While we are not at liberty to give actual values of savings in dollars, we can say that we estimate the value of the savings on labor cost alone amounts at present, on the average month's business, to about four times the current monthly expenditures for carrying on this work.

In order to indicate how much of the increased output per man-hour is traceable to increased volume of output and how much to the result of our efforts towards elimination of labor waste in manufacturing processes, we devised a second chart (Figure 3) for showing these relations.

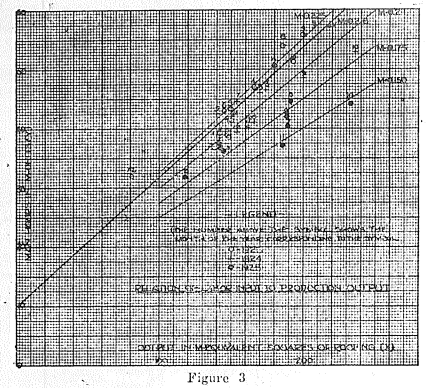

Figure 3

In designing this chart we started from the assumption that, for a plant maintaining the same degree of efficiency, the relation between production output and the total man-hours required for this production can be represented by the general equation, $y = mx + b$, where

"y" is the total man-hours required to get the production output of "x" units;

"b" represents the fixed man-hours; in our case time of watchmen, messengers, firemen, oilers, mechanics, etc.

"m" represents the number of man-hours of productive labor required per unit of output; for a plant operating persistently at a definite degree of efficiency, this value is constant.

In order to test whether this theory could be applied to our operations and to our scheme for measuring the monthly production output, we examined the figures for the last ten months of 1923.

The large circles show the relation between output and man-hours for each month, the month being designated by the figure above the circle.

The value of "b" was determined from records; it averaged for the period close to 10,000 man-hours per month, the maximum for any month being around 11,000, so that this item was fairly constant. It is interesting to note that our work of trying to eliminate waste has not noticeably increased this item, as we expected that it would; we therefore have hopes that we shall ultimately decrease it.

We then drew the line (the heavy line)

$$y = 0.218x + 10000$$

as expressing with reasonable accuracy the relation between man-hours and production output for our operations and organizataions in 1923.

In this equation the value of m (0.218) may be considered as the measure of labor efficiency in the direct production operations. And we have assumed that it gives us an indication of the value of the results accomplished by the work which has been described by Mr. Piacitelli.

All points which fall below the line

$$y = 0.218x + 10000$$

therefore indicate that this work caused an improvement over the average conditions existing in 1923. The relative amount of the improvement is shown, roughly, by the distance of the point from the lines marked m = 0.2, m + 0.175, etc.

It will be noted that all points for 1925 are well below this line, and generally below the points for 1924. This in spite of the fact that the volume of output in 1925 was lower month for month than in 1924.

The point for October, 1925, appears to be much better than any of the others for the year. This is not, however, an accurate portrayal, because it happened that during this month there was an unusually large production of those products which require the least amount of productive labor. It should be remembered that we claim no great accuracy for these charts and for our entire system of measuring the value of this work, but that they are intended to visualize only the general features and trends of the results accomplished. We have found them effective in convincing executives of the value of this work, which is the purpose for which they were intended. And we think that this should make them of interest to this meeting.

The February Meeting

Union-Management Cooperation in the Railway Industry

IT IS with genuine satisfaction that the Taylor Society announces the special meeting to be held in the Engineering Societies Building the evening of Friday, February 5. The subject-matter of discussion and the distinction and authority of the speakers promise a session of unusual importance and interest.

In the spring of 1925, the Society put on record (June, 1925, Bulletin) a case of union cooperation in better management in a small plate-glass manufacturing establishment in Manhattan. At the meeting of December, 1925, William Green, president of the American Federation of Labor, delivered a noteworthy address, printed on page 241, on labor's attitude towards cooperation in developing better management. At the February, 1926, meeting which has been announced, there is to be put on record a definitive statement of union cooperation in management on the railroads.

Problems, methods and detail results will be discussed by Otto S. Beyer, Jr., the consulting management engineer chiefly concerned; labor's appraisal of results will be presented by Bert M. Jewell, President, Railway Employees Department, American Federation of Labor; and the reaction of railroad management will be the subject of an address by Sir Henry Thornton, Chairman of the Board of Directors and President, Canadian National Railways. Meetings of the Taylor Society are an open forum and on this occasion, space should be at a premium in the auditorium of the Engineering Societies Building.

Reviews

Shop and Office Forms, Their Design and Use. By Wallace Clark, McGraw Hill Book Company, Inc., New York, pages 134.

In this work Mr. Clark has given us a most complete and thorough set of standard practice instructions for the preparation of factory and office forms.

The opening paragraph contains a bit of experience that many of us have had: "An engineer is considered a good designer if he develops a machine which produces good results when in use and the designer of forms must be judged in the same way. This is obvious, and yet, even in those companies where the best engineering knowledge obtainable is applied to the equipment of the plant or to the manufacturing processes, the same grade of knowledge is seldom applied to the drawing of forms."

Each of us has his special field of expertness. Within this field we may do good analytical work, but outside of it we seldom, if ever, apply the same type of original thinking. It is for this reason that Clark's book will be of such value to the factory or office manager who is called upon to design forms. The procedure is clearly and graphically shown and Mr. Clark had done the analyzing that most of us hate to do.

The opening chapter on The Purpose of Forms explains the reason for the appearance of those useless forms to be found in the routine of every office.

The second chapter deals with simplifying methods and writing instructions. The points to be remembered are listed and the logic of each explained. Samples of instructions are given but unfortunately the typographer has not indicated the difference between the author's comments and his illustrations. The result is that what really is quite simple and certainly lucid writing becomes difficult reading.

The chapter on The Design of Forms gives the author's standard methods which are logical and should result in a thoroughly satisfactory form.

The chapter on form printing contains much valuable information which should be kept available by everyone who has occasion to order printing.

Then follows a series of samples of forms for stores-keeping, production, cost keeping, maintenance and inspection and the sales department, with explanations of their purpose and use. These chapters are highly suggestive. "The shop methods outlined are those developed by the late Henry L. Gantt," we are told.

The final chapter, Control of Work Through Forms, is too brief to be either instructive or convincing.

Brevity seems, as a matter of fact, to be the only fault I can find with this very interesting and highly instructive book.

W. H. LEFFINGWELL[1]

Problems in Sales Management. By Harry R. Tosdal,[2] Ph.D., A. W. Shaw Company, Chicago, 1925, pages xxiv, 850.

The revised edition of Professor Tosdal's Problems in Sales Management illustrates the rapidity of the development of the technique of preparing problem books of this sort. This advance in three years is marked, and the general trend is in the right direction. This is a better book than the first edition, and subsequent editions may be expected to show even greater improvement. This rapid progress in the art of presenting business problems in this form is at once an evidence of the advantages and of the shortcomings of this kind of a book. The elements of even an apparently simple business problem are compli-

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