between twenty-eight and forty-five years.

2. A thorough physical examination should be made of each applicant by a competent company physician.

3. Existing pregnancy and the possession of infants should exclude the applicant. Young children may be left in a day-nursery which the company should maintain.

4. A competent matron or nurse trained in industrial hygiene should be put in charge of each group of women workers. One such person should be provided wherever the number of workers in a plant exceeds twenty, but whenever the number passes that limit she might easily care for many more, up to one hundred. To her the employee should promptly report any illness or overfatigue, and she should interest herself in the home conditions and mode of life of the employee.

5. In general, women work better by themselves than with the men—there is less tendency to gossip and more concentration of work.

6. Adequate and always separate dressing, toilet, locker, and lunch rooms should be provided, together with rest-rooms equipped with lounges, and a few simple emergency remedies under control of the matron or nurse.

7. A canteen should be provided in connection with the lunch-rooms, where hot soup, cocoa, or tea may be obtained at cost price.

8. The company should provide overalls, caps, and canvas or other gloves, to be sold at cost price, although experience shows that the women often prefer to wear out their old clothes rather than purchase proper overalls. Wherever poisonous chemicals are being manufactured, such as picric acid, or the explosive and highly toxic trinitrotoluol, the wearing of overalls must be compulsory.

9. Transportation and housing conditions may prove as important as proper hygiene in the company's plant itself. Particularly is this true of night-work, where that is undertaken. (It is not at present permitted in New York State.) The woman who leaves the works on a cold winter morning after a night "shift," who has several miles to go to her home, without prompt and comfortable means of transportation, who finds her meal-hours disarranged, and day sleep rendered impossible through a noisy environment

at her home, or noisy children within it—such a one will soon break down, not because of hard work in an eight-hour shift, or because the work itself is any more injurious by night than by day, but because of the conditions affecting the remaining sixteen hours of the twenty-four.

One large corporation with whose plant I am familiar not only contemplates the establishment of day-nurseries for the young children but has studied a three-mile zone around the works with the view of bringing all its women workers into adequate housing within the zone, which is obtained for them through agents of the corporation. In addition it endeavors, in so far as possible, to assign similar hours of work to its men and women workers who are members of the same family. As the men work for nine hours and the women for eight, there is an overlapping of the men's time, *i. e.*, they begin half an hour earlier and quit work half an hour later than the women. Thus the women arrive and depart at separate times from the men, which is a distinct advantage, and enables a woman to get home before her husband and prepare his meal.

10. In the case of each applicant for heavy work the employment bureau should make careful examinations as to family and home conditions, and exclude all women where such conditions are found undesirable.

11. Working women should be given instruction in personal hygiene through the medium of the company physician or social-service nurse. Printed leaflets of instruction also have much educational value.

12. With the possible exception of lead, there are no industrial poisons which are any more injurious to women than to men, and work in chemical manufactures or in dusty trades which is injurious for women is equally so for men. In the admission of women to hazardous trades, such as the manufacture of picric acid or trinitrotoluol, it may be found possible to exact standards of hygiene and protection against poisoning for the women which will prove of equal advantage for the men. In one munitions plant, for example, where I saw over five thousand women employed, the installation of proper dressing-rooms, emergency medical rooms, and an excellent system of medical supervision for the women had resulted in greatly benefiting also the health standards for the men. In this plant, however, the women were doing light work, such as machine stamping, sorting parts of shell-caps, varnishing shells, etc., which is comparable to the ordinary factory and mill work in which

women have long been universally employed, but the company was contemplating employing others in heavy yard-work.

Miss Eva Fenton, of the hygiene staff of the British Ministry of Munitions, who accompanied me on visits to several munitions plants in New Jersey, expressed great surprise at not finding more women employed in heavy work in these plants, saying that in England of the employees in similar service sometimes as many as 95 per cent of all the workers are women.

It would be interesting to have more exact physiological standards for estimation of muscular and nervous fatigue in women workers. Apparatus exists for these determinations, such as scales for recording the force of a blow with a pick or hammer, dials for recording pushing or pulling effort, dynamometers, etc., but as yet few experiments have been made with women workers. In general it is stated that a woman of average strength can lift a weight of fifteen pounds, intermittently all day, without impairing her efficiency. In England, in some cases, this limit is placed as high as twenty-five pounds for work such as lifting steel shells from one table or bench to another. After all, however, the best test is found in careful medical supervision of the work over long periods of time. The introduction of rest-periods of say five minutes in the hour or ten minutes every two hours, in certain kinds of work, has been found actually to increase the total output.

The theoretical objections to the employment of women in the heavy industries are fast disappearing in the face of practical results. For example, it has been objected that the men workers will not tolerate the innovation. It has been found, nevertheless, that where women are shown no favoritism and are not employed exclusively in the lighter jobs in order to force men to the heavier work, the men raise no objection. It has been suggested that the employment of women in the type of industries under consideration would result in certain moral deterioration in their relationships with the men, but this view would scarcely be maintained by any one who has seen women camouflaged in multistained overalls and with faces and hands smeared with graphite, carborundum, yellow picric acid or blue aniline! Such appearances, combined with hard work, are not conducive to flirtation! It is objected that the vigor of the coming race may be impaired by physical strain of women and interference with the regularity of their normal functions. Thus far there is no indication from the observation of women at hard work that such might be the outcome, although the researches available

do not cover a prolonged time. There is, apparently, less ill health among these hard industrial workers taking vigorous exercise, with well-trained muscles, much of it in the open air or in open sheds, than among the poorly dieted, care-worn shop-girl, fatigued by long hours of work and often by ill-advised expenditure of the non-working hours.

It is further objected that we have not yet reached that degree of economic stress which should make it necessary for woman to be summoned to aid in doing man's work. It is not the purpose of this article to enter upon the economic and social phases of the discussion, but merely to point out certain practical matters concerning a subject which is quite new to us in the United States and which rapidly became of national importance as a factor of war industry. The essential facts are that women *can* do men's heavy work with substantially equal output, without any disturbance of the particular industry, and, when guided by proper conditions, without detriment to their health. How far and how long they *ought* to do it in the emergency arising from the war is to be decided upon different grounds.