

The road to advancement in these shops, moreover, is not only open to all employees, but every possible aid and encouragement is given. Practically all positions in the organization, both clerical and executive, are filled by those whose abilities have raised them from the ranks. The plant has reading rooms, and a branch of the city public library. Information is furnished employees concerning special classes in the schools. The management believes in encouraging to the utmost individual education and development.

The significant thing about the Clothcraft Shops, however, is not these things taken by themselves, but the fact that the shops are operated under scientific management, the features described being regarded not only as consistent with, but essential to, a thoroughgoing application of Taylor's principles.

Another plant widely regarded as characterized by an advanced spirit in the place accorded to the men, and also for many years in sympathy with the Taylor movement, is the German-American Button Company, of Rochester, headed by Mr. Henry T. Noyes. Mr. Noyes has a wide vision of the change in spirit that is taking place in industry, and regards the old way as a survival of feudalistic class distinctions. In particular, the distinction between office and factory is a relic of the old disdain with which a leisure class formerly regarded the laboring class. Conditions as to hours of work and treatment in the German-American Button Company are identical for office and factory. Even in ringing in and out on coming to and leaving work, officers, office, and factory have followed the same routine.

Mr. Noyes counts on his employees' taking part in the life of the business through regular department and other meetings. Practically all the foremen have risen from the ranks. None of these features are found to be inconsistent with the use of the stop watch. Nor has the latter device prevented the development of the most cordial relations between management and men. Even the Italians of the second generation are welcomed into the fellowship as full Americans.

These illustrations are advanced not because the shops described are necessarily superior to anything that might be reviewed outside of scientific management; but because the honor and attention which great numbers of the followers of Taylor are giving to this kind of thing shows in which direction the tide of scientific management is setting. We do not say that the spirit in these shops is perfect, or that they are an exact prototype of what will later be universal. On the contrary, we are very doubtful about some of their policies. But do they not in fact show that scientific management is striding towards a more humanized and socialized system, a real science of human relations?

The last point which we wish to make is the important one that, in spite of any elements in scientific management which the future may show to have been ephemeral, there is in the original spirit of Taylor, a principle or two that is valid not only for his time but for all time. The changes taking place and to take place in the outer aspects of scientific management have not and will not carry it away from these principles. They may be given as two in number: first, science in industry; and second, harmony in industrial relations.

The science at which Dr. Taylor so skillfully worked was, as he himself used to insist, never complete. With every change in social institutions, the human side of it will have to be recast; with every advance in invention and industrial technique, the mechanical side of it will tend to become obsolete. Yet the vision of a science in industry has taken possession of some dozen of the leaders of American industry, and by them is being passed on to numerous factories, until it is to be hoped that it will reach ultimately the humblest of American workmen.

The harmony which Dr. Taylor tried to establish ignored several important forces, which his training had not permitted him to understand. His quest for harmony led through conflict, passion, and disappointment to death itself. Yet Taylor's vision will not be forgotten, nor will the effect of his effort be lost. In many factories the relations between employers and men have been ameliorated. And his ideal to consolidate and unify the conduct of American business will live.

Mr. George D. Babcock has defined scientific management as "that kind of management which conducts a business or affairs by standards established by facts or truths gained through systematic observation, experiment, or reasoning." Concretely put, this involves, first, the scientific laying out of tasks; second, a just system of rewards for those who successfully co-operate; third, the scientific study of methods; and fourth, the organization of all work according to a functionalized or specialized division of authority. The more one reflects over these principles, the more evident it becomes that the industry of the future will have to be built upon some such general basis.

It will be the task of human engineering to see that the standards set up under scientific management become increasingly more scientific, taking into account the real natures of both materials and men. It will be the task of public opinion to see that industry becomes progressively more vitalized and more democratic.

This paper will be read by title and discussed at the annual meeting. Members should familiarize themselves with its argument and be prepared to participate in the discussion.

