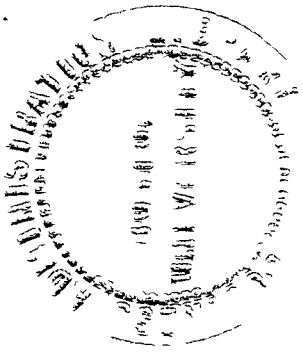
1957

Management operations based on sales forecasts as exemplified by several Du Pont Co. products



BOSTON UNIVERSITY

College of Business Administration

MANAGEMENT OPERATIONS BASED ON SALES FORECASTS AS EXEMPLIFIED BY SEVERAL DU PONT CO. PRODUCTS

by

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Submitted in partial fulfillment of the requirements for the degree of MASTER OF BUSINESS ADMINISTRATION

1957

TABLE OF CONTENTS

LIST OF CHARTS AND FORMS

INTRODUCTION

The basic reason for the existence of a business enterprise is to earn a profit to the satisfaction of the owners of the business. If it consistently fails in this objective, then its demise is merely a function of time.

The continued realization of this basic profit objective is dependent, primarily, upon the sale of needed or desired goods and/or services. The creation, distribution and sale of these goods and service by a manufacturing enterprise is not usually, or for long, a matter of mere chance but requires careful and intelligent planning by management, of the various activities of the organization to the end that the business objective is attained.

Intelligent planning by management however, does not "just happen". It is based to a large extent on reasonably correct evaluations, predictions, and assumptions concerning factors which influence the existence of the company. Since the sale of goods and/or services is so essential to business existence, one of the most logical bases for intelligently planning operations in an organization is a reasonably accurate prediction or forecast of sales, in both the short term and long term view.

Yet, surprisingly enough, there are not a few business enterprises which either do not forecast sales, of if they do forecast, do not do so with any degree of detail.* Management of many companies, especially the smaller ones, still depend heavily upon past experience, hearsay, intuition and chance in guiding and planning the activities of their organizations.**

Whether the company be large or small however, the difficulty may well be not only a lack of knowledge of the methodology of sales forecasting, but also an unawareness of the carryover of the implications of the forecast into planning the operations of the company. The function of the sales forecast as a tool of management may not be fully realized or appreciated and hence its importance may be minimized or disregarded.

The sales forecast in a manufacturing enterprise can be considered as an assumption or prediction of the quantities of goods to be sold within a given future time interval. In a more essential way, it is a prediction of human behavior - how people will act in terms of a particular product, whether they will or won't buy, when, how and how much.

Without this appraisal of human behavior, if you will, it is difficult, if not impossible, to plan intelligently, the scope and direction of sales, finance and production operations. Good sales forecasting, for example, is the first step in the successful budgeting of expenses, costs and profits. Production

* 22 p. 2
** 13 p. 3

planning based on data available from the forecast can reduce the area of avoidable risks and aid in the stabilization of production and employment in the short term by evening out peaks and valleys caused by seasonal fluctuations of sales.* Thus employment may be rendered more stable, resulting in lower employee turnover and lower labor costs, plus better labor and community relations.

Again, effective control of inventories of raw materials, work in process, and finished goods may be based on the satisfactory forecast of future sales. If only historical data is used as a basis for control, it is possible to realize a loss of sales and a deterioration in competitive position, should there be a sudden or unexpected increase in market demand. Conversely, if market demand declines, and there is a heavy inventory investment, a direct loss may result.

The reasonably accurate long term forecasting of sales can form the basis for projected expansion of production facilities, involving the investment of comparatively significant sums of money and may influence programs of long term investments and capital requirements.

It may be said that all this is obvious, but possibly it is obvious only to that substantial group of capable and efficient management which not only realizes the importance of sales forecasting but also uses it as an instrument in

* 8, p. 4

planning their future activities. In a sense, it is obvious to them much as the implications of an atomic equation are obvious to one who knows, understands, and uses nuclear physics.

The field of sales forecasting appears to be adequate concerning the methods and types of forecasting and general reference is made to the importance of sales forecasting in management operations. Case studies have been undertaken and presented, illustrating the means and methods used by manufacturing concerns in both long term and short term forecasting.*

The wealth of material on production planning, appropriation of capital, control of budgets, inventories, purchases, traffic and other activities, treats the importance and use of these functions in the operations of management and describes methods of procedure in collating and presenting data. Reference also frequently is made to the sales forecast as an important keystone in the constructive planning of these activities.

Rather than treat the subject of sales forecasting as a separate matter however, it is felt that a more complete perspective of its importance and use might be accomplished by presenting not only the methodology of forecasting but also by following through on how the forecast yields information which may be molded into data on which management operations

* 4, 14

in a number of activities may be based.

It is not intended to portray the sales forecast as the only basis for planning operations, or to indicate that all methods of forecasting are applicable to every organization. Each management has conditions, problems and methods of operation which are peculiar to itself and this has an influence not only on the type and method of forecast but also its use in planning the operations of the organization.

The first half of this study is devoted to a general presentation of the various types and methods of forecasting, their apparent advantages and disadvantages, and how the forecast may be used as a basis for planning operations in several activities. These activities are treated under appropriate chapter headings.

The second half of the study is a case presentation of the preparation and function of the sales forecast as exemplified by several divisions in the Film Department - E. I. duPont de Nemours & Company, Inc.

This includes a brief description of the duPont organization and a more detailed picture of the Film Department - the operational structure, products manufactured, markets served, sales force and channels of distribution - so that an overall view of operations is presented. Other chapters cover individual products and include specific methods of forecasting and the use of the forecast in planning particular activities.

In order to avoid repetition, individual products are treated only to the extent that there is a difference in conditions of operation, and the subsequent influence of the sales forecast on particular activities.

The contents of the second half of this study are based on the writer's own knowledge as an employee of the Film Department, supplemented by personal interviews with various personnel of the Film Department at Wilmington, Delaware.

Chapter I

SALES FORECASTING

General Discussion

The forecasting of sales is not new, by any means, It has existed in one form or another almost as long as the beginnings of business itself. The merchants of Greece, for example, consulted oracles, and the Roman merchant read the entrails of slain animals. The results of these methods, if they were available in their entirety, might be interesting to analyze. While the trend of the present is toward a more formalized and scientific approach to the problem, forecasting is still an art, rather than an exact science and in that art there is no substitute for sound judgment.

This does not mean that statistics, mathematical formulae, historical industry and company data do not contribute heavily to the making of an accurate forecast. The point is, these are tools which assist in the building of the final structure; they are a means to an end, and sound judgment must be exercised not only in their use, but also as to the extent of their effect on the accuracy of the final forecast. It is possible, for example, to become so impressed with the mechanism of a purely statistical approach to forecasting that the final data may be taken as gospel, despite the questionable logic of the end result, in the face of sound judgment.

Criteria in Selection of Method

The choice and use of methods of forecasting are dependent upon the needs, problems and conditions of operation of the individual company. A system which produces excellent results in one instance, may produce inaccurate or indifferent results in another. There are, however, certain criteria which have been established as a guide in the selection of methods of forecasting.* The first is almost axiomatic - the method or system selected should produce reasonably accurate forecasts. In the initial selection, sound judgment should be exercised as to whether or not the chosen method appears to be one which will produce the desired results. If reasonable accuracy is not obtained, then the procedure should be checked to see if they are being followed properly. If inaccuracy continues, then the system may be modified or even discarded entirely, and another method set up in its place.

Secondly, the method selected should be understood by all who use the forecast. Unless there is some basic understanding of how the forecast is made, there may be a lack of confidence in the end result. The use of statistical methods or mathematical formulae should be explained in understandable terms.

* 13, p. 74

The third requisite is that the system yield results in terms which lend themselves to ready use within the company. If production control is to use the forecast effectively, then it should be in units and/or product groups which are used at the manufacturing plant, or easily converted to these units. This also applies to other departments using the forecast in their operations.

As a fourth condition, the system of forecasting should produce final data within a reasonably short period from the time when the forecast is originated. A short term forecast may lose much of its value and accuracy if it takes an excessively long time to obtain the final results, simply because it is based on data and information which is no longer current. In this connection, the field of automation may offer definite possibilities, such as the use of business machines in tabulating, sorting and printing final data, thus cutting down the time it takes to obtain the final picture.

An additional requisite in selecting a forecasting system is that the accuracy of results, and the benefits and values derived by the company should more than offset the cost of installation and operation of the system. This is not always easy to determine and may require a careful analysis on the part of management not only as to costs, but also as to how the forecast might form a basis for improving the operating efficiency of other departments within the company, so that cost may be justified.

In addition to these criteria, there are other factors which study indicates should be taken into consideration, including availability of industry and company data, stability of the industry, and the characteristics peculiar to the company itself, such as size of the company, newness, type and width of the product line, the marketing area, and the channels of distribution.

Where sufficiently accurate data in industry and company sales exist, it is possible to analyze cause and effect and arrive at some basic projections, including a reasonable assumption of the company's future share of the total business of the industry. Some other method must be used if industry data is sketchy or lacking entirely, or if company records are poor and incomplete.

In an industry which is fairly stable, and not strongly affected by swings in the economic picture, possibly an analysis of the pattern of industry growth and increase of population may provide information for arriving at a sound forecast. Some other approach may have to be considered, however, where the demands for a product is subject to wide swings and fluctuations, dependent perhaps on changes in the economic cycle.

Generally, the greater the size of a company, the more complex its operations become and the more complicated becomes the job of forecasting, possibly requiring the services of a competent staff. If a company is putting out

a new product, market research techniques and testing of consumer demand may have to be used and frequent revisions of the forecast may be indicated.

A company producing a specialized product, used only in a specific market may find it sufficient to concentrate on obtaining an intimate, accurate and current picture of that particular market. The problem of forecasting becomes more complicated, however, when a company produces a variety of goods sold in different markets and affected by dissimilar factors.

Where sale of a product is confined mainly to a particular marketing area, then it may become of paramount importance to concentrate on a knowledge of factors influencing sales in that area, since local conditions may have a greater bearing on sales than the general economic picture. Crop conditions in the wheat belt, for example, may be more important to the manufacturer of specialized wheat harvesting machinery, than crop conditions, nationally.

Products marketed through several different channels of distribution may require separate forecasts and methods of forecasting for each, in order not only to obtain a picture of the trends and importance of each method of distribution, but also to arrive at a reasonably accurate overall forecast.

These then are some of the criteria and factors which study indicates should be taken into consideration in the selection and setting up of a method of short term forecasting.

The methods themselves may be modified and combined according to the dictates of the individual company's needs, and several methods may be tried or revised until a system is devised which gives the desired results.

Methods of Forecasting - Jury of Executive Opinion Method

One of the oldest methods of forecasting involves the averaging or pooling of the opinions and estimates of executives high in the echelon of management. Frequently this means consultation with and among a jury of executives representing typically, sales, production, finance and staff functions; hence this approach is most commonly called the Jury of Executive Opinion method. The top men may submit their estimates individually, with supporting reasons, for final review and consolidation by the operating head of the organization, or there may be a group meeting or several meetings, where estimates and views are presented and evaluated until a final decision is made by the presiding officer.

Advantages and Disadvantages of Jury Method

As in every method, there are advantages and disadvantages to the Jury of Executive Opinion method. It can be a simple procedure which may not require the preparation of elaborate statistics, and which permits the forecast to be made quickly and easily. On the other hand, in order to obtain accurate estimates it may be necessary to supply factual data which may involve the preparation of sales

statistics, economic forecasts, market reports and similar information. This is the trend being adopted by a number of companies, in order to supply their jury with a sound basis for their estimations.* The method then becomes more complex and less simple in its execution.

Where factual data are lacking or are not available, the jury method may be the only way of obtaining an accurate forecast, since it can call on the judgment of executives who, because of knowledge, experience and background, are qualified in their special fields.

Some of the criticisms leveled at this system are that it is based on opinions, rather than facts; does not pinpoint forecasting responsibility; averages personal opinions which may result in greater inaccuracy; is costly because it uses the time of highly paid executives; presents an overall forecast which subsequently may have to be broken down into products, markets, units and seasonality, for use by other departments within the company.

These strictures, however, may be looked upon as pitfalls to be avoided, where possible, rather than disadvantages inherent in the Jury Method generally. If, for example, executive opinion is based on accurately compiled factual data on sales, economic and market conditions, then the conclusions arrived at are not mere guesses picked out of thin air, but carefully considered estimates.

* 13, p. 7

In addition, because of their place in management, the jury is in a position not only to examine the facts themselves, but also to interpret them more accurately based on their knowledge of the internal conditions and operations in their own particular company. It is possible, that a mere averaging of opinions might result in a greater overall inaccuracy, but this can be overcome by weighing the individual estimations in view of past performances.

The overall responsibility for the forecast may be delegated to the presiding officer of the group meetings, or the individual who prepares the final forecast, however, the jury members can be held accountable and answerable for their individual estimates.

The subject of cost of the system is relative. Again, it depends upon the value of the forecast to the particular company and it may well be that the company, as a whole, is more than compensated for the use of high priced executive time.

Where it is necessary to break down the overall forecast into a number of different products, a definite negative does exist. The additional time and effort used in such a procedure may be a definite bar to the use of the Jury Method.

Sales Force Composite Method - Grass Roots Approach

Another method of forecasting utilizes the sales force and/or sales management in arriving at a short term forecast. This method, called the Sales Force Composite Method, has several variations. In one variation, the fore-

cast starts with salesmen's estimates of future sales in their particular territories. Since this is the beginning of the ladder, so to speak, the variation is named the Grass-Roots Approach. The forecast may be by account, by product, in units, in dollar volume, or in combinations of these items and may include additional information such as estimates of competition and customers' inventories. The forecast may be a yearly total, or may be broken down into months and quarters, with periodic revisions being made throughout the year.

The individual salesman may prepare his forecast in consultation with his immediate superior, or do it on his own and submit it to his sales manager for review. Individual and district forecasts then start up the ladder to top management, for review and consolidation into a company forecast.

Providing he is operating in a free market, a forecast by a conscientious and sincere salesman is what he expects to sell - in part, how successfully he expects to be able to persuade people to buy his product(s), when, and how much. This may have very little to do with the general economic picture, or trends or cycles, and in some cases, quite correctly so.

Sales Force Composite Method - Sales Management Procedure

Another variation of the Sales Force Composite Method is to have the forecast start at the level of the

district or branch manager. This approach is known as the Sales Management Procedure. When forecasts begin at an even higher level, the procedure takes on the aspect of the Jury Method.

Where conditions warrant it, other than direct channels of distribution may be asked to forecast sales, with the salesmen acting as recorders of the required information.

As a check and means of comparison against the forecast by sales personnel, a separate forecast is frequently prepared by qualified staff people*; any significant variation may be resolved by investigation and consultation.

Advantages and Disadvantages of Sales Force Composite Method

Among the advantages listed for the Sales Force Composite Method is that it utilizes the information and knowledge of the men closest to the buyer; lets the ones who have to do the selling have a voice in how much is expected to be sold and hence possibly greater confidence in the forecast; permits easy breakdown of the forecast into product(s), territories and units; pinpoints strong and weak areas; tends to compensate for error because of the relatively large number of individual estimates; and does not require any specialized knowledge of forecasting techniques. As an aid in preparing their forecast, the sales personnel most often are supplied

* 13, p. 10

with historical sales data against which they may check their projections.

Criticism of this system centers mainly around the salesman as a forecaster. He is prone to underestimate or overestimate; he tailors his forecast to his own ends; he may not be given sufficient time to prepare an accurate forecast; he may not be equipped with a knowledge of economic trends and events which might effect his forecast. If, however, the salesman has been properly selected, correctly indoctrinated and instructed, and is intelligently supervised, his forecast tends to act as a challenge to him to present a true and accurate picture. The salesman also must feel confident that his forecast is significant to management; that it is not just a set of figures which he is called upon to produce periodically. It is not too much to expect that management will give the sales force a reasonable explanation should their forecast consistently be drastically revised, or made impossible to realize through, for example, curtailment of, or lack of, production facilities. Not only must the sales force have confidence in management, but also management must have confidence in their sales force and its belief in its ability to sell what they say they will sell.

