

early in the year, naturally contracted their later ordering to such an extent that our cycle line fell almost vertically after April, stabilizing after June at below-normal levels. Taking the year as a whole, the amount by which we overran the external index in the early part of the year was almost wholly offset by the amount of underrun later in the year.

Further than this, all sections of Figure 7 depict the curves projected throughout 1924. The projections shown are upon the dead line basis—that is, upon the basis of order volumes which can be counted upon from the sales units. The projections were determined by our opinion as to how the external index would probably run throughout 1924, an opinion which was formed, of course, after considerable economic investigation. As a check upon the reasonableness of the foregoing analysis and of the 1924 projections the lower section of Figure 7 gives another convenient index designed to reveal the cycle action. While this index is not quite so reliable as the index in standard units, at the same time it does have a certain check-up value. Thus, if the estimate looks reasonable against all the possible means of checking it against past performances, there is a fair degree of probability that it will approximate the actual, which time will develop later.

By charts of this type prepared for each product group and by similarly specific data concerning product classes with reference to their product group, it is possible to build up one year in advance for each quarter of the year a dead line estimate for each product class of importance. To suggest how essential it is that we give separate consideration to each class of product, not only as to its peculiar individual characteristics, but also as to its relation to the grand total, there is introduced here the product group seasonal tendency chart, Figure 8. This chart brings together in one place the varying seasonal tendencies of the major product group covering product of our own manufacture. It may be interesting to state here that in general, so far as the business cycle is concerned, the product groups all rise and fall together, but when the business cycle variations are combined with these varying seasonal fluctuations, there is often very little appearance of similarity between product groups.

Now, of course, this annual program determined for the year in advance must be revised as current reports are posted. If the first months of the year show that orders are running 10 per cent under the

initial forecast there may be the option of considering that we may still get the same actual annual total. This would probably mean that the shortage of anticipated orders in the early part of the year would be offset by an overrun of orders toward the end of the year. On the other hand, analysis of other factors might indicate that the 10 per cent overrun in the first months should really indicate to us that our annual estimate as a whole was 10 per cent optimistic. In any case, as the year progresses, there is a constant check-up and revision according to later developments. Sufficient has been shown in this connection to indicate that the application of statistical analysis develops the possibility of estimating orders well in advance—that is, sufficiently early to determine a mature production and inventory program while there is yet time to control the factors governing production and inventory. Before closing our discussion, it will be well to suggest how the significance of the projected order estimate can be "brought down to earth" and applied to the control of inventories and of production.

Figure 9 shows the Portland Branch inventory chart, posted as it would have been about January 25, 1924. The Portland warehouse had a considerable inventory when the old owner sold the interest to our company. During 1921 the inventory line showed some liquidation of inventories in spite of a very low rate of sales. However, at the end of 1921 it was found advisable to write off in an adjustment a certain portion of that inventory. Even with this adjustment the inventory entered 1922 with what we consider to be an undesirably large number of months' sales tied up in stock. This situation was improved during 1922, not so much by an inventory reduction as by increasing the rate of sales without a proportional increase in inventory. Hence the shaded area above the three months' inventory line gradually diminished.

In September, 1922, there was established the policy of setting up in advance inventory marks to be attained before a prescribed date. At that time, inventory marks for December 31, 1922, were established for each of the branches. The level of inventory represented by the mark of the Portland Branch is shown on the chart by a cross, the cross applying to the upper of the two inventory lines. October and November show a definite response to the desired inventory liquidation program, but it became evident before the close of the year that, in anticipation of

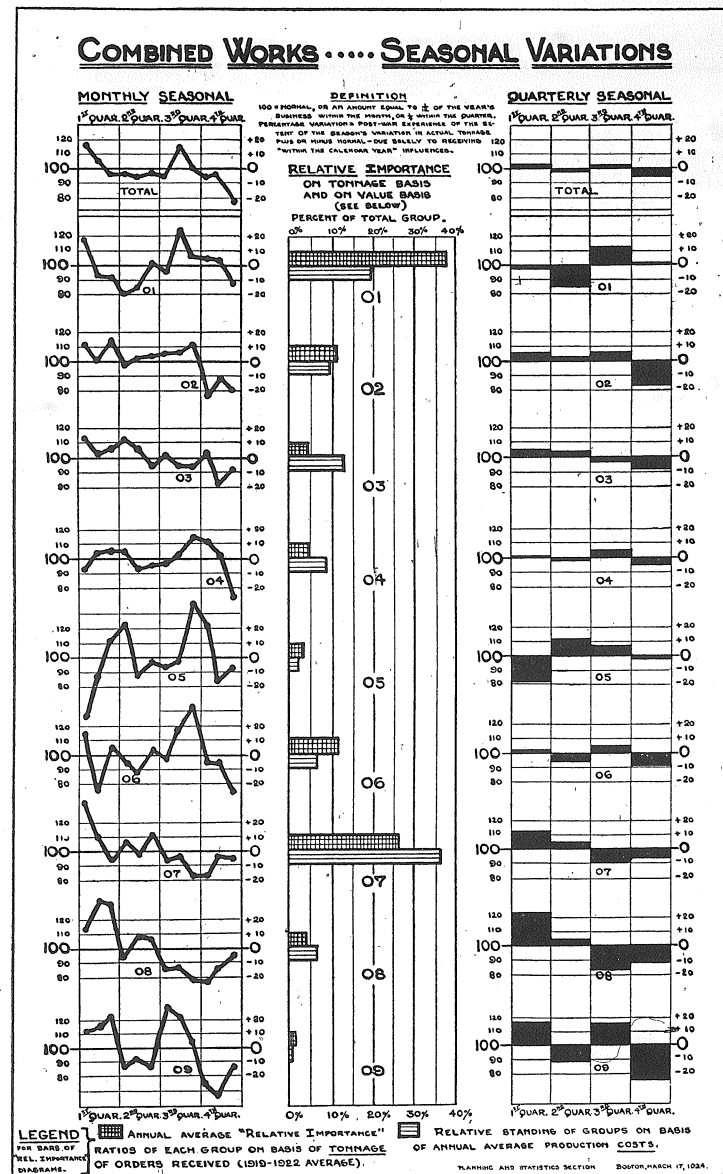


Figure 8.