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Accountant's Role in Product Obsolescence

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Approaching obsolescence of one of a client's product lines can often be predicted in an industry where conditions are stable and marketing practices are comparatively unimportant. Here's the story of—

AN ACCOUNTANT'S ROLE IN PRODUCT OBSOLESCENCE

by Harris J. Nadley
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JOHN MAYNARD KEYNES, the eminent British economist, once said, "In the long run, we are all dead." While this happy truism may apply rather casually to large industries, and large firms within such industries, when tastes or technologies change, it has much more sudden impact on smaller firms. This article will deal with the latter problem, and necessarily be limited in scope to certain broad types of controllable situations and how the smaller accounting practitioner can assist in dealing with them.

There is no concrete indication that product obsolescence is increasing in frequency, but no one doubts that an acceleration has occurred. This has been provoked by two principal factors: cost cutting and product improvement, both by-products of an increasingly competitive economy.

The smaller firm, working on a thin equity traditionally, is adversely affected with alarming speed. Working capital disappears because of factors discussed later in the text, and since the "life blood" of the business is involved, it is procrastination to re-stock the firm with injections of additional funds. The type of firm most subject to this problem is typically the small manufacturing company, an independent or sub-contractor operation, dependent on one product line or several related lines. It is also the firm with a comfortable set of financial ratios and a history of modest earnings. The author cites five examples of product obsolescence in his experience, with similarities as mentioned above, that occurred in the past few years:

1. Four-ply automobile tires changing to two-ply tires, thus doing away with the recapping industry
2. Linen sanitary hats giving way to paper sanitary hats
3. Wool floor carpeting changing to synthetic carpeting

(and back to wool in some degree)

4. Sheet steel building products being replaced with plastic substitutes
5. In electronics, the swift change from transistor circuit boards to solid state modular circuits.

Naturally, this discussion will be confined to fairly stable industries; it is obvious that some industries depend on rapid obsolescence to create demand by their own nature, i.e., the garment trade in certain aspects and novelty shoes and toys. While these fields evoke a high degree of risk and compensating profit (or loss), the accountant's role, for purposes of this discussion, is to aid the management in recognizing the danger signals and provide for transitional measures to ensure the smooth flow of working capital and, hence, the continuity of the business.

The sales figures for the past also showed that this particular client's products seemed to show a five-year product cycle, so that was the basis on which we projected sales figures. Then a running projection of true sales figures with projected trends gave us a fairly close control over the firm's profit figures.

Methods of detection

A. Statistical Observance

Almost all clients, with the help of figures prepared by their staff or accountants, watch sales records, or, more specifically, trends in sales. Larger firms devote whole departments to this job. It will be the purpose of this discussion to reduce this task to one of restricted application, so that an individual practitioner can feasibly and economically cope with it.

In the course of periodic reviews with their clients, all accountants include sales comparisons in their presentation, most surely. But the bare discussion of total volume is nothing but an interesting few minutes (if it is up over last year's), if they are not dissected with a practiced eye. Basically, such figures should be broken up into two broad categories of treatment—average sale price per physical sales unit per item and comparisons of such compilations to periods for a month previous, a year previous, and three years previous (or a continuous moving average). These figures should then be graphed to visibly discern significant changes. Note that the "product mix," or determination of what items make up the whole sale dollar, is extremely important. Logically, the sales of one item might be ascending while offset by a compensating decrease in another item, and remedial action should be directed accordingly.

The example we are dealing with in this article is that of the most stable of stable industries—one where advertising and marketing practices are irrelevant and where demand remains almost constant, as long as the automobile remains the nation's most popular form of transportation. The company for which we worked out the analysis described in this article was a used tire processor. So obsolescence as a factor in its operations was almost entirely a factor of obsolescence of one of its product lines rather than the total line.

