

is used in the symbols for loom parts, as BY, battery parts; D, temple parts; L, loom proper parts; WSM, warp stop motion parts. Thus, a bobbin disc stud for a battery would be symbolized as SW (BY-985)L. The number is the manufacturer's pattern number.)

Directly under the symbol appears a space for a second symbol, which is indicative of the location of the item in question in the stores bins.

The unit of issue is the unit in which the supplies are given out to the mill. The unit of purchase is that by which the purchasing agent buys the materials. These may or may not be the same. For instance, pencils are bought by the dozen or gross, but are issued by the piece. Care must be taken to avoid confusing units on the lower part of the balance of stores sheet, where the caption "unit cost" appears, the unit of issue is invariably taken as the base.

The lower half of the sheet showing the headings "on order" and "on hand," is handled in the same way as the debits and credits in bookkeeping.

Many other points might be developed. One of major importance and therefore deserving of mention here is inventory taking. It is necessary to take frequent physical inventories of classified and unclassified stores in order to be certain that any errors, resulting in discrepancies between the physical stock and the book records may be detected and corrected. This is most conveniently handled by a scheme known as "perpetual inventory." Under this scheme, a certain number of items of stock are counted daily. The number is fixed so as to allow for the checking of all stock items four times a year. Also, at four times during the year an actual book inventory is taken. The efficiency of the stores personnel can be determined by the number of adjustments necessary.

THE maintenance department is organized and operated for the purpose of maintaining the established standards as to equipment throughout the plant, upon which depends the performance of each productive operation in accordance with the instructions of the Planning Department, both as to the method to be followed and the time that such operations should consume.

Its function is *preventive* rather than *corrective*, and it is of the utmost importance that this viewpoint be kept constantly in mind by all parties concerned with the carrying on of the work of this department.

Under scientific management the maintenance department is operated in such a manner as to anticipate and prevent in the greatest possible degree loss in output and interruptions to manufacture as a result of machinery and equipment getting in bad condition or breaking down.

Under this system the maintenance department assumes the initiative and the responsibility which are thus centralized in one department instead of being divided and scattered throughout the plant. Under the old scheme the maintenance of equipment was only one of a great many things which the executives (superintendent, department heads and foremen) had to look after and it was well or poorly looked after according to the importance attached to it by the various individuals and the amount of time which other pressing duties permitted their giving it. Under the new scheme it becomes the matter of foremost importance to men who devote their entire time and energy to it in a consistent and systematic manner. (H. K. Hathaway, "Maintenance of Machinery and Equipment as a Part of the Taylor System of Management," *Bulletin of the Taylor Society*, Vol. III, No. 3, May, 1917, p. 7.)

## Methods of Wage Payment and Market Comparisons of Wages

The Importance of Recognizing Differences in Methods of Wage Payment When Group Experience is Used as a Basis of Wage Comparison

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IT IS generally recognized, even though not always admitted, that wages or the prices paid for labor, are influenced, within limits, by forces of demand and supply, just as are the prices paid for other factors required in production. To take this view of wages is not to disregard the fact that labor is furnished by human beings.

This supply is influenced in part, but not alone, by the number of workers available for work of a given kind. Another factor which influences the supply of services is the duration of the working time; another, the efficiency of the workers.

While incentive methods of wage payment are built around the idea that the "exercised capacity" or efficiency of workers is not uniform, the fact remains that very little recognition has been given to this point when market data are used in connection with wage policies. Here comparisons are likely to be made on the basis of an average for all workers in a given occupation. That different methods of payment are only different routes to the same ends is a view implied and often expressly stated.

Interesting information in this regard is furnished by a survey made in April, 1927, among metal manufacturing plants in the Philadelphia area. While the entire survey<sup>1</sup> covered 25,459 employes in 83 establishments, attention will be centered here on a group of male employes operating seven standard machine tools.<sup>2</sup> In this group there were 1,456 men distributed among forty-three plants.

<sup>1</sup>Miss Anne Bezanon, Associate Director of the Industrial Research Department of the University of Pennsylvania, supervised this survey with the assistance of Miss Miriam Hussey of the same department. The participation of the author was principally in regard to the occupations considered here. The detailed study will be published by the Industrial Research Department of the University of Pennsylvania in the near future under the title, "Earnings in Certain Machine Tool Occupations in Philadelphia."

<sup>2</sup>Boring mill, drill press, engine lathe, milling machine, planer, screw machine and turret lathe.

Three general types of wage payment were found to be in use. They were time, piece and bonus. Bonus methods were not uniform in their provisions and the term as used here includes all other than straight time and piece methods. It will be noticed from Tables 1 and 2 that these different methods are used quite extensively among both plants and occupations.

Not only are there different methods of payment but the hourly and weekly earnings are different under each method, as is shown by Table 3. Time earnings are lowest and bonus earnings highest. Thus for the combined occupations the average hourly earnings are 64.7, 70.6 and 78.7 cents for time, piece and bonus methods respectively, and \$32.67, \$35.79 and \$40.53 respectively for weekly earnings. It will be noticed, that piece earnings tend to be 10 per cent and bonus earnings 20 per cent higher than time earnings in both cases.

With the individual occupations there is not an instance where time earnings are not lowest and bonus earnings are not highest, although piece earnings are not consistently 10 per cent and bonus earnings 20 per cent higher than time earnings.

That hourly and weekly earnings are not the same for all methods of payment<sup>3</sup> but that time,

<sup>3</sup>The detailed study referred to in Note 1 will cover the following points: (1) actual wages in the selected occupations; (2) wages between plants; (3) relation of method of wage payment to wages; (4) relation of normal working time to wages; (5) relation of actual working time to wages; and (6) relation of length of service to wages. This analysis will show (1) that the tendency for time, piece and bonus earnings to increase in the order named holds not only for the market but also for the individual plants as shown by a frequency distribution of average hourly plant earnings; (2) that the tendency holds by occupations when only those men are considered who actually worked the normal time of their plants, and (3) that the tendency also holds when allowance is made for the differences in normal time of plants. A discussion of questions of statistical method and economic theory is anticipated in certain of the economic journals.