

shop, make his distribution to his various men, who would start from a central point, make the necessary moves, return the signed slips to him, who in turn would bring them back to the office. As noted above, with one day allowed for this procedure on our schedules in ordinary cases, it worked well enough, but was not suitable to cope with an emergency. We have, therefore, made modifications as follows: Our movemen at present are distributed two in each department and two circulating men. During the period of a large amount of work in the shop we add a man at the weakest point, but the above represents normal conditions. While the chief moveman has been retained, the work has been decentralized to a certain extent. In each department there is a shop clerk whose duties are to sign for, place and keep a record of all departmental materials. When a move is sent from the planning department to the shop it rests in the hands of this clerk. The movemen in the department take care of moves in the department and on the same floor, being directed by the clerk. And when a circulating moveman arrives in a department he reports to the shop clerk, who has authority to give him a return load. Meantime the chief moveman is circulating among the departments both from a standpoint of supervision and rush moves. So far as the trucking end is concerned, the present method seems entirely satisfactory. To expedite the clerical end of the work, as noted in a previous section on the route sheets, we have adopted the practise of accepting the board slip with the number of pieces finished entered thereon as a basis for moving, provided this amount checks with that obtained on previous operations. This eliminates a part of the delay; namely, the waiting for the inspection slip to go out to the foreman and be returned, and the matching with the board slip which was formerly necessary before an entry could be made and the move made out. Our normal time of moving therefore has been considerably reduced, and particular attention has been paid to a machinery for making instantaneous moves on shortage items. Our latest and most effective method is as follows: A red tag is placed in the box or boxes containing the pieces, with the operation and machines to which the part is routed listed on the tag. The finishing of an operation on an item accompanied by this tag means that the clerk in that department should instantly write a move and have the box delivered to the next operation. The clerk in that department has the responsibility of seeing that that operation is immediately started. In this manner the item is carried through the various operations

to the inspection job, and when ready it goes to the finished storeroom. If it is an item for which there is an assembly shortage, it is delivered direct to the clerk on the assembly job, who turns the inspection slip and any surplus pieces over to the storeroom, thereby completing the transaction and preserving the accuracy of our accounting. The defect in this procedure would be the frequency of red tags. We have sought to overcome this by concentrating the placing of those tags on the work with our chief production clerk, and to date the system has worked out very nicely.

12. It has always been a sore point with the foreman that the truckers were not under their control but under the control of the planning department as represented by our chief moveman or the shop clerks. To keep our records straight and prevent the temporary and permanent loss of pieces, it is necessary that the planning department through the shop clerks have a record of each move; therefore, any departure from our layout which does not leave us covered in this way means more time to straighten the items out later on. At one time we were so hard pressed on moves that we began using a blue-printed list of all machine assembly shortages as nearly as could be estimated in advance during a current month. This list was given to the foremen as well as to the planning department men, and the general foremen were given truckers so that they could move the items on the list without waiting for them to go through the routine. As was expected, there was considerable trouble because of the two systems of moves working simultaneously, but the good result obtained was that this plan brought about a better understanding between the foremen and the planning department than we had ever had before. Each appreciated the difficulties under which the other was laboring. The foremen saw more clearly the necessity of keeping our records correct, and the planning department saw the necessity of moving instantaneously on the completion of an operation. This last is recited here just to show how far we had to go to effect what was demanded. Nothing we had gave the instantaneous relief desired, and we adopted a method. We realize the solution found was not the best but it met a situation, and if a better solution had been found and was available in the records of our Society, it would have been of great value at the time. As an apt illustration this serves to show that we production managers must meet critical situations; but in making adjustments it is our responsibility to see that Taylor principles are not "swept by the board."

## BALANCE DEPARTMENT

13. For many months we concentrated on an effort to place our balance sheets on machine tabulators. We are pleased to be able to go on record as agreeing to the sentiments expressed by Mr. C. Moffitt Ford at the Philadelphia Section meeting when he said, "the utilization or non-utilization of unit posting media might mean the difference between the success or failure of the entire system." But our efforts in this direction brought us in touch with a rapid index file which paid for itself in a year's time. This file permits the use of a sheet 11 inches wide by 11¾ inches deep in place of the old sheet which measured 19¼ inches wide by 14 inches deep. The complaints against the old sheet were identical with the route sheet: bulky, cumbersome and lack of space to permit more than one person using one file at a time. We have now ten flat panels on a stand which permits the taking out of each panel separately, and in which panel are fifty balance sheets. Its rapid reference facilitates the posting of issues, permits more than one person access to information at the same time, and is a great saver of both time and floor space. The balance-of-stores clerk can post issues without having to go from his desk to the file rack and back again, since the stands allow for the carrying of same on a desk. Thus far we can definitely say we operate with two less balance clerks. It is an adapter for our balance sheets that has met with approval by all who have seen it.

14. If this paper has made clear my thought, you are visualizing these problems as coming from a plant operating under the Taylor plan of scientific management; therefore, they are practical—not theoretical—problems. This is a feature in which the business element of our Society at least is especially—yes selfishly—interested. You are visualizing, too, a production manager struggling to maintain the good work begun by an experienced engineer. That manager is apt to be blinded by the narrowness of the confines of his own business; but for us the future of the installation is in his hands. You will see the necessity of pooling all the experiences of installations; you will want a record of the effective and efficient changes made in the actual workings of our principles; you will see to it that through no lack of interest on the part of our Society shall a Taylor installation cease to be a scientific layout; in short, there must be the strongest kind of a tie-up between the two elements of our Society if the installations already made are to be criteria for future ones, because to use an old expression "a chain is no stronger than the weakest link."

## DISCUSSION

CARL G. BARTH<sup>1</sup>: Mr. O'Conner's paper, which I had the privilege to see in advance of its reading, calls attention to a perfectly natural and unavoidable condition in the life of any man-made institution.

It is an indirect statement of the fact so often laid stress upon by Mr. Taylor himself, viz; that while the principles of his system of management were essential, yes even perhaps as immutable as the laws of nature, the detail mechanisms he had to date developed for the conveyance and application of these principles for the attainment of the results aimed at, were necessarily subject to continual, if not continuous, growth and change. He laid such stress on this as to express the opinion that not a single one of his details, either paper forms or mechanical contrivances, would be in use ten years after he handed them over to myself and my co-workers.

Because Mr. Taylor invariably insisted upon the use of such forms and contrivances as had been developed by him and his co-workers up to a certain time, until the members of a new organization should have become thoroughly familiar with these, his "System" undeservedly got the reputation of being an uncompromising and rigid code for the alleged cure of the most glaring ills of any industrial concern. It must be admitted, however, that Mr. Taylor, in at least one notable instance, tackled the reorganization of a company with a mistaken idea of the essential nature of its business, which needed far-reaching modifications of some of the methods of control and cost finding that he attempted to apply in the beginning. However, none of the modifications that were finally developed did in any way go contrary to his essential principles—indeed, it would have been impossible for them to do so.

In the same manner Mr. Taylor's reputation for not even tolerating that a workman should think, but wanting him implicitly to follow instructions only, is due merely to a judgment of a whole by a misunderstood portion of it; for, whenever a workman had learned to obtain the results known to be possible by an implicit following of a set of instructions, Mr. Taylor even insisted on a special reward being given him for any suggestion that would lead to improved instructions and better results.

Mr. Taylor's whole spirit was that of continued progress, but by evolution only and not by revolution; and he again and again warned his disciples to remember that his system was an evolution of years and not a brilliant invention either on his own part or on that of anybody else.

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