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In Figure 1 (A) on page 39, a typical pattern of a whole sales history is shown. This is the familiar "Gompertz" curve, or "life line" as termed in biological language. The sales start with a strong upsurge, grow at a steady rate, then decline with old age, and if carried to infinity, die away. Our

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ARITHMETIC SCALE

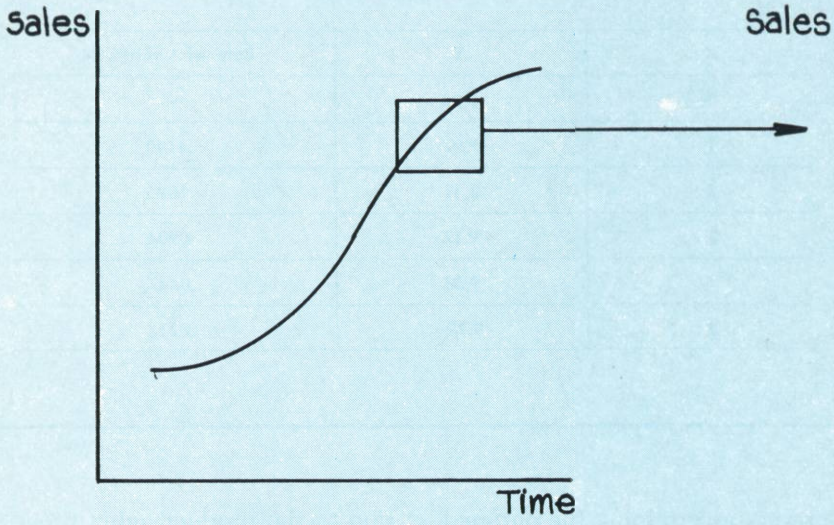

FIGURE 1 (A)

SEMI LOG SCALE

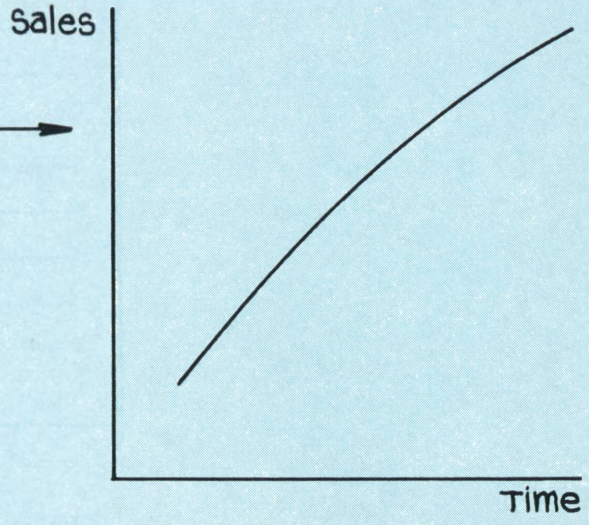

FIGURE 1 (B)

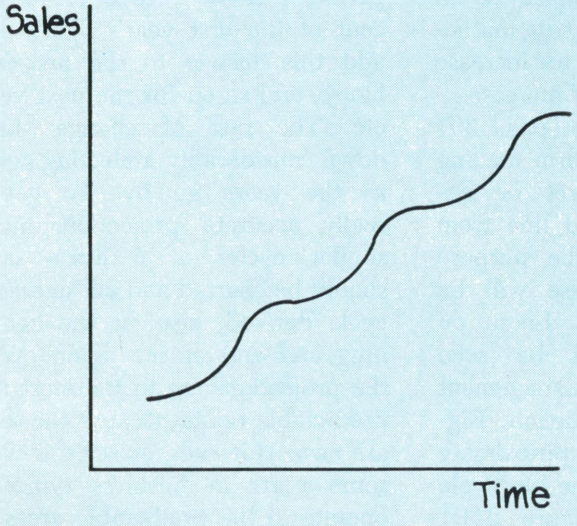

FIGURE 2 (A)

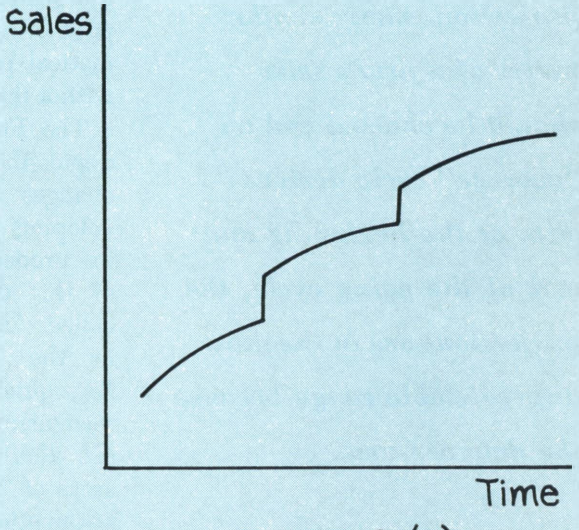

FIGURE 2 (B)

