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# MARKET ORIENTED MANAGEMENT SYSTEMS -- THE NEW REALITY

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I would like you to imagine an agency group briefing called to discuss a forthcoming brand introduction. The account executive might begin by saying:

> "As you gentlemen know we are about to introduce a new brand designed for previously untapped market segments. Simulation tests based on product characteristics finalized by our policy group three days ago have now been completed. Of the four strategies tested Plan C yielded the best results measured in terms of our five highest priority criteria in all conditions except one. If competition should react with premature introduction of their new brand, Plan A will produce broader penetration, and heavier usage in the eight leading metropolitan areas at the expense of districts 4, 11, and 18. This outcome is compatible with our present prioritization of market segments.
>
> "The agency objectives in this program are outlined in Exhibit 1. We are to communicate the four product characteristics and three appeals previously established for this brand to target markets defined in terms of three demographic sets and five predisposition profiles. Budget controls are stringent, and we have been given tough standard cost references. The campaign is scheduled to achieve an effectiveness of at least 6.4 awareness units and 1.3 content recalls per dollar of media expenditure.
>
> "Assuming that we achieve our objectives and competition reacts as predicted, the simulation system indicates a market development of the type illustrated in Exhibit 2. (This is a quick microfilm print taken directly from the television display screen. You would have had the normal four-color prints but Photographic ran into some problems this morning.)
>
> "As you can see, the computer plans to schedule media to achieve an awareness gain peak in the third month. New trials are expected to top out shortly thereafter with subsequent growth based on repurchases becoming well established by the end of the second quarter. As indicated by the dashed line we are going to hit our friends in New Jersey fairly hard so there is a good chance that they will jump the gun on their new brand in which case we'll switch to Plan A. More on that later. Now that you have a general picture of the timing on the introduction, let's look at brand profiles.

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*A talk presented to the Eastern Regional Conference of the American Association of Advertising Agencies, October 26, 1966, Hotel Plaza, New York City.

"The market condition as of Monday morning is illustrated in Exhibit 3. We have continued to maintain a good association in the minds of target consumers between our present brand and its traditional product characteristics and appeals. No. 2 is starting to make some inroads on our major appeal but the latest simulations indicate that Jack's new spot campaign will effectively counter this one. Since this slide was generated from the information system on Monday, it doesn't reflect the new campaign.

"Exhibit 4 is the simulated brand profile for the end of the second quarter following introduction. A certain amount of overlap with the present brand is anticipated due to the common appeal, but this should be countered by segmentation based on product characteristic associations."

Is this hypothetical presentation representative of the new reality? Is the indicated level of pre-introduction market analysis an actual product of recent advances in computerized micro-analytic simulation and market oriented information systems? Is the statement of agency objectives presented in Exhibit 1 reasonable in light of management's present or near term ability to model competitive market actions and responses and to evaluate the impact of promotion as an element in a total marketing plan? These are some of the questions which I would like to discuss this morning as we consider the impact on the marketing executive, creative processes, and the agency business of what has been called "The Systems Approach".

An Agenda

In beginning this discussion I would like to review the present direction of management system evolution. We will then consider the contention that management's problem today is assimilation of more meaningful data rather than the acquisition of greater quantities of data. In my opinion, this problem can be solved through the development of differentiating measures and integrating models with which to structure data and focus attention on actionable problem areas. It is therefore appropriate to comment on manage-

ment's role in the model building process as it affects the development and implementation of market oriented systems. Finally, I would like to speculate on the nature of the management systems with which we will be working during the next five to ten years and examine the roles of manager, creative specialist, and computer in systems incorporating relatively advanced models, measurements, and control mechanisms.

The Process of System Evolution

Successful system development is a matter of evolution. Effective management systems evolve over time as management and system specialists learn to communicate, structure problems, and achieve a joint focus on increasingly broad information needs.

It is seldom possible to impose a pre-packaged computer system on a management group. I have never seen an effective generalized management system. A system must be designed for a particular management context and each agency-company situation constitutes a unique synthesis of creative talent and management insight. An agency's most valuable asset may be its unique perspective on the environment within and outside the client firm. Every management has its own system of priorities and a style of management and approach to problem-solving which are the unique product of particular personalities.

Just as there is no single generic management system, there is no single pay-off associated with all systems. It may be argued, in fact, that the benefits gained from a particular system are largely determined by the level of management involvement in system design.

Management's orientation toward computer based systems is changing dramatically. A recent Sales Management article noted, "In the past, when

computers were acquired for the purpose of automating clerical functions, economic justification was provided by the expectation of lower processing costs. Now, however, computers being acquired to implement management information systems are justified on entirely different grounds. The primary reason for their acquisition is to furnish the means for fundamental changes to systems and their economic justification is provided if the increase in the value of information generated exceeds the increase in cost over the existing system. Management previously expected computers to do jobs more cheaply; now, it expects them to do a more effective job and is willing to pay the price."[1]

Directions of Management System Evolution

While no two management systems develop in precisely the same way, it is possible to identify sets of dimensions which are useful in evaluating the similarities and differences between systems. These are: (1) information recency, (2) information aggregation, (3) analytic sophistication, and (4) computer authority.

Information Recency

The first dimension, information recency, refers to the time lapse between occurrence of an event in the environment and inclusion of data describing that event in the system. This may range from several weeks in the case of certain market developments to a few hours or minutes for an automated media data bank.

The recent CBS announcement of their FREEDA (free data access) system designed to reduce delays in reporting availability while providing

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[1] "Computer in Marketing - Part VII", Sales Management, September 15, 1966, p. 82.

integrated program clearance and sales inventory control for the network is indicative of movement along this dimension.[2] NBC and ABC are reported to be developing comparable systems for implementation in the coming season.[3] Similar systems designed to provide efficient access to recently updated data files are generating comparable availability data for other media.[4]

The more rapid generation of market statistics is enabling the manager to assess the situation in key market areas and evaluate the impact of his marketing program using information which is sufficiently fresh to provide a reasonable basis for action. Time lags of several months in reporting product movement are no longer acceptable. Both companies and market data services are introducing automated procedures to permit more rapid data acquisition, compilation, and presentation.[5]

Information Aggregation

The second dimension, information aggregation, describes the detail with which information is maintained in systems data files. Shipment based information systems in which data detailing product flow to distributors and retailers is maintained at the item level are representative of relatively disaggregated (micro) data maintenance while industry market share statistics of the type developed through trade associations are representative of highly aggregate (macro) measures.

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[2] "Computers: A Special Report", Broadcasting, June 13, 1966, p. 48

[3] Ibid., pp. 48-49

[4] Ibid., pp. 55-56

[5] See, for example, "Advertising Outlook: Promise of Computer in Marketing Is Moving Into the Big Payoff Stage", Printer's Ink, June 10, 1966, p. 3

The computer has given management and the researcher the ability to maintain and manipulate micro data. Many consumer product manufacturers have already begun maintaining data relating to product movement through individual outlets.[6] Such systems serve as the basis for sales force evaluation, analysis of experiments, profitability assessment, evaluation of trade promotion expenditures, and overall assessment of the impact of the marketing program on movement at the retail level. Planning and evaluation now go beyond aggregate market shares to focus on measures of customer orientation affected by advertising and influencing the purchase process.[7] Some companies have established extensive consumer panels rivaling those maintained by market data services which provide inputs to computer based information systems designed to aid in the analysis of buying trends, effectiveness of merchandising, and advertising and consumer research.[8]

The move toward more micro data is evident in the expansion of media rating services to provide increased coverage of local media with samples designed to provide more complete demographic profiles.[9]

The continuing emphasis on detailed consumer panel data raises the specter of a national population sample tied into a large central computer through in-home terminals. Describing such a system Charles Ramond, former Technical Director of the Advertising Research Foundation, noted, "the

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[6]Benjamin Lipstein, "A Mathematical Model of Consumer Behavior", Journal of Market Research, August 1965, p. 259

[7]See, for example, the discussion of General Foods, Pillsbury, and General Mills "Marketing Management and the Computer", Sales Management, August 20, 1965, pp. 53-54

[8]See, for example, the discussion of the Chemstrand system in Sales Management, Ibid., pp. 56-57

[9]See, for example, the discussion of Neilsen, B.A.R., American Research Bureau, and Politz in Broadcasting, op. cit., p. 49

important point about research into the consumer's response to advertising ... is to get the information right after buying decisions are made. Once a week the computer will ask housewives whether they went shopping that day. If they have, the computer will ask a series of questions about what they bought, brands chosen, advertising recently seen or read, reactions to the ads, and so forth. If they haven't gone shopping, the computer will ask a different series. The advantage of such a system ... are that you get the information while it is still fresh and you get it fast."[10]

Analytic Sophistication

The third dimension of evolution, analytic sophistication, refers to the refinement of models or structure encompassed by the system. As illustrated in Exhibit 5 the lowest level of analytic sophistication is that required to identify a particular file and record. At this level the computer has the ability to retrieve the specified record and display the information which it contains. The second level of analytic sophistication involves aggregation -- gathering together numbers from within one or more records to produce a total or sub-total. At the third level the computer may be programmed to perform arithmetic averaging or to compute differences. The fourth level, logical analysis, introduces the use of classification schemes through which various types of data areaggregated within subsets or conditionally segmented.

At the fifth level of analytic sophistication, statistical analyses are employed to develop extrapolations from historic data, statistical best estimates, analyses of variance, or trend estimates.

The term learning is used in Exhibit 5 to indicate adaptive system processes through which the computer is programmed to modify parameter values

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[10] "Computers in Marketing - Part VII", op. cit. p. 68

or model structures on the basis of experience (data inputs received) over time.

At the most advanced level of model sophistication, micro-analytic behavioral simulations are used to create an artificial environment paralleling real world markets referenced by the information system.[11] The manager's perception of the environment is explicitly modeled to a sufficient extent and detail to justify the assumption that the models making up the simulated environment duplicate the real world response pattern in all relevant respects. The model's output under various experimental conditions is then used to test hypotheses or make predictions about real world market responses. The simulation model may consist of hundreds of mathematical and logical statements and thousands of variables depending upon the complexity of the system. Since analytical solutions are not required, the simulation model designer is not constrained to simple models for reasons of tractability. Management judgments regarding the importance of variables is the primary determinant of whether or not a particular factor is included in the model.

Systems encountered in the advertising industry today cover the entire spectrum from rudimentary report generator programs based on card files to complex total environment simulations. Often the level of sophistication associated with a system increases as management demands models of greater scope and complexity. Russell Haley, Vice President of Gray Advertising, has described this process of concept refinement as it relates to data structures designed to provide information for copy testing. "At first

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[11] For a discussion of the simulation technique and description of large scale micro-analytic simulations, see "Simulation Techniques in the Analysis of Marketing Strategy", A. E. Amstutz and H. J. Claycamp, Application of the Sciences in Marketing Management Symposium, Purdue University, July 12, 1966

market segmentation focused on demographics. If a 35 year old housewife head was your target, it was helpful in selecting media but didn't provide much guidance for the creative people. Later on this was replaced by 'the heavy user' idea. But heavy users themselves have different motivations. So ... (now) ... we are concentrating on attitude segments, the sets of people who look for different things in the products they buy."[12]

Computer Authority

The final dimensions of system evolution, authority delegated to the computer, is closely associated with the system's analytic sophistication. Management is more willing to delegate authority to sophisticated systems and, conversely, as management places greater demands on an information system, a greater level of analytic sophistication must be embodied in the system structure.

At the lowest level management may delegate to the computer authority to retrieve information from specified records and files -- entrust to the computer system processes associated with identification and retrieval. Once a retrieval capability has been established it is usually a short step to the next level of computer authority. Recognizing that the computer has access to all records in the file, management concludes that while the computer is "looking at" the contents of each record it might as well check the reasonableness of record content to insure against gross clerical errors. At this stage the computer is delegated a supervisory function checking on human personnel responsible for input.

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11 (cont.)
For a discussion of General Foods use of the simulation technique, see "General Foods: Making Innovation a Sure Thing", Sales Management, September 1966, p. 78.

12 "Computers in Marketing - Part VII", op. cit., p. 65

As management comes to accept computer review for purposes of error detection, they normally begin to think in terms of other functions which the computer could perform "while looking at all those records". It follows quite naturally to have the computer perform additional analyses on records which it is reviewing and refer for further review and action situations meeting criteria established by management.

Management frequently finds that certain classes of monitor output are consistently subjected to additional analyses to determine whether or not action is warranted. In such situations it is natural to suggest that the computer be programmed to perform the additional calculations in order to add a recommendation for action to the monitor report.

As management gains experience with computer based recommendations they may find that in most situations they are able to implement computer recommendations without further investigation. Criteria may be modified to isolate non-typical cases requiring additional review. The computer is then given authority to take action on the remaining cases in which its recommendations are a valid basis for action.

The hierarchy of Exhibit 5 suggests that delegation of authority to predict involves a higher level of management dependence on the computer than authority to act. While the models on which the computer bases its action normally involve prediction, the potential impact of computer based prediction is often greater than computer action. Computer originated actions may adversely affect the firm's position at a point in time. However, actions relate to the operating sphere while predictions are the basis for planning. Thus, inaccurate prediction may have a damaging effect on the firm's activities for months or years while erroneous actions can be

corrected in days or weeks.