The method also has been criticized from the standpoint of taking considerable time and effort on the part of the sales force and executives of the company. Yet this time

may be well rewarded by not only a more accurate forecast, but also by a more intimate knowledge of the individual accounts in a particular market, by the managers as well as the salesmen, themselves.

Statistical Methods

A third method of forecasting employs the use of statistics. Under this heading of Statistical Methods, the procedures may be broken down into three categories - Correlation Analysis, Trends and Cycles, and Mathematical Formulas. The techniques used in statistical forecasting require the use of personnel qualified in statistical procedures and analyses, if good results are to be obtained. Statistics are not something that should be played with by an amateur - it may be fascinating, but dangerous.

Statistical Methods - Correlation Analysis

In Correlation Analysis an attempt is made to discover, by examination of historical data, whether or not there is any connection between a company's sales and some available statistical series, such as Gross National Product or Disposable Personal Income. If there appears to be a relationship, then further study is undertaken to determine whether or not the historical pattern between sales and the statistical series is consistent. The pattern of sales may consistently lead the statistical series, it may follow or lag it, or it may vary directly as the series. The extent of the lead, lag or variation is calculated, and the amount

and degree of the correlation between company sales and the statistical series is established. In forecasting sales, the forecast for the statistical series is examined and the historically established correlation is used to project future company sales. To take an over simplified case, if, over a period of time sales have varied directly as the index of retail sales and the index forecast reveals a 50% increase, then a 50% increase may be forecast for sales.

Correlation Method - Advantages and Disadvantages

The Correlation procedure, as is generally true of statistical methods, is used usually as a supplemental means of forecasting and as a check against forecast results arrived at by some other method or means. It can reveal tie-ins between sales and statistical indexes which may not be apparent on cursory inspection. The indexes themselves are the result of a volume of data which has been accumulated, digested, analyzed and evaluated, and in using them a company is, in effect, utilizing the collective judgment and thinking of a number of people. In the hands of competent workmen, the Correlation Analysis method can be an important tool in the forecasting of sales.

In using the Correlation method however, the company forecast may have to be timed to the peiod when the statistical series forecast is available. This may not always be convenient.

The danger inherent in the system is that too much reliance may be placed upon it, to the exclusion of sound judgment and good thinking. Business is a dynamic thing, prone to sudden changes and deviations, and it might be well to point out again that, basically, a forecast is a prediction of human behavior and statistical tools cannot yet indicate with any degree of accuracy how people will act in terms of a particular product, whether they will or won't buy, when, how and how much.

Statistical Methods - Trend and Cycle

The Trend and Cycle method seeks to evaluate, analyze and measure, statistically, the extent of the influence of long-term growth trends, recurrent business fluctuations and seasonal variations, on a company's sales. When the effect of these influences has been established, and this may not be easy or even possible to do, then an estimate or forecast, is made of the affecting factors. The sales forecast is then developed in the light of these data.

Usually this method is used only in the field of long term forecasting, since it does not pinpoint results sufficiently for short term operations. It may be used in conjunction with correlation analysis, or the results of one method, arrived at independently may be used as a check against the other.

The difficulty in using the Trends and Cycles Methods arises from the fact that there is an element of variation in the cycles themselves. Also, imponderables such as wars, crippling strikes, sweeping changes in manufacturing techniques, socio-economic upheavals and significant technological changes dislocate the regular pattern of cycles.

Statistical Methods - Mathematical Formulas

The use of another statistical method, employing mathematical formulas, is feasible when it is possible to measure and weight a number of factors affecting sales, and combine them in an equation, to effect a forecast. First the extent and degree of correlation for each factor must be ascertained, then an equation may be established, combining these factors so that one may arrive at a forecast.

The Mathematical Formulas approach may be based on a lead-lag relationship, in which case the forecasts of the factors themselves already may be available from another source. Where, however, such a relationship does not exist, it is necessary to establish a forecast of these factors before the formulas are applied and the equation is used. The dangers inherent in this method are similar to those for other statistical methods, already discussed. A great deal of skill and experience is necessary for its efficient use, and sound judgment in evaluating, weighting and developing a workable equation of the affecting factors, is essential.

One of the criteria suggested in the selection of a method of forecasting is particularly applicable to all statistical approaches to forecasting. In order to build confidence in the end result, the method should be understood, at least basically, by all who use the forecast. It should be explained in as simple, discernible terms as possible, by a qualified technician.

Multiple Method Approach to Sales Forecasting

Most companies do not rely entirely on just one method of forecasting, but on two or more methods. This Multiple-Method technique has the advantage of using different approaches as a check against each other.

Where there is acceptable agreement on the end result, there exists greater confidence in the accuracy of the forecast. If, however, there is wide disagreement, additional investigation and analysis is indicated in order to resolve the difference.

Difficulties in Forecasting Sales

The difficulty of accurately forecasting sales takes on added complications when (1). a newly formed company begins to produce and sell an established product or, a new product and (2). when an established company begins to produce and sell a product new to them, or entirely new in itself.

In the case of a new company selling an established product, industry data and information on competitors' sales may be available for use as a basis for forecasting. The

estimate as to future sales may resolve itself into the use of the Jury of Executive Opinion method, using as many facts as can be marshalled. The forecast may be an estimate of how much of the present market the new company reasonably can expect to capture, in view of known conditions. Where a new company is marketing a product new in itself, a basic estimate of the sales potential - the highest level of sales attainable, assuming complete market acceptance - may be made. This may involve the use of market research, market surveys, special consultants, analyses of the market for competitive products which the new product may be expected to replace, and consultation with prospective buyers. When the sales potential has been established, then the forecast can be made based on how much of the sales potential the company can reasonably expect to realize within the period of the forecast. This may not be easy. While a new product logically may be estimated to replace an established competitive product in a particular market, effective replacement may take several years, because of conditions peculiar to the particular market. Where the market use of a new product, for example, is as an integral part of another product, it may require testing and evaluation on the part of the consuming manufacturer as to cost and efficiency in comparison with the product currently used. In addition, the consuming manufacturer may have to change the design of his goods in order to use the new product. All this takes time, and effects the short term forecast accordingly.

A company which has been in business for a period of time, whether producing a product new to its line, or new in itself, has at its disposal additional tools for forecasting which may not be available to a new organization. If the new product is related to the current line, the company's own sales data on established products may prove helpful, as might estimates from its own sales force. If the product is new in itself, the sales force and management may function, in effect, as a market research team, based on their knowledge and experience.

In the field of new products and new companies, it is almost axiomatic that performance versus forecast be checked frequently and carefully, and that revisions of the original forecast be made as new facts and knowledge come to light.

Long Range Forecasting

Long range forecasting of sales provides a basis on which to plan the long range growth and development of a company. It sets up a target or series of targets, against which goals for the necessary components to conduct all or part of the forecasted amount of business may be set. These components include the capital required to finance plant and equipment facilities, allowing for the necessary lead time between approval, authorization and realized use of the new facilities; an estimate and appraisal of the personnel required in management, sales, production, research, and development needed to obtain and service the estimated

volume; a conjecture of the volume of raw materials needed, and their availability; and possible determination of where new production facilities are to be located.

Dependent upon the particular business, long range forecasts may vary in length of time covered from two to twenty, or even twenty-five years, with the average being five years. Generally, the long range forecast is estimated by years, rather than by months or quarters, since this is sufficient for the long term planning uses to which the forecast is put. In addition, it is difficult to pinpoint accurate long term sales to a particular month or quarter.

Methods and Principles Used in Long Range Forecasting

The methods used in short term forecasting also are adaptable to long term forecasting. In general, however, this is an home office function, requiring the services of qualified personnel. It may be difficult, if not impossible, for example, to use the Grass-Roots Method, when there are many factors affecting the long term future, both within and outside of the company, of which the salesman has no knowledge or awareness. This is particularly evident when it is realized that long term forecasting may involve an analysis of trends in a particular industry and the general economy, and an estimate of their impact on future sales. In addition, the volume of future business may be evaluated in the light of possible extension of product use, competition, price trends, anticipated sales and promotion efforts, and availability of

production facilities.

Some basic principles of long range forecasting include*: always make one; review it periodically and keep it up to date, in line with changing conditions; state the assumptions on which the forecast is based in a manner which can be understood by those who will use it; do not attempt to forecast a particular year in the exact point in a business cycle; avoid forecasting in detail without forecasting in total; indicate to the user that the forecast is a reasonable approximation, not an exact figure, at the same time, avoid generalization; forecast the market before attempting to forecast company sales; employ the Multiple-Method approach so that results may be cross-checked; when formulas are used, support them by sufficient interpretation, analysis, and clear explanations; and last but not least, use the forecast, just don't make it and then file it away.

The short term forecast may be used as an adjunct to the long term forecast in that it acts as a check on the near years of the long term forecast. Possibly the short term forecast may suggest that revisions should be made in the longer forecast, or give cause for questioning it.

* 13. p. 60

General Business Forecasting

Almost as a preliminary to sales forecasting, it may be advantageous or even necessary for a company to forecast general business conditions which affect their products' success in the market place. This is particularly true when statistical methods of forecasting are used. If the company is large enough and can afford it, it may have its own trained staff to perform this function. Data may even be drawn from regional and district sales managers concerning economic conditions in their particular area, for analysis and interpretation by the home office. Other companies may find it suitable to use outside research services and part time consultants.

A great deal of data is available to the forecasters of general business conditions. Government agencies, trade associations, private research firms and consultants, banks and brokerage houses, all publish reports, statistics, analyses and forecasts. It is up to the individual company as to how these data are used and evaluated. Particular data may be uncheckable, both as to source and method of preparation; it may contain "puffing"; it may contain components which distort the picture as far as a particular company is concerned; it may lack certain components which may be essential, it may conflict with other data. Caution, therefore, is indicated in the choice of data to be used.

There are a number of what are termed basic business

indicators available in estimating the economic picture. Among them are included series on personal income, industrial production, gross national product, employment and a host of others. The Statistical Abstract of the United States contains a rather complete listing of available series. Again the use of these basic indicators requires proper evaluation, examination and sound judgment. The indicators themselves may not be sufficiently precise. For example, where a gross national product of $440 billion is projected, a mere 2.5% margin of error means a difference of $11 billion dollars either way. The percentage of error may be relatively small, but the dollar value and its possible impact on the economy effecting a particular company's business may be considerable.

The methods used in forecasting sales lend themselves generally to the forecasting of general business, with the possible exception of the Grass-Roots Method. It cannot be expected that the man in the field, whose main job is selling, has either the time or the knowledge of data available, to forecast for general business, though he may well be thinking along that line in the preparation of his own forecast, and reflect the opinions of his particular customers concerning the business future.

Summary

In the last analysis, forecasting is not quite as easy or precise as might be thought. If the forecasting of sales is considered as essentially a prediction of human

behavior - how people will act in terms of a particular product, whether they will or won't buy, when, how and how much, then history indicates that the ways of the consumer can be difficult to predict. In the years immediately following World War II, for example, many experts were confounded by the strength of pent up consumer demand.* On the other hand, in 1949 and again in 1954, the consumer acted contrary to predictions by tightening his purse strings. In a thriving capitalist economy, the consumer is truly king, and royalty has the privilege of changing its selection of products in the market place.

* 24. p. 1

Chapter II

Sales Forecasts as Applied to Sales Operations

It is one thing for a company to make a forecast, it is quite another thing to use it as a dynamic force in the conduct of the business itself.

The business which plans its future operations increases its chances of continued success over a business which is prone to take things as they come and then devise hastily conceived and probably inadequate measures, whenever the occasion arises.

Sales are the magic ingredient which breathes life and vitality into a company and in planning operations of the sales division or department, the sales forecast can be a useful and important tool, albeit it should be emphasized, not by any means the only one.

There may have been a time when selling was considered dependent largely upon a kind of personal magic. The corollary to this was, if enough of this possibly nebulous quality could be instilled in an organization, sales operations were certain of success. One of the jobs of sales managers and executives was to "fire" the organization with enthusiasm and inspire the sales force with a zeal that would overcome all obstacles.* When, what, where, how and to whom to sell were considerations which were secondary.

* 5, p. 69

This is not to imply that vision, courage and enthusiasm do not play an important part in the selling operation, but these excellent attributes require buttressing with data and facts in order to reach optimum effectiveness.

Competent sales executives of today realize this more and more, and support enthusiasm with logic, and inspiration with knowledge. They have, or seek to acquire, a knowledge of products and services to be sold and the way in which these services and products will meet the wants and desires of customers; a knowledge as to where and in what industries customers are located, what prices they will pay, what kind of effort and how much will be needed to obtain orders, and what profit margin must be realized to get required sales profitability. They want to know how much the customer can buy, and when and how much he will buy. In addition to what might be termed product and customer knowledge, or perhaps based upon it, the sales executive seeks to know and develop the character and ability of the sales organization itself to do the job required.

In regard to the sales force itself, the sales forecast can act as a challenge and a target. This is particularly true when the salesmen have a hand in the forecasting, as in the Grass-Roots Method. The conscientious and alert salesman, if he is provided periodically with data on actual sales versus forecast, can see for himself how well he is doing, against what he

said he would do, and take remedial action where necessary, possibly calling upon supervision for suggestions and guidance.

Sales Forecasts as a Tool of Sales Management

From the viewpoint of management, where a territory, or even a district area, consistently fails to make a forecast by a significant margin or conversely "overmakes" the forecast, a signal is given indicating investigation of the continuous variation may be advisable. It may be that a particular product or line of products consistently give evidence that sales of these products are below forecast. This may be due to no lack of effort on the part of the sales force, but rather to an underestimation of competition generally, or in particular markets or industries. Competitors may offer lower prices, or better "deals". They may have better coverage in a market, do more advertising and promotion, and their advertising and promotion may be more effective. They may provide plus service; freight costs may be less because of plant locations closer to the market. They may have a product of better quality and longer life. All these are not excuses for not "making" a forecast, but sound reasons why a forecast was not met by actual sales, and it may well be that a company may feel they will not ever, or in sufficient time, be able to get sales dollars which will permit them to obtain the return on investment which they consider necessary. The company may then choose to abandon a

product or line of products and devote the time and energy of their sales force to some other product or line of products, which will result in sales dollars permitting a return on investment which the company considers satisfactory.

Use of the Forecast in Sales Quotas

The sales department sometimes uses sales quotas in their field operations. Sales quotas are the amount of dollar or physical volume of sales set up for a particular salesman or territory, department, branch, or other division, as a measure or standard, or one of the measures or standards of satisfactory performance. The quotas may, of course, involve additional considerations, e.g., gross profit, new accounts, and order quantities, such as so many carloads. These quotas are more sound and realistic if they are based on facts and data relative to sales possibilities, rather than on arbitrary quantities arrived at by a sometimes wishful "5% more than last year" method. The sales forecast, properly, sincerely and conscientiously come by, can provide a sound and equitable basis for setting up a sales quota and measurement of the salesman's basic task. The method of arriving at the sales quota, using the sales forecast as a basis, should be explained so that the fairness of the quota is apparent.

Use of the Forecast in Allocation

It may be that a company, for whatever reason, may not be in a position to produce a sufficient quantity of

goods to satisfy the market demand for its product. A system of allocating available production may be set up to distribute, equitably, among the sales force the goods which can be produced. If it is estimated that operating the plant at, or close to maximum realizable capacity will result in the production of only 85% of the goods forecast to be sold, then each sales unit may be notified that they will be allocated material on the basis of 85% of their sales forecast. In using the forecast as a basis for allocation, consideration is given to the growth pattern of the sales unit, e.g., the forecast for a particular territory may predict, accurately, an increase of 50% in sales over the previous year, while another territory, for good and sound reasons, may actually reflect an expected decrease in sales. If the allocation were set up purely on the basis of past sales experience, the first territory might be penalized by having available for sale only 56% of the goods which could be sold, while the second territory has available 85%, or possibly more, of the goods to be sold. This would appear to be neither sound nor equitable.