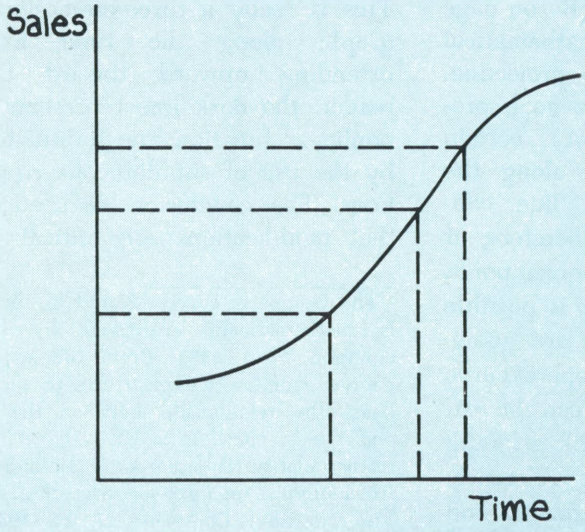

FIGURE 3 (A)

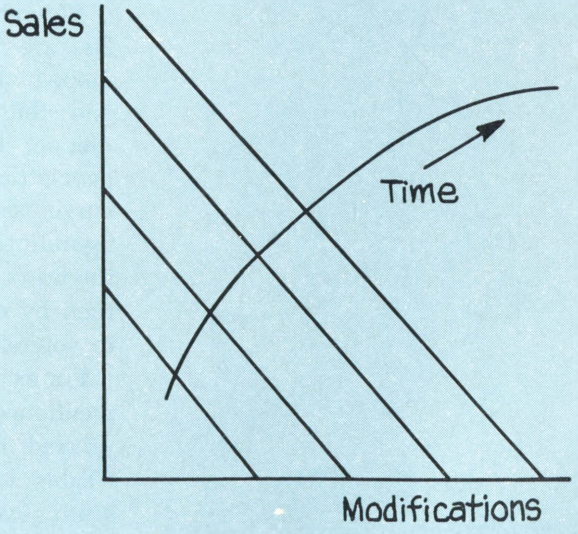

FIGURE 3 (B)

TABLE I

THE AGING PROCESS

X	Y	Rate of Change %
0	5.00	—
1	7.07	.4140
2	8.41	.1896
3	9.17	.0904
4	9.58	.0447
5	9.79	.0215

To get a really accurate projection, many similar cycles of a firm's sales should be charted and an "average" cycle derived; also, at the beginning and end of the aging cycle, the projections are in the most unpredictable range because the data are new.

interest is ascertaining the outlined area, the point of decline. This is presented better by reference to the semi log chart (Figure 1B on page 39). It shows the true mathematical perspective of an increase with a declining *rate* of increase.

The Figure 2 series (page 39) depict the effect of a firm making changes in its product or developing a new related line from its predecessor. For the purpose of this discussion, these will be called "modifications." Later on in the text, it will be seen how quickly an alert management recognizes this phenomenon. Figure 2(A) shows the approximate areas of "re-birth" in the life cycle arithmetically, and Figure 2(B) shows the same reaction much more dramatically.

Figures 3(A) and 3(B) on page 39 are extended mathematical models that involve projection, and, thus, the ultimate goal, prediction. In Figure 3(A), certain geometric ratios exist along the curve, as the dotted line configurations indicate. Therefore, if the firm's sales are at a given point, then by computation it is possible to foretell where they are going.