The chance for successful computer based prediction is ironically reduced by the very nature of management-computer interaction. Since predictions are often based on relatively sophisticated models, management is frequently hesitant to accept the computer's prognostication until they have gained experience with the system and had an opportunity to "see how it does". With the passage of time management's satisfaction with predictions which are verified by subsequent experience increases. However, as time passes the modeled environment may change -- the original models may become less and less applicable. Finally at that point when management is ready to take action based on the computer's predictions the models may be completely outdated and no longer accurately represent the decision environment. When this happens the stage is set for disillusionment or worse. It is considerations such as these which argue strongly for management involvement in the system design process, familiarity with system structure, and understanding of models on which system decisions and predictions are based.

At the present time computers are being given authority to recommend format characteristics for advertising; evaluate new products; set sales goals; assess the potential for a given product and market; and evaluate the potential effects of alternative marketing programs.[13]

Media Allocation: An Example of Current System Development

At the present time most agencies are either using or "have available" some form of computerized media allocation vehicle. While the systems differ

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[13] For a discussion of computer prepared format recommendations, see Daniel S. Diamond, "Computer Preparation of Magazine Advertisement Formats", IFORS Conference, September 1, 1966. Other applications are noted in "The Computer and Marketing - Part VII", op. cit., p. 76

markedly when evaluated in terms of our four dimensions they are all oriented toward optimizing and/or evaluating media schedules to achieve higher returns per dollar spent. "Return" normally means the percent of a target market exposed per dollar spent on media. Young & Rubican's High Assay Media Model uses measures of consumer purchase behavior and media exposure to develop simulated product purchase cycles for a population exhibiting some 540 combinations of demographic characteristics. They are reportedly using this model to assess potential markets and to establish media schedules matched to potential markets on the basis of measures of return.[14] As in most such situations, experts at Y & R are relied on for evaluation of key process model attributes such as the value of repeated media exposures.

B.B.D. & O.'s System for Integration of Marketing and Advertising Data and CEIR's Mediametrics system employ a linear programming technique to develop a media schedule based on an evaluation of (1) the compatibility between the media audience and the target market profile; (2) the exposure probabilities for each medium, and (3) an estimate of the probable impact of a particular ad in a given media. B.B.D. & O.'s experts assign ratings for the probable impact of each ad in a particular medium and assess the reasonableness of system outputs.[15]

McCann Erickson's Marketing Communication Investment Decision Analysis System has been described as a "highly sophisticated and computerized system for comparative media analysis and allocation of advertising investment that

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[14] For a description of HAMM, see "Computers in Marketing - Part VI", Sales Management, July 15, 1966, pp. 59-61

[15] Ibid., pp. 61-62

other agencies will be copying."[16] Unofficial reports indicate that it, too, is linear program based.

The ten agencies working jointly on the Computer Oriented Media Planning and Selection System (COMPASS) are reported to be employing a linear program to evaluate the results from a simulation model in a system designed to assess the efficiency of alternative schedules.

In a slightly different vein Kenyon & Eckhardt has focused attention on a system designed to predict audience shares for new television shows. Inputs to this system include Neilsen time slot shares from previous seasons as well as limited attitudinal data. B.B.D. & O. has reported that a similar system has been 75% effective in predicting ratings within three or four points.[17]

Not to be outdone by the agencies, the Katz representatives indicate that they will soon be able to rapidly prepare "a schedule that conforms to the advertising agency's request for say, TV spots that give the lowest cost per thousand for women 18-35 with two kids and a husband making between $7000 and $10,000."[18]

These developments in the media allocation area point to some of the problems and potentials of systems applications to marketing management. The most basic problem is definition of desired objectives in terms sufficiently specific to permit later assessment of whether or not these objectives have been achieved. Such specification requires explicit and quantitative measures of marketing processes. In the media case, for example, what is it that is to be maximized? Exposures? What are they? How are they to be measured? What is the process through which advertising influences the

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[16] Broadcasting, op. cit., p. 43

[17] Ibid., p. 46

[18] Sales Management, op. cit., p. 64

predispositions and perceptions of a potential purchaser? Is the consumer's response to a campaign more accurately assessed through measures of exposure, attitude, or content playback? These questions must be meaningfully answered by management before a useful system can be established.

The Role of Models in Management Systems

Since all of us are concerned with the same consumer response processes it is reasonable to assume that eventually certain common behavioral models may serve as the basis for all market oriented information systems. This does not mean that all systems will be the same. Different managers will focus on different aspects of the response process and as such place differential emphasis on various parts of the model.

The relationship between the manager's perception of the environment and the applicability of a particular model is frequently demonstrated. A participant in the COMPASS activity noted earlier has been quoted as saying:

> "It's hard enough for a single agency to get its own people to agree on the quantitative value for such inputs as the people you want to reach or the valued judgments of a page of print versus a 30 second TV spot. Multiply this by ten agencies, each with its own orientation and client needs, and you have the problem compounded several times over."[19]

Once a management group has agreed on a particular model of the environment they are able to focus on a limited number of accepted measures as relevant indicators of the state of the environment. General Foods executives discussing that corporation's management information system noted that "a key objective" of that company's systems development effort, "... is getting the different divisions to speak with one language. When you have several product divisions, such as we have, you can simulate a

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[19] "Ten Agencies in Search of a Model", Sales Management, July 15, 1966, p. 66

tremendous variety of experiences on the computer. However, you first have to get the divisions to follow a consistent path to collect their data in comparable fashion, if you want to do any cross fertilization."[20]

A key element in the system development process is translation of management knowledge and assumptions of competitive interaction into explicit models which can be tested. A useful model must describe the processes through which management actions influence behavior in the market. In developing such models the company and its competitors are viewed as input generators. The objective is to develop a model which will duplicate the response characteristics of the real world environment to the inputs generated by the competing firms.

Establishing Boundary Definitions

System development activity normally begins with definition of boundary conditions limiting the scope of the system to be developed. In most instances this preliminary specification is relatively crude. Management generally attempts to describe a limited number of market sectors as illustrated in Exhibit 6. This Exhibit defines the extent of marketing management's concern in terms of an environment consisting of manufacturers, distributors, retailers, and consumers and indicates management interest in interactions between these basic sectors.

Description of Macro Behavior

Once system boundaries have been established model development begins. Each step in the development process leads management to consider increasingly detailed descriptions of behavior within the specified environment. As an

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[20] "General Foods: Making Innovation a Sure Thing", Sales Management, September 15, 1966, p. 78

example of this process, Exhibit 7 illustrates a further step in the development begun in Exhibit 6. The description of interactions between sectors has become more explicit. Information flows are now differentiated from product flows. Communication based interactions are expressed in terms of bilateral channels relating the manufacturer and his competitors to distributors and retailers through their respective salesmen. Promotional channels permitting communication from the manufacturer to the consumer directly and through trade channels have been specified.

The crucialness of this early specification stage was well described by a General Foods executive. "Any error that occurs in the early stages will be carried through the entire program, and all you end up with are piles of paper. Even more critical, surely, is the time and talent involved in defining the problems for the computer. What you're involved with are not computer problems but user problems, which must be made explicit. Our objective is not a computer based solution to a marketing problem, rather, it is a solution to a marketing problem that uses the computer as a tool."[21]

As system development proceeds major decision points within the environment to be modeled are identified. Figure 8 illustrates one such description of decision and response factors within the manufacturer, retailer, and consumer sectors of a market as viewed by a particular management.

Description of Decision Processes

Once key decision and response elements have been identified the focus of model development shifts from description of relationships to formulation

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[21] Ibid.

of behavioral theory. Each decision or response point is described in terms of its inputs and outputs. Hypothesized relationships between inputs and observable behavior are reformulated in terms of measurements which permit validation of the model against data from the actual market environment.

The process of consumer exposure and response to advertising may be used to provide an example of the development of a behavioral model. Exhibit 9 illustrates one way of describing the communication process. This conception may be summarized in a series of explicit assumptions.

1. All media may be classified exclusively in one of M media-type classes. Media-type classes include: daily newspapers (with city-population breakdowns), Sunday newspapers (city-population breakdowns), daily tabloids, spot radio (broken down by time of day, spot, I.D., or announcement), spot TV, network TV, etc.

2. The probability of a consumer being exposed to a media-type is solely a function of that consumer's media habits and in no way influenced by the producer-advertiser.

3. The probability of exposure to a particular media type is a function of the effective (unduplicated) circulation of that media type and the proportion of effective circulation purchased by an expenditure of the amount specified.

4. The probability of a consumer assimilating ad content -- achieving recognition sufficient to permit unaided recall -- is a function of (a) the size of the ad, (b) the appeal(s) used by the advertiser, and (c) the consumer's orientation toward the chosen appeal.

5. Once an ad is assimilated the probability of gaining awareness of the advertised product's brand name is a function of (a) the magnitude of consumer attitude toward elements of the ad and(b) the prominence of the brand name -- the proportion of the advertisement devoted to the brand name and/or brand symbols.

6. A brand or product can be described in terms of a limited number of product characteristics.

7. The consumer's expressed attitude toward a brand is a function of: (a) the cumulative communication regarding the brand assimilated by the consumer devoted to each product characteristic and appeal, and (b) the consumer's attitude toward each product characteristic and appeal component of the brand image.

Models based on assumptions of this type may be used to relate the probability of consumer exposure to specific advertisements to the advertiser's media schedule and the consumers' media habits. Once the probability of exposure is established the probability of advertisement content being assimilated by the consumer who has been exposed may be expressed as a function of codable format and content descriptors.[22]

Content Description

Three classes of promotional information content have been defined as: (1) product-related appeals, (2) product characteristics, and (3) brand name associations.

Appeals

Product related appeals denote needs which the product is promoted as satisfying -- all alleged benefits of product usage. In the case of a food product, appeals might include health, enjoyment, economy, or prestige. Product related appeals for an appliance might be efficiency, addition to leisure time, ease of task performance, modernity, or status.

Characteristics

Product characteristics are attributes which can be perceived using the five senses. Product characteristics of a food item include package size, product color, salinity, sweetness, and texture. Product characteristics descriptive of an appliance include size, weight, material of construction, and brand features such as high-speed motor or automatic timer.

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[22] Dik Warren Twedt, "A Multiple Factor Analysis of Advertising Readership", Journal of Applied Psychology, Volume XXVI, No. 3, June 1952, pp. 207-15, and Daniel S. Diamond, op. cit.

Brand

Brand name associations include the company name (Ford), the company logo (IBM), specific brand name (Mustang), brand symbols (the Mustang pony), and the distinctive appearance of the product or its package.

Content Specification

Given this classification scheme, content is specified as the proportion of communication devoted to particular appeals, product characteristics, or brand name associations. Such specification involves quantification of qualitative attributes and therefore requires coding by a human intermediary. It is the coder's responsibility to identify product characteristics, appeals, and brand name associations present in an ad and to evaluate the relative importance of each of these elements. In assessing relative importance one might measure the surface area of a magazine ad or time segment of a broadcast devoted to each characteristic or appeal. Such an approach, however, ignores the effect of advertising layout and design in transmitting an impression of relative importance to the human observer.

Quantitative expression of the coder's perception of relative importance is achieved using the relative prominence scale illustrated in Exhibit 10. The coder's evaluation of the importance of each product characteristic, product-related appeal, and brand name association appearing in a promotion is expressed using this scale. The proportion of that promotion devoted to each element is then defined as the ratio of the element prominence to the sum of the prominences of all elements present.

Assimilation and Response Models

Once advertising format and content have been coded the ad may be communicated to a consumer response model. One such model which has been

implemented in several systems establishes the probability of consumer assimilation of advertisement content -- the consumer's probability of achieving a degree of cognizance sufficient to permit later unaided recall of ad content.[23] Inputs to this model include advertisement size (or time period), color, [illegible] content coded as described above and consumer pre-exposure attitudes. Following determination of content assimilation other models may be used to simulate the process of selective perception. One model employed in large scale behavioral simulations establishes a detailed memory update to the mind of an artificial consumer on the basis of pre-exposure memory content, consumer attitudes, and ad content.[24]

Behavior of an Artificial Population

Once response models of the type described above have been validated they may be combined with other behavioral models in a computerized simulation structure. In a micro-analytic simulation, consumer cells are described in terms of demographic characteristics, knowledge, experience, and predispositions. Models governing the behavior of each consumer cell are initialized to conform with the characteristics of that cell. Each artificial consumer is then "exposed" to the conditions encountered by actual consumers during a particular period of time. If the models constitute a valid representation of the determinants of behavior, the artificial consumer responds in a manner analogous to an actual consumer.

A Week in the Life of a Simulated Consumer

Exhibit II was obtained by monitoring the "thoughts and actions" of one member of a simulated consumer population during a simulated week in which the population experienced events comparable to those encountered

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[23] For a detailed exposition of this model see: A. E. Amstutz, "A Marketing Oriented Behavioral Theory of Interactions Within Consumer Product Markets", Unpublished Ph.D. Dissertation (Cambridge, Mass.: M.I.T., 1965), pp. 302-7

[24] Ibid., pp. 308-16

by a comparable real world population during the week beginning February 19, 1962.

Identifying Characteristics

The information provided beginning with the third line of output in Exhibit 11 identifies characteristic attributes of consumer 109. He is a suburban (SU) resident of New England (NE) between 25 and 35 years of age with an income between $8,000 and $10,000 per year, and has a college education. He presently owns a product of brand 3 manufacture purchased six years earlier.

Consumer 109 presently favors retailers 5, 11, and 3 in that order. He subscribes to or otherwise has available media of types 1, 4, 9, 10, 11, and 12. Media of types 2, 3, 5, 6, 7, 8, and 13 through 24 are not available to him.

