

hour men for the entire industry to one-third, and if one makes the boundaries of the industry wide enough perhaps to nearer one-fourth. No exercise in percentages can, however, alter the fact that in the great nucleus of the steel industry, where most of the men are employed, in the great plants where iron ore is made over into pig iron, pig iron into steel, and steel into various rolled shapes (excepting sheet), the body of the workmen are on duty 12 hours a day. Whether the 12-hour workers be considered as 50 per cent of 300,000, or as 25 per cent of 600,000, makes not the slightest difference. Working in plants where for the most part they have constituted a majority of the workers, these men, who must number altogether about 150,000, have until recently had no alternative other than the 12-hour day, unless they would change their occupation. For them and for their families, numbering perhaps a half or three-quarters of a million of people, the 12-hour day has become a fixed industrial habit, firmly entrenched in the traditions of the industry and in human lives and habits.

It should be added that in the case of blast furnaces there is not only the 12-hour day but the 7-day week, and with the 7-day week there is associated one very objectionable feature, the 18-hour or 24-hour turn which comes to one-half the men whenever the day shift and the night shift exchange places. The 7-day week is also a common feature of open-hearth work, though some open-hearth furnaces operate only six and a half days a week, and some only six. Rolling mills rarely operate longer than six days a week.¹

¹The 7-day week has, however, been outlawed so far as concerns plants of the U. S. Steel Corporation. Blast furnaces must, of course, operate seven days; but the Corporation has ruled that the individual men must take off one day in seven. By March, 1912, according to a report issued in that year by what was then the Bureau of Labor (*Report on conditions of employment in the iron and steel industry*, Sen. Doc. No. 110, 62 Congress, 1st Session, Vol. iii), the Steel Corporation had (excepting for a very few employees) eliminated 7-day labor in all but one of the Corporation's plants. During the war, the rule against 7-day labor was admittedly not enforced. But Mr. Charles L. Close, Manager of the Corporation's Bureau of Safety, Sanitation and Welfare, now states that the prohibition of the 7-day week, and the abolition of the long turn, is again being rigidly insisted on. He believes that it exists today in only very exceptional cases.

Among the "independents," the 7-day week is, however, still a very widespread practice. As to whether the 7-day week is an evil when the daily turn is reduced from 12 to 8 hours, is a question which will not be taken up in this paper. Where the introduction of the three-shift system ends the long turn, and the day off would not (except rarely) come on Sunday, there are arguments for as well as against 7-day work; it being possible, in fact, so to arrange the system as to give the workers a substantial percentage of their Sundays off.

II. REASONS FOR THE TWELVE-HOUR DAY

When these facts regarding the large volume of 12-hour work in the steel industry first became a matter of general knowledge and discussion some ten years ago and then again last year, a great many people were surprised to learn that so large a group of men could have gone on all these years practically untouched by the movement toward shorter hours. As a matter of fact the development and continuance of the 12-hour day in the steel industry was the rather natural outcome of special conditions, an understanding of which must precede any intelligent approach to the problem of putting the steel industry on three shifts.

There is of course no difficulty in explaining how the 12-hour day started. It was once the ordinary practice in all sorts of industries in England and in the United States.² Nor is there any difficulty in explaining why the steel industry, in common with all other continuous process industries³ should have adhered to a 12-hour day longer than those industries where all the work is done by one set of men. In "single-shift" industries, if we may use that term, the working day can be fixed at any convenient length. But in industries that run 24 hours, the men working shifts must work either 12 hours, 8 hours, or some other even fraction of 24. Now the jump from 12 hours to 8 is a big one and it was quite natural that for a long time after many industries had reduced their hours from 12 to 11 or 10, the steel industry should continue to operate for 12; and the impossibility of making any very gradual reduction of hours for shift workers is doubtless one of the reasons why the steel industry has until this day hesitated to make any change.⁴

But although the awkwardness of the jump from 12 to 8 hours for many years kept most continuous

²Cheyney (*Industrial and Social History of England*, p. 249) declares that "the actual working hours in the factories in the early part of the (nineteenth) century were from twelve and a half to fourteen." Of this country, Bogart (*Economic History of the United States*, p. 254) states that one of the aims of the labor movement of the thirties was to reduce the hours of labor to a day of from "six to six."

³Twenty-four-hour operation is absolutely essential for the blast furnace; it would be very wasteful to operate an open-hearth furnace in any other way (though the open-hearth furnace may be eased up on Sunday); and it is the custom—not quite always followed—to operate rolling mills continuously (closing down on Sunday).