For example, the Gompertz curve mentioned previously can be expressed in the form of a graph (Table 1 above) with "X" representing years equally spaced and "Y" representing time in proportion to the product aging process.[1]

To determine values of projected sales from the starting year or period ("X–O"), take .4140 per cent of the first year's figure and add this answer to the first-year figure, and so on for the next year, etc. The rate of change slows down considerably, reflecting aging as the years go by. To get a really accurate projection, many similar cycles of a firm's sales should be charted and an "average" cycle derived; also, at the beginning and end of the aging cycle, the projections are in the most unpredictable range because the data are new. However, most firms with some years in business typically operate in the predictable areas.

Figure 3(B) represents a scant introduction to probability theory. This is really a three-dimensional graph; along the time axis, extending upward toward the reader, the dark line represents a nonlinear function line formulated by the use of simultaneous equations. The conclusion deduced is that modifications are critical to

[1] The Gompertz curve referred to above is mathematically expressed by the equation $Y = AB^{cx}$. From this exponential equation, a typical growth curve bears the relationship between the X and Y axis: curve $Y = 10(0.5)^{0.5x}$. For further elaboration, see A. C. Rosander, *Elementary Principles of Statistics*, D. Von Nostrand Company, N. Y., 1951, p.p. 387-394.

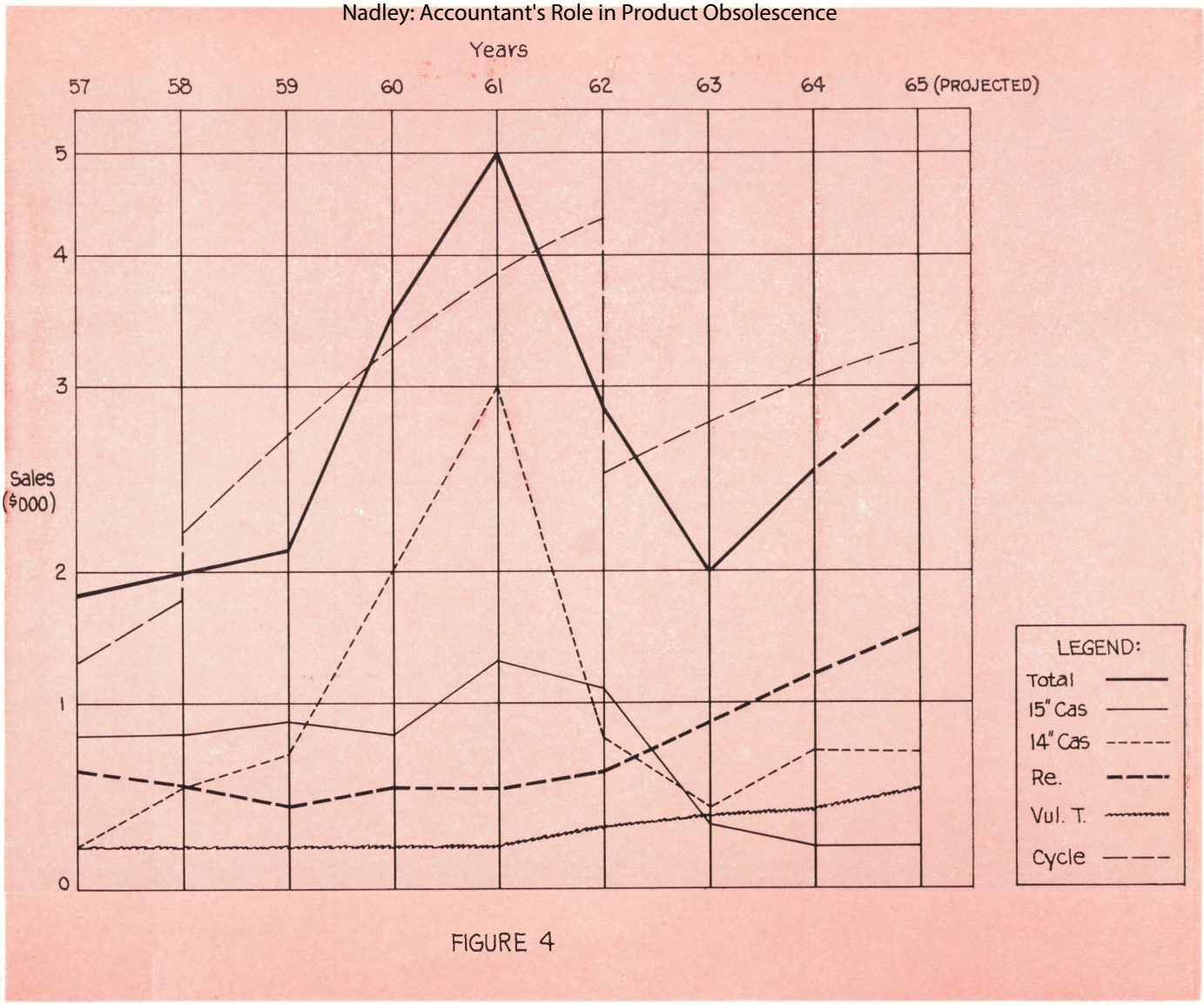

FIGURE 4

the growth of sales until a saturation level is attained; thereafter the cost of further improvement becomes prohibitive. Since this type of formulation is beyond the scope of many accountants, it will not be discussed but is drawn just to stimulate the reader a bit.

A case history using this analysis shows how interesting this technique is to an accountant in the course of reviewing periodic financial results with a client. In Table 2, on page 42, which represents an arithmetic graph (the "normal" kind of graph scaled equally 1-2-3-4-5 etc.), the sales of this scrap company looked moderately good in 1957 through 1959 in total form, but broken up into product lines and put on semi-log paper (Figure 4 above), the sales picture showed instead that there was no growth rate at all in most lines with the unexplained exception of product "14 CAS," and that in product "RE," the lead line that always foretold sales for the next five-year cycle, the rate was *down* at an increasing rate. (Product "RE" was resold without any processing and since this line came directly from the factory and was sold as "second-line" rejects, it represented the "fastest" merchandise to hit the market.)