Consumer 109's attitudes are summarized in a matrix beginning on line 6 of Exhibit 11. This matrix indicates his orientation toward 12 product characteristics, 12 appeals, 4 brands, and 18 retailers. From these figures it may be established that the most important (highest attitude) product characteristic insofar as consumer 109 is concerned is characteristic 8 which he regards very highly (+5). Appeals 11 and 4 are similarly indicated as of primary importance to this artificial consumer. From the retailer attitude portion of this matrix his preference for retailers 11 and 5 (both +5 attitudes) and 3 or 16 (both +3 attitudes) may be established. The final entry in the orientation matrix indicates that consumer 109 is aware of brand 1.[25]

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[25] The awareness measure used in this system is indicative of the respondents top-of-mind cognizance determined by eliciting the name of the first brand in a product class which "comes to mind".

Consumer Memory Content

The line stating "MEMORY DUMP FOLLOWS. BRANDS LISTED IN DESCENDING ORDER 1 THROUGH 4" introduces the print-out of consumer 109's present simulated memory content. This memory dump is a record of noted communications retained by the consumer relating specific product characteristics and appeals to each of four brands. From this report it can be established, for example, that consumer 109 has retained 14 communication exposures associating product characteristic 8 with brand 1, 13 exposures relating product characteristic 8 with brand 2, and 14 exposures associating appeal 7 with brand 3.

Media Exposure and Response

The entry in the report following the memory dump indicates that the segment of the simulation representing media exposure processes has become operational. Six media appear (are published or broadcast) during week 117. Consumer 109 is not exposed to medium 3 since that medium is not available to him (see media availability indicator in the characteristic output). Medium 4 also appears in week 117 and since it is available to consumer 109 he may be exposed to relevant ads appearing in it. The output indicates that he is exposed to an advertisement for brand 3 but does not note that communication. On the other hand an advertisement for brand 4 also present in medium 4 during week 117 is noted as indicated by the line reading, ADVERTISEMENT 19, BRAND 4 NOTED. CONTENT FOLLOWS. The output message then indicates that advertisement 19 contains a high prominence (4)[26] reference to product characteristic 11 and a medium prominence (2) reference to

[26]The prominence measures are specified in terms of the Prominence Scale Values defined in Exhibit 10.

characteristic 4. Advertisement 19 also contains medium prominence references to appeals 5, 7, and 12.

Consumer 109 does not see medium 7 although it appears in week 117, however, he is exposed to three advertisements in medium 12 which also appears during that week. The advertisement for brand 2 is noted while those for brand 3 and 1 are not. Media 16 and 23 also appear in week 117 but are not seen by consumer 109.

Word-of-Mouth Exposure

Report entries following the media exposure section indicates that consumer 109 is exposed to word-of-mouth comment generated by consumers 93, 104, and 117, but fails to note communication from any of these individuals. Had noting occurred, a message content report comparable to that generated for advertising would have specified the information noted.

Product Experience

Consumer 109 did not have product experience during week 117. Had he made use of the product a report of his response to product use indicating product characteristics or appeals, if any, emphasized by the use experience would have been printed.

Decision to Shop

The next entry in the Exhibit 11 output indicates that consumer 109 has made an explicit decision to shop; that his highest perceived need is for brand 3; and that his first choice retailer is 5. Simulation models representing in-store experience have been loaded.

In-Store Experience

The first entry within the SHOPPING INITIATED section notes that the consumer is exhibiting behavior associated with the explicit decision to shop option and is seeking brand 3 (there is therefore NO SEARCH activity --

no opportunity for accidental exposure). Simulated retailer 5 is carrying brand 3 therefore consumer 109 finds the brand he is seeking (3).

Retailer 5 has placed point-of-sale display material for brand 3. The consumer is exposed and notes its content emphasizing appeals 3 and 6 and product characteristics 5, 7, 10, and 11 as attributes of brand 3. Retailer 5's simulated salesmen are either not pushing brand 3 or busy with other customers. In any event, consumer 109 is not exposed to selling effort while shopping in retailer outlet 5.

Decision to Purchase

The output statement DECISION TO PURCHASE POSITIVE -- BRAND 03, $38.50, specifies that consumer 109 has made a decision to purchase brand 3 at a price of $38.50. The line following indicates that retailer 5 can make immediate delivery of brand 3.

Response to Purchase

Since consumer 109 has now purchased brand 3 his awareness which was favoring brand 3 is changed to favor brand 3.

Word-of-Mouth Generation

Since consumer 109 is now the proud owner of a brand 3 product, it is not surprising to find him initiating word-of-mouth comment regarding his new purchase. The content of his communication regarding brand 3 emphasizes product characteristics 2 and 8 and appeals 4 and 11 -- the appeals and product characteristics toward which he has the highest perceived brand image as indicated in the previous memory dump.

Forgetting

Consumer 109 did not lose any of his existing memory content during week 117.

The final output line of Exhibit 11 indicates that consumer 109 has concluded week 117.

Simulated Population Behavior

The behavior of population groups within each simulation sector is described by accumulating simulated individual behavior. Population behavior may be summarized in terms of the proportion of purchases allocated to each brand (brand shares), changes in population attitude distributions towards brands or changes in the perceived brand images held by significant population segments.

One Year in the Lives of Two Simulated Doctors

Once the legitimacy of simulated behavior of the type outlined in Exhibit 11 has been established through Turing tests,[27] the system may be used to produce behavior over time. Exhibit 12 illustrates the cumulative prescription rates generated by two general practitioners operating in a simulated drug product environment in contrast to the appliance environment in which consumer 109 was resident. The two doctors prescribed only one drug during the first two weeks of simulated activity. However, as the simulated year progressed, they used other drugs and by year end their cumulative prescription shares were 37.5, 28.3, 21.1, 5.5, and 5.0 for drugs 1-Y, 2-X, 2-O, 1-O, and 1-+ respectively as illustrated at the end of the time plot.

Total Population Behavior

Output of the type illustrated in Figure 12 is used primarily to test system stability. Two simulated G.P.'s are no more representative than two real world doctors. Meaningful tests of system response require examination of the behavior exhibited by major population segments. Exhibit 13 illustrates the weekly prescriptions of ten drugs by 100 members of an artificial doctor population during the simulated year, 1961. These simulated market

[27] Turing has suggested that if a person knowledgeable in the area of simulated decision making cannot distinguish the modeled behavior from

shares may be directly compared against data generated during a comparable period in a real world test market.

## Management Systems of the Future

What is the future of market oriented management systems? I do not expect them to differ markedly in form or structure from the more advanced model based systems with which we are working today. The process of evolution already noted will undoubtedly continue. More accurate and detailed data will be more readily available. More sophisticated models will be validated, and as management gains confidence in the validity of these models greater authority will be delegated to the computers using them.

If the systems of tomorrow are a product of this evolutionary process, through survival of the fittest they may be expected to bear marked resemblances to the successful systems of today. It is therefore appropriate to ask, what are the characteristics of successful management systems in operation today?

## Characteristics of Successful Systems

While specific functions performed by successful systems are as varied as the managements to which they contribute, four common characteristics of successful systems or perhaps more correctly the environment in which successful systems operate, can be specified.

1. The system is founded on management's conception of the decision environment.
2. The user-manager understands the system structure.
3. The system is based on disaggregated data files.
4. System development has proceeded to increasing levels of sophistication through a process of gradual evolution.

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27 (cont.)
reality the model is realistic. See: A. M. Turing, "Computing Machinery and Intelligence", MIND, October 1950, pp. 433-60.

Management's Conception of the Environment

Systems providing meaningful information to a management reflect that management's priorities and provide data of a type and in a form which is assimilable in the context of existing management decision processes. In most situations the information is selectively generated -- management is simply incapable of assimilating reams of paper -- and based on accepted measures -- output relate directly to management conceptions of processes occurring in the monitored environment.

Management Understanding

Management is involved in the quantitative specification of system boundaries. They understand and accept the conceptual structuring of system requirements in terms sufficiently explicit to define the measures and analytical procedures encompassed by the system. If this level of communication is not achieved, it is impossible for those concerned with formulation to develop a system which will be used.

The Disaggregated Data File

At the heart of every successful information system is a disaggregated data file -- a file in which information is maintained in detailed time sequence as it is generated. As new inputs are received they are maintained along with existing data rather than replacing or being combined with existing information. New data are not combined with old to form sums, averages, or aggregate distributions. As a result, structural biasing through aggregation which destroys much information value is avoided.

Exhibit 14 illustrates the concept of a disaggregated data file based on data from invoice records. The disaggregated customer file contains the name, address, demographic, and financial experience records for particular consumers. Each transaction is recorded in chronological order in the file

so that at any point in time it is possible to recreate the company's interactions with each consumer over time. In a similar manner the product file is organized to reference a detailed chronological sales record.

The importance of a disaggregated file rests in part on the evolutionary process through which successful information systems develop. Although an information system may initially be designed to perform strict limited functions, as management gains experience these functions change. If data are initially structured (aggregated) to meet first stage requirements, later modification of system functions necessitate costly file reorganization.

Design for Evolution

Successful information systems are designed to permit expansion and change. As indicated above, the disaggregated data file is a key element in system flexibility. In addition, data files must be designed to permit expansion. Variable, rather than fixed record length file structures and self-expanding file constructs are basic to the well planned system.

As management gains experience in working with well organized and accessible data they become increasingly interested in and prepared to use more advanced analytical procedures. The system's analytical structure must not preclude this advancement. Programs must be organized to permit experimental use of new techniques as well as the permanent incorporation of additional capabilities as part of the standard system configuration.

Characteristics of Managers Who Implement Successful Systems

In view of the key role which management plays in the specification and design of information systems, it is not surprising to find that the managers who are successful in developing and using management information and control systems share common attributes which distinguish them from the average administrator.

There is no industry bias in the population of successful information system users. Successful systems have been designed and implemented in consumer and industrial product and service companies as well as financial institutions. The members of this heterogeneous group may, however, be distinguished from their colleagues on the basis of the following characteristics which they share:

1. Belief that corporate growth is limited by their ability to assimilate and act on information.
2. Willingness to consider change.
3. Willingness to become personally involved in explication.
4. Willingness to test preconceptions.
5. Willingness to modify "time proven" procedures.

The managers involved in system development are interested in making better decisions. They are sufficiently confident and mature to consider conflicting approaches to a problem and to choose between alternatives on the basis of rational evaluation. They are willing to give up implicit models with which they have worked for many years if, when made explicit and tested, these models are found lacking.

Over and above the personalities of individual managers, the environment within the company supports a free interchange of ideas. If managers are unable to separate ideas from men -- if they evaluate the worth of a concept in terms of the title of the individual proposing it -- steering committee sessions will quickly give way to corporate infighting.

Obviously no company has a management which is perfectly objective and devoid of all traces of negative attributes. In final analysis it is a question of the ability of proponents of information system development to promote and implement this concept and management's willingness to engage in this type of activity recognizing the commitment and orientation required

for success.

A Prototype System

Market oriented management systems of the future may be expected to be adaptive systems based on micro-analytic simulations of the market environment. Two characteristics of the marketing decision structure strongly favor the successful use of adaptive simulation based systems.

1. Controlling conditions in the market are functions of complex dynamic human behavior and responses.

2. Management must influence actions and responses in the market through persuasion since they are unable to exert direct control.

Management information systems based on micro-analytic market simulation generally focus on the processes through which management attempts to influence behavior in the market. The models on which such systems are based encompass detailed representations of retailer, distributor, salesmen, and consumer and industrial purchaser behavior as well as competitive interactions in the environment external to the firm.

The data files associated with these information systems encompass measures of the extent and nature of inputs to the market environment generated by the company and its competitors.

Exhibit 15 illustrates the structure of a simulation based information system. Inputs from the market environment are reviewed and formatted by a pre-processor system before being transferred to the master data file. The data file serves as the reference source for the information system and provides the historical data base for simulation model initialization.

Management has the ability to interrogate the data file directly and obtain responses following procedures comparable to those associated with a basic retrieval system. This set of interactions is noted by A in Exhibit 15.

Management's use of the simulation model as a basis for testing proposed programs is illustrated by the interaction set indicated by B. Proposed plans are inputted to the information system which establishes hypothetical conditions for runs of the simulation model. Results obtained in the simulated environment are transferred to the information system which formats them for presentation to management. Following this process management is able to evaluate the conditional results of proposed programs using the same procedures and equipment employed to assess the current state of the market through traditional interrogation.

Once a program has been finalized the proposed plan is established as a reference and simulated measures based on the plan are generated for use by the monitor sector of the information system. As the plans are implemented in the market environment actual measures of market performance are compared with simulated measures indicating the expected results of planned implementation. Significant deviation from plans becomes the criteria for monitor referral to management as indicated by C in Exhibit 15. The information system may be used to evaluate the results of research activities as well as operating plans, as indicated by D.

The system permits management to test proposed policy and strategy in the simulated environment; choose between alternatives on the basis of resulting output; implement the selected policy in the real world environment; and evaluate the effectiveness of implemented plans through an information system. The manager references the simulated environment to ask "what if?" and the information system monitoring the real world environment to determine "what is?".

