and nonindustrial injuries disabling for eight consecutive days or longer were considered. The average number of persons employed by these companies was about 50,000 men and 2000 women.[129]

The relationship of the human aspects of industrial organization to absenteeism and management's opportunity to attack the problem from this angle has been pointed out by Fox and Scott.[130] They studied simultaneously the rates and trends of absences in the casting shops of three companies of comparable size and location. The major differences between Company A, which had a high rate of absenteeism and Company C, characterized by a low rate of absenteeism, were in the "internal

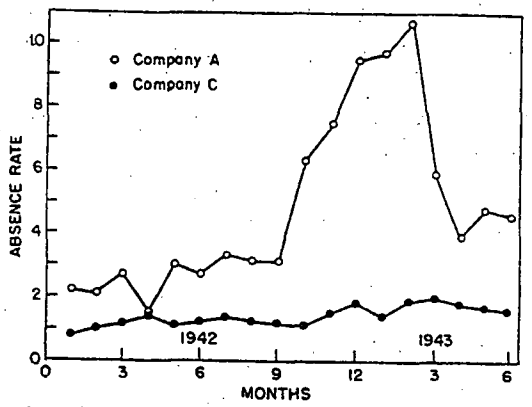

FIG. 20. Absence of workers in casting shops of two companies.[130] Absence rates were computed as percentages of workers on the payroll.

organization" of the two shops. In Company C an efficient two-way communication existed between the management and the workers: there was provision for the communication of workers' complaints upwards; also, company's policies and practices were explained to workers by their supervisors and foremen. The handling of the human relationships by the foreman was considered an important part of his job, and care was taken not to overburden him with technical responsibilities for production. One of the important factors directly tending to affect absenteeism was the difference in the payment system. Company A used individual piece-work payment and paid each caster for metal poured on one shift. Company C had a group payment system under which all the men *on all three shifts* on each furnace line were considered as a single payment unit. "These developments of internal organization have given rise to a team spirit, and have induced a social pressure of the team upon the individual of a kind that management would never dare to exercise."[130]

The rate of absences in the two companies for 18 months is represented in

[129] W. M. Gafafer, in *More Manpower Through Reduction of Absences*. Industrial Hygiene Foundation, 1942.

[130] J. B. Fox and J. F. Scott, *Absenteeism: Management's Problem*. Harvard Univ. Press. Cambridge, Mass., 1943.

Figure 20. In these data a series of consecutive days of absence by one man was counted as one absence. The rate of absences in Company C was lower than that of Company A throughout the period studied, and the fluctuations were negligible. In Company A there was a sharp rise in the absence rate during the winter months of 1942–43. This was a period of uncertainty and rapid changes of the work schedules and rates of payment. These factors were affecting both companies, but Company C was able to adjust to these changes by timely communications of the relevant information to the workers without creating confusion.

V. Comment

In dealing with production materials, management seeks the expert advice of test laboratories. When dealing with the human factor arbitrary decisions and rule-of-thumb are often used, even in cases where an experimental evaluation of possible alternatives is feasible. Thus it may be company's "policy" to enforce standing of the workers when the job could be done more comfortably and efficiently in the sitting position or when alternating between standing and sitting would be least fatiguing.

The concept of "scientific management" includes logically the human aspects of industrial efficiency. Contrary to the widely held opinion, F. W. Taylor was aware of the necessity for paying attention to the psychological aspects of management. In describing his experiment on increasing the productivity of the pig-iron handlers, he wrote: "It was our duty to see that this work was done without bringing on a strike among the men, without any quarrel with the men, and to see that the men were happier and better contented when loading at a new rate of 47 tons than they were when loading at the old rate of 12½ tons."[131] It is unfortunate that in the practice of time studies the regard for the human side of industrial efficiency has often been lost. Although the timing of the motion cycles is carried out by the mechanical engineer with great accuracy, the estimation of "normal" production rates and of "fatigue allowances" has little support in fundamental studies of sustained performance capacity in different types of industrial operations. The problem as to what constitutes a proper day's work is much more "bargained" about than objectively and dispassionately studied.

The determination of the most efficient work methods must involve consideration of physiological characteristics of the working human organism as well as individual-psychological and social-psychological factors. The human aspects of industrial efficiency represent a complex problem and its study along any single dimension alone is not sound.

Let us consider the problem of posture, as an example. We can study the effect of posture at work in terms of output, both as daily totals and as hourly output curves. We can determine the effect of the variations in posture on the subjective feelings of fatigue. The difference between doing work while sitting in a chair provided with a well-fitting back support and working in bended position, in which "static work" is done by continued contraction of the muscles counteracting the

[131] F. W. Taylor, *Principles of Scientific Management*. Harper, New York, 1913.