Therefore in Cycle 1, which was the five-year period that ended in 1957-1958, the chart indicated a "bottoming-out" of the "RE" or "seconds" type of merchandise. Simultaneously, the charts indicated an increase at an increasing rate of the "14 CAS" sales. The client, on this presumption, immediately began to accumulate inventory of product "14 CAS," which showed the strongest rate of growth. This carried through nicely, representing the largest sales by far to 1961, and, even though dropping swiftly then, was already being replaced by accumulation and promotion of product "RE," now recognized again as the most profitable product line.

Of course, an understanding of how to read semi-log charts is the key to this type of analysis. Semi-log charts are scaled in linear proportion—lines, 1, 2, 3, 4, etc., are in fact numbers 1, 2, 4, 8, 16, etc. Each number, therefore, is the result of the line before it times 2. Any number can be used as a multiplier, and the typical semi-log table is a decimal table, the numbers being in terms of 10 power logarithms. In actual fact,

SUPPORTING FIGURES FOR
FIGURE 4

Years	Sales ($000) 15 Cas.	14 Cas.	Re.	Vul. T.	Total
1957	80	20	60	20	180
1958	80	50	50	20	200
1959	90	70	40	20	220
1960	80	200	50	20	350
1961	130	300	50	20	500
1962	110	80	60	30	280
1963	30	40	90	35	200
1964	20	70	120	40	250
1965 (PROJECTED)	20	70	160	50	300

TABLE 2

while understanding the computations is useful, just interpreting the facts plotted on the graph is the meaningful object. What is being depicted is the "rate" of growth, and this rate is what is discussed as significant with the client. In Figures 5(A), (B), (C), (D) and (E) on page 43, a visual portrayal of all kinds of growth rates possible when reading semi-log charts is shown.

Returning to the case example (Figure 4), the trend line (heavy dash line) of the total sales volume now shows the growth as increasing with a "rate of decrease," and the sudden jumps called "discontinuities" are the decision changes that the management made to improve the sales potential. The important point seen here is that while sales fell during the various cycles, the total trend is always on a higher plane. The short dash lines are the projections made by the management and can be used at the next conference with the client to see how the results are working out.

Use of the Gompertz calculations—before outlined—on the total sales, for example, would produce the analysis in Table 3, page 44.