A Note on the Consumer of the Future

One final thought about the possible nature of future marketing systems. We have been assuming that such systems will be designed to serve a human consumer -- an assumption which may be subject to serious question. In a recent article in the Journal of Marketing Marshall Lewis conjured up the following image of the industrial marketing process of the future:

> "(1) New product advertising may become a kind of program instruction for our prospect's computers -- tessing them simply to store information about our new products. (2) The computer will 'demand' that it be allowed to do all the purchasing for decentralized corporations because it can clearly do it more efficiently. There will be less and less 'local option' in various locations; and it will be more and more imperative for the marketer to serve the customer on a national or even international basis. (3) As the computer 'rationalizes' and considers all of the substantive data about a product, it will force all competitors to meet certain basic product criteria. The computer will not tolerate a second rate product nor will it accept excuses." [27a]

These comments raise interesting questions. As already noted, a computer can be programmed to duplicate in many respects the process of human response to communication and assimilation of information. The objective thus far has been to program the computer to duplicate the responses of representative consumer population segments. Perhaps, instead, we should be working with the computer to develop models which will respond as a highly rational being should respond in order to achieve optimal results measured in terms of definable moral, social, economic, or aesthetic values.

The Role of Systems in the New Reality

Let's return now to the hypothetical agency presentation with which we began this discussion. Is it a fair representation of the new reality?

Starting with the objectives presented in Exhibit 1, the specifications of promotional content in terms of product characteristics and appeals is

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[27a] Marshall C. Lewis, "A Leap Into the Future of Industrial Marketing", Journal of Marketing, April 1966, pp. 56-58, on p. 57

directly compatible with micro-analytic simulation structures serving as the basis of promotional campaign planning and evaluation in some corporations today. Simulation based evaluation of alternative strategies in terms of prioritized criteria is current practice in some planning groups. The use of effectiveness measures based on awareness and content recall is congruent with simulation based planning and detailed market evaluation of the type made possible through the use of disaggregated data files.

Exhibit 2's detailed projection of market developments, initial trials, and repeat purchases are routinely generated as output from micro-analytic simulations in operation at this time. The fact that the computer is scheduling media should not surprise anyone.

Brand profile analyses of the type illustrated in Exhibit 3 are a standard by-product of a disaggregated data file based on continuing consumer response surveys. Conditional estimates of the effect of specified programs on population segments are obtained on a regular basis as an output from simulated market strategy tests.

It is important to remember that we are discussing management systems in which men and machines interact to achieve a higher level of effectiveness measured in terms of criteria specified by management. In these systems models operating on a computer may perform clerical functions; update and maintain integrated data files containing billions of pieces of information; evaluate alternative market strategies; coordinate the elements of a planning activity; schedule a program for implementation; monitor the elements of an implemented program; evaluate market response; and refer actionable situations to management.

The advertising executive's function in this new reality will not involve new or strange activities so much as a new emphasis on already familiar concerns. Little or no time will be spent in routine analysis, evaluation, or allocation. The procedures to be followed in these "programmable" activities will have been explicitly specified and authority over them delegated to a computer based system. The executive will be concerned with broader policy problems which he will approach with increased effectiveness due to the availability of more meaningful data and increased (model based) understanding of his environment. He will be concerned with problem definition and will devote substantial time to the broader planning functions which are now often relegated to low priority positions on the executive agenda to make way for fire fighting and crisis curtailment. Much of his time will be spent in increasing his understanding of the environment in which his company operates and refining his insights into the communications processes which are his area of expertise. He will spend substantial time building models -- making explicit, testing, and validating or rejecting hypotheses regarding the nature of his environment and his impact on it.

Freed from many of his present day routine commitments and provided with the ability to study the implications of new concepts and approaches, the executive in the new reality will have a new freedom to experiment with creative ideas and to employ imaginative approaches to the formulation and solution of advertising problems.

In 1960 viewing developments of the type which we have been discussing, Herbert Simon predicted much of the evolution which we have experienced. At that time he characterized the probable direction of change in the manager's job with two words, "rationalization and impersonalization".

He also proposed that any anxieties aroused by the stereotype of the robot "... are unnecessary because the existence in the world today of machines that think and of theories that explain the processes of human thinking, subtracts not an inch, not a hair, from the stature of man. Man is always vulnerable when he rests his case for his worth and dignity on how he differs from the rest of the world or the special place he has in God's scheme or nature's. Man must rest his case on what he is. This is in no way changed when electronic systems can duplicate some of his functions or when some of the mystery of his processes of thought is taken away."[28]

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[28] "The New Science of Management Decision" reprinted in The Shape of Automation: For Men and Management, 1965, Harper and Row Publishers, Inc., p..109

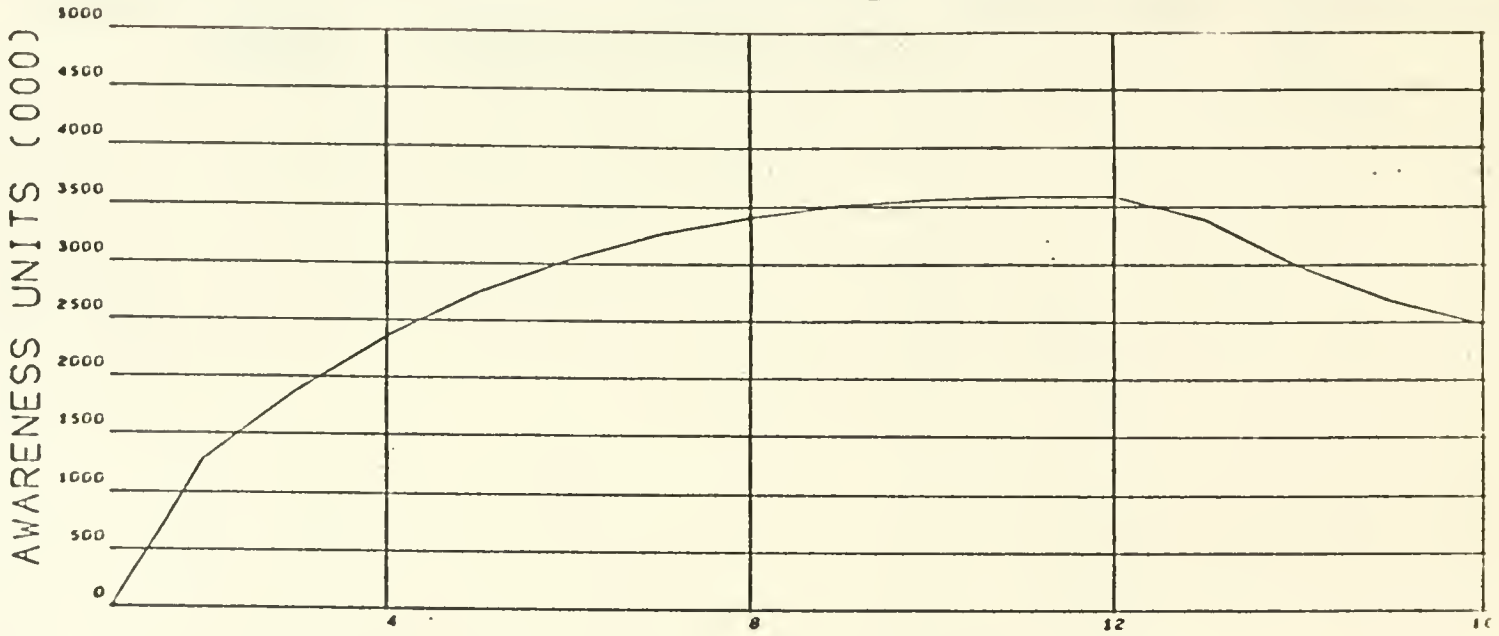
AEA:maf
10216

AGENCY OBJECTIVES

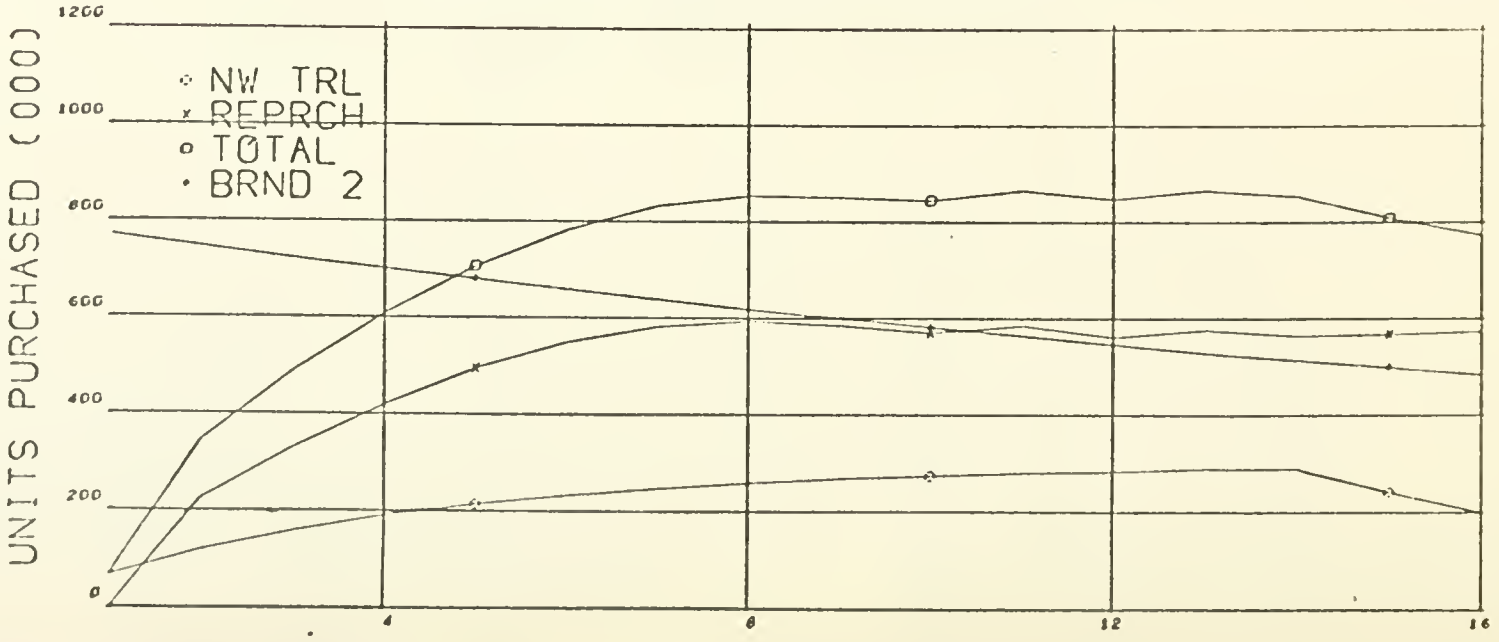
| | |
|---|---|
| Communication Content: | Product Characteristics: AGD, IAT, SIE, MCS |
| | Brand Association Appeals: SAF, SEL, ECN |
| Target Markets: | Demographic Sets: 4, 5, 8 |
| | Predisposition Profiles: 11, 17, 25, 26, 27 |
| Effectiveness Requirements: | Maximum Awareness Units/Media Dollar 6.4 |
| | Maximum Content Recalls/Media Dollar 1.3 |

