A STUDY OF MICHIGAN DAIRYMEN'S ATTITUDES TOWARD THE DAIRY HERD IMPROVEMENT ASSOCIATION'S PRODUCTION TESTING PROGRAMS

By

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ABSTRACT

A STUDY OF MICHIGAN DAIRYMEN'S ATTITUDES TOWARD THE DAIRY HERD IMPROVEMENT ASSOCIATION'S PRODUCTION TESTING PROGRAMS

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This study investigates the attitudinal space of Michigan dairymen in relation to the Dairy Herd Improvement Association, as measured with metric multidimensional scaling techniques. The purpose is to find a practical solution to the low adoption of DHIA's production testing programs.

In addressing this problem, classical diffusion theory and metric multidimensional scaling techniques are used, including four Significant Other queries.

Demographically, annual production levels were the most significant indications of adoption of the innovation.

The best persuasive message produced by the analysis was: Accurate Information, Convenient, and Profit; when attributed to DHIA this message will produce the maximum motion in the space causing DHIA and You to move toward each other.

The significant other probes found that promotion of DHIA by local bankers, Production Credit Associations, other farmers and county agents of the Extension Service, would be the best interpersonal channels to utilize in diffusing DHIA's innovation.

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CHAPTER I

INTRODUCTION

"The Dairy Herd Improvement Association and the Co-operative Extension Service of Michigan wish to increase the rate of adoption of DHIA's Production Testing Service."

DHIA is a non-profit association of Michigan dairymen. The service they provide is a complete set of production records for each individual animal in a dairyman's herd. This allows herd management decisions to be made on a per cow basis as opposed to the antiquated rolling herd-average approach. This information makes computing individual animals' income contribution possible from production and feed ration data. There are three primary benefits claimed for DHIA records; (1) proving sires; (2) improving herd quality; and (3) accurate feed ration data. These three factors, used in conjunction, will increase production and therefore profits for any dairy herd not now using a testing device.

The information which is input as raw data into the record computation and is collected monthly is of five types: (1) weights from two successive milkings for each cow in production, (2) a representative milk sample from each cow for the butterfat content analysis; (3) pertinent

dates (new fresh dates, dry dates, out of herd dates, and new breeding dates); (4) amount of grain fed to each cow; and (5) roughages fed on a herd basis. From these data, the production records are calculated to provide the dairyman with the following (12) pieces of information: (1) production (milk in lbs., fat content); (2) age; (3) gross income per cow; (4) income over feed costs; (5) days in production; (6) recommended grain ration; (7) expected dollar income for 305 days of production; (8) breeding date; (9) fresh date; (10) suggested breeding date; (11) pregnancy; check date; and (12) suggested dry date. An example of the record set for Michigan State University's Kellogg-Guernsey herd will be found in Appendix A.

DHIA provides 12 record-keeping programs for Michigan dairymen. Three are classified "official" and the results are used by USDA in the Sire Summary program; nine are "unofficial" and these sets are provided only for the dairyman enrolled.

The goal of DHIA and of the Extension Service is to have all Michigan dairymen with 40 or more cows in milk production--roughly 70% of all herds in Michigan--on some form of testing program. This research addresses the problem of finding some practical means of positively affecting the rate of adoption of DHIA.

Theory

This is a communication problem with the variables of classical diffusion theory as expressed by Rogers (1971). Most terms and definitions here are taken from his work.

Two changes must take place with Michigan dairymen in order to affect the diffusion rate of DHIA: (1) attitudinal and (2) behavioral; e.g., Michigan dairymen changing their attitudes toward DHIA in a positive way and as a result enrolling in some DHIA program, behavioral change.

Rogers defines social change as "any alteration in the structure and function of a social system," with social system defined as "a collectivity of functionally differentiated individuals engaged in joint problem-solving with respect to some goal."

Because social change takes place within a social system, the social structure, the various statuses, norms and values of that system, will either impede or accelerate the rate of diffusion through "system effects." These system effects arise from the interaction, communication and behavior between the individuals who maintain those various statuses, norms and values of the social system. Indeed, it is this very interaction that establishes the social system, its structure and the feedback networks utilized to sort information for the decision to adopt or reject any innovation.

The strategy used in this study is to generate persuasive messages to be input into this information network at various strategic points as defined by the respondents themselves.