Observe that the projected sales, calculated originally in 1957, followed the *trend* of this five-year cycle fairly well, but also at the end failed to signal the sharp jolt as the product became thoroughly obsolete.

Discontinuities on the chart indicate a deliberate break on the client's part for some change in procedures to alter the particular line. Manufacturers of this type (used tire processing) must adapt their product occasionally because they are reprocessing scrap and the type of raw scrap may change appreciably over a period of time.

In other words, adaptations have to be made, according to the available supply of "raw material."

Some mathematics essential

Again, it is obvious that use of these techniques involves a knowledge of higher mathematics, but this article hopes to encourage an understanding of these tools. And they should be used with proper professional advice, so that an accountant who is pursuing such a project is aware of the statistical confidence limits of such projections. Some awareness of this theoretical approach has already been imparted to the accounting profession.[2]

B. Other Factual Observance

The accountant can also develop a "feel" for this problem by examining other data available to him during the course of his routine audit. "Backlog" figures are an excellent example. Any sudden unexplained drop in the backlog often flashes a warning months in advance. An unexplained build-up in accounts receivable, not necessarily confined to the slow end of the aging schedule, reflects consumer resistance but is, naturally, a short-run indicator. Such intuitive observations make the client aware, at least, although there is no substitute for continual study.

Combating the problem

A. Discussion

The astute management develops a policy constantly improving its product technically. This is not done in spurts, but is programed to take place each year over a term of years—the best specimen of this being the automobile industry. All can observe the body