Exhibit 1

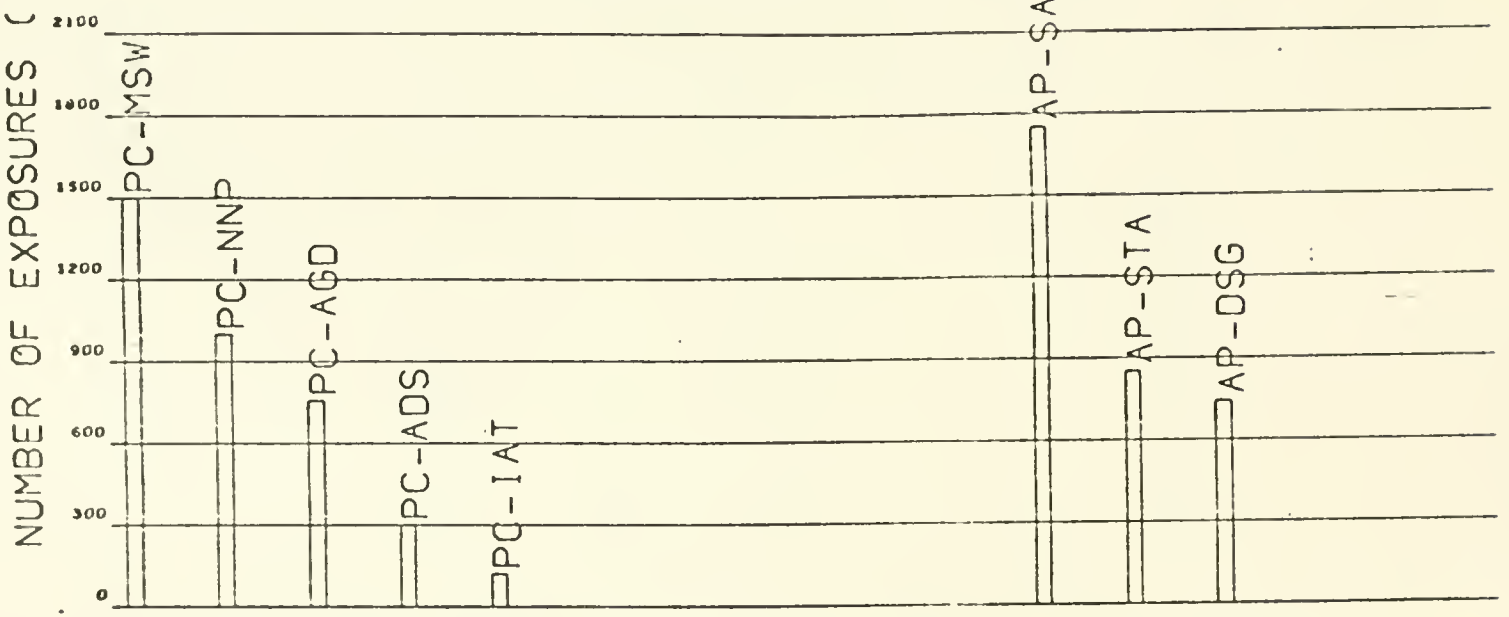
PLAN C - NEW BRAND INTRODUCTION TEST
SIMULATED MEDIA RESPONSE



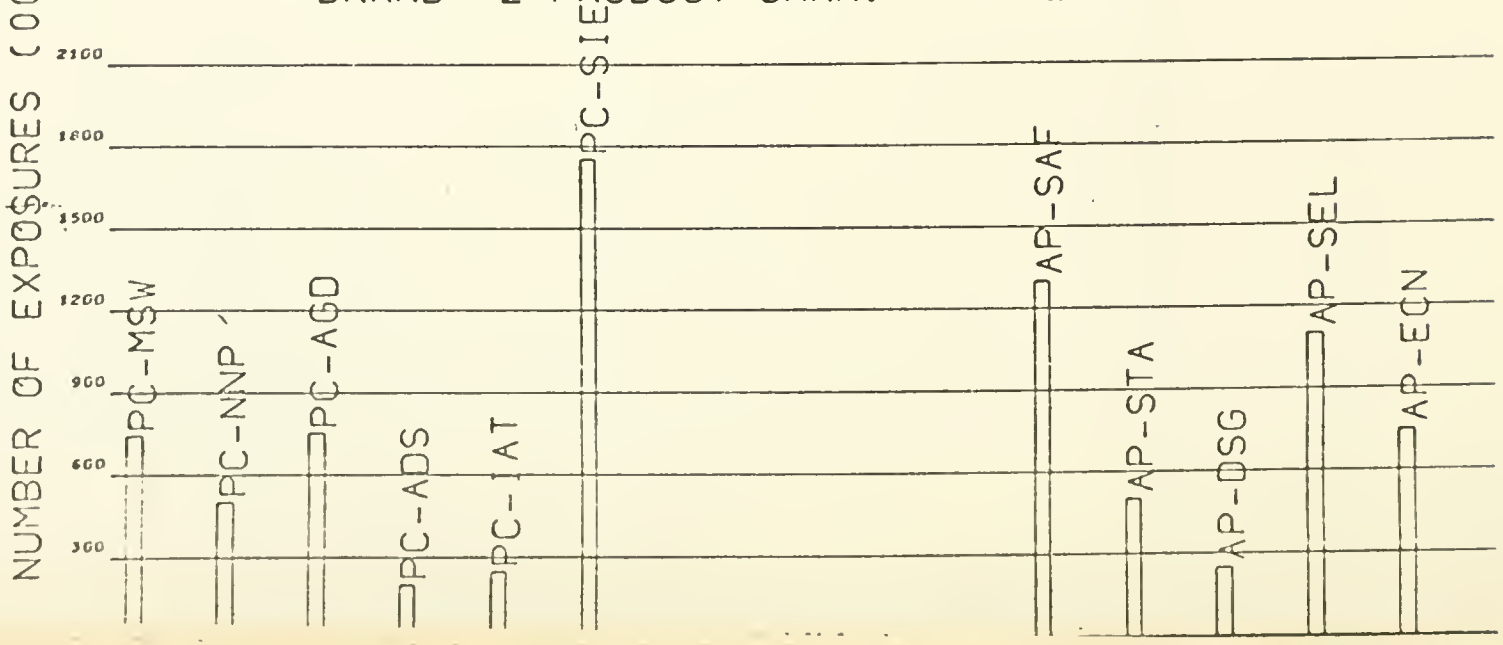

PLAN C - NEW BRAND INTRODUCTION TEST
SIMULATED PURCHASE RECORD



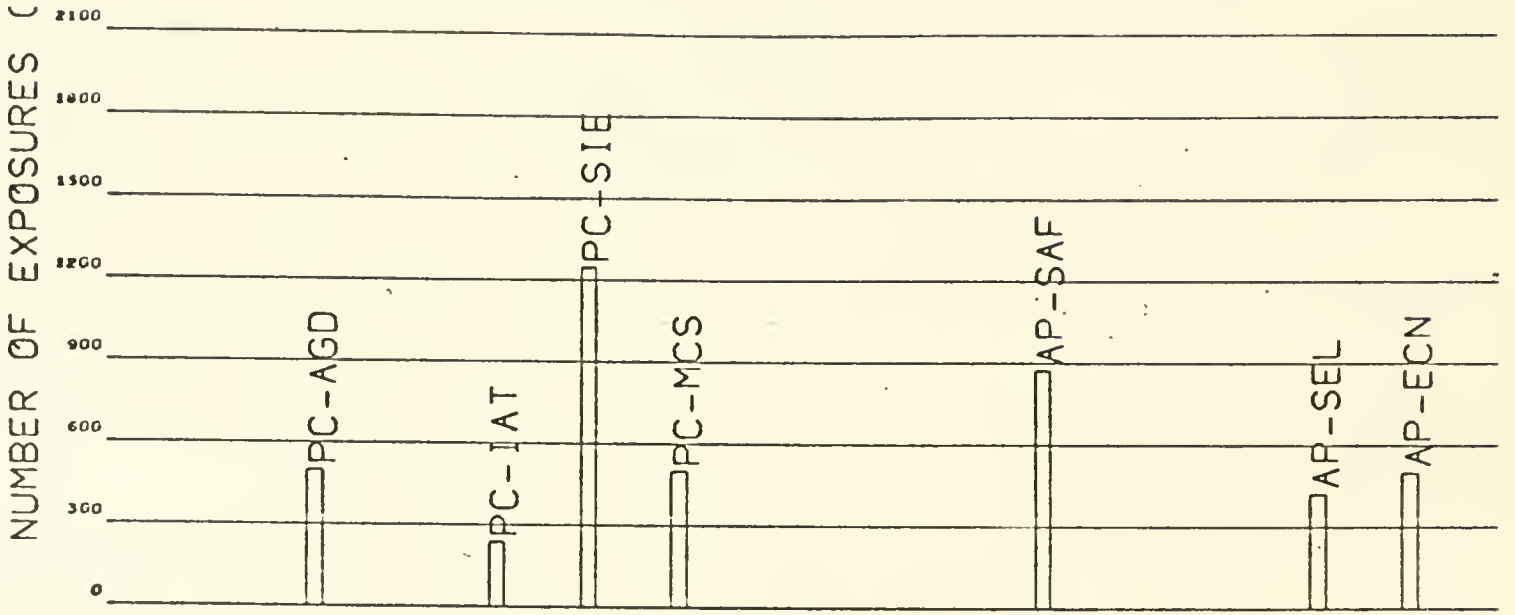
BRAND PROFILE -- TOTAL DATA FILE -- 10/24/66
BRAND 1 PRODUCT CHAR. + APPEALS




BRAND PROFILE -- TOTAL DATA FILE -- 10/24/66
BRAND 2 PRODUCT CHAR. + APPEALS



BRAND PROFILES -- SIMULATED PLAN C INTRODUCTION
NEW BRAND PRODUCT CHARS + APPEALS




BRAND PROFILE -- TOTAL DATA FILE -- 10/24/66
BRAND 1 PRODUCT CHAR. + APPEALS

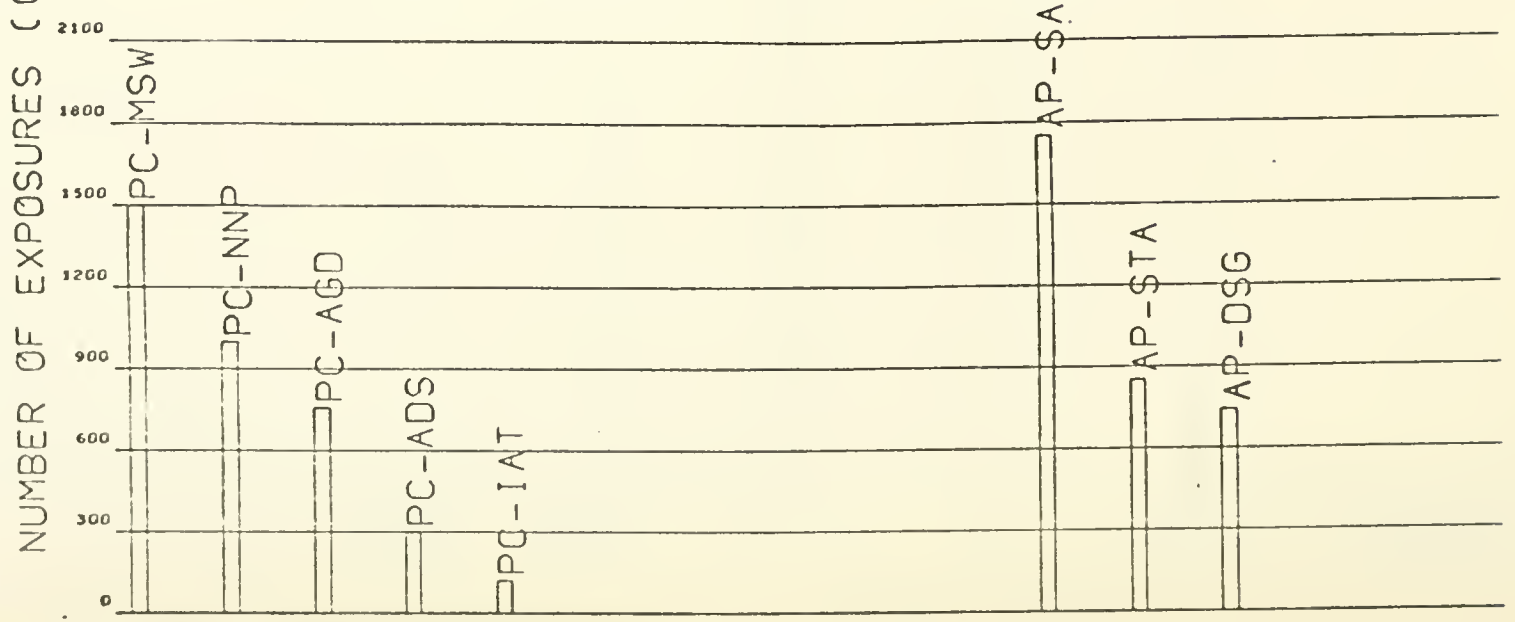


Exhibit 5

BASES OF SYSTEM EVALUATION

DIMENSIONS 3 and 4

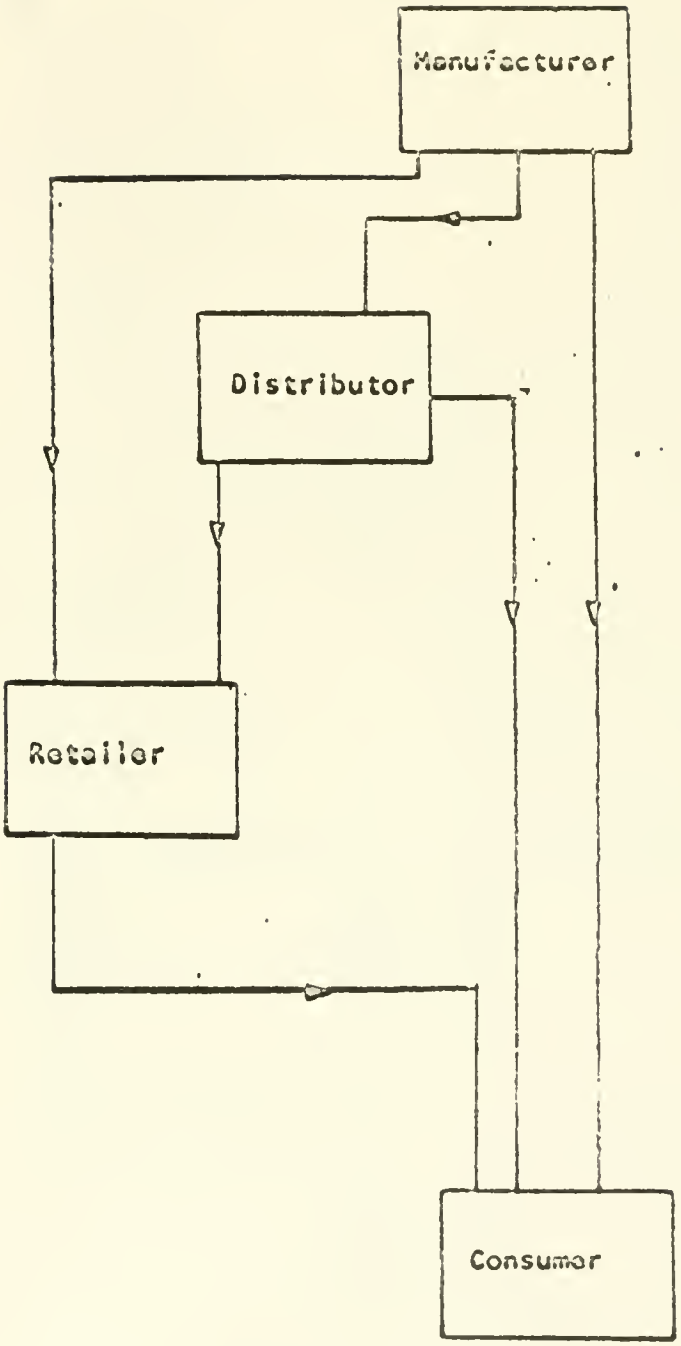



Exhibit 6

SYSTEM BOUNDARY CONDITIONS