⁴It is claimed that three-shift work was more common in the steel industry 25 years ago than in recent years, the introduction of less laborious methods of work having made possible a lengthening of the day.

process industries on a 12-hour schedule, for a number of years past various such industries have been very rapidly switching over from two to three shifts. There must therefore be some special reason why this did not tend to take place in the steel industry; and to a review of such reasons we shall now turn.

In the first place it is of the utmost importance to understand that most of the work in the steel industry is quite intermittent in character. In most plants one is told that a man does not work more than about 6 or 7 hours on a 12-hour turn, and to one passing through the works this is just about the general impression conveyed. At one of the blast-furnace plants visited a measurement of the working time by efficiency engineers showed that on the average the men were employed less than 50 per cent of the time. Much the same thing is true of open-hearth work, and in the case of rolling mills there are apt to be long waiting periods, or, especially in certain kinds of work, the men are apt to work in spells. So that in all these main branches of the industry, the work is in almost all cases highly intermittent, and while the men are in the plant 12 hours, it is doubtful whether on ordinary days they are actually occupied as long a time as are the men in most 10-hour, and perhaps in some 8-hour plants. Eight hours of actual work would certainly be a liberal estimate for most steel industry 12-hour jobs.

Nor during recent years has the work which the men perform when they are working usually been of a very heavy character. Once this was so. A good deal of heavy labor still remained at the time when Mr. Taylor did his celebrated work at Bethlehem. But nowadays one does not find the pig-iron handler, or anybody shoveling ore. The pig-casting machine, the open-hearth charging machine, not to mention the blast furnace skip hoist, the electric crane, and the mechanically operated rolling mills, have revolutionized the industry. There is a good deal of cleaning-up work that is not pleasant while it goes on, and odd jobs of varying degrees of difficulty, hard and hot shoveling at times around the open-hearth furnace, and severe labor on the hand-operated rolling mills. But for the most part the steel worker of today is simply moving levers, or watching and waiting while the heat and machinery do the work. There is still a large element of hazard, and in places a good deal of exposure to heat; but conditions for the most part are far from being of a shocking sort—especially when one has become used to the spectacular magnitude of everything and realizes that the machinery does not rest on the men.

But, it may be asked, if steel industry work is so slack why do not the employers cut down the force, give everyone steady work and let the men go home at the end of 8 hours, or 10? I should not be surprised if the problem should eventually work itself out somewhat along those lines. But there is this very serious difficulty, that while the men may not be actually working all the time a certain force of men is needed for emergencies. The work in a steel plant is irregular in its irregularity. Some days everything goes perfectly and the work is slight. Other days there is a lot of trouble and for hours all hands will be needed. Furthermore a part of the idle time, especially in the rolling mills, is due to waiting for ingots, or to time lost while changes are made in the rolls. The complete elimination of mishaps and badly balanced conditions, though highly desirable, would be unusually hard of attainment in an industry where the things to be correlated are as unwieldy as in the steel industry. So a condition has become general in which the managers choose to have on hand a fairly adequate number of men, working at an intensity which permits them to stay around for 12 hours.

This is the management's side. So far as the men are concerned, they have for the most part acquiesced in the 12-hour day because physically the manner of work was such that they could stand it, and financially they were receiving in exchange for spending their spare time in the works an additional hour's pay for every extra hour worked. In view of the unusually large number of hours worked per week it is possible that hourly wage rates may not always have been fixed as high in the steel industry as they would otherwise have been; so that it may be doubted whether the weekly earnings have always been increased by as much as the number of extra hours.¹ Even had the steel workers felt that this was so, it is doubtful, how-

¹Considering the increases in the wage rates of steel workers during and since the war it is doubtful, however, as to whether hourly rates in the steel industry are now low as compared with those in other industries. The nominal rate is perhaps low; but considering the fact that the men are paid time-and-a-half for all work over 8 hours (one-third of their day) the average hourly rate is raised to a respectable figure. Thus of the 29 industries listed in Table I (See p. 10), the average earnings per hour worked were higher in the steel industry than in any other. That was at the beginning of 1919. Later there were substantial wage increases in many industries, while wages in the steel industry remained on a level; also the figures for the steel industry must have included some skilled workers who earn extremely high wages. Nevertheless the lowest pay in the industry is not bad, especially when the total earnings for the long hours are figured in. The lowest rate for unskilled labor which I came across this fall (as a result of more or less casual inquiries) was 46 cents an hour straight time and 69 cents an hour overtime. While it is reported that lower