Rogers further defines change as either imminent or contact change; imminent change is internally created and developed, while contact change occurs when a source external to the social system introduces the innovation. Directed contact change occurs when the external source seeks to introduce an innovation to achieve some goal they have defined. Since directed contact change requires that information be passed from a source to the members of some social system, a communication process is involved by definition. This process is a special case of communication, the diffusion of innovations--the spread and adoption of new ideas and practices. Because diffusion of innovations requires behavior changes on the part of the people who make up the social system, risks are involved for the receiver of the information, as well as for the source. The risks for the receiver could be social rejection, economic loss, or both. The risks to the information source could be reduced credibility in the eyes of the members of the social system, or possible rejection by the entire community. This rejection is most usually explained by a heterophilic relationship existing between the information source and the receivers.

Heterophilly as an aspect of diffusion is functionally related to the source and receiver. Rogers defines heterophily as, "the degree to which pairs of individuals who interact are different in social attributes, statuses, norms, and values." Here we shall expand this definition to a systems level, and shall define heterophily as the degree to which social systems that interact differ in social attributes. Since heterophilic interaction is likely to cause cognative dissonance, when it occurs in the diffusion of innovations it can create negative attitudinal percepts toward the innovation and the change agency, presenting barriers to adoption.

Rogers lists one main element in the diffusion of innovations, the innovation itself, and its five constituent attributes. The five attributes are: (1) relative advantage, economic and social, as perceived by the adopters; (2) compatibility, to what extent adopters perceive the innovation as being consistent with their values, needs, and experiences; (3) complexity, the degree to which the innovation is perceived as being difficult to understand and to use; (4) trialibility, the extent to which the innovation may be experimented with on a limited basis; and (5) observability, the degree to which the results of the innovation are visible to the adopter. The more visible the results of an innovation, the more likely a client is to adopt it.

Two communications channels are available to any agency: (1) the mass media and (2) interpersonal channels. The effect of these two channels are (1) the mass media are the most effective in creating knowledge-awareness of the innovation, while (2) interpersonal communication is most effective when trying to change people's attitudes and behavior.

"Time is the key to diffusion research" (Katz et al., 1963). All human interaction takes place in a time referent. Rogers identifies three variables related to time; they are: (1) the decision process, which has four components ((a) knowledge, (b) persuasion, (c) decision, and (d) confirmation); (2) innovativeness, the relative time at which adoption occurs compared to others in the social system; and (3) the rate of adoption, a quantifiable measure of the acceleration of adoption.

Rogers discusses two final variables in diffusion to be considered here: (1) the change agency, an organization attempting to influence innovation-decisions in a given direction; and (2) opinion leadership, an individual's ability to influence the attitudes and behavior of others with relative frequency.

The problem now needs to be restated in terms of Rogers' theory and the previous research addressing these specific variables: (1) heterophily; (2) relative advantage; (3) compatibility; (4) complexity; (5) trialibility; (6)

observability; (7) opinion leadership; (8) innovativeness; (9) the change agency; (10) rate of adoption; and (11) the decision process.

Heterophily has not been previously researched for Michigan dairymen and DHIA. From Rogers' theory it may be expected that a homophilic relationship exists between the adopters of the innovation and DHIA. Concommitantly, a heterophilic relationship exists between DHIA and those Michigan dairymen who either have discontinued use of the innovation or never adopted.

The relative advantage of DHIA is economic as well as social. Economically, Meadows and Knisely (1976) have shown in their study of Kent County Michigan dairy herds that the average 140-cow-herd's dollar income per year for those herds "on test" (enrolled in DHIA production testing) was $51,600 higher than those herds not on test. The net return, after deduction of test and feed costs, was $29,800 greater per year than from herds of comparable size. They conclude:

> Dairymen with production records have a definite competitive advantage over those not testing. . . . Large commercial dairy farms (100 cows or more) are not likely to survive (in the long term) without records.

Hillman and Logan (1976) demonstrate the genetic potential of a dairy herd:

> Genetic potential is the inherited ability of a cow, or herd, to produce more milk when

> other management factors are similar. The genetic potential is increased through (1) use of DHIA records on each cow as a basis for culling, breeding, and feeding, (2) breeding to sires that produce superior offspring.

Socio-cultural advantages accompanying these advantages are: increased social status, esteem, prestige, convenience in record keeping, and knowledge that one's work returns increasing rewards. Also, there are awards given for producing above certain levels.

