

further intensive study of the problem of compensation. Meyer Bloomfield's article is particularly timely—it is the responsibility of scientific management particularly to carry forward the torch of idealism for better industrial relations in these times when throughout industry there is a marked decline in practical measures looking towards better relations with workers. Mr. Cooke's article indicates a new and necessary method of measuring the efficiency of management. And are there still engineers and executives who wonder what the financial system has to do with good management? Is it possible that there are those who still fail to see that the kind of dollar we have is a practical question of management—in these times when executives are having little to manage and engineers few plants in which to develop better methods, because, in part, of havoc created by the influence of a wabbling dollar on prices?

THE following letter from Mr. W. W. Norton will be appreciated by members who are graduates of engineering schools. Fully half of the graduates of these schools become executives in industry and do not pursue the strictly professional work for which they have been narrowly and intensively trained. And those who remain professional engineers find that many of their problems are problems of administration and management. Yet the faculties of these schools persist in their refusal to afford the student opportunity for the study of business administration. Why do not the alumni of each engineering school who have had the same experience as Mr. Norton and who have the same point of view, organize to bring pressure to bear upon the faculty of their school for the purpose of securing such a curriculum as their experience proves is desirable?

TO THE EDITOR OF THE BULLETIN:
Dear Sir:

Some years ago I approached the Dean of the engineering school of one of the largest western universities with the request that I be permitted to take a course or two in the Economics Department of the college of arts. The Dean reminded me that I was a candidate for a degree in mechanical engineering and refused my request. However, I managed to take the courses in question without his knowledge and, of course, without credit. Subsequently, when I told the Dean

what I had done his only comment was to express his indignation at the professors who had permitted me to take my time away from the prescribed engineering subjects. (Although this university now has a school of commerce with a number of excellent courses in business administration, industrial management, etc., I understand these courses are still "taboo" to students in the engineering school).

During the past year I have had these conditions confirmed as the lot of perhaps a half dozen engineers with whom I have discussed the matter. They have uniformly bewailed the lack of training, aside from the technical courses, received at their respective alma maters.

To be sure, in a few institutions a start has been made. The Massachusetts Institute of Technology now offers a course in engineering administration with the same status as their regular engineering courses. Students of their regular engineering courses, however, do not connect with any of the subjects given in these courses. At the University of Wisconsin, where an experienced engineer is giving a number of courses in labor management, with particular reference to the various plans that have been worked out for shop committees, and other methods of employee representation, these courses are "available" to regular engineering students as electives in their Junior year.

But nowhere, so far as I can learn, unless it is to be at Antioch, are courses dealing with the human factors in industry made a part of the engineering curriculum. Men are graduated each year, well trained to meet all of their mechanical problems, but without an idea in their heads about the broader social and economic problems with which they are likely to be confronted. Institutions take the greatest care in training men to handle materials in the most scientific way, without any consideration whatsoever being given to the study of the handling of the men who will work these materials.

As a matter of fact, in a survey which I have just made I find that at only two of twelve leading engineering schools in the country is it possible for regular engineering students to take any courses in the field of industrial relations. And with respect to the exceptions mentioned, I am informed that the initiative making possible these electives came entirely from outside the engineering faculties.

Members of the Taylor Society more than any other group in the country should feel the responsibility of arousing the engineering faculties to this situation. It seems to me that we should be able to bring such pressure to bear upon these faculties as to make them recognize the need for providing as a regular part of their curriculum, courses covering a thorough-going study of the principles of economics, courses in the management of industrial enterprise (including the study of the science of management, as presented by Taylor, Gantt and others, with the idea of inspiring in the student the same scientific approach to these problems that he is taught in his engineering work), courses devoted to labor problems, with a brief study of the labor movement, trade unionism, shop committees, arbitration courts, wage payments and the psychology of the worker.

In an industrial age such as ours, the future is to the class of society actually in charge of the industrial processes—the engineers. Upon the degree then to which our colleges turn out engineers trained to have some regard for social functions of their work will human progress largely depend.

Very truly yours,

W. W. Norton.

MACHINE-POSTED BALANCE OF STORES RECORDS¹

By C. MOFFITT FORD²

I. REASONS AND ADVANTAGES

A. REASONS FOR MACHINE POSTING

BEFORE considering the question of what machine posting of stores records is, or how it can be accomplished, the very insistent and fundamental question arises: *Why* is machine posting?

The first reason for machine posting is *accuracy*.

The second reason is *speed*, greater speed in posting than can be realized by hand when the same amount of information is shown in either case.

The third reason is *legibility*.

There is another question, too, that always comes up; speed and legibility may be conceded, but why should machine posting be any more *accurate* than hand posting? Partly because the machine is largely automatic in its operations, while the human hand and brain are not; partly because, being automatic, machine work is less fatiguing to the operator. But these are only contributory features. They merely *reduce* the frequency of machine mistakes over hand mistakes; they do not eliminate them. The feature that corrects mistakes once made, that eliminates error in the final results, is the positive *mechanical proof* which is a part of machine methods, but which is impossible by hand. Practically the entire theory of machine posting revolves around the mechanical proof. If accuracy in any proposed installation is not important enough to justify the expense of a full and positive proof, it is not important enough to bother with a mechanical installation.

But there is a great difference in efficiency among the various machine systems themselves; for the development of machine posting is really in its infancy. Some applications are simpler, more rapid, more nearly automatic, more readily readable, and, above all,

capable of a more positive proof than others. It is such an application that we believe we have developed in the Eaton, Crane & Pike Company of Pittsfield, Massachusetts, and that I shall endeavor to explain to you tonight.

B. ADVANTAGES OF SPECIFIC PLAN HEREIN PRESENTED

To be somewhat more explicit, the features wherein we consider our own mechanical application superior to any other machine-posting plan of which we are aware are principally these:

1. It is *automatic* to the extent that no other plan is. It is not only *relatively* automatic but almost absolutely so. The operations of selecting the posting columns, determining whether the postings therein are plus or minus, making the calculations, and finally printing the results, are all completely automatic. The only part of the posting process in fact which is not automatic is transcribing the amounts from the posting media to the keys of the machine. The direct results of these automatic features are, of course, greater speed, less mental strain and fatigue, and therefore fewer mistakes to correct in the proving process.

2. It incorporates a *proof* which has been described without much exaggeration as error proof, water proof, hole proof and fool proof. This proof consists of an entirely new method of *double verification*; viz., the customary "old-and-new-balance" proof and in addition a cross footing proof, the combination of which readily discloses any possible kind of error that could be made in the posting process.

3. It *eliminates repetition* of date and distinguishing symbol or order number in any single posting. These designations according to our method are required to be posted once only for each transaction as against twice by either the hand method, or by the usual machine method. This simplification is accom-

¹A paper presented before the Philadelphia Section of the Taylor Society.

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