

clerks, the bank about 600, and the department store 2,500 when the work was started. There was range in the three cases cited. In proportion to the size, the results were about the same in each organization.

Scientific management is applicable to any size of office, even to one of half a dozen clerks.

The development of scientific management is a great factor in man-building. In each example quoted, there are now many more people interested in improving conditions than there were when the work was started; some, indeed, have made startling advances. This interest is evidenced not only in the executives but also in the employees. One employee made a suggestion which saved the company from spending upwards of \$50,000 in a proposed building project. The progress we have indicated would not have been possible without this cooperation of executives and employees. We wish again to emphasize this fact: the results shown represent the work of many people in the organization of our clients.

Scientific management builds and perfects the organization. It increases cooperation. It increases interest. Having once thoroughly grasped the meaning and the possibilities of analysis, this magic touchstone is applied by many who previously performed their duties only subconsciously; who followed the ruts worn by their predecessors. Scientific management gives the management a control such as firms of the old type cannot comprehend.

And, scientific management pays. It is often charged that scientific control builds up a huge overhead; an army of clerks, a file room full of expensive records. Figures are not available to show a comparison of the cost of control methods mentioned with the former cost, for the main reason that such control as existed before was inextricably bound up with the regular routine. There is, however, no work that was not performed before. Possibly in all three establishments combined the sum might run as high as \$50,000 a year; certainly not more. But a comparison of the total expenses previous to the development of scientific management and the present expenses shows a net saving in the three offices combined of approximately \$675,000 per annum!

These savings were made possible by cooperation. Emphasis should be placed on the fact that scientific management is an educational process. It does not consist of systems which can be imitated. And it is this educational work which wins cooperation. Cooperation must be preceded by understanding.

IX. DISCUSSION

WALLACE CLARK:¹ I have listened to Mr. Leffingwell's paper with a great deal of interest and want to emphasize one of the points which he brings up, that is, that we must not mistake the mechanisms used in an office for scientific office management. A certain office appliance may be a remarkable mechanism and certain methods may be highly scientific, but that is not necessarily management.

The value of every mechanism and every detail of method should be judged from the point of view of getting work done. That is the yard-stick by which to measure all office work. For instance: in the manufacturing office there are production cards or job tickets which are used in two ways; first, to make up the payroll, and second, to enter on the cost sheet for that specific order. Should this work be done on a Hollerith machine or by hand? The machine is a remarkable mechanism and would be generally regarded as scientific, but judging the machine from the point of view of getting work done, it is found to be much slower and much more expensive. Good management would demand that this work be done by hand. Take another plant in which these production cards have to be classified and tabulated in six or seven different ways instead of two. In that case, the work can be done more rapidly and at considerably less cost if it is done on a tabulating machine instead of by hand. In that case, good management demands the use of a tabulating machine.

Suppose it is proposed in the supply stock room of an office, to use a mnemonic classification of stock items. This is usually regarded as scientific. That stock room is there to issue supplies when they are wanted. Suppose their aim is to fill requisitions within two minutes after their receipt. With that in mind, will the mnemonic classification help or hinder issuing of stock within the two-minute limit?

A stenographic department is organized to get work done; that is, to get into the mail by closing time all the letters dictated that day. It is highly desirable that the stenographers shall increase their speed by even a fraction of a word per minute, but the assignment of work there becomes of major importance. All copying is assigned to typists, leaving the stenographers free to write nothing but dictation. Routine typing such as addressing envelopes, copying lists, etc., is given

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to typists who can stand this uninteresting work, and the cutting of stencils is assigned to a "two-finger" operator, if there is one in the department. It may be called unscientific to use the typewriter with less than ten fingers, but stencils can unquestionably be cut better by a girl who uses only two fingers on each hand. The success of the management of a stenographic department is measured by its ability to get work done.

There are three limits to getting work done:

1. It must be in accordance with a definite standard of quality;
2. It must be done at a reasonable cost;
3. It must be done at the time the work is wanted.

The relative importance of these three limits varies with each specific case. In some instances quality and cost are less important than time; and sometimes quality is most important of all, and where cost is the chief factor, quality and time take second place. However, in the doing of all office work, quality, cost and time must be considered.

Granted that the purpose of office management is to get work done with due consideration to quality, cost and time, what is the most important step for a management to take in order to reach this end? My experience has led me to believe that that most important step is the assignment of clear-cut jobs—giving a man necessary authority to do his work and holding him responsible for results.

You can probably call to mind two managers you have known; one who is exceedingly good on detail and is continually developing new forms and methods; but when the work comes into his office, hands it to anyone who may be nearest him, giving him most minute instructions as to how the work should be done. You probably know another manager who does not spend much time on the detail methods, but has the duties and responsibilities of his subordinates clearly understood; when work comes into his office, he assigns it to the man who is responsible for that kind of work. The manager never goes over that man's head to give instructions to subordinates, and holds that man responsible for the successful completion of the work, giving him, of course, whatever help he may require.

The first type of manager is too often regarded as scientific. The second type is not generally regarded as scientific, but there is no doubt in any one's mind about his being a manager. In any installation of scientific management in an office, therefore, the necessity for clear-cut jobs, adequate authority, and definite responsibility cannot be overemphasized.

As this authority and responsibility are conferred on individuals, they must be given the necessary help to enable them to shoulder those responsibilities. I have found that the easiest way to do this is not to sit down and study every detail of work done by the individuals in a department, and to write out full instructions as to how everything is to be done, but to find out what prevents them from doing their work satisfactorily. Referring again to a stenographic department whose task is to write out each day the letters dictated during that day, instead of starting out with a complete investigation of the details of that department, get a report showing how many lines of dictated matter are left over at the end of the day, and then get at the reasons why they were left over. That will lead directly to the condition which is most unsatisfactory and that can be investigated and the trouble remedied. In practically every kind of office work this can be done. In the multigraphing department, it is the lines of work left over at the end of the day; in the receiving department, the packages which have been received during the day, but not delivered at closing time; in the filing department, it is the unfiled letters or orders; at a telephone switchboard, it is the absence of the operators from the board; with the house electrician, it is the time the elevators were not ready to run or that lights were out; and so on through other departments.

I have suggested that the yard stick by which to measure the details in the management of an office is their effect on getting work done. The use of such a yard stick will help to eliminate and simplify office work. The engineer must eliminate idleness, unnecessary equipment, unused space. He must simplify methods of doing work; that is, in clerical work he must simplify the forms used and the method of transferring information from one form to another. In letter writing, he must simplify both the work of the dictator and of the stenographer. Office work has become so complicated during recent years, that it is top-heavy, and in the reorganization of an office one of the most important aims must be to simplify work. The success of any reorganization depends on the simplifying and elimination of work, and upon the training of all office workers to simplify their own work and overcome their own obstacles.

The responsibility of the engineer, therefore, is not only to conduct investigations and discover the best methods, but also to inspire workers constantly to investigate for themselves and discover better methods.