The variables complexity and compatibility have been shown by the work of Houghaboom (1963) and Kucker (1970) to be closely related and will be discussed concurrently. Houghaboom (in Vermont) and Kucker (in Michigan) found that discontinuance was most often caused by the farmers' inability to realize the value of testing, due to an inability to understand the computerized results of the test; they found similarly for non-adopters. Additionally, some Michigan dairymen cited that their cows were not good enough to be on test; hence embarrassment by comparison would be a compatibility factor.

Kivlin (1960) found complexity of farm innovations to be negatively related to the rate of adoption more than any other variable except relative advantage. Given the findings of Houghaboom and Kucker, complexity would seem to be one of the key factors in the slow rate of diffusion of DHIA.

Trialibility demands are met in the case of DHIA as the programs are easily enrolled in and costs are low.

Observability of the effects of the innovation on milk production is problematic. If the adopting farmer utilizes the feed measurement option, then his milk production should begin to increase in the short term, say one to three months. But, if the adopting dairyman does not consider the feed variable in his milk production, then increased milk production will depend upon increasing the quality of his herd through breeding techniques and will be long term in nature. As average turnover of a dairy herd in Michigan is seven years, observability is lost and the value of the testing program obscured.

Opinion leaders at the community-system level for Michigan dairymen have not been shown through previous research.

Innovativeness among Michigan dairymen and adoption of DHIA production testing is bound to the heterophily phenomenon discussed in Rogers' theory. Again it must be pointed out that Michigan dairymen are not laggards where adoption of useful innovations are concerned; DHIA was founded in Michigan in 1904. Where profitability has been shown, dairymen are quick to adopt; but where advantages are clouded with misunderstanding, adoption suffers.

The rate of diffusion is the elemental time variable discussed in this work. Figure 1.1 presents the diffusion

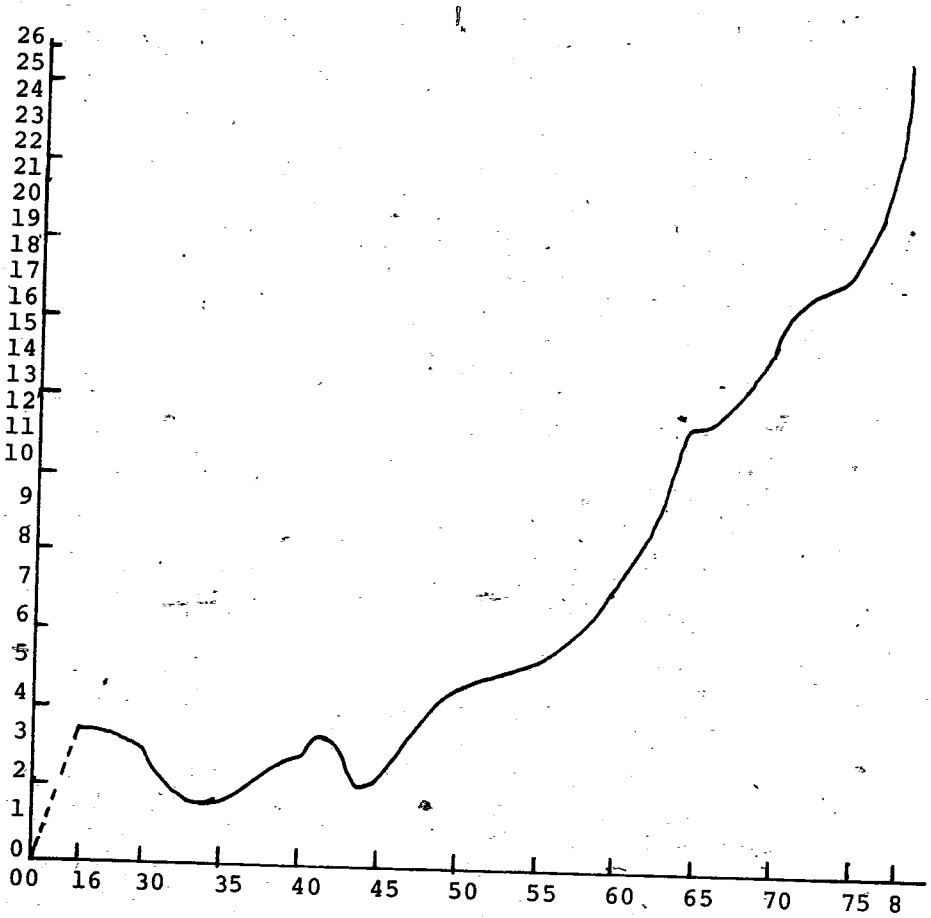


Figure 1.1. DHIA Diffusion Curve. Adoption Rate of DHIA Production Testing Presented as the Percent of Cows Enrolled in the Program, 1906, 1926-April 1978.

