Appendix B

The Graphic Presentation of Seasonal Patterns

The average seasonal pattern of prices from month to month through the year usually is shown by plotting the data in a simple time chart with prices up the side and the twelve months of the year along the bottom. Charts of this nature sometimes include an additional 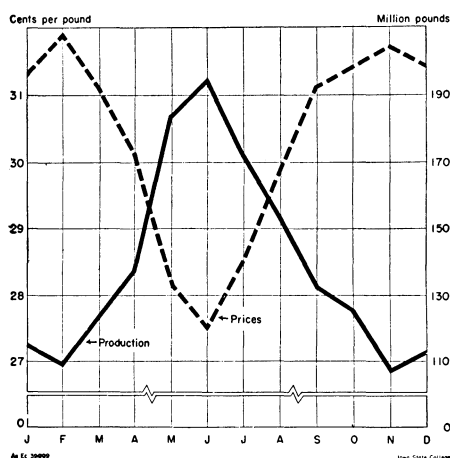line showing the seasonal pattern of production or receipts of the commodity month by month. The two lines usually show an inverse relationship. A typical chart of this sort, reproduced direct from a marketing bulletin dealing with seasonal movements of prices and production,[1] is shown in Figure B.1.

Fig. B.1 — Average seasonal pattern of creamery butter production, and prices of 92-score butter at New York City, 1929–38.

Charts of this kind provide a clear picture of the qualitative relation between prices and production or receipts throughout the year, but they may convey a misleading impression as to the *quantitative* relation between prices and production if the scales are not properly drawn. Figure B.1, for example, would leave most readers with the impression that the average seasonal fluctuation in butter prices is about as great as the average seasonal fluctuation in butter production. Closer inspection of the chart, showing that the scales are both broken at the bottom, would raise a question in some readers' minds as to the accuracy of this impression, but only the technically trained reader would

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[1] Eugene Hamilton, "Seasonal Market Variations and Their Importance to Iowa Farmers," Iowa Agr. Exp. Sta. and Iowa Agr. Ext. Serv., Bul. P5 (New Series), 1940, p. 200.
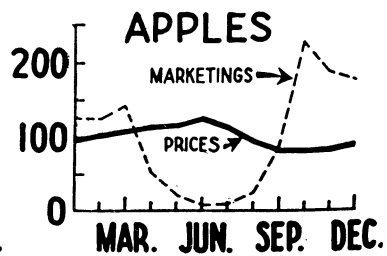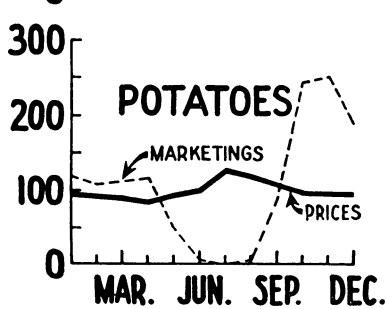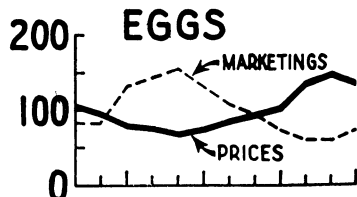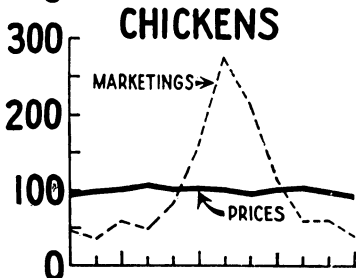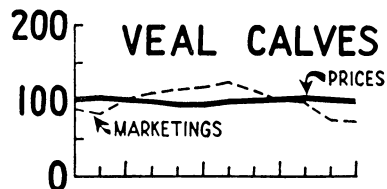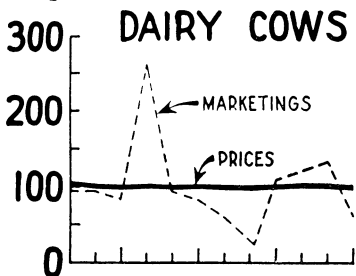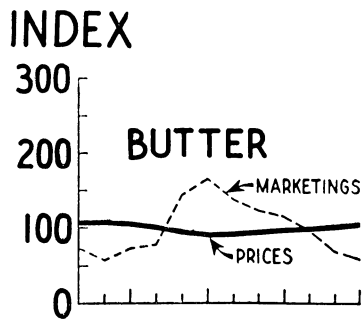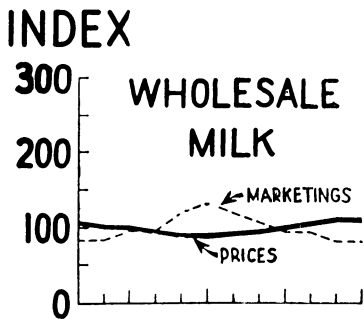
Fig. B.2 — Average seasonal patterns of the marketings and prices of various
Pennsylvania farm products, 1933–37. (Courtesy Pa. State Univ.)