Sales Training

The modern sales organization or division appears to devote considerable time and effort in the selection and training of its sales representatives. The expected result is that the sales force will be more proficient and effect-

ive in selling the products manufactured. Here information derived from the long range forecast can be useful and helpful, not only by indicating possibly the number of salesmen which will be needed to attain projected volume of sales, but also by suggesting qualifications which appear to be desirable in the sales force itself. Where forecasted increased volume of sales over a future period of time appears to be dependent on opening up new sales areas or territories, adequate coverage of these areas is a consideration, and may even be an assumption in the forecast. Based on past records and data on what constitutes adequate coverage, the manpower requirements needed to obtain the sales forecasted in the new areas may be estimated and schedules set up for obtaining the necessary personnel.

The long range forecast also may estimate that new business may be expected from a market or industry hitherto not contacted or serviced. The nature of this market may be such that certain basic qualifications are necessary in the make-up of the salesman himself, if he is to be fully equipped to do a successful job. The new market may involve technical applications of the company's product in the industrial field, with calls being made on engineers and technicians. Under the circumstances, it would seem that one of the basic qualifications for new sales personnel would be that they have an engineering or technical background or education. It may even be a prerequisite that

they have some previous experience in selling in a particular market, which is new to the company, and in which the company has had little or no experience.

Channels of Distribution

Again, the long range forecast may indicate, or be based on assumptions that new channels of distribution will be necessary to obtain forecasted volume of sales. A company which has been selling directly to the consumer, for example, may look ahead to increased sales through the use of distributors and jobbers as outlets for its products, either in present territories or new territories. This may be done on a selective basis, which means investigation and evaluation of these distributors and jobbers, so that the ones which it is thought will do the best job from the company's point of view may be chosen.

Conversely, the long range forecast may indicate that an increase in sales volume over a period of time is predicated on an assumption that the present system of selling through jobbers, distributors, or other than direct representation, is to be abandoned, or at least modified. Greater increases may be forecasted, based on a direct selling type of operation.

Analysis of performance versus short term forecasts made for, or by distributors or jobbers, may indicate certain distributors or jobbers consistently fail to produce the reasonably expected volume of forecasted sales. Investiga-

tion of the apparent reasons for this condition may indicate the distribution outlet requires more intense supervision, help in promotions, additional selling aids, better prices or even possible abandonment of that particular outlet because it simply is not equipped to do, or cannot do, the job which is required.

Advertising and Promotion Activities.

The sales forecast, both short term and long term, can be useful in planning advertising and promotion activities. Where a number of products or product lines are manufactured, the short term forecasts indicate those products which are exepcted to show the greatest sales and/or greatest sales increases. If all products are equally profitable to manufacture and sell, or nearly so, then the advertising and promotion appropriation may be allocated among the products on the basis of the percent each product represents of total sales, e.g., if the forecasted sales dollar for Product A is $100,000.00 and the forecasted sales for Products B, C, and D total $100,000.00, then 50% of the total appropriation for advertising and promotion of all products may be allocated to Product A.

Possibly the short term sales forecast may indicate that sales will be greater, in some markets than in others. This may be a basis for allocating to those markets a higher percentage of the advertising and promotion expenditure. On the other hand, the forecast may indicate that realizable

potential in a certain market practically has been reached. The company's position may be particularly strong in that market, so that advertising and promotion expenditures instead of being devoted to that market, may be directed to those areas where the company position is weak, or where there exists a greater unrealized potential.

The advertising and promotion budget may be made up by the advertising and promotion section based on their best judgment as to what expenditures are needed to do the job required. However, if the expected return on forecasted sales is not sufficient to support this budget, then the advertising and promotion section may be directed to pare their estimates in line with the forecasted sales dollars.

The long range forecast can provide a basis for justification of advertising and promotion activities and expenditures in a market or area which, in view of the data contained in a short term forecast do not appear to be justified. The short term forecast for a relatively new product, for example, may present no basis for a contemplated expenditure of time and money for the current year, but this expenditure well may have justification when the long term forecast is examined. Sales forecasted for this particular product three, four, or five years hence may be considerable and may involve markets and areas in which, at the present time, little or no advertising and promotion work is done. However, in order to lay the groundwork for capturing these

markets and attaining the forecasted sales volume, advertising and promotion efforts and expenditures must begin to be stepped up in the present. In addition, a new approach may be necessary, new media may be employed, possibly necessitating market research as to where and how efforts should be directed to obtain the best results.

Selling Prices

The selling price of a product or line of products is important to sales management. If price is considerably out of line with competition, all other factors being equal, the selling job is that much more difficult.

Production costs to a great extent dictate prices, and, in the main are a function of the volume of goods produced. The volume of goods produced depends upon the amount of goods sold, which quite often is a function of price. In order to set up a firm selling price which will return a required or reasonable margin of profit, it is necessary to have some idea of future sales volume. This gives some estimate of the amount of goods which will have to be produced to meet expected sales. This estimate permits calculation of production costs and aids in the subsequent establishment of a sound price.

It is quite possible that in some instances moderate changes in price will have little or no effect upon sales volume and hence upon production costs, or, if sales volume does fall off, the change in the level of pro-

duction may not materially affect unit cost and hence price. However, there may be instances where actual sales give indication of falling considerably below forecast, with subsequent loss in production volume and increase in costs. If price is to be maintained and an adequate profit realized, selling costs may have to be reduced, e.g., sales personnel may be let go, advertising and promotion budget may be cut, sales services may be reduced.

A long range forecast may indicate a certain forecasted volume based on lower prices which are the result of that volume, but if sales do not materialize as expected, then lower prices may not be able to be made, and hence drastic revisions may be necessary.

Summary

The foregoing indicates some, but by no means all of the ways in which the sales forecast can be used in sales operations, There may be considerations and conditions which may make it impossible or unwise to use the forecast as indicated. In addition it is beyond the scope of this study to present, even briefly, an analysis of all the considerations and conditions which might arise. Neither is there any intention of attempting to cover all operations in all their ramifications. Such would be impossible in a study of this nature.

Chapter III

Sales Forecasts as Applied to Production Operation

Despite the varied conceptions regarding the meaning, extent and implications of automation, manufacturing plants and operations do not run themselves. Products and units do not flow off the line or out of the factory automatically in response to sales orders, controlled as it were, by some giant faucet, starting, stopping or controlling the flow as needed. While it may be that the actual manufacturing operation itself is largely automatic, the amount or quantity of goods or units to be produced, when and where, in a multiple plant operation, they will be produced, at what capacity the plant will operate, how much personnel, raw materials and equipment will be required, the size and diversity of finished inventory and inventory storage facilities, all require skillful and efficient planning.

This planning involves not only a consideration of providing goods for the customer in accordance with his wants and desires, at a profitable cost, but also an awareness of the needs of, and influence on plant personnel and even the community.

Planning in the field of production may be divided into manufacturing planning, factory planning, production control and production planning. Manufacturing planning follows research development and product engineering and generally concerns itself with the processing and fabrica-

tion of products, establishment of methods and equipment to be used, the time required to perform various operations, the material requirements per unit of production, and the estimation of costs at various production levels.

Factory planning covers the study of new industrial buildings, additions to or modifications of present facilities, and consideration of the utilities or services needed in such buildings. Production control is involved in seeing to it that production schedules are executed so that there is an uninterrupted flow of goods through the manufacturing department, according to plan. This also involves the maintenance of raw material inventories at levels that do not tie up excessive amounts of working capital or lead to shortages that curtail production, and the regulation of inventories of finished goods so that they become neither too high, nor so low that customers' demands cannot be met.

Production planning is concerned with setting up master production schedules in connection with the quantity and types of goods to be produced, and when they are to be produced. On the basis of these master schedules, other schedules such as raw material requirements, personnel needs, inventory demands and machine maintenance may be set up.

Use in Production Planning

Rather than attempt to indicate the possible use of the sales forecast in, and its effect on, all phases of planning in the field of production, it is the intent of

this chapter to confine the discussion to production planning, as defined in the preceeding paragraph. It should be pointed out, however, that the various phases of manufacturing planning, factory planning, production control and production planning have considerable interdependence and since each affects the other, the effect of the sales forecast may be felt among all, when it is used as a planning tool.

In order effectively to set up production schedules there must be some foundation on which to base estimates of what the demands on production will be. In this connection, sales forecasts are essentially the first approximations in production planning; they provide foundations on which plans may rest and adjustments may be made.* Management says, in effect, this is what we expect to sell within a given period of time and based on this, production planning estimates what must be produced within a given period of time.

Production Scheduling

In those instances where the sales forecast is in terms of physical units, it is a relatively simple procedure to determine how many units must be produced to satisfy estimated requirements of customer demand. When the forecast is expressed in terms of dollars, however, it must be converted into physical units, based on past experience. Before the production estimate can be completed, it must be decided

* 7. p. 91

what the inventory of finished goods is to be at the end of the production period. The size of the inventory for a forecasted rate of sales depends upon the length of time required to process the product and the number of stages of stock, with due consideration for the margin of safety necessary to insure proper service to customers; the cost of maintaining inventories in view of the company's financial position, and possible protection against shortages, labor trouble, and changes in price and product.

When it has been determined what quantities of goods must be produced within a given period of time then production schedules involving the timing of production may be prepared. This may involve a consideration of the productive capacity of the plant, availability of storage facilities, job security, economical and efficient production runs, the purchasing program and the financial strength of the company.

Affect of Sales Forecast Exceeding Productive Capacity

It is possible that the sales forecast may exceed productive capacity, and, for a number of reasons it may not be possible, or even wise, to increase production facilities, Production planning may, under the circumstances indicate the maximum quantity of goods which reasonably can be produced, based on a production forecast. It them becomes the responsibility of sales management to set up a system of allocation for distributing the available product.

Timing of Production

When machine capacity is sufficient to meet quantity requirements, then thought may be given to when the goods are to be produced. Possibly the pattern of the sales forecast indicates a seasonality of demand, with consequent peaks and valleys in customer requirements. If production follows these peaks and valleys a situation may be created where workers must be laid off and then rehired. This may tend to foster job insecurity and instability. Those laid off may secure jobs in other plants and industries, and the training and rehiring of new personnel, can be costly and time-consuming. The laying off of workers, besides having a demoralizing effect on the workers themselves, may also have repercussions in the community. The result is not only poor industrial relations in regard to the employees themselves but also in regard to the community. The union contract itself may make it mandatory to maintain production at a reasonably constant level. There exist, therefore, strong incentives and reasons for leveling out production as much as possible.

Other factors, however, may be evaluated in the leveling out of production. The product itself may be bulky, necessitating the use of storage facilities having large capacity. This may place a limitation on how much goods can be produced and stored, purely from the stand-

point of unavailability of space, as well as cost. Again, the financial position of the company may make it unwise or impossible to permit inventory build-up, despite the advantages of level production. As a help and a guide, standards may be established setting maximum, as well as minimum inventories, which may be carried.

Master Production Schedules

After a careful consideration and evaluation of the factors involved, production planning may draw up master production schedules. Based on these schedules, subsidiary schedules for departments or areas, machine use and maintenance, the purchase of raw materials and labor requirements can be prepared. As a safeguard, alternate plans or schedules may be set up, such as what is to be done in case production has to be curtailed or increased. It may be well to recall at this point that the sales forecast was the basic motivating factor behind all of these schedules, reaching down to influence the subsidiary schedules through the master production schedule. The importance of the role the sales forecast plays in influencing production operations becomes more apparent and the need for accuracy in the forecast assumes greater proportions.

Effect of Inaccurate Forecasting on Production and Plant Personnel

The effects on production caused by inaccurate sales forecasting may be clear, but it is thought advantageous to

point out some of the more obvious ones. The inaccuracy must be significant, and this is dependent to a large extent on the industry, the product line and the company. In some situations an error of plus or minus 10% may not have any affect on production while in others such an error might necessitate considerable revision.

Underforecasting

If sales are underforecasted or the pattern of the level of sales is off, the inventory of finished goods may be depleted to the point where shipments cannot be made on time. This can cause customer dissatisfaction and loss of potential business. In order to get goods into the hands of buyers, production schedules may have to be revised, starting a chain of events affecting the entire plant. If there is unused capacity, additional machines may have to be brought into operation, necessary machine maintenance involving down time may have to be deferred, posing the threat of possible damage or breakdown. In a one shift operation, overtime may have to be paid, increasing the labor cost per unit of product.

It may even be necessary to increase the labor force, involving the hiring and training of new personnel. Outside of an implied obligation of providing steady employment for such additional personnel, there may be a problem in actually obtaining people because of a shortage in the

labor supply.

The increase in production may drain raw material inventories to the danger point. This puts an extra burden on purchasing to get the necessary ingredients, possibly at any cost within reason. The lead time on critical materials in short supply may be such that it is impossible to obtain sufficient stock to keep the plant running at the required rate, ultimately leading to customer dissatisfaction. The point is that all this can be quite costly and efficiency of production may be seriously impaired, as well as the profit per unit of goods.

Overforecasting

Conversely, overforecasting of sales has more than its share of headaches. If, for example, actual sales give evidence of being significantly below forecast, it might be thought that the obvious thing to do would be to cut production, but the problem is not as easy of solution as that. Cutting production may involve the shutting down of machines and equipment, which, once shut down, take a considerable amount of time to start up again. A case in point would be a Bessemer converter in a steel plant, which requires a number of days to shut down and start up.

Industrial Relations

The industrial relations picture may have to be considered. The cutting of production may necessitate laying

off personnel. These people may find other positions and the company may never get them back, losing skilled workers who can only be replaced by hiring and training new workers, at considerable cost and effort. Down grading of employees may be necessary, as well as the curtailment of the number of working hours, both resulting in a reduction in wages. This can have a serious effect on both the morale of the workers and on the economy of the community in which the plant is located. Difficulties with the union may result, and the company may have to recompense the employee under some contract provision such as the guaranteed annual wage. This factor of consideration of the worker appears to be assuming increasing importance as business tends more and more to accept and consider socio-economic responsibilities.

In view of the foregoing, it may be the consideration of management not to cut production, but to continue to produce at the originally forecasted rate and store excess production in inventory, with a reasonable expectation that sales will pick up and the original sales forecast will be attained or approached. There is a limit, however, as to how far this solution can be carried. Storage facilities for finished goods may fill up rapidly and additional storage room may not be available, or the company may not be able to stand the cost of tying up additional cash in inventory. If the expectation, or even gamble, that sales will pick up does not materialize,

then the inevitable may happen and the cut in production which finally does occur may be even more drastic and sudden than it would have been if it had not been delayed.

Purchases

When production is cut, purchases of raw materials may be reduced, necessitating downward revision of purchasing contracts, with possible penalties, or increased prices because of lower quantities purchased. The reduction in purchases of raw materials in turn affects the sales of the supplier, which may have an adverse effect on their business.

Summary

These then are some of the adverse results which may stem from significantly inaccurate sales forecasts and tend to emphasize the need for care and judgment in their preparation. It would seem that the sales forecaster, whatever his position in the echelon of forecasting, who realizes the implications of his forecast when it is used as a tool in production planning, will do his best to produce a forecast which is honest and sincere and based on his best judgment and analysis of all available data.

Chapter IV

Sales Forecasts as Applied to Financial Operations

General Discussion

Thus far sales forecasts have been discussed from the point of view of their use in and effect on sales and production operations, with but brief reference to the financial aspects of a business. All three, sales, production and finance are, of course, intimately related and interdependent, and the main reason why they are treated separately in connection with sales forecasts is to facilitate ease of presentation and discussion.

Neither Sales nor Production can operate without funds and the basic reason why they operate at all is to enable the company ultimately to show a net profit commensurate with the needs, requirements and standards of a particular company. In addition to providing funds for selling and manufacturing activities, financial operations include the provision of moneys for payment of dividends, construction of new facilities, development of new enterprises, and the productive utilization of funds not immediately required for industrial and/or other corporate purposes.

It is not the intent of this study to attempt to touch, even briefly, on all the facets connected with the financial operations of a company. Instead, the discussion

will be confined to the use and effect of sales forecasts on budgets, financial statments, financing new plants, and research and development.