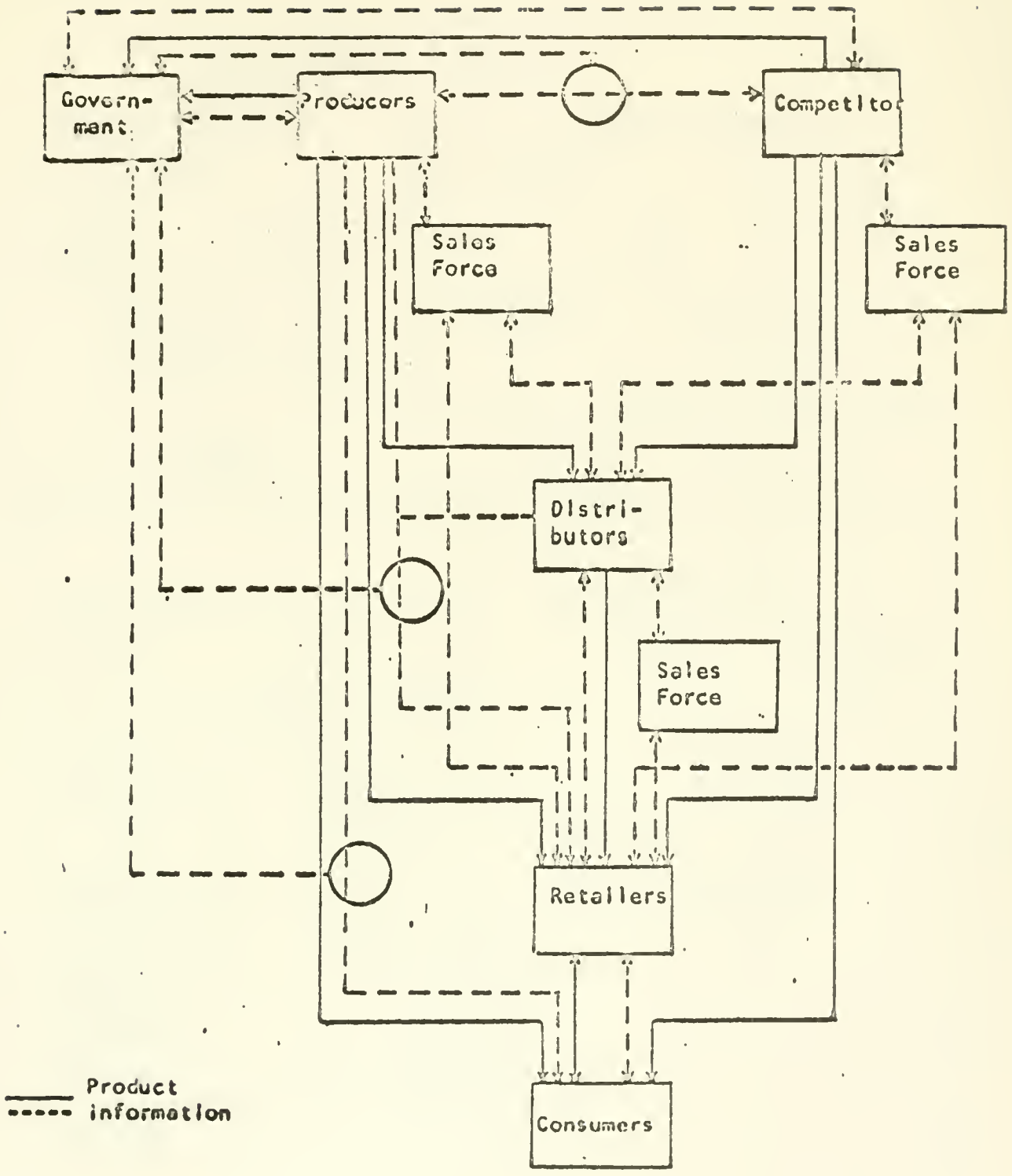



EXHIBIT 7

SECOND STAGE SYSTEM DESCRIPTION

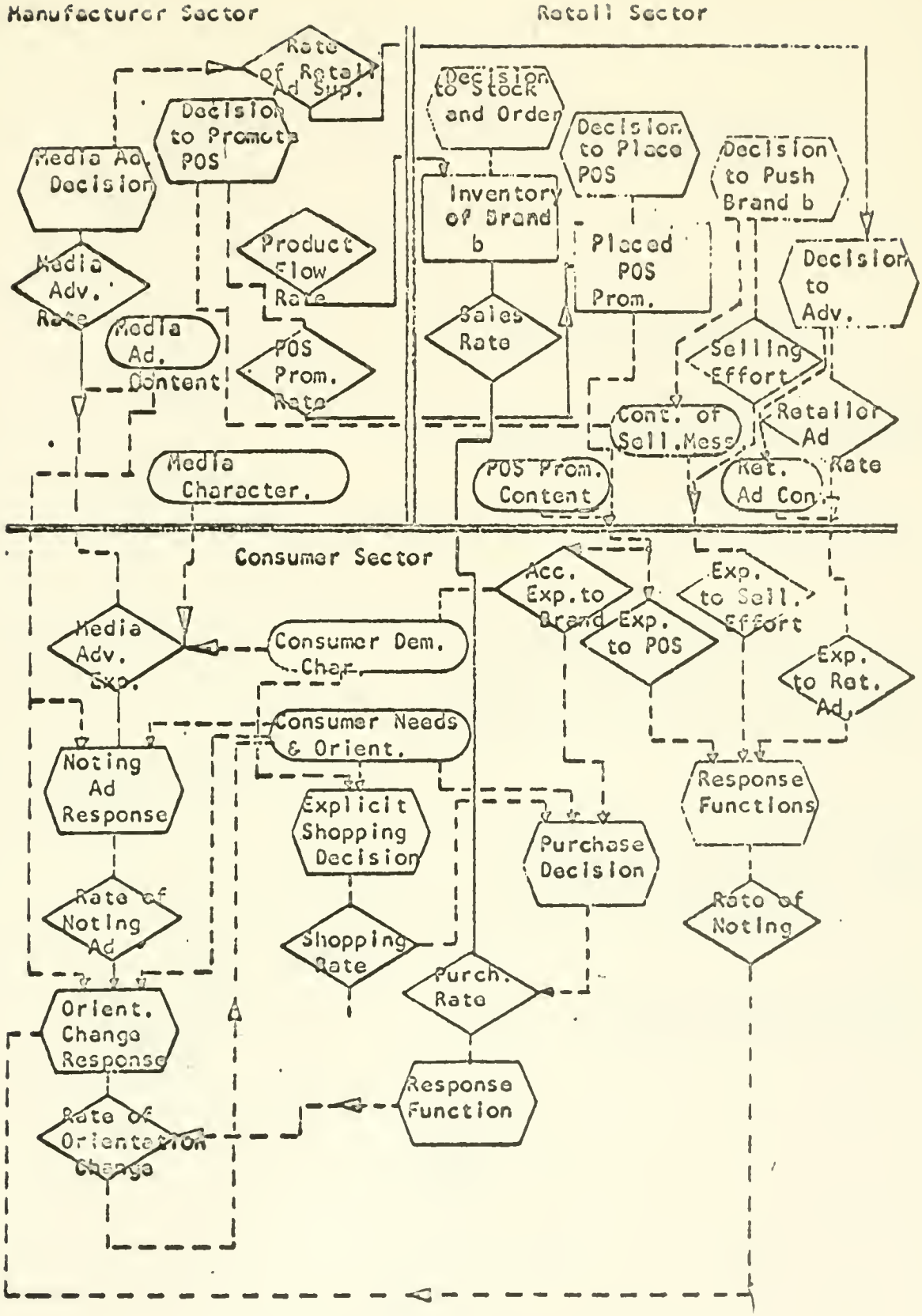



EXHIBIT 8

MAJOR DECISION POINTS IN CONSUMER MARKET SIMULATION

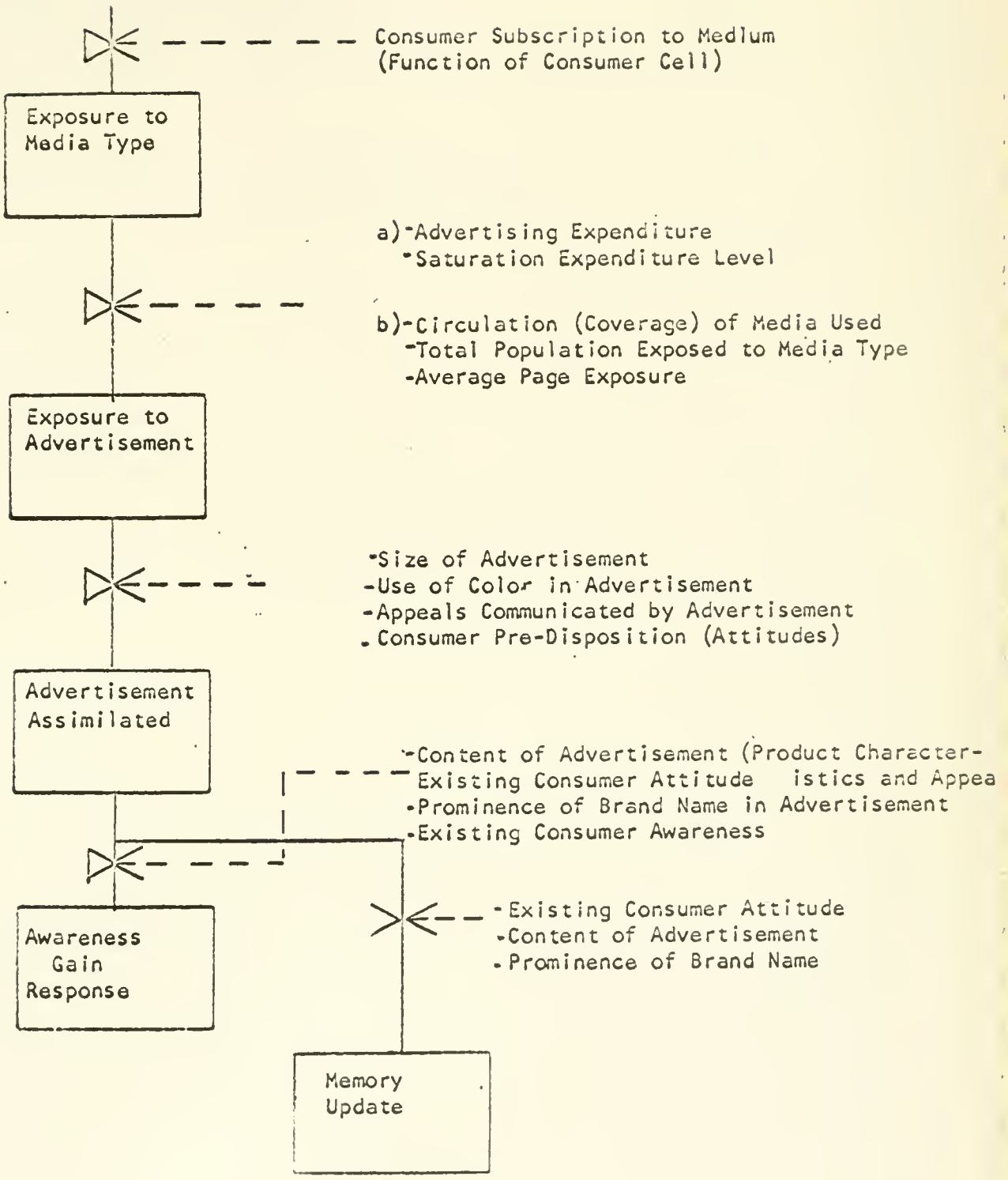



EXHIBIT 9

ADVERTISING EXPOSURE AND RESPONSE Processes

| Level of Prominence | Evaluation Scale |
|---|---|
| Extremely Prominent -- Impossible to Miss | 4 |
| Very Prominent -- Major Emphasis Given | 3 |
| Average Prominence -- Normal Identification | 2 |
| Present but not Prominent -- Easily Missed | 1 |
| Not Present -- Impossible to Determine | 0 |

EXHIBIT 10

THE RELATIVE PROMINENCE SCALE

SIMULATION APP-05 TEST RUN APRIL 4, 1965 1400 HOURS

-- CONSUMER 0109 NOW BEGINNING WEEK 117 -- FEBRUARY 19, 1962

- REPORT MONITOR SPECIFIED. TO CANCEL PUSH INTERRUPT.