SCIENTIFIC MANAGEMENT AND ITS RELATION TO THE HEALTH OF THE WORKER¹

BY RICHARD A. FEISS²

1. Scientific management, as the name suggests, applies the scientific method to all the activities of management. This means that the management assumes the responsibility for thorough investigation and procedure based on accurate knowledge. Not only are materials and equipment scientifically studied and methods for their use and up-keep established, but the human effort expended in their use must also be studied from the point of view of continuous up-keep. In fact, scientific management is the management of conservation. As such it must deal primarily with the conservation of human effort. This is true not only from the humanitarian point of view, but also from the economic. Taking the purely business aspect, there is nothing more profitable or more essential.

2. In considering conservation of human effort the steadying of employment is of the greatest importance. The loss both to the management and to the worker through the constant change of personnel one finds in the ordinary industrial organization, can hardly be conceived. It has often been estimated that the cost in dollars and cents of replacing an old employee by a new one amounts to anywhere from fifty to two hundred dollars. The loss to both the organization and the worker in effort, morale, and efficiency, while less tangible, is far more important. A manufacturing concern in Detroit, employing fifteen hundred men, employed some thirteen thousand men, or over eight hundred per cent of its total standing payroll from the spring of 1915 to the spring of 1916. A brass foundry in New England employing three thousand, employed during the first eight months eight thousand. The latter replacements would be at the rate of twelve thousand a year, or over four hundred per cent. A large rubber concern in Ohio employing over ten thousand men and women is said to have a labor turnover of one hundred fifty per cent. At the Clothcraft Shops of The Joseph & Feiss Company an attempt has been made to approach this subject from the point of view of scientific management. The percentage of replacements during 1915 was forty-eight per cent, and for the first nine months of 1916 was no greater. This result comes from a realization of the importance of conservation of human effort, and of the fact that employment is not a mere matter of hiring and firing but, from the scientific viewpoint, is a matter of hiring and keeping.

3. For the purpose of scientific employment The

Joseph & Feiss Company have established an Employment and Service Department. The functions of this department are conducted from the point of view of keeping every position in the organization filled with fit men and women. The fitness of the worker involves primarily his health. It is apparent on the face of it that a worker under the handicap of even a minor ailment is going to suffer materially in his steadiness and efficiency. His health, therefore, must be conserved in the most scrupulous manner. For this purpose an adequate medical department is considered an essential part of the employment and service function. A medical examination is not only essential for the new employee but a periodical re-examination and follow-up are also an integral part of the work. In this way alone can the results of the work upon the health of the worker be properly checked up and a course consistent with the best health of each individual worker be followed. Some of the details of this work and its effect have been touched upon elsewhere. (*1)

4. In connection with the health of the workers in industry, home conditions are of vital significance. No real educational or constructive work can be done without keeping this fact constantly in mind. The carrying of educational work into the home is of inestimable value. For a very capable description of this kind of work refer to an article entitled "The Relation of Home Conditions to Industrial Efficiency" (**2) by Mary B. Gilson, Superintendent of the Service and Employment Department of The Joseph & Feiss Company.

5. The poor health of a worker is commonly laid at the door of industry. Conditions contributing to the ill health of workers, however, are not inherent in industry, but are the result of unintelligent or unscientific management. While it is true that the conditions under which people work are responsible in some instances for ill health, a thorough investigation of the facts in each case would often disclose the ill health of the worker to be due entirely to personal habits or home conditions. It is common not only for the layman, but also for the physician to jump at conclusions in this matter. Physicians are often too ready to lay the cause of an ailment to a man's work and to advise him, without any real investigation, to quit his job or not to work in a factory. It is very

¹A paper delivered before the American Public Health Association in Cincinnati, Ohio, October 25, 1916.

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*1"Personal Relationship as a Basis of Scientific Management." A paper read by R. A. Feiss before the Society to Promote the Science of Management, Philadelphia, Pa. October 23, 1915.

**2Appearing in the Annals of the American Academy of Political and Social Science, Philadelphia, May, 1916. Publication No. 1009.