Budgets

In financial activities, as in sales and production efforts, there must be some basis on which plans for future operations may be constructed and evaluated. In this connection, the budget is a very important tool, and may be defined as a financial plan or forecast. The use of a budget implies control, requiring explanation of tendencies to exceed it as well as justification of being significantly under it.

There are many different kinds of budgets including sales, production, materials or inventory, purchases, labor, manufacturing expense, cost of goods sold, administrative and general expense, selling expense, advertising, research and development expense, other income and expense, and capital assets. These detailed budgets usually support the three major budgets consisting of the Statements of Estimated Income and Expense, Estimated Financial Condition and Estimated Cash Receipts and Disbursements. These three major budgets form the master budget or financial plan.

Sales Budget

Usually the most logical starting point in budget preparation is the final sales forecast approved by manage-

ment.* If the forecast is in units, it is translated into dollars, so that the all important business income from sales can be estimated and the probable flow of cash into the business calculated.

The sales budget, to a certain extent, sets a limit or top on the other subsidiary budgets. If, for example, budgeted expenses exceed the estimate of income from sales, it may be necessary to effect a downward revision of those expenses. The same thing holds true if budgeted expenses versus estimated sales income indicates non-attainment of the net profit required by a particular company.

As an aid in subsidiary budget guidance standards may be developed, assigning to each budgeted activity a percentage, or factor of budgeted sales, with the understanding that this factor is not to be exceeded, except with adequate justification and proper authorization. Thus an element of control is established. A case in point might be where the advertising budget, representing the best estimate by that department of what expenditures for advertising and promotion will be for a given period, exceeds the factor assigned to its activities. This raises a signal which may require investigation as to why the standard is being exceeded and places the responsibility of justification on the advertising department. The

* 5. p. 37

department may have sound and sufficient reasons for exceeding its budget factor, and after explaining them to management, approval may be given. On the other hand, even though the reasons may be sound, the sales budget may not be able to support the increased advertising budget and, it may have to be revised downward.

Production Budgets and Dependent Budgets

In Chapter III the influence of the sales forecast on production planning and scheduling was indicated. Once the production schedule has been determined and approved, then takeoffs may be made of the direct labor hours and shifts, the machine shifts, the plant personnel required, and the raw materials needed. This permits dependent budgets to be prepared, including the purchase budget, inventory budget, direct labor budget, and manufacturing expense budget.

These budgets, in themselves, are not based on the sales forecast, rather they are influenced by the production budget. However, when the production schedule and budget is based to a large extent on the sales forecast, then it may be said that the sales forecast has a definite bearing on those budgets which are dependent upon the production budget.

For purposes of illustration, let us assume a simple preparation of a direct labor budget and see how the sales forecast reaches down to affect it.

A. Sales Forecast - 1957

Product	Total Units Forecasted To Be Sold
A	300,000
B	600,000
C	700,000
Total	1,600,000

B. Sales Budget - 1957

Product	No. Units	Units Selling Price	Total Sales
A	300,000	$10.00	$3,000,000
B	600,000	$15.00	9,000,000
C	700,000	$20.00	14,000,000
Total	1,600,000		$26,000,000

C. Production Budget - 1957

Description	Products		
	A	B	C
(a) Quantity Required for Sale	300,000	600,000	700,000
Ending Inventory Required	60,000	100,000	100,000
Total Requirements	360,000	700,000	800,000
Less Beginning Inventory	40,000	50,000	150,000
Required Production	320,000	650,000	650,000

(a) Based on Sales Forecast

Direct Labor Budget - 1957

Product	No. Units (a)	Standard, Labor Hours Per Unit	Total Standard Labor Hours	Direct Labor Budget at $2.00 Per Standard Labor Hour
A	320,000	1.0	320,000	$640,000
B	650,000	2.0	1,300,000	2,600,000
C	650,000	2.0	1,300,000	2,600,000
Total	1,620,000		2,920,000	$5,840,000

(a) From Production Budget.

This is a rather simple illustration but it indicates how the sales forecast reaches down through the sales budget and production budget to affect the direct labor budget. It should be pointed out that all budgets connected with production are not so directly affected, e.g., the manufacturing expense budget.

Financial Statements

Based on those budgets which are influenced mainly by the production budget, a Statement of Estimated Cost of Goods Sold may be prepared, having as its basic ingredients, raw materials, direct labor and manufacturing expense. Here the quantity of units forecast by sales has been a determinant in the expense of these basic ingredients.

With the Estimated Cost of Goods Sold, and the forecasted sales reduced to net sales, the gross profit can be estimated. This, less the operating expenses available from the Budgeted Statement of Operating Expenses, permits the calculation of net income. It is interesting to note that items listed in a Statement of Estimated Income and Expense are very often expressed as a percent of forecasted net sales. This affords comparison with actual results in the past, and points up deviations from the historical pattern which might bear investigation.

The estimated or forecasted net income forms a basis for setting up the Statement of Estimated Retained Earnings,

including the amount which might reasonably be expected to be paid out in dividends. It is not drawing too long a bow to say that the individual stockholder is affected by the sales forecast, though he seems far removed from it.

In addition to the foregoing financial statements, a Statement of Estimated Cash Receipts and Disbursements usually is prepared. Here it may be difficult at first glance to see how the sales forecast fits into the picture, until it is remembered that at least two big items are influenced by it. These items are the cash collections from Accounts Receivable and the cash disbursements through Accounts Payable for Materials and Supplies.

Finally, these budgets form the main constituents of a projected Statement of Financial Condition.

These statements and supporting budgets form the basis for controlling the finances of the company. For example, the estimated Statement of Financial Condition indicates what the picture on finances will be at the end of the budget period, and permits examination as to whether or not this is a healthy condition. Ratios may be calculated, such as net working capital to fixed liabilities, current assets to current liabilities, total assets to net worth, to mention a few; and these ratios may be compared to historical data in order to evaluate whether the forecasted trend is toward weakness or strength. Let us suppose for

example, that the cash picture appears weak or insufficient to meet cash disbursements. The Cash Budget may then be examined in more minute detail and an estimate made of the cash inflow and outflow on a monthly basis, or in some cases, for even a shorter period of time. Based on the information developed, the amount and timing of short term borrowing may be calculated, and the Statement of Estimated Financial Condition may be a factor in evidence as a basis for obtaining the needed loan.

Effect of Inaccuracies in Sales Forecast

As pointed out in Chapter III, in connection with production operations, in order to affect the financial operation, the inaccuracies in a sales forecast must be significant. When they are significant, then there is cause for revision of the entire financial program. It may be true that if sales drop below forecasted levels, there is a corresponding drop in expenditures for labor, raw materials and manufacturing expense, but for obvious reasons, it is not a directly proportionate decrease. When sales decrease, the net flow of cash into the business usually is decreased and the net income is lessened. Expenses may have to be cut all along the line and, in addition, increased borrowing may be necessary.

The possible results of cutting expense have been implied in Chapters II and III and to repeat them here would be redundant. The necessity for making increased loans,

however, may put a particular company in a tight bind. They may be difficult to arrange or even unobtainable and it is quite possible that the company may be forced to the wall. Again, the reduction in net income may make it unwise or even impossible to pay dividends, or financial commitments. This may be talking in terms of extremes, but it could happen.

New Plant Facilities

The preceeding paragraphs have discussed financial operations from the short term view. There is also the long term picture of from three to five years, or more, to be considered. This long term financial forecast is based on principles similar to those used in presenting the short term picture, but in dealing with an extended period of time, it is not prepared in as great a detail.

One area to be considered in long term financial operations is that of construction of, and investment in, new plant facilities. For purposes of brevity, the discussion here is confined to new plants for existing products or product lines.

First, in order to have a starting basis, there must be a demonstrable need for a new plant. Disregarding obsolescence and replacement, it must be expected that the capacity of the new plant will be utilized, i.e., that its output will be sold. Here the long range sales forecast performs a definite service. It indicates the number of units forecasted to be sold in a future period of time.

If, for example, over a period of five years it is estimated that sales will double and present plant capacity is insufficient, then thought may be given to investment in additional plant facilities. Further, based on the long range sales forecast and the assumptions in it, long range financial forecasts may be made, including estimated net return on the capital investment in the new plant. It may be that the return expected is insufficient to meet the standards required by a particular company, and some other means of increasing present capacity may be investigated, e.g., increasing the number of shifts, or technological improvements resulting in increased output.

If the indicated return meets company standards, then means of financing the new plant may be explored. Perhaps funds may be available from retained and estimated earnings, or equity or debt financing may be necessary. Again, it may not be advisable, or possible, in view of the forecasted financial position of the company as a whole, either to use retained earnings, if available, or engage in increased long term borrowing.

Finally, however, the decision may be made to go ahead, and the timing of the investment may be determined. If the plant is constructed and placed in operation and the long term sales forecast is inaccurate, and forecasted sales do not materialize, then the company may be in very serious trouble. Mistakes made on what turn out to be

unwise plant expenditures usually cause serious losses which cannot easily be corrected.

Research and Development

Another area in which long term financial planning is of significant importance is research and development. Industrial research may be defined as an organized effort on the part of a company to provide itself with the technology it needs for its present and future operations. Whether or not the industrial research is carried out effectively can effect a company's competitive position, its future growth, its employee relations, and almost everything else connected with what the company does.*

It is in the fields of pure research and applied research that long term financial planning comes into play. This is necessary because of the uncertain nature of the work and the time required to perfect results, which may be measured in terms of years rather than shorter periods of time. If such research is started and stopped or significantly modified as a result of changes in the short term financial picture, the research program may be seriously hampered or impaired.

In connection with research, the long range sales forecast may play a dual role. First the forecast itself may be based partially on assumption that there will be product improvement, resulting from research, which will permit a

* 17. p. 25

sales increase. Secondly, on the basis of the forecasted income predicated on the long range sales forecast, it may be estimated that a long term research program may be undertaken and financed. If the expected sales give evidence of not materializing, then the research program may have to be cut, with a consequent loss in product improvement, which in turn may be reflected in lowered sales results.

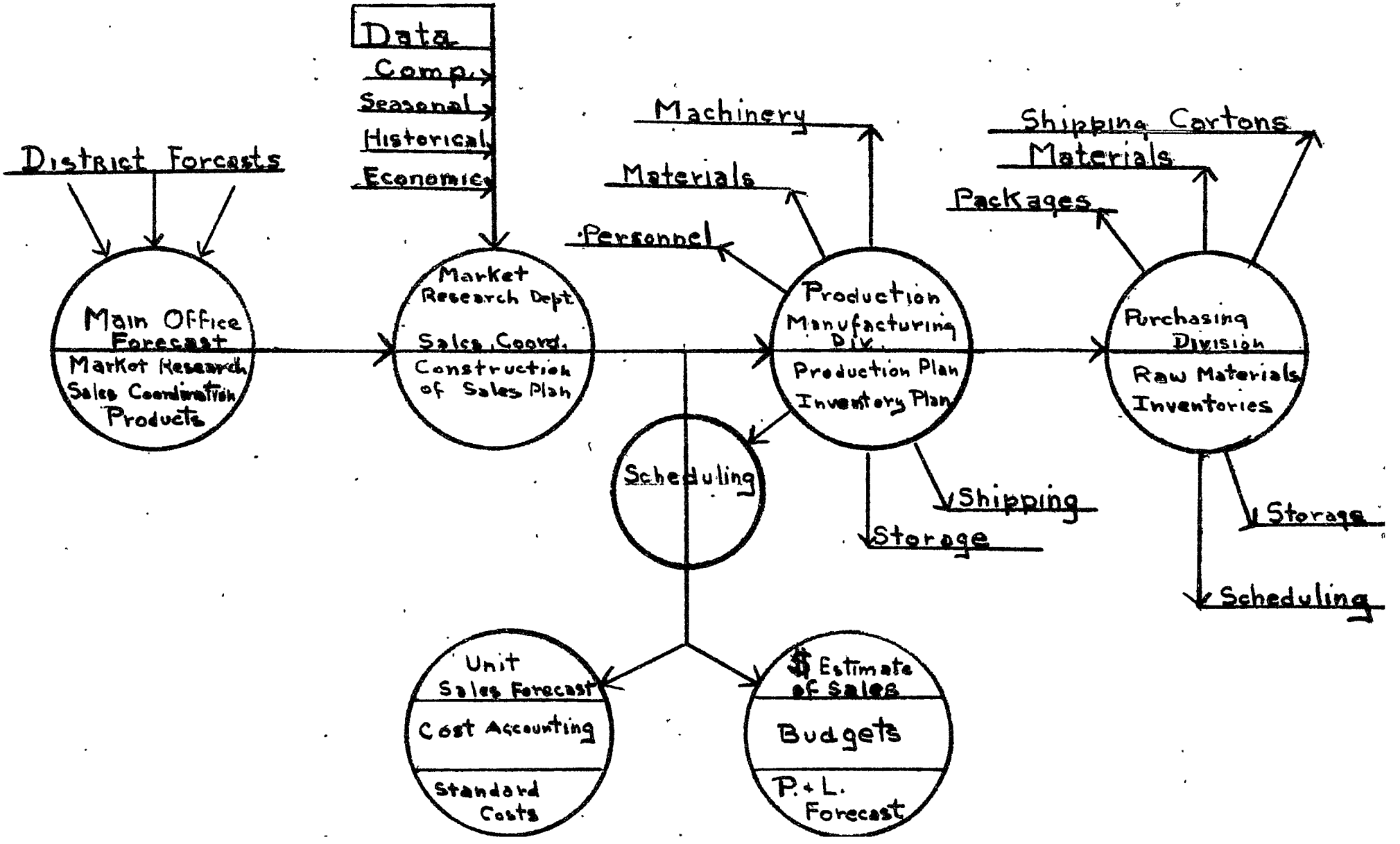
Summary

The first half of this study, comprising the first four chapters, has attempted to indicate briefly the methods used in sales forecasting and how sales forecasts may influence and be used in some of the operations of the sales, production and finance divisions of a company. It is not the intent to explore and discuss all the implied ramifications; such is beyond the scope of this study.

As an aid in visualizing the use of sales forecasts in company operations, the chart appearing on the succeeding page has been prepared. It is explanatory in itself.

The second half of this study is a case presentation of the preparation and function of sales forecasts as exemplified by several divisions in the Film Department - E. I. duPont de Nemours & Company, Inc.

Flow and Influence of Sales Forecasts



Chapter V

The duPont Organization

Prior to showing how sales forecasts are prepared and used in the Film Department, it is thought it would be advantageous to present a brief picture of the duPont organization. On the following page is a basic organizational chart which will aid in this presentation.

As is shown, there are four permanent committees of the Board. The two committees which are actively engaged in executive management of the Company are the Finance Committee and the Executive Committee. As of October 1, 1956, the Finance Committee was composed of eight members and the Executive Committee of ten members. These are active committees - the Finance Committee meets twice monthly, and the Executive Committee meets all day each Wednesday, and at any other time which it is deemed necessary.

The President of the Company is Chairman of the Executive Committee and each of the other members of the committee are Vice Presidents. All are members of the Board of Directors. This committee has charge of the operating phase of the Company's business. Collectively they formulate policy, individually they act as advisers in such fields as Personnel, Sales, Advertising, etc., however, they have no administrative duties in connection with the operations of a particular department.