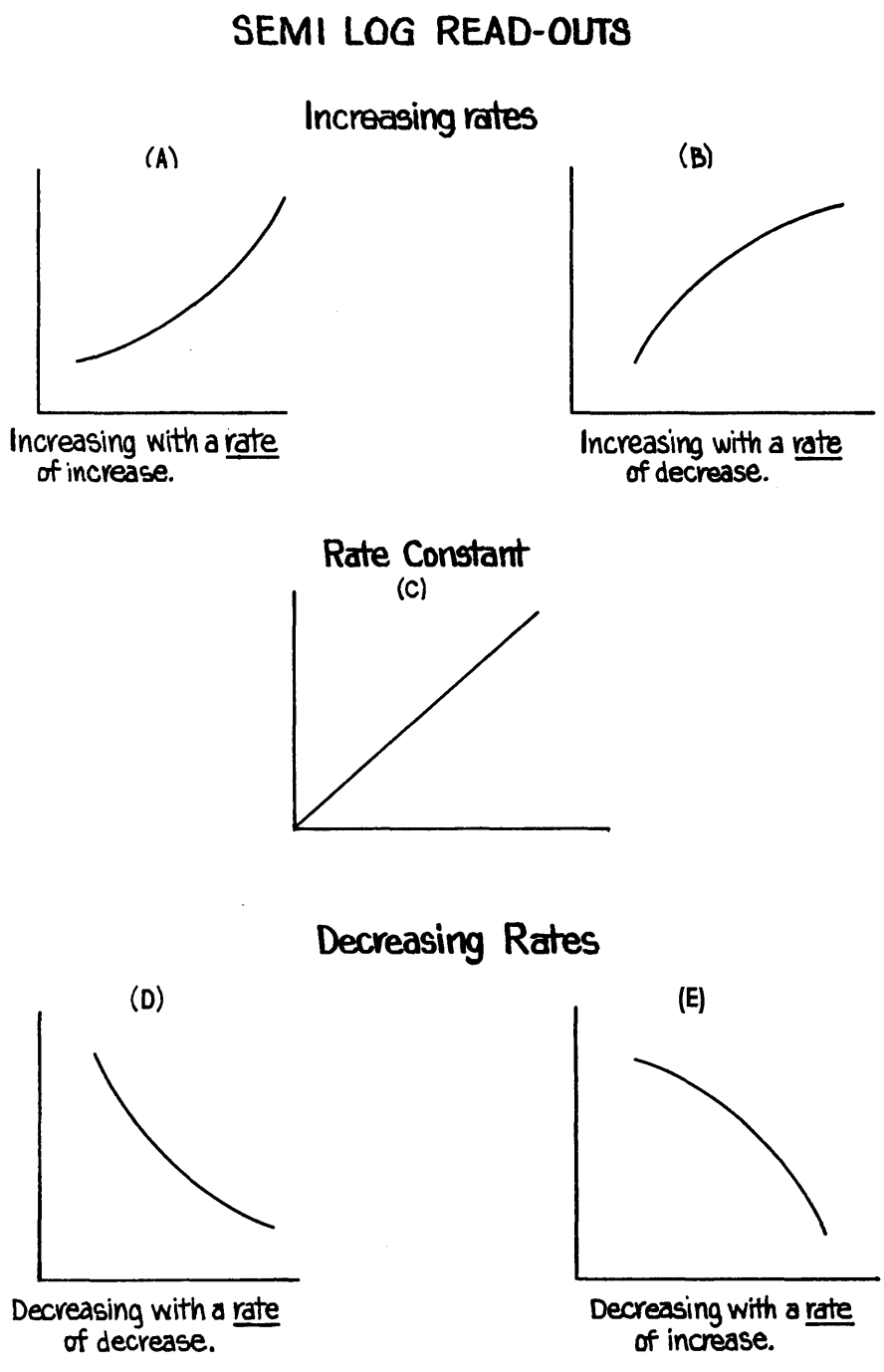

FIGURE 5

[2] *I.B.M. Data Processing Information Bulletin* (for the consulting and accounting professions), Number D.P.I., series B-3. Published by I.B.M. Corporation, Data Processing Division, 112 E. Post Road, White Plains, N. Y., dated April 25, 1963, "Scientific Techniques in Business Operations."

TABLE 3

	Actual Total Sales	Projected Sales
1957	180	—
1958	200	255
1959	220	303
1960	350	330
1961	500	345
1962	280	352

Even in smaller firms, research is invaluable, even though not assigned impressive titles such as "R. & D.," and it need not cost excessively. The constant reading of trade journals, liaison with other suppliers or beneficient larger competitors, perusal of overseas developments (as carried in business magazines and newspapers), and working with local organizations devoted to basic research are but a few measures utilized to keep abreast of product usage.

styling changes, but few realize the safety and economy of the double interlock door catch. On a more modest scale, one of the author's clients quietly changed the switching mechanism in his product from wire wound relays to electronic transistor switching circuits. The circuits were cheaper and, lacking friction, would last longer. Another client purposely modified his product with a host of minute technical changes (although the product was selling well), because he knew his competition closely examined his product, and, as a matter of deliberate strategy, he wanted to confound them.

B. Research

The point to remember is that, even in smaller firms, research is invaluable, even though not assigned impressive titles such as "R. & D.," and it need not cost excessively. The constant reading of trade journals, liaison with either suppliers or beneficent larger competitors, perusal of overseas developments (as carried in business magazines and newspapers), and working with local organizations devoted to basic research[3] are but a few measures utilized to keep abreast of product usage.

C. Financial Aspects

Although redundant, a review of some conservative financial philosophy may be suggested to the client in respect to this problem. Avoid the pitfalls of overexpansion, whether in bricks and machinery or in the luxury of expanded "staff" overhead. Keep a certain percentage of assets in liquid form for quick action (from cash to marketable securities)—in fact, one client insisted that 10 per cent of his total assets be in this form, despite its apparently nonproductive nature, for product generation. Another contradictory measure observed by the author was the signing of long-term fixed-price commitments, so that basic overhead would be covered while other products were "in the hopper"—ordinarily not done in these inflationary times.

Summary

The accountant has come to realize that management services have become a vital ingredient in his practice, and the author believes that recognizing product obsolescence is a significant part of this service. While the amount of service performed depends on the emphasis he or the client desires, and may range from brief discussion to an elaborate survey, it should be done nonetheless. The author is of the opinion that "sudden death" matches should be fought on the playing field, not in the economic sphere, where intelligent application should reduce blind chance to the absolute minimum.

[3] The Franklin Institute, in Philadelphia, maintains a full-time staff to assist area firms to perform development—on a negotiated contract fee basis.