- CHARAC - REGION NE SU, AGE 25-35, INCOME 8-10K, EDUCATION COLLEG

- BRANDS OWN 3, 6 YEARS OLD. RETAILER PREFERENCE 05, 11, 03

- MEDIA AVAILABLE 1 0 0 1 0 0 0 0 1 1 1 1 0 0 0 0 0 0 0 0 0 0 0 0

- ATTITUDES

| | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| PROJ CHAR | 0 | +1 | +1 | 0 | -3 | -1 | 0 | +5 | 0 | +3 | 0 | 0 |
| APPEALS | -3 | 0 | +1 | +5 | 0 | -3 | +3 | 0 | 0 | 0 | +5 | 0 |
| BRANDS | +2 | +1 | +3 | +2 | | | | | | | | |
| RETAILERS | +1 | -5 | +3 | +1 | +5 | -5 | -5 | +1 | -1 | -3 | +5 | +1 |
| | -3 | +1 | -1 | +3 | +1 | +1 | | | | | | |
| AWARENESS | 1 | 0 | 0 | 0 | | | | | | | | |

- MEMORY DUMP FOLLOWS. BRANDS LISTED IN DESCENDING ORDER 1 TO 4

| PRODUCT CHARACTERISTIC MEMORY | | | | | | | | | | | | APPEALS MEMORY | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 1 |
| 2 | 3 | 15 | 0 | 5 | 5 | 4 | 14 | 8 | 7 | 1 | 3 | 8 | 9 | 7 | 3 | 1 | 11 | 7 | 4 | 4 | 3 | 9 | |
| 8 | 0 | 6 | 4 | 9 | 5 | 4 | 13 | 0 | 3 | 6 | 7 | 6 | 8 | 0 | 7 | 0 | 9 | 2 | 4 | 3 | 10 | 3 | |
| 0 | 6 | 15 | 7 | 0 | 3 | 11 | 3 | 5 | 2 | 5 | 7 | 0 | 4 | 8 | 10 | 9 | 2 | 14 | 3 | 9 | 7 | 9 | |
| 7 | 9 | 3 | 7 | 3 | 2 | 7 | 2 | 6 | 12 | 14 | 2 | 0 | 9 | 7 | 8 | 13 | 9 | 11 | 6 | 0 | 2 | 5 | |

- MEDIA EXPOSURE INITIATED

- MEDIUM 003 APPEARS IN WEEK 117 -- NO EXPOSURES
- MEDIUM 004 APPEARS IN WEEK 117
  - EXPOSURE TO AD 013, BRAND 3 -- NO NOTING
  - EXPOSURE TO AD 019, BRAND 4
    - AD 019, BRAND 4 NOTED. CONTENT FOLLOWS
    - PROD. C 11 P=4, 4 P=2,
    - APPEALS 5 P=2, 7 P=2, 12 P=2,
- MEDIUM 007 APPEARS IN WEEK 117 -- NO EXPOSURES
- MEDIUM 012 APPEARS IN WEEK 117
  - EXPOSURE TO AD 007, BRAND 2
    - AD 007, BRAND 2 NOTED. CONTENT FOLLOWS
    - PROD. C 8 P=3, 12 P=1,
    - APPEALS 2 P=1, 4 P=1, 6 P=1, 10 P=1,
  - EXPOSURE TO AD 013, BRAND 3 -- NO NOTING
  - EXPOSURE TO AD 004, BRAND 1 -- NO NOTING
- MEDIUM 016 APPEARS IN WEEK 117 -- NO EXPOSURES
- MEDIUM 023 APPEARS IN WEEK 117 -- NO EXPOSURES

EXHIBIT 11

COMPUTER OUTPUT

- WORD OF MOUTH EXPOSURE INITIATED

    - EXPOSURE TO CONSUMER 0093 -- NO NOTING
    - EXPOSURE TO CONSUMER 0104 -- NO NOTING
    - EXPOSURE TO CONSUMER 0117 -- NO NOTING

- NO PRODUCT USE IN WEEK 117

- DECISION TO SHOP POSITIVE -- BRAND 3 HIGH PERCEIVED NEED
    -- RETAILER 05 CHOSEN

- SHOPPING INITIATED

    - CONSUMER DECISION EXPLICIT FOR BRAND 3 -- NO SEARCH
    - PRODUCT EXPOSURE FOR BRAND 3
        - EXPOSURE TO POINT OF SALE 008 FOR BRAND 3
            - POS 008, BRAND 3 NOTED. CONTENT FOLLOWS
            - PROD. C 3 P=4, 6 P=4,
            - APPEALS 5 P=2, 7 P=2, 10 P=2, 11 P=2,
    - NO SELLING EFFORT EXPOSURE IN RETAILER 05

- DECISION TO PURCHASE POSITIVE -- BRAND 3, $ 38.50

    - DELIVERY IMEDAT
    - OWNERSHIP = 3, AWARENESS WAS 2, NOW 3

- WORD OF MOUTH GENERATION INITIATED

    - CONTENT GENERATED, BRAND 3
        - PROD. C 3 P= +15, 8 P=+15,
        - APPEALS 4 P= +50, 11 P=+45

- FORGETTING INITIATED -- NO FORGETTING D

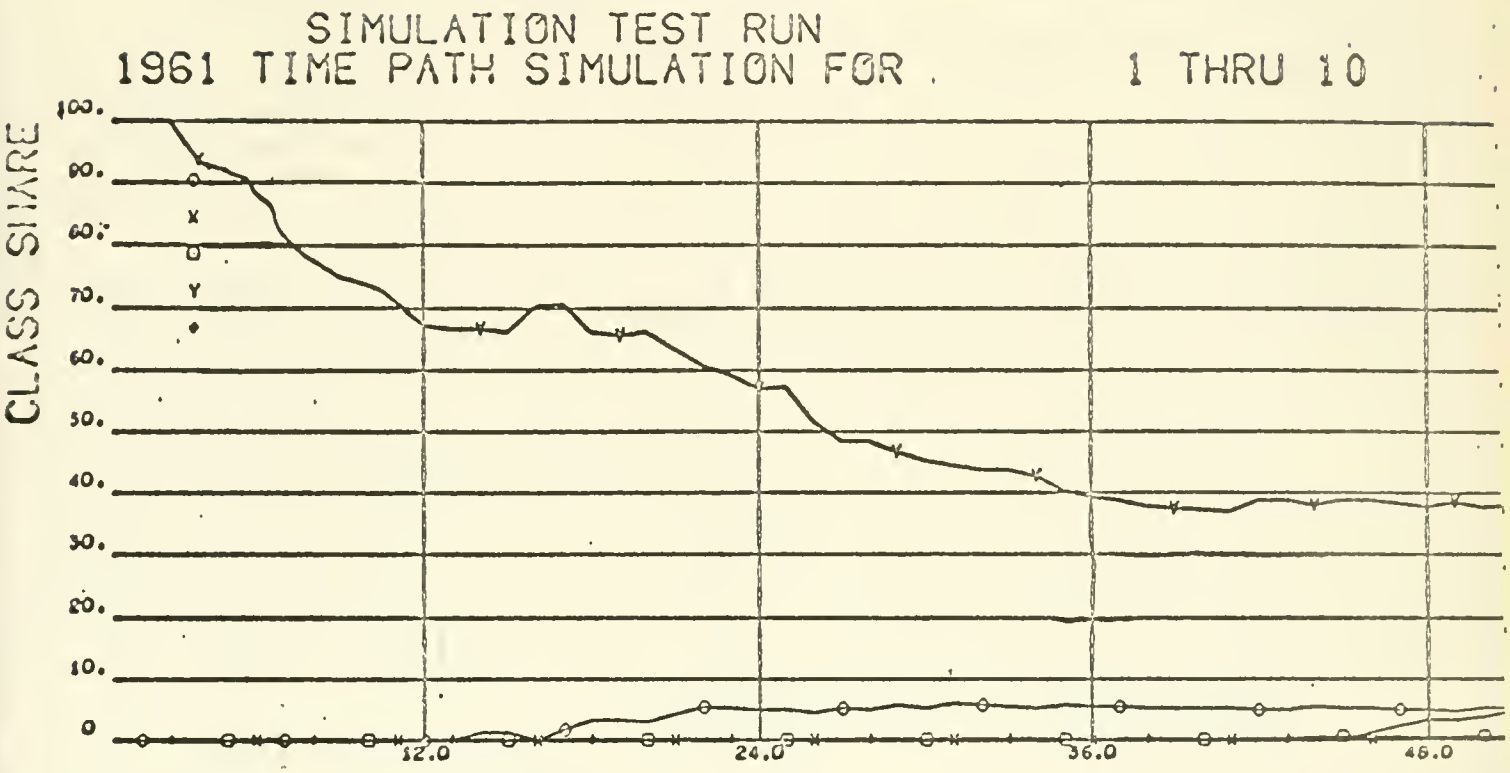
-- CONSUMER 0109 NOW CONCLUDING WEEK 117 -- FEBRUARY 25, 1962

-- CONSUMER 0110 NOW BEGINNING WEEK 117 -- FEBRUARY 19, 1962

QUIT,
R 11,633+4.750

EXHIBIT 12

Sample Output -- Two Doctors



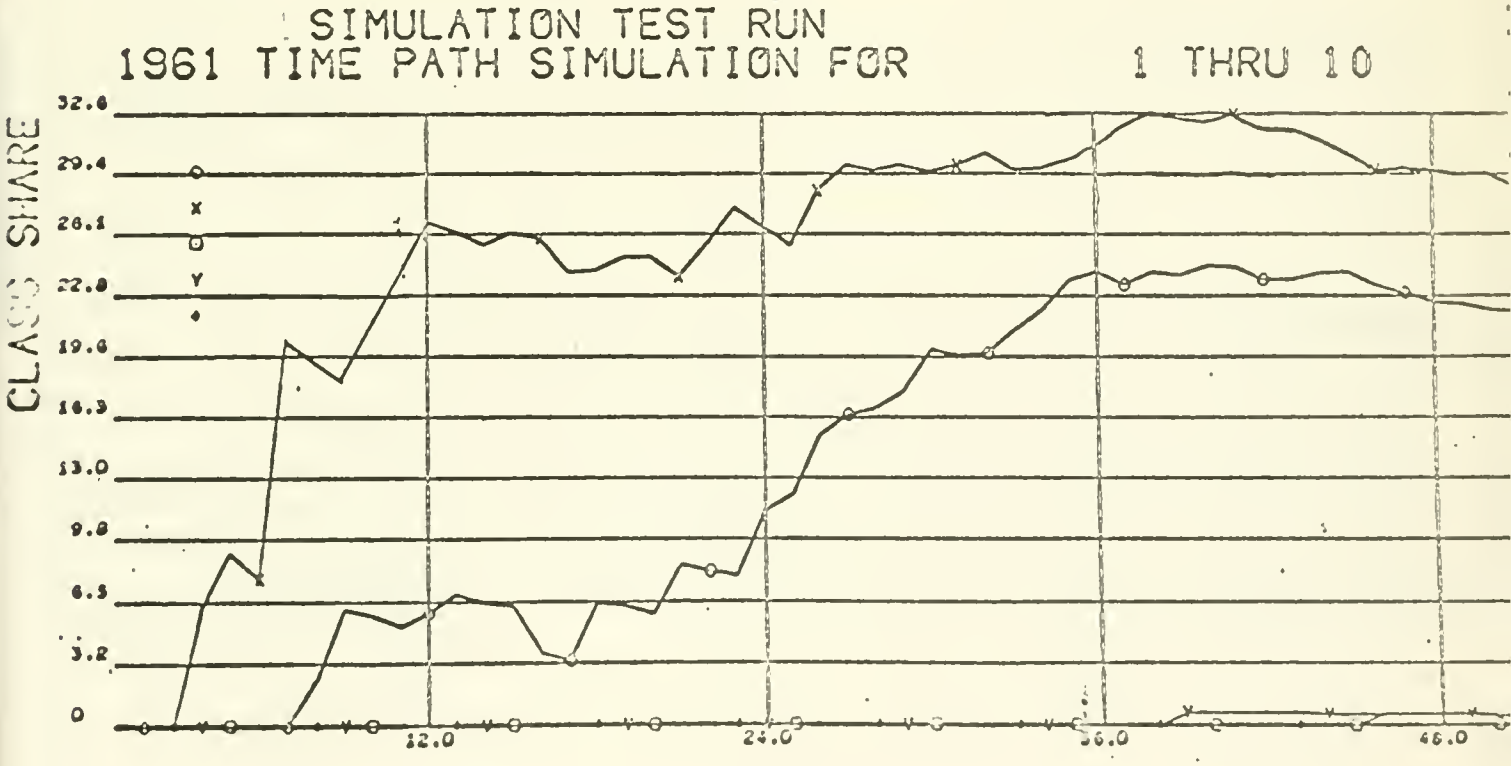
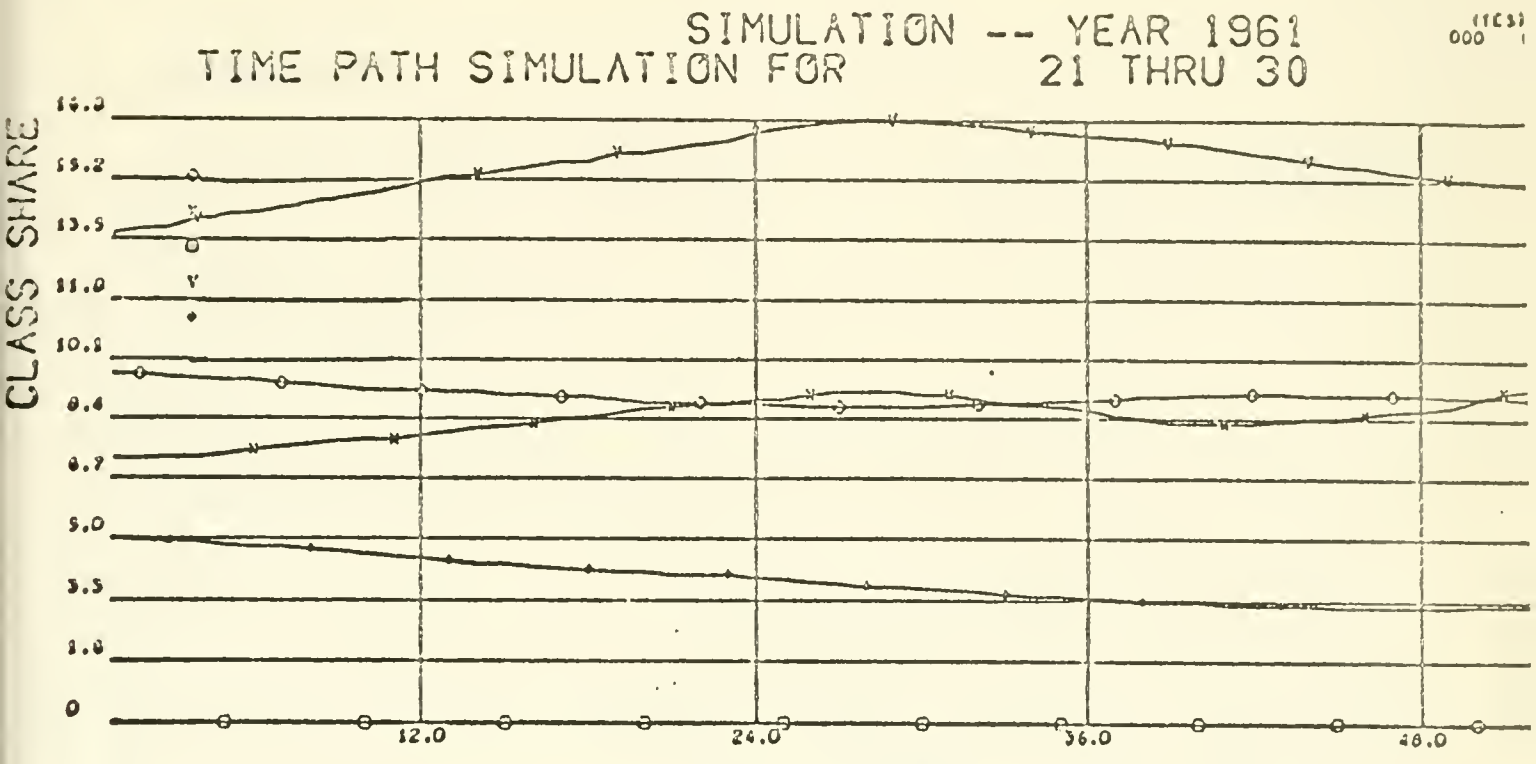