OCTOBER 1, 1956

STOCKHOLDERS

BOARD OF DIRECTORS

- BONUS & SALARY COMMITTEE
- EXECUTIVE COMMITTEE
- FINANCE COMMITTEE
- COMMITTEE ON AUDIT

PRESIDENT [redacted]

SPECIAL ASSISTANT [redacted]

INDUSTRIAL DEPARTMENTS

- ELECTROCHEMICALS DEPARTMENT — GENERAL MANAGER [redacted]
- EXPLOSIVES DEPARTMENT — GENERAL MANAGER [redacted]
- FABRICS & FINISHES DEPARTMENT — GENERAL MANAGER E. G. HICKERSON
- FILM DEPARTMENT — GENERAL MANAGER [redacted]
- GRASSELLI CHEMICALS DEPARTMENT — GENERAL MANAGER [redacted]
- ORGANIC CHEMICALS DEPARTMENT — GENERAL MANAGER [redacted]
- PHOTO PRODUCTS DEPARTMENT — GENERAL MANAGER [redacted]
- PIGMENTS DEPARTMENT — GENERAL MANAGER [redacted]
- POLYCHEMICALS DEPARTMENT — GENERAL MANAGER [redacted]
- TEXTILE FIBERS DEPARTMENT — GENERAL MANAGER [redacted]

Elastomer Chemicals Dept. General Manager [redacted] 11/1/57

AUXILIARY DEPARTMENTS

- ADVERTISING DEPARTMENT — DIRECTOR [redacted]
- CHEMICAL DEPARTMENT — DIRECTOR [redacted]
- DEVELOPMENT DEPARTMENT — DIRECTOR [redacted]
- EMPLOYEE RELATIONS DEPARTMENT — DIRECTOR [redacted]
- ENGINEERING DEPARTMENT — CHIEF ENGINEER [redacted]
- FOREIGN RELATIONS DEPARTMENT — DIRECTOR [redacted]
- GENERAL SERVICES DEPARTMENT — DIRECTOR [redacted]
- LEGAL DEPARTMENT — DIRECTOR [redacted]
- PUBLIC RELATIONS DEPARTMENT — DIRECTOR [redacted]
- PURCHASING DEPARTMENT — DIRECTOR [redacted]
- TRAFFIC DEPARTMENT — DIRECTOR [redacted]
- ECONOMIST [redacted]

TREASURER'S DEPARTMENT

TREASURER [redacted]

SECRETARY'S DEPARTMENT

DIRECTOR

Effective January 1, 1957, there were 11 industrial departments, of which the Film Department is one. Each Department is in charge of a general manager, who reports and is responsible to the Executive Committee for the manufacture and sale of products assigned to his department. The general manager, as head of his department, directs the operations of the department as though it were, in effect, a separate company of which he is the chief executive.

The Auxiliary Departments act in the capacity of staff functions to the Executive Committee and the Industrial Departments. The Treasurer's Department and the Secretary's Department are responsible to the Finance Committee.

Executive Committee Control

Since the general managers are responsible to the Executive Committee for the operation of their particular departments, the Executive Committee must have data and information which will permit them to evaluate departmental performance. One method of presenting this data clearly and concisely is through the Chart System. These charts and tabulations, prepared and maintained by the Treasurer's Department for the Executive Committee, do not replace the customary financial statements such as budgets, forecasts or historical data, but they are used by the Executive Committee in reviewing with a general manager the operations of his department.

The charts for each department are reviewed at least

once every three months. Also, there is, at the minimum, one series of charts set up for each department. Where it is considered desirable to treat a section of departmental activity as a separate unit, a set of charts is prepared covering that unit.

Return on Investment

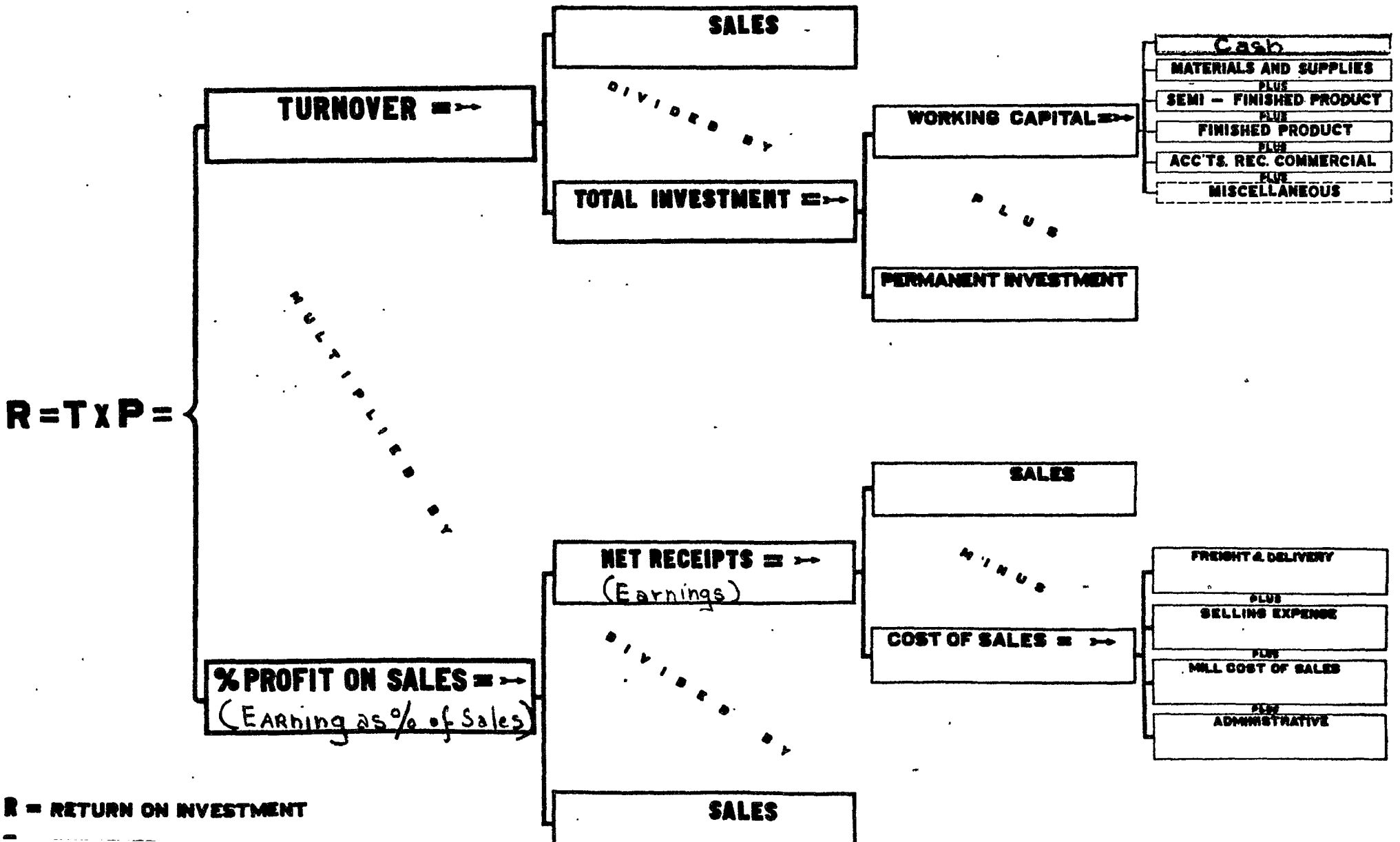
Primary emphasis is placed on return on investment and the chart series are constructed toward this end. As indicated by a graphic presentation, on the following page, of the overall formula used, Return on Investment is treated as Turnover, multiplied by Earnings as % of Sales. These two factors influence the Return, e.g., assuming no change in selling price, increased turnover indicates a department is getting increased sales out of the same plant and working capital; an increase in earnings as percent of sales (gross profit margin) points toward the fact that the cost in proportion to the sales dollar is being reduced.

Chart Series

It is neither the intent, nor within the scope of this study to present, analyze, or discuss in detail the chart system of duPont. It is merely mentioned here to illustrate the graphic means by which the Executive Committee can visualize departmental operations quickly and concisely. Charts are prepared to show, among other things, Percent Return on Investment, Percent Turnover, Earnings as % of Sales and Transfers, Sales and Transfers,

CHART SHOWING

RELATIONSHIP OF FACTORS AFFECTING RETURN ON INVESTMENT



Expenses as % of Sales, Inventories Compared with Standard, Investment, etc.

As representative of the detail and information shown on these charts, on the succeeding page is a fictitious chart showing Return on Investment, Turnover and Profit on Sales. By way of explanation, the duPont Company makes four forecasts a year. These complete forecasts show Sales, Cost of Sales, Earnings and Investment. Based on these forecasts, which are charted on their respective charts, the items shown on the Return on Investment chart may be forecasted. These forecasts are shown on the chart by arrows pointing to the left (A).

Forecasts

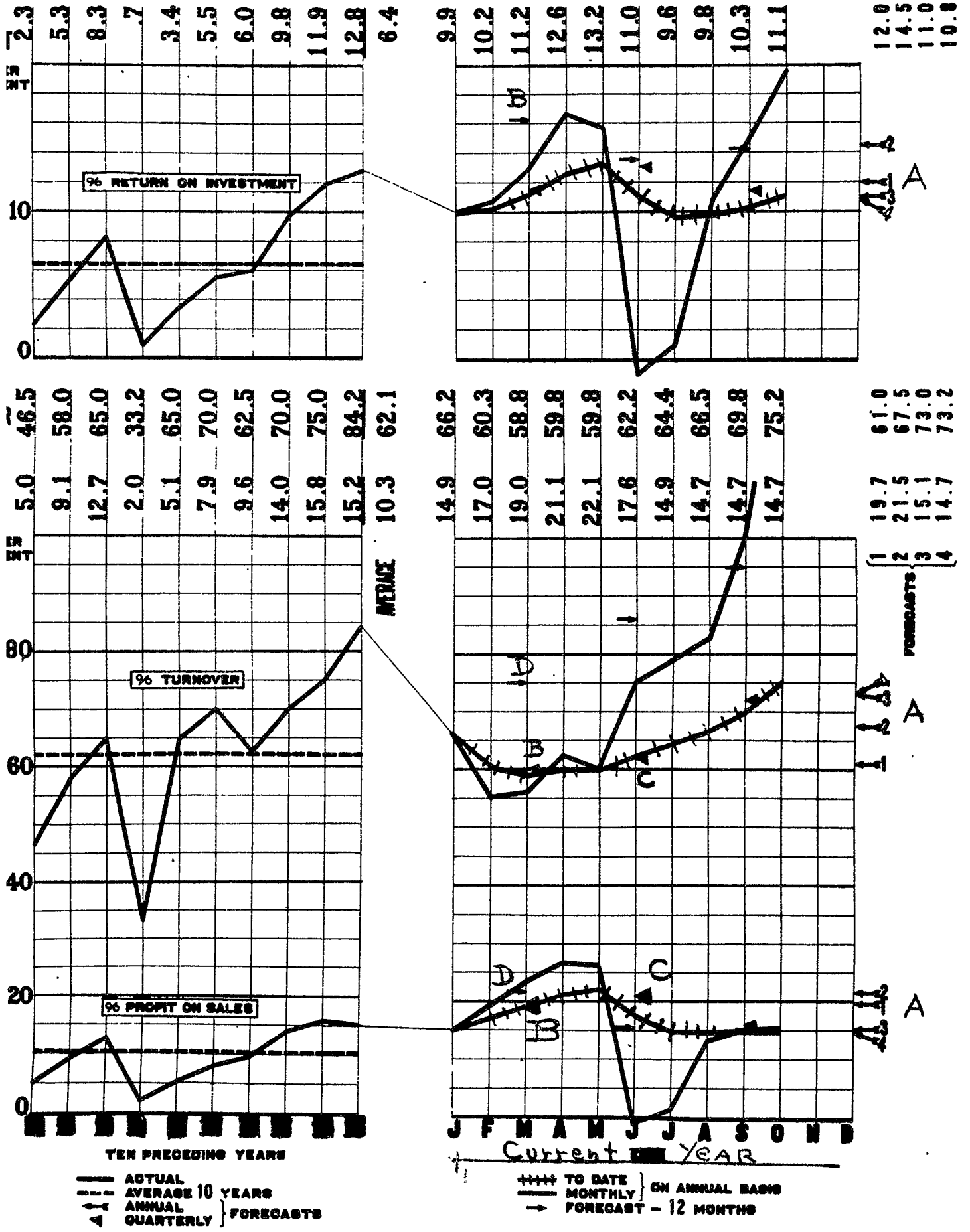
The No. 1 forecast is for the period January through December, with the first quarter being forecast by months. The No. 1 arrow indicates the expected position at the end of December. The first quarter is put on an annual basis and the arrowhead (B) on the March ordinate indicates the estimated position at the end of March.

The No. 2 forecast, due in April, covers the period April through March of the following year. The calendar year forecast, now consists of three months actual, plus nine months forecast and is shown by arrow #2 (A). The arrowhead represented by (C) now covers the first three months actual, plus the No. 2 forecast for April, May and June and gives the expected position at the end of June.

FICTITIOUS

RETURN ON INVESTMENT, TURNOVER AND PROFIT ON SALES

CROSS SALES AND NET RECEIPTS AS USED IN THESE CALCULATIONS INCLUDES TRANSFERS AND OUTSIDE SALES



Since the forecasts run twelve months into the future, arrow (D), pointing to the right shows the expected position at the end of March of the following year, based on the No. 2 forecast. A similar procedure is followed for the No. 3 and No. 4 forecasts.

As an aid in facilitating ease of analysis a current-year ordinate (not shown on the example chart) is added to the annual chart on the right on which is plotted the most current actual-data-plus-forecast.

Since the Sales Forecast itself is used as one of the factors in preparing the Return on Investment chart, it can be seen that the Sales Forecast is a very important tool in charting and controlling the operation of the company and the departments.

Charts As a Control Device

There is a definite relationship among the series of charts following closely the formula shown graphically on Page 68. This permits a rather complete analysis of the salient points of cause and effect. Referring to the chart on Page 70, a very satisfactory trend of return on investment is indicated for the first half of the current year, with a dip during June, July and August, followed by a return to normal.

Examination of the two component charts indicates that the high return on investment was realized through low "Turnover" and high "% Profit on Sales". The normal return,

after the poor showing in June, July and August, was due to considerably higher turnover and lower profit on sales and followed the pattern of historical data. Turnover, being a function of sales and investment, gives an indication that excessive investment existed in the first half of the year, or volume of business was low, while later in the year this factor returned to normal. The answer to this and other questions, is revealed by examination of succeeding charts in the series.

The Film Department

The Film Department, as shown on the chart on Page 65, is one of the eleven industrial departments of the duPont Company, and is headed up by a general manager. On the following page is an organization chart showing the managerial set-up of the various segments that go into the make-up of the Department.

The Department manufactures and sells cellophane, cellulose acetate, "Mylar" polyester film, "Cel-O-Seal" cellulose bands, cellulose sponges and cellulose sponge yarns. Manufacturing is done in plants located in Buffalo, N. Y.; Circleville, Ohio; Clinton, Iowa; Columbia, Tenn.; Old Hickory, Tenn.; and Richmond, Va.

General offices are located in Wilmington, Delaware, which is headquarters for the duPont Company. In succeeding chapters a more detailed breakdown will be given, as occasion warrants, covering product description, sales force, areas and

channels of distribution and other information pertinent to this study.