curve for DHIA and demonstrates the exponentiality of the diffusion process. From 1906 to 1958 the rate of diffusion was one-tenth of one percent, (0.1%); from 1958 through 1978 the rate of diffusion increased to one percent per year, (1%/yr.). The effect, historically, of various macro-economic phenomena upon the rate of diffusion is also demonstrated.

Figure 1.2 is a presentation of the adoption rate as a percentage of all herds in Michigan as compared to the number of herds on test from 1965 to April 1978. The problem, as posed by this presentation of the data, is that while DHIA has consistently increased the number of cows on test, the number of herds on test has not varied significantly. Over this same period the average herd size in Michigan increased from approximately 40 animals per herd to 75 animals per herd. One may conclude from this that the problem of heterophily may be greater than otherwise indicated.

The final variable to be discussed is that of the change agency, DHIA; no previous research has been accomplished to indicate how Michigan dairymen perceive DHIA in relation to themselves. Priess (1954) found that the success of Michigan Cooperative Extension Service agents was positively related to their disregard for the expectations of the Michigan Cooperative Service, in favor of their clients' expectations.

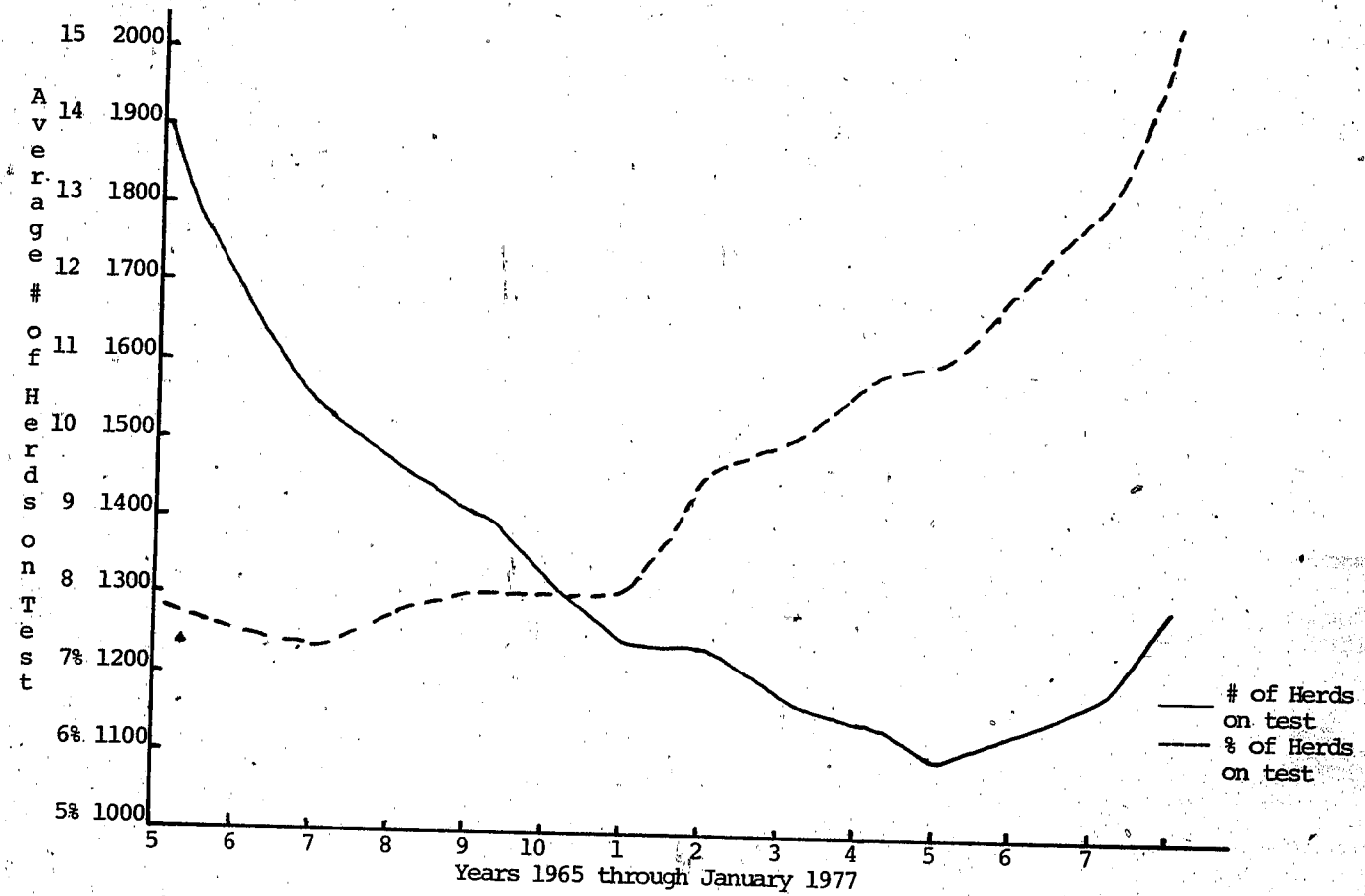


Figure 1.2. The Adoption Rate (Percent on Test, Broken Line) Compared with the Number of Herds on Test from 1965 through April 1978.

The problem now needs to be restated in terms of the theory. There are three variables which require attention; they are (1) heterophily, (2) community opinion leaders and (3) the rate of adoption. To affect the slow rate of adoption and reduce the level of heterophily between this large group of non-users and DHIA, a measurement of the cognitive space of Michigan dairymen in relation to DHIA needs to be taken. Additionally, the opinion leaders at the community level need to be identified for specific issues related to the dairy industry. With this measurement of the cognitive space of the dairymen, a practical solution to the problem of slow rates of adoption of DHIA can be reached. Using the Galileo methodology (Woelfel & Gillham, 1975), the major contributions of this study will be to generate persuasive, client-oriented messages, to reduce the degree of existing heterophily and to increase the rate of adoption.