EXHIBIT 13

Sample Output -- 100 Doctors



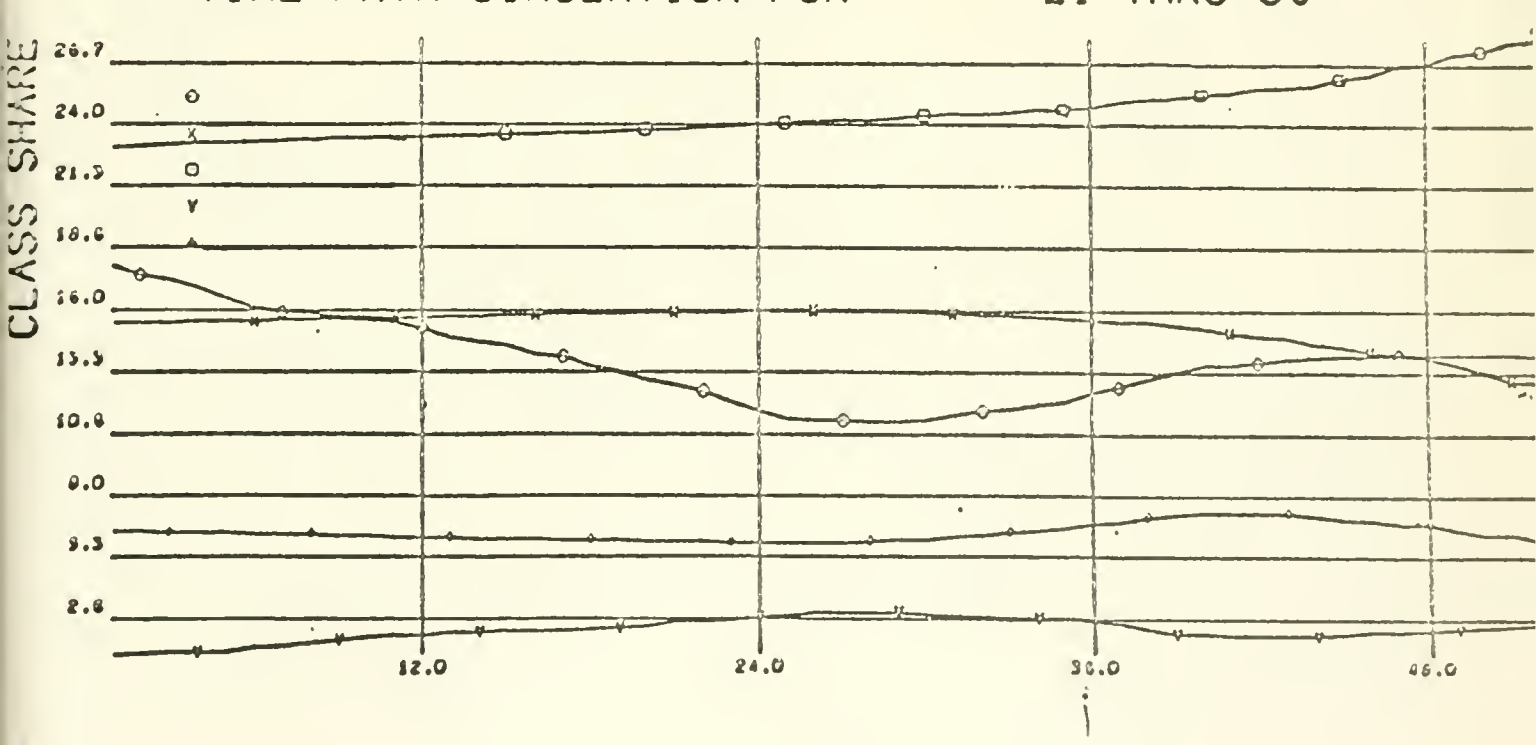
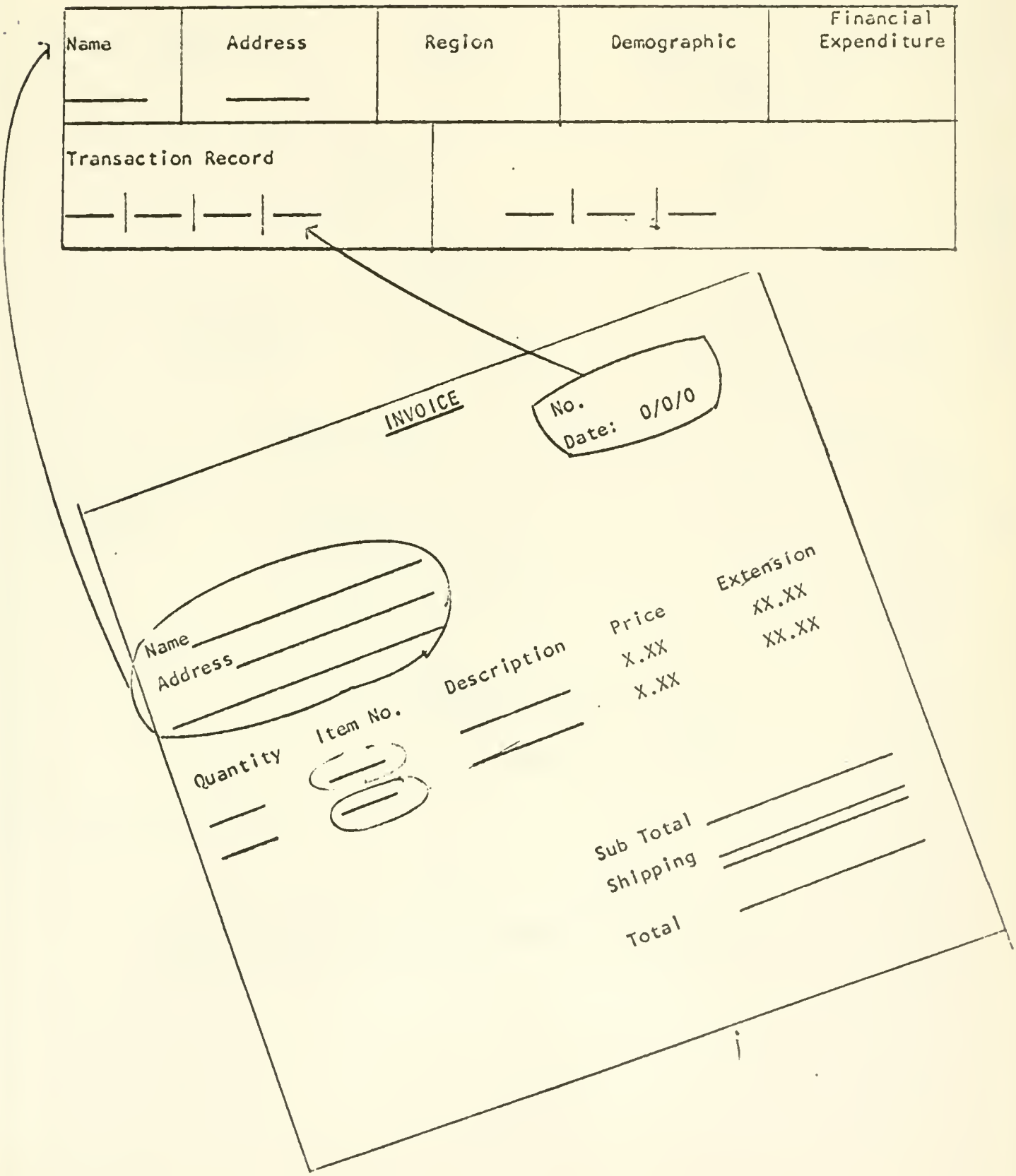



Exhibit 14

DISAGGREGATED DATA FILE

Customer File



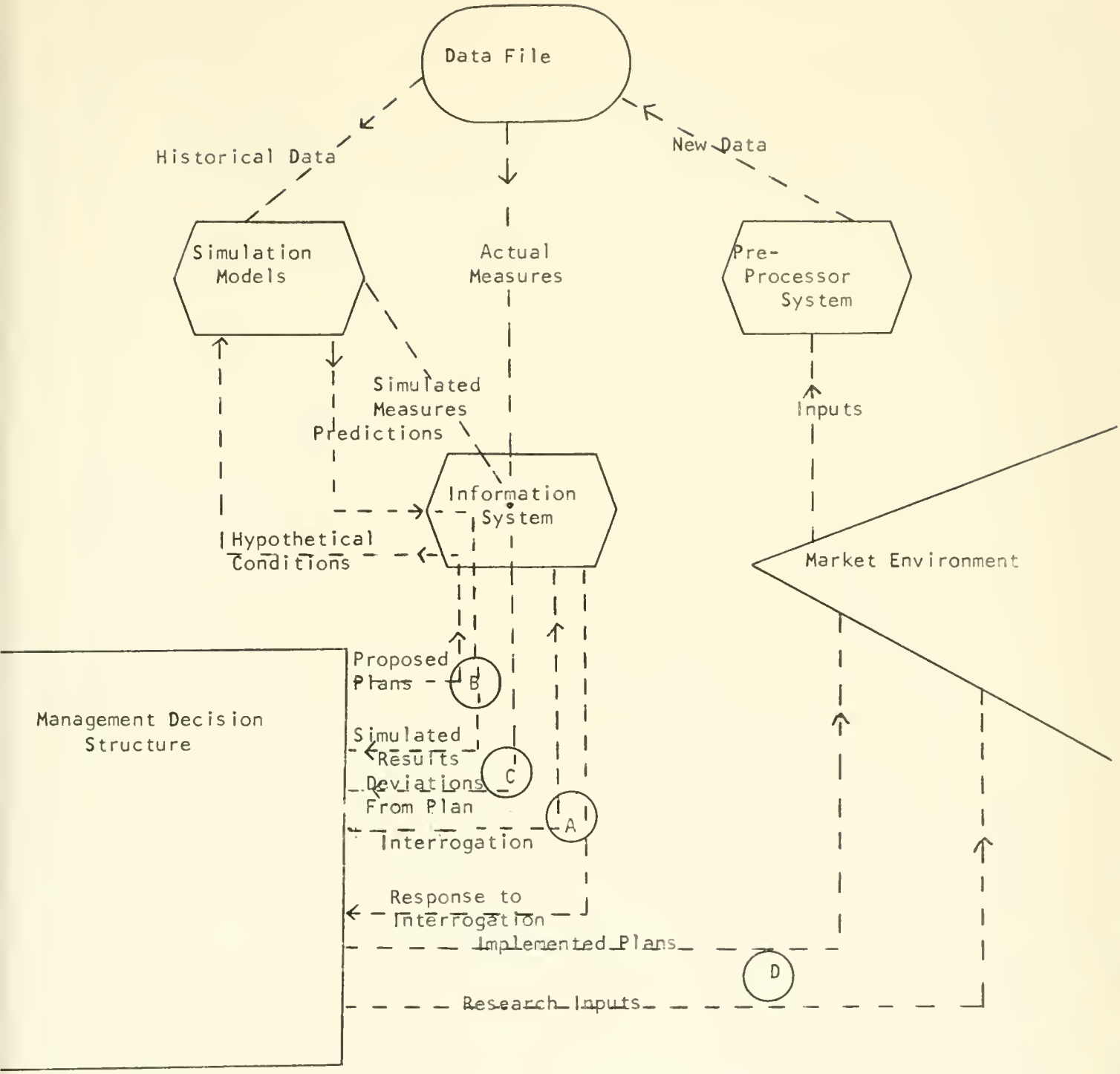



Figure 15

ADAPTIVE SIMULATION BASED MANAGEMENT SYSTEM STRUCTURE

Date Due

DEC 11 '75
DEC 22 '75
JAN 20 '76
FEB 18 '76
DEC 27 '76
MAY 21 '79
SEP 1 '79
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