ORGANIZATION CHART

FILM DEPARTMENT - E. I. DU PONT DE NEMOURS AND COMPANY

- GENERAL MANAGER -
  - ASSISTANT GENERAL MANAGER -
    - CONTROL MANAGER -
      - ASSISTANT CONTROL MANAGER -
        - ACCOUNTING SECTION - MANAGER -
        - OFFICE SERVICE SECTION - MANAGER -
        - PLANNING & SCHEDULING SECTION - MANAGER -
        - SPECIAL STUDIES SECTION - MANAGER -
        - STANDARDS SECTION - MANAGER -
    - PERSONNEL MANAGER -
      - ASSISTANT PERSONNEL MANAGER -
      - ASSISTANT PERSONNEL MANAGER -
    - DIRECTOR OF PRODUCTION -
      - ASSISTANT DIRECTOR OF PRODUCTION -
        - SPECIAL ASSIGNMENT -
        - PRODUCTION MANAGER ("CEL-O-SEAL" & SPONGE) -
          - COLUMBIA (SPONGE) - PLANT MANAGER -
          - YERKES (CELLOPHANE, "CEL-O-SEAL" BANDS, SPONGE YARN) - PLANT MANAGER -
          - CIRCLEVILLE ("MYLAR" POLYESTER FILM) - PLANT MANAGER -
          - CLINTON (CELLOPHANE) - PLANT MANAGER -
          - OLD HICKORY (CELLOPHANE) - PLANT MANAGER -
          - SPRUANCE (CELLOPHANE, ACETATE FILM) - PLANT MANAGER -
          - CELLOPHANE TECHNICAL SECTION - MANAGER -
    - RESEARCH DIRECTOR -
      - ASSISTANT RESEARCH DIRECTORS -
        - DEVELOPMENT SECTION - MANAGER -
        - PATENT SECTION - MANAGER -
        - WILMINGTON RESEARCH LABORATORY DIRECTOR -
        - YERKES RESEARCH LABORATORY DIRECTOR -
    - DIRECTOR OF SALES -
      - SPECIAL ASSISTANT -
      - ASSISTANT DIRECTOR OF SALES -
        - PROMOTION & ADVERTISING SECTION - MANAGER -
        - SALES DEVELOPMENT & TECHNICAL SERVICE SECTION - MANAGER -
          - ASSOCIATE MANAGER -
          - ASSISTANT MANAGER -
          - ASSISTANT MANAGER -
        - TRADE ANALYSIS SECTION - MANAGER -
      - ASSISTANT DIRECTOR OF SALES -
        - "CEL-O-SEAL" SALES - MANAGER -
          - NEW YORK DISTRICT MANAGER -
        - CONVERTER FILM SALES - MANAGER -
          - ASSISTANT MANAGER -
        - EXPORT SALES - MANAGER -
          - ASSOCIATE MANAGER -
        - INDUSTRIAL FILM SALES - MANAGER -
          - ASSISTANT MANAGER -
            - EASTERN DISTRICT - NEW YORK - MANAGER -
            - WESTERN DISTRICT - CHICAGO - MANAGER -
        - PACKAGING FILM SALES - MANAGER -
          - CENTRAL DISTRICT - CHICAGO - MANAGER -
          - EASTERN DISTRICT - PHILADELPHIA - MANAGER -
          - NEW ENGLAND DISTRICT - BOSTON - MANAGER -
          - NEW YORK DISTRICT - NEW YORK - MANAGER -
          - PACIFIC COAST DISTRICT - SAN FRANCISCO - MANAGER -
          - SOUTHERN DISTRICT - ATLANTA - MANAGER -
          - SOUTHWESTERN DISTRICT - KANSAS CITY - MANAGER -
        - SPONGE SALES - MANAGER -
          - ASSISTANT MANAGER

Chapter VI

Sales Forecasting Method - Salesman and District Level

General Discussion

In order to present a clear picture of the methods of sales forecasting used in the Film Department, it is thought advisable not only to describe the methods themselves, but also, to give a brief description of the products being forecasted, the sales force, the channels of distribution, the historical data supplied to the forecasters, and other pertinent data. In the interests of brevity, a detailed description of sales forecasting methods will be presented, as it applies to cellophane. The major principles embodied in this description apply to methods used in forecasting the sales of other products. Variances and deviations, will be treated separately under product headings, as will problems peculiar to a particular product.

Product - Cellophane

Cellophane is produced from wood pulp by the viscose process, in four plants, located in Buffalo, N.Y.; Clinton, Iowa; Old Hickory, Tenn.; and Richmond, Va. It is a strong, flexible, transparent film, highly resistant to grease, oil and air.

There are a variety of kinds, types and gauges produced, including plain (non-moistureproof), moistureproof, heat-sealing, and colored. Several modifications of the moistureproof variety are manufactured to provide heat sealing

properties and water resistant properties. Choice of the correct cellophane to be used is dependent upon the end use.

Cellophane is used as a packaging film, in fabrications and laminations, and for industrial applications, e.g., as a mold release sheet in certain pressure molding operations. One only has to visit a modern supermarket to see the variety of industries in which cellophane is used as a packaging material. These include baked goods, tobacco, meat, candy and gum, crackers and biscuits, potato chips and popcorn, produce, food, textiles, and miscellaneous items.

DuPont supplies cellophane in unprinted rolls and cut-to-size sheets. Rolls are used, generally, in machine applications, such as packaging machines, while cut-to-size sheets are used in hand operations. In forms other than unprinted rolls, cellophane is supplied by converters and fabricators, e.g., a printed bag would be supplied by a converter. The unit of sales is pounds, in the case of rolls, and per thousand square inches in the case of sheets.

Area and Channels of Distribution

Cellophane is sold by the Film Department in one form or another throughout the United States. It is also exported to other countries through the Export Section. In this study, the export phase of the business will be disregarded, since it is a relatively small percentage of the entire business and in itself is rather complex, besides adding little to this discussion.

The sales structure for cellophane and other films is broken down into the three main segments of Packaging Sales, Converter Sales and Industrial Sales, each headed by a manager reporting to an Assistant Director of Sales as shown on the chart on Page 74.

Packaging Sales is responsible for domestic sales, and development of new markets for all films to the end user for packaging purposes, to authorized distributors and to paper jobbers. The bulk of sales is, by far, direct to the end user.

Converter Sales is responsible for domestic sale of all films for conversion as a primary packaging material and for certain agreed-upon non-packaging uses. Also sales to authorized distributors, dairy jobbers, fabricators and domestic sale of waste film.

Industrial Sales is responsible for domestic sale and development of new uses for all films in industrial markets - except fields specifically designated as being a function of Converter Sales.

Sales in all three categories are nationwide with the greatest number of accounts, the largest sales force, and the heaviest poundage, being in Packaging Sales, in the case of cellophane. Poundagewise in regard to cellophane, Packaging Sales is followed closely by Converter Sales.

Sales Force

Packaging Sales is further broken down into seven

districts, each in charge of a district manager; assisting the district managers are a total of nine assistant district managers. Among the various responsibilities of the district manager is the responsibility for sales and sales forecasts in his district.

District offices are located in Boston, New York, Philadelphia, Atlanta, Chicago, Kansas City, and San Francisco. A total of fifty three salesmen report to these district offices, stratigically located to blanket the entire country.

Converter Sales is divided among seven salesmen, located throughout the country, and reporting to the Assistant Manager and Manager of Converter Sales at Wilmington. Heavy and substantial poundage is concentrated in a number of large converters and the total number of accounts compared to Packaging Sales is substantially smaller. Hence there is not the need for as many salesmen as in Packaging Sales.

Industrial Sales is divided between two districts and among thirteen salesmen, reporting to their respective district managers, each having an assistant district manager. Districts are located in Chicago and New York. The sale of cellophane is not large in comparison to the tonnage moved through either Packaging Sales or Converter Sales. However, in the case of "Mylar" polyester film, Industrial Sales moves more tonnage than either of the other two.

Initiation of Sales Forecast

It might be well at this point to state that in all further discussion involving forecasts, the term "sales forecast" will be used to denote a short term forecast covering a period of a year. Long term forecasts will be designated as such, i.e., "long term sales forecast".

Sales forecasts are initiated four times a year at Wilmington's request and cover a period extending a year hence. For example, the No. 1 forecast covers the period from January through December of the following year. The No. 1 forecast covers the first three months of the forecast period by months and the succeeding nine months by quarters. In Packaging Sales, the forecast for cellophane originates with the salesman in accordance with instructions received from the District Manager. This is the Grass Roots Approach at this point.

Forecast Detail - District Level

In order to illustrate the detail of the forecast made by the salesman, the forecast form shown on the following page is presented. The forecast is in pounds, by accounts, and includes an estimate of inventory, competitive sales and sales to the accounts by a converter or authorized distributor. The individual salesman sends his completed forecast to the district manager, who checks the forecasts in terms of his own knowledge of his district and the historical data available to

District_____ PACKAGING SALES

Salesman_____ ALL FIGURES IN M POUNDS Date_____

ACCOUNT	INDUSTRY	*	1967								Direct Comp Film		Converted Film	
			Jan.	Feb.	Mar.	1 Q.	2 Q.	3 Q.	4 Q.	Total Year	1 Q. 1967	Year 1967	1 Q. 1967	Year 1967
TOTALS														

* Unconverted January 1 Cellophane Inventory-No. of Week at Use Rate (Account Total)

80.

him. Any question concerning a specific or forecasted account is resolved by discussion with the particular salesman involved.

Although each salesman usually has over 100 accounts, he forecasts only for those accounts which represent the bulk of tonnage sold in his territory. For example, 30% of his accounts may take 80% to 95% of the tonnage sold in his territory, direct and through converters and jobbers, and by the competitor. At the district office level the individual salesmen's forecasts are consolidated into a district forecast and projected to a total which compensates for the unforecasted accounts. The district total, by territories, and the individual salesmen's forecasts by account are sent to Wilmington, together with a letter by the district manager containing explanations and comments pertinent to the forecast.

The No. 1 forecast also is broken down into a forecast by industry, as well as account, and the individual territory forecast is projected into a district forecast, by industry, as described in the preceeding paragraph. In addition to the quarterly forecasts, special forecasts covering particular types of film may be requested from time to time, as circumstances dictate, e.g., for a new type of cellophane being introduced, perhaps on an experimental basis. It should be noted that the forecast for cellophane is in units of pounds, not in terms of dollars.

Historical Data Available at District Office and Salesman Level

Since each order placed through Packaging Sales is coded as to industry end use, e.g., Baked Goods, Candy and Gum, Crackers and Biscuits, etc., it is possible, through an I.B.M. machine set-up in Wilmington, to tabulate, by account, salesman, and industry, the total poundage sold each month and the poundage sold to date. This tabulation is issued once each month to the individual salesmen and the district office. The individual salesman's tabulation is by account, coded as to industry. In addition to receiving these data, the district office also receives a tabulation showing total district sales, by industry. Sales for individual accounts are posted to sales data cards in the district office and the salesman posts sales to his own set of sales cards.

In addition to this data, quarterly reports are issued to the district office and salesman showing the poundage to date, by industry. Thus an historical pattern of direct sales data is built up which can aid the salesman and the district in the construction of their forecasts.

Supplementing historical data on direct sales, the salesmen and the district office are supplied, quarterly, with data on competition and on sales of converted cellophane for packaging uses. The data for these quarterly tabulations are based on trade reports written by the salesmen themselves.

A copy of the direct sales trade report form on the succeeding page shows sections from which the basic data for the quarterly competitive and indirect sales reports are taken. This information is tabulated on I.B.M. equipment and returned to the district office and salesman, via the quarterly tabulations.

The competitive quarterly reports show a breakdown by account, by industry, and by competitive type of film. The indirect sales quarterly tabulations are broken down by account and coded by industry.

The district manager also receives, quarterly, from Wilmington a "Forecast of Economic Trends Related to Cellophane Sales", with an accompanying letter of appropriate comments and observations prepared by the manager of the Trade Analysis Section, The forecast of economic trends is obtained from the Economist Office and will be discussed in more detail in a later chapter. In addition, industry and other data and studies relating to sales are issued periodically by Wilmington.

Quarterly, the district office is provided with a report showing actual performance versus forecast. Although not required by Wilmington, some districts prepare a monthly report showing analysis of performance versus forecast and issue it to the salesmen. This gives the salesman the opportunity of evaluating his sales performance against his forecast, as well as seeing how his fellow salemen and the

district are doing.

Additional Forecast Information Channeled to Wilmington

There is also a flow of information to Wilmington through and from the district office not directly connected with the district office sales forecast, but contributing data which can be helpful to Wilmington in their forecast evaluations. Trade reports, for example, can contain information and data, which, taken in the aggregate can indicate trends and conditions having a definite bearing on future sales. Each month the district manager prepares a monthly report for Wilmington covering developments and activities in his district, including observations concerning expected order flow and general business conditions. Also, periodically, in the case of cellophane, the district managers in Packaging Sales are requested to give their estimate of the ultimate degree of penetration of cellophane sales potential, nationwide, by industry.

Summary

It can be seen from the foregoing paragraphs that the volume of data available at the district office and salesman level is considerable and provides a means for helping develop accuracy in the sales forecast made at those levels.

The Grass Roots Approach is evident in the forecast made by the individual salesman, while the district forecast submitted by the district manager begins to take on the

aspects of the Sales Management technique.

The discussion in this chapter has been centered around cellophane and Packaging Sales. The forecast procedure on all films, and in Industrial Sales and Converter Sales follows a like pattern, although it is not identical. Also, the historical and economic data supplied is not the same for all products. There is sufficient similarity, however, so that a recital of procedures and data available in connection with Industrial and Converter Sales would be repetitious.

Chapter VII

Sales Forecast and Use of Forecast at Wilmington Level

General Discussion

In the preceeding chapter the sales forecast for cellophane was treated from the standpoint of its initiation and preparation at the salesman and district office level. This chapter will be devoted to a discussion of the sales forecast and its use at headquarters, or Wilmington level.

Forecasts for all products are funneled to and through the Trade Analysis Section. In the case of cellophane, the forecasts are consolidated by the Trade Analysis Section into a departmental forecast in total pounds, for presentation to and approval by management.

It is thought that a clearer picture of the checks and balances used in firming up what might be called a final and approved forecast can be obtained by presenting, briefly, a description of the Trade Analysis Section, its functions, and the principles used in its approach to sales forecasts.

Trade Analysis Section

This section, headed by a manager, operates as a staff function, under an assistant director of sales (see chart page 74). It maintains records of sales and trade contacts on all departmental products, assists in sales forecasts, analyzes sales and competition, prepares periodic reports as required, and makes statistical market studies to

determine potentials and marketing trends. The section keeps the field force regularly informed as to their sales and otherwise assists management in measuring sales performance and in planning sales policies and activities, as well as maintaining customer and prospect mailing lists. The wealth of data supplied to the salesman and district office mentioned in the preceeding chapter is prepared mainly by the Trade Analysis Section.

At one time the Trade Analysis Section prepared a separate, complete sales forecast which was compared with the total of the forecasts submitted by Packaging, Industrial and Converter Sales, but this is no longer done. Instead, after the forecasts have been consolidated the results are presented in meetings with top management in the Sales Division. Appropriate comments, data, and observations are presented by the manager of the Trade Analysis Section for evaluation and possible action by management in arriving at a final forecast.

Methods Used in Evaluating Forecast

The observations, comments and data presented to top management by the Trade Analysis Section are based upon a number of factors. These factors include analysis of historical data, correlation, trend analysis, and estimated share of total industry poundage.

Trend analysis is based on the history of past sales and a trend is established using the method of least squares.

Indications are that this trend analysis, at least at the present, gives a fairly accurate check on forecast figures.

A "Forecast of Economic Trends Related to Cellophane Sales" is used in correlation analysis. This forecast, mentioned in Chapter VI, includes FRB Index of Industrial Production, FRB Index on Non-Durable Goods Production, Total Civilian Employment, Disposable Personal Income and Retail Store Food Sales. This last item is particularly interesting since approximately 78% of the cellophane sold is used on food products alone, and there are other non-food products sold through food stores in which cellophane also is used.

All in all, there are a number of checks and balances used in evaluating the forecasts submitted by the sales sections. Finally, after consultation and discussion, top management arrives at a final forecast which is approved by the Director of Sales. This latter step is an example of the Jury of Executive Opinion in operation, and in view of the various methods used in forecasting, including checks and balances, it is indicated that the forecasting of sales in the Film Department is by means of the Multiple-Method Approach.

Use of the Sales Forecast

General Discussion

It would be difficult in a treatise of this nature to attempt to explore all the ways in which the sales forecast is used, or influences operations, in the Film Department. It is estimated, for example, that out of each quarter of three months

duration, there are only about ten days in which periodic data, reports and studies connected directly or indirectly with the sales forecast are not being worked on or with, and then the next quarterly forecast comes along. There are approximately thirty-seven reports, studies or tabulations, due in accordance with a specific time schedule and connected in some way with the forecast, including "costing" by the Control Division. From this "costing" data the various items of working capital investment are forecasted, the permanent investment forecast being made on the basis of new construction, write-offs, etc.

These completed forecasts are forwarded to the Treasurer's Department for analyzation and presentation to the various executives of the company. The forecasts are represented on the Executive Control Charts, mentioned on Page 67, by means of arrows and arrowheads placed on ordinates for various periods in the future. It is obvious that the sales forecast is really used, and not just filed away as "something nice to have".