Linear force aggregation theory (Woelfel, 1969) states that the position of any individual will move toward the mean of all messages he/she receives. Therefore, when one is surrounded by similar attitudes, his/her attitudes are at or about the mean and this position is stable. It becomes obvious then that, given the measurement of an attitude, the degree of heterophily is given by the standard deviation of the mean measure of that attitude toward any concept.

$$H_t = s.d.$$

Where H_t = heterophily

s.d. = standard deviation

It follows then that linear force aggregation theory predicts that communication increases homophily. Additionally, given any two groups, each group's mean attitude will move toward the combined mean for both groups as communication increases between the two groups.

To measure the cognitive space of Michigan dairy farmers, the Galileo system of measurement will be used. The Galileo procedures are designed to give us a precise map of the cognitive space of any group of people. The Galileo system is a theoretical variation of classical metric multidimensional scaling. Woelfel explains it this way;

> All MMDS procedures begin with the assumption that any element of cognition, whether it may be a word, belief, idea, value or any other cognitive object, is defined in terms of its relationships to other elements of cognition; and, further, that these relationships take the form of dissimilarities or distances.

In the case of Galileo these distances are estimated directly by the respondents. They are asked to make these judgments given some criterion, such as: if x and y are n units apart, how far apart are a and b? While this system of measure may be unreliable at the individual level, due to the complexity of judgments required and lack of structure

of scale, in the aggregate any level of reliability may be achieved by simply increasing the number of respondents, given the law of large numbers. Thus, the scale presents itself as a fully metric, unbounded, continuous ratio scale.

The scaling procedure described above will be used with a pair-comparison questionnaire to determine precisely and accurately the cognitive space of Michigan dairymen for the time period covered.

CHAPTER II

SAMPLING INFORMATION

To fulfill the objectives of this study, data were collected from a random sample of all grade "A" milk producers in Michigan. The sample was drawn by DHIA as follows; the sample for data set one (March 1977 through June 1977) consisted of 1996 grade A producers from a total of 7,400. Data set two (May 1977) included all grade A producers in the Lansing and Grand Rapids telephone directories. This was accomplished by cross referencing the list of grade A producers and the respective telephone directories. Data set three (January 1978 through June 1978) consisted of 2,003 grade A producers of 7,100 total.