INDEX

WHEAT

300
200 — MARKETINGS
100 — PRICES
0
MAR. JUN. SEP. DEC.

INDEX

CORN

300
200 — MARKETINGS
PRICES
100
0

OATS

200
100 — PRICES
MARKETINGS
0

RYE

200
100 — PRICES
MARKETINGS
0

SHEEP

300
200 — MARKETINGS
100 — PRICES
0

LAMBS

300
200 — MARKETINGS
100 — PRICES
0

WOOL

400
300 — MARKETINGS
200
100 — PRICES
0
MAR. JUN. SEP. DEC.

HOGS

200
100 — MARKETINGS
PRICES
0

BEEF CATTLE

200
100 — MARKETINGS
PRICES
0
MAR. JUN. SEP. DEC.

go further and carry through the mental arithmetic involved in comparing the proportions of the parts of the two scales shown.

Yet a little computation shows that the price scale is nearly four times as great as the production scale. The two scales would not run down to zero at the same point. Actually, the fluctuation in butter prices was only about one-fourth as great as the fluctuation in production. Butter prices were much more stable than butter production; they fluctuated only one-fourth as much as production.

There are several ways of avoiding this sort of misrepresentation. One way is to make both scales run down to zero at the same point at the bottom of the chart, using no broken scales at all. This is shown in Figure A.3, reproduced directly from another marketing publication.[2] A feature of this sort of chart is that it either leaves a large amount of space blank, below the lines on the chart, or, if the vertical scales are compressed in order to prevent this, makes the fluctuations in prices appear small. (The latter alternative was chosen in Figure B.2.) Perhaps this should be considered an asset rather than a shortcoming; the statistician would argue that if the fluctuations actually are small, proportionally, they should be shown that way. Farmer readers, however, might feel differently about the matter. They might argue that even a small fluctuation in prices means a large fluctuation in profits, and profits are what they are interested in.

Another way of handling the chart is to use large (but still proportionally equal) price and production scales; that is, make a very "tall" chart (long from top to bottom) and then cut off the lower half. This shows up the fluctuations more clearly, but does not show directly how great the fluctuations are proportionally. And it does not enable direct comparison of one chart with another, unless the same amount (for example, the lower half) is cut off all the charts. Still another way is to use logarithmic scales. This is a very good method in most technical respects, but it has the disadvantage of being not perfectly clear to the nontechnical reader.

Then what is the best method to use? There is no one method that best suits all purposes. The thing to do is to use the method that best conveys the particular message to the particular audience involved. For a technical audience, perhaps the best method is not to use a time chart at all, but to use a scatter diagram. This shows the relation between the two in demand curve form, and enables observation of any curvilinearity in the relation. This demand curve is not the consumers' demand curve, but the dealers'.

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[2] Ellen F. Anderson and F. P. Weaver, "Prices and Pennsylvania Agriculture," Pa. State Univ. Bul. 384, 1939, pp. 17–19.