In the following pages an attempt will be made to highlight several of the ways in which the sales forecast is used and how it influences departmental operations.

Use on Sales Activities

Allocation and Sales

Cellophane, for a period of years, has been in short supply. Production capacity, despite increased production due to technological improvements has not been sufficient to satisfy

demand. Hence, a system of what might be termed "internal allocation" has been in operation, which in effect, allocates to the various selling sections and districts the tonnage of cellophane available, monthly. One basis for allocation is the forecast from those selling sections and districts.

The forecast on cellophane supplies valuable information on customer inventories in terms of weeks of supply, estimated competitive sales and sales by and through converters. These data may be used to direct and emphasize sales efforts and activities to certain areas and markets.

Quarterly, the sales force is supplied with data permitting a comparison of actual sales versus forecast. In the case of cellophane, where Sales is operating under a controlled poundage, this comparison may not assume the same significance as in a situation where Sales is operating in a free market, e.g., in Sponges.

Promotion and Advertising, and Market Research

The sales forecast appears to exercise some influence in advertising and promotion activities. The manager of the Promotion and Advertising Section consults with Trade Analysis in connection with the sales forecast by end use, e.g., Meat, Baked Goods, etc. This provides him with one basis for deciding what advertising and promotion expense should be directed or allocated to a particular market. In this connection, an important question answered by the forecast is how much can be expected in the way of an increase in sales in a particular

market.

A certain amount of market research is done by the Promotion and Advertising Section, particularly in connection with the preparation of sales aids, including consumer studies, "How-to-Package" brochures and motion picture films. The sales forecast, by end use, may be used as supporting evidence in a decision to direct market research expenditures and efforts to a particular end use market, e.g., Fresh Produce.

Sales Development and Technical Service

Some of the functions of the Sales Development and Technical Section include the collection and analysis of facts pertaining to characteristics, performance and trade use of all products, the presentation of such data to Production, Research, Control and Sales groups for consideration and appropriate action, and the supplying of technical information regarding the utility and application of all products in new and established markets so that all sales groups can promote, sell and service users.

The manager of the section may use the sales forecast, from an end use standpoint, as an aid in determining the deployment of personnel in various activities, e.g., how many men shall work in electrical uses and applications, how many will be required for mechanical uses and applications, etc.

These are some of the ways in which the sales forecast is used and influences operations in sales.

Production Planning and Control

After the sales forecast has been approved by management it goes to the Control Division for use in production planning and costing.

Since production capacity in the case of cellophane is insufficient, at least at the present, to meet the sales forecast, the plants submit a production forecast which forms the basis for production operations and indicates the tonnage which will be available for Sales. In regard to other products not in tight supply, such as sponges, "Cel-O-Seal" bands, and "Mylar" polyester films, the Control Division, with the aid of the sales forecasts, works up the production schedule as to quantity and timing so that production is leveled out throughout the year to take advantage of available manpower.

The sales forecasts are in units, i.e., pounds, cubic inches, etc., dependent on product. Based on historical data, it is possible for the plants to break down the forecast into various products, types, e.g., - how many pounds of 300 gauge MSD-51 Cellophane will be produced. This can then be translated into terms of raw materials, labor, machine set-ups, etc. On the following page is a form used in setting up the "Cellophane Production Program".

Close control appears to be exercised over production operations by the Control Division and management. Every three days, for example, information teletyped from the plants to the Planning and Scheduling Section is charted by the Control

- FORECAST

CELLOPHANE PRODUCTION PROGRAM
(M LBS.)

Plant Cast. Pack. Fcst.	S.F. Inventory			Cast Packed	Packed Prod.	Carry Over	Ship.	Sales Fcst.	Finished Inventory		
	Actual	Std.	Std. Mos.						Act.	Std.	Std Mos

Prepared by Control Division

Division and routed to management. This includes such items as Orders Scheduled for Current Shipping Month, Unshipped Orders - All Months, Shipments to Date, Forecast in Units, and other data. Management thus has a concise, up-to-date picture of operations.

Finance-Budget Operations

The Accounting Section of the Control Division "costs" the approved sales forecast. The bulk of the thirty-seven reports, tabulations, etc., mentioned on Page 90, funnel through the Accounting Section. The data resulting from the "costing" of the sales forecast, together with information on costs received from the plants, selling expense budgets, administrative budgets, accounting and distribution expense budgets, etc., enables the Control Division not only to prepare additional forecasts, e.g., Construction Forecast, but also to prepare forecast statements such as Return on Investment, Turnover, Earnings as % of Sales and Transfers, Expenses as % of Sales and additional items which appear in the Executive Chart Series set up by the Treasurer's Department for presentation to the Executive Committee.

The general manager is the one who gives final approval to the data and information which is forwarded to the Treasurer's Department. He is the chief executive of an industrial department and he may withhold approval or request changes as he sees fit.

The No. 1 sales forecast is the basis on which,

directly or indirectly, a number of standards are calculated. These standards also are used in the Executive Chart Series. The standards are calculated on the basis of established formulas. Inventory standards, for example, are based on producing the forecasted sales at a uniform monthly rate throughout the year. They are expressed in terms of the number of months supply of materials that should be invested in inventory at the end of any one month in order to provide for estimated consumption based on the volume of business forecast. Actual dollar investment in inventories is related to months supply by using forecast consumption figures.

Actual, plotted against standard, indicates whether there is an excess, or too little investment in inventory. When dollar inventory is in excess of standard, a condition exists in which turnover, and, therefore, return on investment is decreased in proportion to the excess in inventory. Conversely, an inventory investment below standard is not desirable, since it may cause interruption or slowing down of plant production with a consequent adverse effect on service to the customer.

Long Range Forecasting of Sales

General Discussion

This study, up to this point, has concerned itself, in the main, with short term sales forecasting in connection with the Film Department, with but little reference to long range forecasting. This activity, however, has been carried on ever

since the beginning of product production. It is considered as an essential factor in estimating the rate and direction of growth and in anticipating future expansion.

Forecasts normally cover a period of five years, and are made for all products. They are reviewed annually and then extended for an additional year. Every three years, a forecast covering a ten year period of time is prepared. This is in line with a policy established by the Executive Committee that all industrial departments must submit a ten year forecast, by products, every three years. Forecasts of economic factors which may affect long range sales are not forecast by the Film Department. These data are obtained from the Economists' Office of the company and include such items as population growth, civilian employment, FRB index of industrial production, disposable personal income and retail food store sales.

Methods of Approach

The long range sales forecast is prepared by the Trade Analysis Section, in consultation with management, and covers totals, by year, not months or quarters. The forecast is in terms of units, e.g., pounds in the case of cellophane and cubic inches in the case of sponges, etc., and is by end uses, not by account.

The long range forecasting procedure takes into consideration historical data; points which must be determined for the future; and an evaluation of factors which have influenced

the past and may influence the future.

Historical data by product, includes company sales and total industry sales, by end use; end use growth; and current sales potential by end use, both maximum and attainable. This last item is obtained from potentials reported by salesmen in their trade reports, from market research and by statistical approach.

Points which must be determined in regard to the future include basic forecast assumptions; anticipated end use growth, by product; and maximum and attainable sales potential, by end use. A basic forecast assumption, for example, might be that ample capacity to meet the forecast will be provided.

Analysis and evaluation is given to those factors which may have influenced past history and may have an effect on future conditions and estimates. These include general economic conditions; competitive status, production capacity; price; new and obsolete markets; technological improvements in own and competitive products; methods of distribution; and changing consumer preferences.

An example of a change in method of distribution is given under the discussion relating to cellulose sponges, where it is indicated that the use of grocery brokers in the distribution of sponges through food stores, is of comparatively recent vintage. Changing consumer preferences perhaps can be exemplified best by pointing out the apparent trend, accept-

ance, and preference on the part of the consuming public for the self-service type of operations, of which the supermarket is a prime example.

The final sales forecast, as in the case of the short term forecast, is approved by the Director of Sales.

Use of the Long Range Forecast

The long range forecast is a primary tool in planning long term operations in the Department. Production, for example, when they receive a copy of the forecast, may indicate that in order to meet expected sales, say three years hence, additional production facilities will be needed, or even a new plant will be required. If departmental management approves of the addition of new facilities, or a new plant, an appropriation request for design is submitted for approval by the Executive Committee. Data is accumulated on costs and other pertinent information and the Control Division prepares an estimated return on investment on the new plant and on all existing plants, for purposes of comparison. Final approval of new plant construction is vested in the Executive Committee.

As recently as February 1957 duPont announced the construction of a new plant for cellophane, at Tecumseh, Kansas, to be completed in 1959.

The five years sales forecast, unlike the short term forecast, is not carried through to a financial forecast, but is used as needed, as, for example, in new plant construction. The Executive Committee and/or the Finance Committee, of course,

may specifically request that the forecast be projected through a financial forecast.

Summary

The foregoing chapter has indicated briefly the manner in which the sales forecasts are treated in Wilmington. It appears obvious that a number of checks and balances are used in arriving at a final forecast approved by management, and it can be said that the Multiple-Method Approach is used in sales forecasting.

Data, tabulations, and reports, based directly or indirectly on the sales forecast are used in, and influence, the operations of the Department, and this influence and use extends all the way to the Executive Committee and the Executive Control Charts.

Long range forecasting begins at management level and normally covers a five year period, with the exception of the ten year forecasts required by the Executive Committee. They are used as a basis for development and charting long range plans for the Department.

Chapter VIII

Forecasting for Other Products of the Film Department

General Discussion

Sales forecasting, in the case of cellophane, is concerned with a product on which there is considerable historical data on sales, channels of distribution, trends, end uses, market potentials, relative stability of price, and position in the industry. While competition may be considered as any material used which cellophane might reasonably be expected to replace, there are only two other concerns which produce cellophane. The product itself is, at least at the present writing, in tight supply and has been for a considerable period of time, with the exception of a few short intervals. A great deal of experience has been developed in sales techniques, and product qualifications, improvements and applications. These all tend to make the task of sales forecasting easier and the forecast itself more accurate, e.g., a forecast accuracy approaching 97% is not unusual. It is a matter of conjecture in this connection whether or not an estimated 40% increase in production capacity in the industry by 1959, versus production capacity in 1956, will have any appreciable effect on the task and accuracy of forecasting in future years.

There are several products manufactured by the Film Department, however, which appear to present facets in sales forecasting sufficiently different from those in cellophane

so that separate treatment of these products seems desirable in order to round out this study. The products discussed in the following pages are "Mylar" polyester film, "Cel-O-Seal" cellulose bands, and cellulose sponges.

"Mylar" Polyester Film - Product Description and Uses

"Mylar" is a highly durable, transparent, water repellent film of polyethylene terephthalate resin. It is characterized by its outstanding strength in comparison with other films, its electrical properties and its chemical inertness. Inherent thermal stability permits its use in temperature conditions from -60° C. to 150° C.

Some of its uses in the electrical and industrial fields include electrical insulation for capacitors, motors, generators and transformers, barrier tape for wire and cable, decorative laminations, metallizing, metallic yarns, vapor barrier materials, printed covering for acoustical tile, and various types of industrial tapes and magnetic recording tapes. "Mylar" also is used as a packaging material where the unique properties fulfill a definite need and function, including bundling, drum liners, vacuum packaging, frozen and cook-in-the-bag foods and windows in window boxes.

It is available in rolls and cut-to-size sheets in thicknesses ranging from .00025" to .0075", and in several types for specific applications. The unit of sales is pounds, in the case of rolls and M. sq. inches in the case of cut-to-size sheets.

Area and Channels of Distribution and Sales Force

The area and channels of distribution are the same as those for cellophane. Sales are handled by Packaging, Converter and Industrial Sales, each being responsible generally for the same type of markets for "Mylar" as they are for cellophane. At the present time, the bulk of the tonnage is sold through Industrial Sales.

History of Development

"Mylar" is produced in a new plant, opened in 1954 at Circleville, Ohio, using a continuous method type of operation. Prior to that time it was produced on pilot plant scale at Buffalo, N. Y. It is, commercially, a relatively new product.

Briefly, when a new product appears to have commercial possibilities it is initially under the aegis of the Development Section, reporting to the Research Director. This group investigates and evaluates possible markets to determine whether or not the product appears to warrant production, at least on a pilot plant scale. Included in their reports is an estimate of possible sales, by markets.

When the product passes to the pilot plant stage, it is taken over by the Sales Development and Technical Section. They, in turn, go out into the field and attempt to evaluate the product under actual conditions of operation. They, too, make a forecast of estimated sales by markets, both short and long range, in conjunction with the Trade

Analysis Section.

If indications are such that it appears the product warrants full scale production, let us say, in a new plant, the project is approved and implemented by company management, and the new plant is constructed. The product then is turned over to the regular sales force.

Considerations in Forecasting

The considerations involved in forecasting sales for "Mylar" from its incipient stage onward are similar to the difficulties inherent in forecasting for new products, generally. These include lack of historical data on sales and end uses, limited knowledge of markets, and lack of practical experience in product limitations, qualifications and applications.

The lack of historical data on sales and end uses makes the development of trends and correlations extremely difficult, if not impossible. The forecasting agency is thus missing two very useful tools.

Limited knowledge of markets can upset forecast timing. As pointed out in Chapter I, Page 23, in a situation where a new product logically might be estimated to replace an established product in a particular application, effective replacement may take as long as several years, because of conditions peculiar to that particular market. In an industrial use, for example, where the new product gives promise of being incorporated as an integral part of another item, the new product may require

extensive testing and evaluation on the part of the consuming manufacturer as to efficiency and cost in comparison with the product he is currently using. The consuming manufacturer may even have to change the design of his goods in order to use the new product. All this is time consuming and effects the sales forecast accordingly.

Lack of practical experience in product limitations, qualifications and applications not only can slow adoptions of the new product, but also lead to misplaced sales efforts and promotions in directions where product improvement is necessary before sales can be established.

Price may be a factor, e.g., forecast assumptions concerning increased volume may be based on price reductions, which in turn may be predicated on expected volume. If the expected volume does not materialize, it may be impossible to reduce the price, and the sales forecasted on the basis of a price reduction may not materialize.

These are some of the difficulties encountered in forecasting for a new product, and when sales fail to reach original projections, the implications are obvious.

As an adjunct to their own thinking regarding a new product, a company may, when it is deemed necessary, employ the services of marketing and management consultants.

In view of the foregoing, it is apparent that forecasting for a new product involves a number of considerations and difficulties which are not encountered to the same degree,

if at all, as in forecasting for an established product, such as cellophane. As experience is gained, and historical data is accumulated, the tendency is not only for the task of forecasting to become less difficult, but also for the forecast to become more accurate.

"Cel-O-Seal" Cellulose Bands

Product Description and Use

"Cel-O-Seal" cellulose bands are produced in a continuous method process at a plant at Buffalo, N. Y., by regenerating cellulose from a viscose mix which is basically the same type of mix from which cellophane is regenerated. The bands are odorless, non-combustible, harmless and resistant to oils, fat, dirt and dilute acid. They are regularly shipped in a wet state and are ready to use directly from containers, application being by hand or by machine.

Bands are available in several different styles: transparent, opaque, metallic and "Wind-O-Band" seals, which are developed for the distilled spirits industry, and are officially approved by the U. S. Treasury Department for use over government strip stamps. "Wind-O-Band" seals are sold only to licensed bottlers of distilled spirits who place U. S. Tax Stamps on their products.

All bands may be obtained in a variety of standard colors, and also are available in printed private designs up to three colors, bearing the name of a product or manufacturer

and produced only on order.

Bands are ordered by size, i.e., length and diameter. Sales are made on a declining discount, e.g., a large order covering a year's requirements against which the consuming manufacturer periodically specifies shipments, takes a larger discount than an order covering three months.

Area and Channels of Distribution

Since the main use of bands is as a sealing closure in foods, drugs, beverages, chemicals and other bottled products, these are the main industries using the product. Sales are made directly to the consumer in New York State only, and through Armstrong Cork Company in the rest of the United States.