A total of 421 instruments were completed and returned. The response rates for the specific data sets by adopter categories is presented in Table 2.1 below. Row totals represent the adopter categories' totals as count and percent of total respondents. The column totals show their corresponding counts and percent for the specific data sets. Adopter categories are self-explanatory: adopters were those enrolled in some sort of milk testing program at the time of response; discontinuers, were those who indicated

Table 2.1 Cross Tabulation of Data Sets by Adopter Category. Presents Number of Responses for each Data Set by Adopter Category

	DATA SETS 1	2	3		ROW TOTALS
NON-ADOPTERS	41	16	32	count	89
	(46.1)	(18)	(36)	row %	21.1%
	(22.3)	(29.9)	(17.6)	col.%	
	(9.7)	(3.8)	(7.6)	tot.%	
ADOPTERS	114	25	119		
	(44.2)	(9.7)	(46.1)		258
	(62)	(45.5)	(65.4		61.3%
	(27.1	(5.9)	(28.3)		
DISCONTINUERS	29	14	31		
	(39.2)	(18.9)	(41.2)		74
	(15.8)	(25.5)	(17)		17.6%
	(6.9)	(3.3)	(7.4)		
COLUMN TOTALS:					
count	184	55	182		421
%'s	43.7%	13.1%	43.2%		100%

they had been enrolled at one time and subsequently dropped out of the program; and non-adopters were those respondents who indicated they had never enrolled in a milk testing program. As can be seen from Table 2.1 the sample is predominated by the return rate for adopters 61.3%, non-adopters 21.1% and discontinuers 17.6%. Adopters make up only 30% of all Michigan dairymen.

In descriptive terms the sample was characterized by the following statistics: the average respondent was age 45, married, with a high school education; 21.2% of all respondents report more than 12 years of education. The sample was further represented by dairymen whose annual average production was 14,000 pounds of milk. Their average herd size was 62 head of cattle in milk production; the average number of acres operated was 416. These facts represent a rather well educated, above the norm respondent, in terms of the average dairymen as reported in the 1978 Michigan Agricultural Statistics. In this report, the average dairyman milked 34 cows, yielding an average annual production of 11,893 pounds of milk per cow. These figures for 1978 included all Michigan dairymen, marketing grades A and B milk. This sample only recorded figures for grade A producers.

There were 155 instruments returned with either address problems or insufficient information to warrant keypunching. Of these 155 instruments, 81 were from data set

one, 4 from data set two, and 70 from data set three. Table 2.2 presents the return rates for all DHIA data sets in the present survey.

Table 2.2. Return Rates for All Data Sets

DATA SET	SAMPLE SIZE	TOTAL RESPONSE	RETURN RATE	UNUSABLE RETURNS	USABLE RETURNS	ADJUSTED RATE
1	1796	265	14.8%	81	184	10.7%
2	164	59	36.0%	4	55	34.4%
3	2003	252	12.6%	70	182	9.4%
TOTALS	3963	576	14.5%	155	421	10.6%

A drop of 1.3% in the return rate from data set one to data set three was recorded, but is not considered large enough to be significant. The difference between the two data sets is an additional 25 items that appear on the 1978 instruments. The data set one instrument was split four ways to reduce respondent fatigue and, thereby to increase the response rate. The 1978 instrument, data set three, was split two ways and the resultant decrease in the return rate, 1.3%, is offset by the wealth of data added to the 1978 responses.

In May 1977 there were 200 questionnaires mailed in the random sample using a seven point semantic differential scale to compare the return rates with the last 200 Galileo instruments. This would give us an idea of the difference in difficulty of completing an instrument with seemingly

antiquated, semantic differential scale and the more accurate and precise Galileo ratio scale. The return rates for the two groups revealed that (1) the semantic differential instruments had total returns of 35 completed, or a 17.5% return rate, (2) the Galileo scale questionnaires, for the same period and number of mailings, had total returns of 33 completed instruments or a return rate of 16.5%. No significant difference is evident. Due to the four way split in the 1977 instruments, there was insufficient data on the nine complete semantic differential questionnaires to warrant keypunching or data anlysis.

Methodology

The Galileo method of measuring the cognitive space of any group of people is a set of metric multidimensional scaling procedures which allow ratio measurements of the differences, or distances, between concepts held by any group toward a given phenomenon. By using ratio scaling techniques, a precise and accurate mental map of the sample of Michigan dairymen's cognitions regarding DHIA may be constructed. This was accomplished by conducting 30-50 nondirective personal interviews with a stratified sample of the population, so as to include the greatest amount of variation of opinions held by the various members of the population. These personal interviews produce a list of concepts, which are arrived at via a content analysis of the responses to the nondirective interviews. Typically the list contains

10-20 concepts. To this list was added a self-concept, such as you, me, myself, and the object concept, in this study, DHIA. From the completed list a pair-comparison questionnaire was constructed, which included each concept matched with every other concept, creating a questionnaire with $\frac{n(n-1)}{2}$ items.

