

routine system, or a mechanical device. When we recognize the fact that the form taken by the bricks and mortar, machinery, etc., is, in the first instance, conceived by a human mind, we surely cannot fail to realize that ultimate success depends upon encouraging the creative faculty of that same mind. Truly, then, as Mr. Feiss points out, the progress of the plant is, in the last analysis, an expression of a typical group of individuals. I have been simply trying to show how this group can be aided in the expression of their creative powers by giving individuality to the group and at the same time blending every member of the organization into that individuality.

Mr. Mixer missed the point when I indicated the effect of red tape. No man can best express his will if any portion of his anatomy is overdeveloped, as, for instance, the glutton who has allowed his appetite to become his ruling passion. Unless his will asserts itself he will weaken his whole organism by becoming a slave to his stomach. The thing which makes it hard for him to break the habit is the domination of the senses, such as taste and smell, with particular reference to the demands of the digestive tracts.

It is particularly hard for the other bodily functions to get their requisitions past the overdeveloped system of the gastronomic nerves, all of which naturally tends to break up the unity of action.

I agree with Mr. Mixer that there is danger of making Scientific Management too much like a military organization by over-emphasizing the planning department. We must do more than give men a chance to make suggestions to the planning department; we must give them an opportunity to externalize the suggestions of their own minds in the performance of their work. This is something a military organization does not permit to any but the general staff. A military organization is not designed to create, but to destroy, so we cannot handle a producing system in the same way.

A central corporation office assumes the military type when it attempts to determine for all plants a "one best way" of accounting or recording manufacturing operations.

Just as individual men differ in temperament, so the individual plants differ and each one is a law unto itself.

The relationship between the directive principle back of the central corporation and each manufacturing plant should be the same as that between the common law of the land and individual men. This does not in any way prevent the central governing body from adopting standards of great value to the individual units. Except for those regulations,

however, whose violations would endanger its corporate unity, it must not attempt to force their adaptation if they are not acceptable in each particular case.

Mr. Shelton, I fear, misunderstood my meaning. I did not say that the failure of some organizations to put their business on a scientific basis has been caused largely by the fact that they have not used the mechanism of scientific management, but that their failure to use this mechanism for the purpose of perfecting its unity was the reason why they did not make a success.

I agree with him thoroughly that the point of view is of primary importance and the mechanism merely incidental. It helps very materially to clarify the point of view.

In concluding this discussion I feel that I must call attention to Mr. Barth's remark that he does not see how I have time to study anatomy and philosophy. I feel that I cannot afford *not* to take the time. It is of the greatest importance that we understand which way we are going in all of this complicated process of civilization. There must be some purpose back of all of the wonderful creative activity surrounding us and a philosophy of life is necessary, to all of us in order that we may get our poise, otherwise we simply add to the noise and confusion. Philosophy is merely a search for the truth underlying our own individual organized life. So must we also build up a philosophy of management, which will give us the principles underlying industrial organization. In this way, alone can we properly direct it.

#### EMPLOYMENT

(The purpose of this column is to bring available members and desirable opportunities into touch with each other. Names will not be published, but inquiries from those interested will be forwarded to the proper persons. Original inquiries will be given code numbers, to which please refer in answering.)

P1. Opening for man to take executive charge of developing Planning Department. Experience and executive ability required.

P2. Opening for man as assistant to Superintendent in machine shop. Technical gradtate, with two or three years' S. M. shop experience preferred.

M1. Man, age 24, graduate of college and of a business school giving courses in Sci. Mgt., but without practical experience, seeks apprenticeship position in Planning Dept.

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#### SCIENTIFIC MANAGEMENT IN GOVERNMENT ESTABLISHMENTS<sup>1</sup>

By GEN. WILLIAM CROZIER<sup>2</sup>

The title of my address might be understood to indicate that there is some difference in the practice of scientific management in the government service and in private industry. In practice I think that there is not much difference, if there is any; but that there is some difference in the character of the troubles which are encountered through such opposition as there may be to the system, some of which I will bring to your attention later on. I do not have to tell the members of this assemblage what is meant by the term "Scientific Management," nor to describe what the practice of scientific management consists of; but just to be sure that we are thinking about the same things, I will indicate the divisions of the subject under which I will speak of the experience of the Ordnance Department of the Army with it.

#### Taylor System.

The Taylor System of Scientific Management, which is the one we have partially installed in the Ordnance Department, and in pretty full practice at one of the arsenals, can be divided into two general parts. The first part relates to the systemization of the processes of manufacture so that these processes shall be carried on in a perfectly orderly manner, with better forethought than has ever before been given them, and with more detailed arrangement concerning the relations of the processes to each other and the manner in which the work shall proceed through the establishment, without loss of time through collisions or side-trackings of any of the component parts of it. Of course there is nothing new in systemization, since all persons connected with the management of industrial establishments have, from the beginning of industry, been giving attention to the system and order with which the work of their estab-

lishments should be conducted. The new thing for which we are indebted to Mr. Taylor is the realization of the degree of attention which it is worth while to devote to this subject, and of the amount of time, energy, and money which can profitably be expended in connection with it.

It is said on behalf of the opponents of the introduction of scientific management that they have no objection to the systemization features. While the experience of the Ordnance Department accords generally with this claim, it does not absolutely confirm it.

It was in the year 1909 that the inauguration of the Taylor System of Scientific Management was commenced at the Watertown Arsenal, in Massachusetts, of which arsenal the principal output is seacoast gun carriages. The manufacture of seacoast gun carriages resembles that of large machine tools very closely, so that the general character of the shops at the arsenal can, by means of this comparison, be very well understood. The arsenal has a foundry, a forge shop, a machine shop, a pattern shop, and a laboratory. After the introduction of the systemization features had proceeded to a fairly complete stage, I assembled at the Watertown Arsenal the commanding officers of the other large manufacturing arsenals of the Ordnance Department, of which there are five. I subsequently sent to the Watertown Arsenal assistant officers from each of the other four arsenals and kept them there for periods of from a month to six weeks, with the object of having them absorb as much as they could in this time of the special features of systemization which had been put in practice at the Watertown Arsenal, and with such assistance as could be had by correspondence, and with the aid of the central control which I could exercise, to put in practice at their own stations the beginnings of the method of systemization.

At the Rock Island Arsenal, in Illinois, one of the first new features to be introduced was the job card. You know what a job card is. It carries the name of the workman to whom it is given, a statement of his particular job, the time of its commencement and completion, the rate of pay of the workman, and a few items of information with reference to inspection, etc. The principal object of the card is to enable the cost division to charge the cost of the job to the proper order; and incidentally it serves as an assistance in making estimates for new work, and for various other purposes. There was very strenuous opposition to the introduction of this card at the Rock Island Arsenal upon the part of Organized Labor, some of the labor officials going to the vicinity of the arsenal to assist in the manifestations of opposition. The opposition did not abate when it was explained that the object of the card had nothing to do with any efforts which the workmen were expected to make, nor with the compensation for them, but was only intended for the purposes which I have described. Representatives of the opposition demanded as a condition of its introduction that there should be a promise that the features of the Taylor System which do directly affect the workman should not in the future be adopted at that arsenal. The opposition was not yielded to, but after full explanation the use of the

(1) An address delivered before the Philadelphia School of Commerce and Accounts, October 12, 1915, in the hall of the Y. M. C. A. The views expressed are not intended in any way to commit the War Department, which is aware of what has been done in the arsenals of the Ordnance Department but has not taken any final position in regard thereto.

(2) Chief of Ordnance, United States Army, Washington, D. C.