Sales Force

The "Cel-O-Seal" Sales Section is headed up by a product manager, responsible for the domestic sale of bands. There is one district office, in charge of a district manager, located in New York City and employing three salesmen.

Sales Forecasts

Forecasts initially are prepared by the New York district salesmen, by account, and by the Armstrong Cork Company. The manager of the "Cel-O-Seal" Sales Section, acting jointly with the Trade Analysis Section, uses the district forecast and Armstrong's forecast in arriving at an overall forecast of so many million bands, at an average length and price.

The Multiple-Method Approach is used, including Correlation, Trend Analysis and estimated share of total industry.

Production, Planning and Service

Since, unlike cellophane, production capacity is sufficient to support forecasted sales, the sales forecast is used as a basis for setting up production operations, with the objective of leveling out production as much as possible.

Standard bands are produced for stock, but printed bands are produced only on order. Customers may, for example, place orders for printed bands a year in advance, giving instructions as to size and time of shipment. These "in the house" orders can be both a help and a headache. They help in that production can be planned against firm orders, but the headaches occur when the customers, because of the needs of their business, change the quantities and dates of their shipments. If stepped-up shipments and quantities are required by the customer, for example, planning and production may have to be revised considerably, in order to provide adequate service to the accounts. This can be anything but a simple problem.

It would appear that the problems of forecasting are a bit different than those that exist in connection with cellophane.

Cellulose Sponges and Sponge Yarn

Product Description

Cellulose sponges are sponges of regenerated cellulose, highly absorbent, long lasting, and soft and resilient when wet. They will not scratch, can be sterilized by boiling and are not affected by ordinary cleaning compounds. Sponges are produced in both coarse pore and fine pore, in standard and special sizes, and are used in the home, by institutions, in industry and in industrial applications. They are available in regular buff shade for general cleaning purposes and in several pastel shades for home use. A turtleback car washing sponge is also produced.

Cellulose sponge yarn is composed of a cotton yarn core covered with cellulose sponge, and wound on ball multiple end warps and single end spools. The yarn is approximately 1/4" in diameter and available in buff or green. It is used by converters in manufacturing household and industrial wet mops and for weaving into cloths, pads, coaster mats, etc.

Sponges and sponge yarn are produced at a plant in Columbia, Tenn.

Area and Channels of Distribution

Domestic sale of sponges and sponge yarn covers the United States. Sponge yarn is sold directly to converters, as are special sizes of sponges and sponges involving industrial applications. Standard size, packaged sponges are

sold to grocery, drug, variety store and sanitary outlets through brokers and agents. The automotive, hardware and paint trades are sold by the Specialties Sales of the Fabrics & Finishes Department, and fine pore packaged sponges for photographic use are sold by the Photo Products Department.

Sales Force

Sponge Sales is headed up by a product manager reporting to an Assistant Director of Sales and an assistant manager, to whom report a grocery sales supervisor, a supervisor for specials and yarn sales, an advertising supervisor, and a variety and drug broker salesman. A total of five grocery broker salesmen report to the grocery sales supervisor and three salesmen report to the supervisor of specials and yarn sales. All supervisors operate out of Wilmington headquarters.

Grocery broker salesmen contact grocery brokers which are regional representatives chosen by the Sponge Sales Section as capable of doing the job required. Distribution is from thirteen warehouses, strategically located throughout the country.

Sales Forecasts

Sponge yarn has relatively few customers and, therefore, fluctuations in overall sales and between sales and forecasts may be large, since if only one or two customers do not buy as expected, the entire forecast may be "off".

There is no balancing compensation which might be expected when a substantial number of customers are purchasing a product, e.g., - cellophane.

Since the selling set-up in sponges is rather complicated, the discussion of sales forecasts in relation to sponges will be confined mainly to grocery sales for purposes of brevity and clarity.

Forecasts initially are made by sales representatives through their supervisors, e.g., grocery broker salesmen submit their forecast, by broker account. The forecasts are consolidated by the Trade Analysis Section into a forecast in cubic inches, by industry. There is no competitive forecast as such. However, the services of a market research organization are employed which provide information on the out movement of all sponges sold through food stores. This includes information on sponges by size, by competitive manufacturers, by "deals", etc. This historical data is used in firming up the forecast.

Considerations in Forecasting

The distribution of sponges in food stores and supermarkets, through brokers, is a relatively new venture for the Film Department. No other product is sold in this manner; hence experience and historical data had to be, and still are being developed.

Another facet which makes sales forecasting in sponges different from other products is the prevalence of

"deal" sales in the industry. In a sense, this may be interpreted in terms of instability of price. The product manager sets up the "deal", e.g., plans to give away one case of sponges for every ten sold, etc. The effect of these planned "deals" and the possible "deals" which might be offered by competitors have to be considered in making up a final forecast. It is a definite challenge to attempt to forecast with any degree of accuracy under such conditions.

Production Planning and Service

The sales forecast is used as a basis for setting up production schedules, as in the case of "Cel-O-Seal" bands, and "Mylar" polyester film.

Sponge sales are characterized by strong seasonality of demand with the Spring and Fall being peak seasons. Production is set up on the basis of leveling it out as much as possible with due consideration for seasonality; warehouse requirements, which must be supplied in advance to meet expected demands by size, and kinds; and peak requirements due to "deals" and heavy promotions. Deliveries to customers must be rapid and prompt in order to compete with other sponge producers.

In the face of keen and established competition, the prevalence of "deals" and what appears to be a certain lack of brand loyalty, actual sales may not approach forecast expectations. This may necessitate production cut-

backs, with all its attendent problems including lay-offs; reduction in expense, e.g., paring the advertising budget; and investigation of brokers to see whether they are doing the job required. If they are not, then they may have to be replaced, and other brokers may be contacted and checked to see if one appears to offer possibilities of satisfactory performance.

These are some of the problems and factors to be taken into consideration in forecasting sales for sponges and setting up and planning production schedules and service to the customers.

Summary

This chapter has attempted to present some of the facets and considerations peculiar to forecasting sales for "Mylar" polyester film, "Cel-O-Seal" bands, and cellulose sponges, together with the dependent functions of production planning, scheduling and service.

It is felt that the discussion of these products from the standpoint of the products themselves, their markets, areas and channels of distribution, and the sales force help round out the picture.

The Film Department also manufactures cellulose acetate film. This product has not been treated in this study, since it is felt it would not contribute materially to the presentation.

Summary and Conclusions

The first half of this study concerned itself with a general presentation of the methods used in sales forecasting for manufacturing enterprises and an indication of how sales forecasts may be used in management operations in such enterprises. It is emphasized again that the preparation of sales forecasts and their subsequent use are dictated, in the main, by the limitations, needs, problems, and conditions of operation which are peculiar to a particular company. Methods which may produce excellent results in one company, may produce poor and indifferent results in another company.

Insofar as the use of sales forecasts are concerned, certain conditions may exist which preclude its employment as a basis for guidance in certain operations. A case in point is cellophane, where, because production facilities are not, and have not been sufficient to meet forecasted demand, production programming is based on the production forecast of what the plants indicated they will be able to produce, rather than on the sales forecast.

A forecast is not something that should be made haphazardly, or because it appears fashionable. If it is merely initiated, prepared, and approved, and then set aside, filed away, or ignored completely without excellent justification, then it is a wasteful expenditure of time and money which serves no useful purpose.

The forecast must be planned and approached with

definite objectives in mind, and it requires the conscientious efforts, best thinking, and judgment of all those who in any way are connected with its preparation. The corollary to this is that those individuals must have some basic knowledge and appreciation of the importance of the forecast to management and its use in management operations if they are to exercise their sincerest efforts.

Forecasts should be reasonably accurate, not only from the standpoint of quantity, but also from the viewpoint of timing or pattern. A short term forecast may be accurate in total, for example, but if it does not reasonably predict peaks and valleys of actual demand, it may significantly upset the production and financial planning, based on it. What constitutes reasonable accuracy cannot be judged arbitrarily by a percentage derived from comparing actual sales versus forecasts. A forecast accuracy of 95% is not significant in itself, but only in relation to what might reasonably be expected under conditions peculiar to the industry, company, product, sales force, channels of distribution, competitive status and markets. It may well be that an accuracy of only 60%, under a given set of circumstances and conditions, might be justifiably considered reasonable, as in the case of a new company, manufacturing a product not only new to itself but also new to the market; whereas an accuracy of 90% under another set of circumstances and for another product might be considered as evidence of poor forecasting. This does

not mean that forecasts consistently off the target should be accepted without investigation and analysis as to the reason why they are off, or that every effort should not be made continuously to improve forecasting methods, procedures and results. The objective always should be to attempt to achieve perfection.

The section of this study devoted to outlining the preparation, use, and function of sales forecasts in the Film Department presents ample evidence of the importance of sales forecasting and how it may be used in management operations. The forecasts reach through departmental operations to the Executive Committee, and are an important tool in Executive Committee control of company operations.

Forecast procedures themselves appear thorough and complete, and the forecasts from their very inception are subject to close scrutiny, checking and evaluation by management. As the forecasts go "up the ladder", management has the assistance of a qualified staff to help them firm up the final forecast. The Multiple-Method approach is used in both short term and long range forecasting.

Considerable importance is placed on the compilation, preparation and use of historical data and there is a wealth of information available at salesman, district office and headquarters level which can be used as an aid in arriving at an accurate forecast. The use of I.B.M. equipment has helped materially in accumulating and preparing information,

and making it quickly available. Other companies may not be either so fortunate in having, or sufficiently foresighted in obtaining, this historical data; or they may not be able to afford the cost of getting it and keeping it up to date. The preparation, compilation, analysis and evaluation of sales forecasts in the Film Department involves a considerable expenditure of time and money, but it appears that management feels these costs are justified.

Under the circumstances of short supply and other conditions outlined in regard to cellophane, the high forecast accuracy normally realized, logically should be expected. This high accuracy is not manifested to the same degree in the forecasts for "Mylar" polyester film, "Cel-O-Seal" bands, or sponges. It cannot be concluded, however, that these forecasts were and are not reasonably accurate in view of circumstances, conditions and necessary basic forecast assumptions peculiar to each product.

It might be said, for example, that the forecasts on "Mylar" polyester film should have been approached with a greater realization of the length of time involved in industrial adoptions of the product, and the limited knowledge of product limitations, qualifications and techniques of application, but this criticism is from the vantage point of hindsight. The Monday morning quarterback is, as usual, the headiest player on the field. Significantly, while the forecasts for "Mylar" were considerably "off" in volume,

they were reasonably close dollar-wise; but it is volume that is needed to keep plants operating at a profitable capacity.

In line with good practice, the Film Department gives ample evidence of continually seeking ways and means of improving forecasting techniques, and are quick to abandon methods which do not appear to yield expected or improved results. In the case of cellulose bands, for example, a mathematical formula was attempted, but the results were unsatisfactory, and the method was discarded.

Several times throughout this study it has been indicated that cellophane has been in tight supply, except for a few brief intervals, for a number of years. During these years selling forecasts indicated that predicted sales consistently would exceed production capacity. Despite the fact that technological improvements in manufacturing techniques and methods resulted in considerably increased production, demand consistently exceeded supply. In view of this, a logical question might be raised as to why a new plant or new facilities were not provided. One of the basic reasons given for not constructing a new plant was the implications posed by a suit on the part of the Federal Government, lasting several years, implicitly charging the duPont Company with monopoly in the field of cellophane. DuPont subsequently was found not guilty of this charge, but what management would have gone ahead or has the right to go ahead in a project involving millions of dollars in

capital investment, under such conditions of risk and possible consequence? Actually, the duPont Company provided increased capacity for the industry by interesting a large manufacturing concern in entering the cellophane business, and furnished the know-how in plant construction and operating techniques to a now active competitor in the field.

The sales force, and in fact all personnel in the Film Department, were continuously kept informed of broad developments, so that they were aware that there were logical reasons why a new plant was not being constructed in the face of consistent predictions of demand exceeding production capacity. This is one way of obviating the possible impression that management was ignoring forecast implications pointing toward the need of a new plant. Such a procedure does much to sustain confidence in management on the part of the forecaster. As mentioned on Page 99, in February 1957, duPont announced the construction of a new plant at Tecumseh, Kansas, to be completed in 1959; giving evidence not only of a more favorable risk climate, as it were, but also of confidence in the dependability of the sales forecasts themselves.

This study, at its inception, presented the thought that sales forecasts in their true sense are basically predictions of human behavior - how people will act in terms of a particular product, whether they will or won't buy, when, how and how much. The variables implicit in this conception,

in a free economy, appear such that it is difficult to think of sales forecasting as assuming the appearance of an exact science. Perhaps at some future time it will be possible to reduce the variables to equations and the unknown factors to reasonable probabilities and, through the use of electronic computers, to arrive at forecasts which are precisely correct. Until such time, and even when that time arrives, sound judgment and thinking will remain indispensable tools of the trade.

As a final word, thankful acknowledgment is expressed to the management and personnel of the Film Department, without whose fine understanding and cooperation it would not have been possible to complete this study.

BIBLIOGRAPHY

I. Books

1. Aries, Robert S., and Copulsky, William: Sales and Business Forecasting in Chemical Process Industries. New York, Chemonomics, Inc., 1950.
2. Cox, Garfield V.: An Appraisal of American Business Forecasts. Chicago, Illinois. The School of Commerce and Administration, the University of Chicago. 1929.
3. Eastwood, R. Parker: Sales Control by Quantitative Methods. New York, Columbia University Press, 1940.
4. Goodman, Oscar R.: Sales Forecasting, A Case Study Approach. Madison, Wisconsin, University of Wisconsin, School of Commerce, Bureau of Business Research and Service, 1954.
5. Heckert, J. Brooks and Wilson, James D.: Business Budgeting and Control. New York, The Ronald Press Company, 1955.
6. Landy, Thomas M.: Production Planning and Control. New York, McGraw-Hill Book Company, 1950.
7. MacNiece, E. H.: Production Forecasting, Planning and Control. New York, John Wiley and Sons, Inc., 1951.
8. Newberry, Frank D.: Business Forecasting. New York, McGraw-Hill Book Company, Inc., 1952. pp. 1-24 and pp. 237-264.
9. Rautenstrach, Walter, and Villers, Raymond: Budgetary Control. Funk and Wagnalls Company, in association with Modern Industry, 1950.
10. Rowland, Floyd H., and Harr, William H.: Budgeting for Management Control. New York, Harper and Bros., 1945.
11. Wright, Wilson: Forecasting for Profit. New York, John Wiley and Sons, Inc., 1947.
12. Various Authors: Successful Production Planning and Control. New York, American Management Association, 1955.

II. Booklets, Pamphlets and Publications of Associations

13. Ethe, Solomon: Forecasting in Industry. New York. National Industrial Conference Board, Inc., Studies in Business Policy #77, 1956.
14. Management Takes the Long View. New York, American Management Association, General Series No. 171, 1954.
15. Production and Marketing Problems: A Coordinated Approach. New York, American Management Association, General Management Series No. 172, 1954.
16. Targets for Management. New York, American Management Association, General Management Series No. 177, 1955.
17. Making Use of Research and Development. New York, American Management Association, General Management

Series No. 180, 1956.
18. Planning for Efficient Production. New York, American Management Association, Manufacturing Series No. 206, 1953.
19. Production Guides and Controls for the Modern Executive. New York, American Management Association, Manufacturing Series No. 211, 1953.
20. Practical Techniques of Forecasting, Planning and Control. New York, American Management Association, Manufacturing Series No. 215, 1954.
21. Company Approaches to Production Problems. New York, American Managements Association, Manufacturing Series No. 220, 1955.

III. Newspapers and Periodicals

22. Fort Worth Business Review, Bureau of Business Research, Texas Christian University, School of Business. September 1952: The use of Sales Forecasts - A Survey.
23. The Management Review, August 1956. Strong, Lydia: Sales Forecasting Comes of Age.
24. Barrons, December 31, 1956. Forecast for 1957.

IV. Personal Sources of Information, Correspondence, Interviews

25. Interviews with various management and supervisory personnel of the Film Department, E. I. duPont de Nemours & Co., Inc., Wilmington, Delaware.