

centive for a foreman to cooperate with the workman. Therefore, while the majority of the men may be doing what they consider a fair day's work, and some few may be working efficiently, the efficiency of the whole is low.

One example will illustrate a well-known loss in efficiency. A workman in the hat trade performed one process in making a hat by piece-work, and earned not over \$15 a week. He was well adapted to that kind of work and could easily have earned \$25 a week at that rate and would have been happier doing his best, especially as he needed the money. He was limited to \$15 a week by the union. It cost that firm more by this method, because the floor space occupied by this part of the work could have turned out 60 per cent more hats if the men had been rightly selected for that kind of work and had been permitted to do their best. It also cost more because overhead charges were 60 per cent more per hat than was necessary for that operation. More than that, a workman who is well fitted for a task is not happy when he is not doing his best and earning all of which he is capable. There is an economic loss to each, and the result is bad. Even greater inefficiency than this may occur with day workers.

## II. SYSTEMATIZED MANAGEMENT

This term as used here applies to the well organized and managed plants which make no claim to Scientific Management as such. In these plants the managers are methodical and systematic, have studied and systematized each department carefully and aimed to secure the best that has been done in the line of systematizing up to the present time. As stated before, in some departments of many such plants, the efficiency is exceedingly good.

A. *Accounting.* In this form of management the accounting is well done. The books will show the condition of the business quarterly or monthly, and in considerable detail. This will include the comparative feature; that is, for example, last year's costs to date with this year's costs for the same period, for a given department or product; will show costs of materials and labor, and the proportion of overhead charges that make up the cost of a single job or a given product. Such results may even be charted and shown in graphic form to the management each month. Other records will come up weekly or even daily. As accounting is the means by which is ascertained the exact condition of the business at a given time, the *systematized* management recognizes the importance of this information. Much

of this accounting, however, is done with the ultimate end of securing correct costs, and these cost data are relied upon almost wholly, (1) to establish the selling price, and (2) to point out excessive costs and indicate perhaps where they may be reduced. Many believe that when their accounting is well done they have a systematized and efficient plant, but this really covers one phase only of the management.

Frequently, too, the clerical work in the different departments is not a part of the general accounting, and is not controlled by the ledger accounts. In other words, the same general system of accounting does not permeate the whole plant and help to support itself.

B. *Purchasing.* Materials and supplies are purchased through one man or department, a maximum and minimum generally established, and a decided effort made to purchase the materials best suited to the workrooms. Some analytic methods are used in determining the proper materials, and standardizing is done on the more important kinds. This purchasing department aims to have a stock of everything required, but buys largely what it is asked to. It does not always make purchases on complete specifications, and a lack of complete standardization increases the detail of that department. So far as the clerical system is developed, however, it is generally quite good.

You will recall the words of a well-known railroad president some time ago who stated, before the Interstate Commerce hearings, that the railroads had reached their ultimate end of efficiency. It is interesting in the light of this statement to note an example of efficiency in purchasing by one system of railroads, which has been acknowledged to me by railroad officials as leading in this particular department. This is the purchasing as done by Mr. Thorne, who buys over \$40,000,000 worth of materials annually for the Union Pacific and Southern Pacific railroad systems. One characteristic of Mr. Harriman when he took over a railroad was that he would go to any expense in order to standardize every bit of material used. Mr. Thorne is the man who carried this out. In a letter the other day he told me that in the standardization of printed forms alone he had saved over 30 per cent in the purchase of that particular commodity. In standardizing these forms he reduced them in number, specifying certain standard sizes of paper, type, and other conditions to be followed, and I have no doubt that in his other purchases his methods have secured a great saving over those of competing roads.

C. *Storage of Materials.* A marked contrast to the

storage methods of the *unsystematized* plant will be seen at once. Here is an adequate room in charge of a storekeeper who issues stores only on requisitions, and is expected to keep his place neat and orderly and deliver his stores on call. A perpetual list is kept in the office and balances with the stores, and the balance is proved by an actual count of the stores once a year or oftener. Stores are partially classified and standardized to some extent. It is only the most-used stores that are assigned to orders before actually called for. The physical handling of the stores, moving them in and out of the storeroom, is done by the assistants of the storekeeper and the efficiency of this work and the orderliness of the department depend wholly upon the kind of man in charge. The central office can exercise very little real control in this department.

Not all systematized plants control work from a central planning station by writing the operations for each process before the work is started; therefore materials are not exactly predetermined and work is still likely to be started before it is discovered that some material is lacking. Neither are the quantities always kept up automatically through the purchasing department by a predetermined maximum and minimum of each kind. Also, it is general practice to have storage space for different departments, some of which are not under control of the office; for instance the miscellaneous supplies used by the power department for repairs, piping and plumbing, electrical maintenance, etc., may be scattered about with little idea of order, while the actual materials for manufacture may be in good order.

D. *Execution of Work.* A complete set of order-cards for recording and transmitting orders is in use. The worker receives a written order for the work he is to do. This seldom takes the form of an instruction card giving him complete information for every move and every tool. It is apt to say *what* the work is, assuming that he will do it in a satisfactory manner. Workers almost always record their time for each job on a card which registers the labor cost accurately. They do not always register the time lost in securing tools, materials and further instructions. The planning of a job, except in plants where the work is very largely repetition, is likely to be done as the work proceeds. Piece-work is used wherever possible, and is considered the most economical way of performing a given operation. It is the aim of most *systematized* plants to secure as much piece-work as possible. This may be unfair for different kinds of work to both employees and employer.

Under *systematized* management the system keeps things running smoothly, avoids most of the mistakes due to the lax methods of the first kind of management and turns out a good product. But a lack of centralized planning and centralized control of workers causes loss of efficiency.

E. *Efficiency of the Worker.* The emphasis of *systematized* management is laid on costs, freedom from errors and bad work, and the greatest output per man and per machine that can be secured. The standard for this output is generally established by the opinions or experience of the bosses, who have neither the time nor the training to ascertain it by exact methods. Great emphasis is put upon the installation of new and modern machinery, but there is not very much analytical work done by the management to ascertain whether the worker is working in the very best possible way, or whether he is adapted to the particular job he is given. The person who has charge of the employment considers that there are four classes of people—men, women, boys and girls. If the foreman wants a girl, that is sufficient information for the one in charge of the employment, and a girl is hired and assigned. Little or no thought is given to the question whether that particular girl is the right one for the task.

For instance, in bookbinding there are different kinds of work. Laying gold leaf calls for a girl with small fingers and a delicate touch. Strength is not required. Another operation calls for a large, strong girl, who can easily handle bundles of work weighing seven or eight pounds. In proofreading the time reaction of seeing a word and grasping its meaning is a very important feature. Other girls doing inspection must have the ability to concentrate their minds on one particular operation. The different kinds of work demand girls selected with special reference to their aptitude for their particular work. In every factory will be found workers in one department who cannot successfully do their work, but who could successfully do work of another kind. The scientific selection of the worker is almost unknown in the *systematized* plant, and this fact alone makes impossible the highest efficiency.

When I think over the psychology of industrial workers, I am reminded of my own experience in college. In the psychological laboratory tests were made on all my class. I had the quickest time reaction from seeing a flash of light to muscular action in pressing a button; I had the slowest time reaction in the class to seeing a word, comprehending its meaning and then pressing a button which registered the time it had taken