



Figure 9.

*Explanation*—The spotted line represents end of month total inventory as reported in thousands of dollars.

The heavy full line represents the average monthly rate of replacement cost of stock sales (except consigned pipe) in the three months next following the points of plotting.

The actual average for each quarter is plotted against the inventory amount at the end of the previous quarter.

The light full lines parallel the monthly sales rate line to indicate the levels at any point on the chart representing 2, 3, 4, etc., months' sales at the then average monthly rate line.

improved spring business according to forecasts, it would be desirable to permit increase of inventory to higher levels in the spring. The financial budget operated to keep tabs month by month upon this permitted increase in total inventory, and from the chart it is observed that inventory was expanded from a low point in November, 1922, to a high point in March, 1923. This high point represented a doubling of stock on hand, although the bulk of the increase was in the margin of material in transit and not in the material actually on hand in the stockroom.

Thus, if December 31 inventory equals January, February and March sales, the inventory line will fall on guide line 3. And, if the inventory is maintained on a similar three months basis, the line will stay on that guide line.

The future estimated sales line may be drawn and the guide lines extended parallel to it. The present inventory level, carried into the future, would show as a horizontal line to the sales, is read from the extended guide lines.

right. The significance of that level, in terms of the future crosses indicate marks set in advance by the general office.

Nevertheless, the commitments had been doubled in so short a time as four months and it would have been a simple matter for free purchasing habits to have been formed.

Again the policy was invoked, however, when in March, 1923, new inventory marks based upon forecasts were established for the end of June. The inventory level established for Portland Branch is again shown by a cross, and the chart records the immediate adjustment of the branch's inventory policy. The revision of policy was made sufficiently

early and definitely so that the inventory mark was reached on June 30. The chart indicates that this liquidation virtually meant only a limitation upon commitments for material in transit. The material actually in stock (as represented by the lower of the two spotted lines) was not yet decreased. This actual in-stock inventory was at good levels until July, insuring good service over the counter at that branch, as long as the second quarter sales (represented by the March location plotting on the chart) remained at peak levels. The real decline in the in-stock inventory did not begin until after the peak of orders had passed.

By the end of June, 1923, the peak of sales had been passed and there had been sufficient confirmation of the general forecast of a decline in sales so that, in July, there were established with confidence inventory marks to be reached at the end of December. As always, the inventory marks considered the burdens which were placed upon inventory in view of the anticipated rate of sales in the following quarter. Thus the inventory mark set for December, 1923, represented three months' sales on the basis of the estimate sales for the first quarter of 1924. At a glance the chart indicates that rapid strides were made in the direction of the inventory mark, first by eliminating the margin of material in transit and later by an actual reduction in the material on hand. This latter reduction was possible largely because of seasonal decline in the rate of orders.

To the right, the guide line projections into the 1924 section of the chart are based upon the 1924 quarterly forecast for the purchase cost of sales, out of Portland branch stock. The January and February projections of the total inventory line indicate the inventory policy recorded by the Portland branch manager by means of his monthly budget estimate. Each month we receive similar budget estimate, figures from other units; and the simple charting of contemplated inventory increases or decreases upon the various branch charts gives a vivid picture of continued or changing inventory policies.

Charts of a similar nature are maintained for each product class inventory, but upon a tonnage rather than upon a value basis. As in the case of the branch inventory charts, so also in the case of the works product class inventory charts, the exceptional theory has been carried out, in that the executive, reviewing a complete series of charts, needs to watch only for those of specific cases where areas are devel-

oping. Of course, in the case of works inventory control, the situation is a little more complex, involving considerations of unfilled orders carried over from month to month to be added to the current rate of incoming orders and questions concerning raw material purchases, the extent of work in process and the rate of liquidation of inventories through shipment; but the principle of analysis and control does not differ greatly.

From much of the discussion so far, it might seem that complete dependence has been placed upon statistical analysis alone. This would indeed be an incorrect inference. Statistics at best are but a handy tool. They may become a dangerous tool, even to the point where the user of statistics will be misguided, unless he combines judgment with the statistical inferences. Statistics serve to aid the mind in its reasonings up to a certain point. Beyond that point experience and judgment must take the final jump to a decision.

It will be interesting to see how statistics, in just this sense, are proving of value to our major executives in their determination of the inventory and production programs for a coming quarter of the year. Figure 10 shows the tabulation of pertinent data which must be considered in order to determine for the second quarter of 1924 its production and inventory program for the product class 014. There is a similar sheet for each product class for which it is advisable to establish a program in advance.

This type of quarterly estimate, prior to each quarter of the year, is in effect a revision of the original annual estimate. The revision will be made in the light of present knowledge and experience, just as the need is arising for a sound basis for entering into the shops work orders for what will become the next quarter's finished production. Now, at the time of considering the program for the second quarter, the latest actual information at hand is the information for the closing month of 1923. In other words, in order for the producing units to receive their information sufficiently early to enable adjustment of their raw material purchases and work in process (so that they may effect inventory increase or decrease in the second quarter), the authorization must be granted to the vice-president in charge of production not later than the first of February. At that time, not even total January orders will have been reported. Hence, it is necessary, not only to estimate all the factors operating to affect inventory