The respondent was then asked to measure the difference, or distance, between concepts in the instrument using the Galileo scale. The Galileo scale offers a criterion measure and asks respondents to estimate the distances between concepts based upon this criterion. The typical criterion would ask: if x and y are n units apart, how far apart are a and b? The scale was further defined such that identity is equal to zero; and if two items are perceived as being twice as far apart as x and y, the respondent writes 2n, and so on. We see that this constitutes an unbounded and continuous ratio scale associated with typical measures in the physical sciences.

The present work describes the procedures used to identify those concepts held by Michigan dairymen toward DHIA, to map that cognitive space, to take dynamic measures of the sample to insure accuracy, and to generate persuasive messages to reduce the amount of heterophily between Michigan dairymen and DHIA.

Instrument Construction

The method requires a pair-comparison type questionnaire made up from the concepts which the farmers themselves use to define DHIA. These concepts were discovered by conducting 29 confidential, nondirective personal interviews with Michigan dairymen from a sample of 36. The sampling procedure is listed below, in Tables 2.3 and 2.4. It is designed to include the maximum attitudinal variation in the population. Meadows' long experience and expertise was the criterion for selection of the above areas. As can be seen from Table 2.3, the criteria for the stratification of the sample were geographic region, ethnic group and herd size.

Table 2.3. Sampling Strategy for Non-directive Interviews. Ss=36, Counties Chosen for Sampling are from Regions in Michigan with the Greatest Concentration of Dairymen

REGION	ETHNIC GROUP	HERD SIZE
THUMB, counties Tuscola, Huron, Sanilac	Polish, Irish	Average (50-100)
CENTRAL, counties Ingham, Clinton, Shiawassee	Mixed European	Average to Large (70-120)
WESTERN, counties Allegan, Kent, Barry	Dutch	Small - Average (o-70)

Table 2.4. Sampling Plan for 36 Non-directive Personal Interviews. Regions by Adopter Categories

ADOPTER CATEGORIES	REGIONS			
	Thumb	Central	Western	Totals
Long term adopter (1 year +)	2 (1)	2 (1)	2 (1)	6
New adopter (less than 1 year)	2 (1)	2 (1)	2 (1)	6
Discontinuer	2 (1)	2 (1)	2 (1)	6
Non-adopter	6 (3)	6 (3)	6 (3)	18
Totals	12	12	12	36

In Table 2.4, the sampling plan is presented and shows us that twelve prospective respondents were chosen from each region, with four coming from each county within a region. The interview sample was also stratified as to adopter category: six each were chosen from the first three categories: long term adopter (greater than one year); short term adopter (less than one year); discontinuers; and non-adopters. Adopter categories were based on information available from DHIA. DHIA did not have adopter category information for more than one year previous to the date requested, January 1, 1977.

During the personal interviews each respondent was asked simply to talk at length about how he felt about DHIA and the reasons for their particular attitudes. The concepts were recorded as they were described by the respondents.

The interviews were conducted to the point of redundancy. A content analysis of the interviews reveals that of the many words and phrases that the dairymen use to describe DHIA the list was soon reduced to twelve concepts. To complete this list, the self-concept "you" and the target concept "DHIA Production testing" were added to the twelve original concepts; the complete list follows:

01	Accurate Information	08	Measuring Production
02	You	09	Necessary
03	Good	10	Profit
04	Convenient	11	Inexpensive
05	Keeping Records	12	Computers
06	Culling	13	Useful
07	Breeding	14	DHIA Production Testing

These fourteen concepts produce a 91 item pair-comparison questionnaire, $\frac{n(n-1)}{2}$.

The criterion pair chosen was Dairy Farming and Crop Farming; the comparable distance was 100 units, i.e. Dairy Farming and Crop Farming are 100 units apart. The rational for this criterion pair also resulted from the personal interviews, many farmers pointed out that dairy farming and crop farming were very different.

Four significant other queries (Haller and Woelfel, 1972 and 1975) were placed at the end of each 1977 questionnaire, to identify the opinion leaders for each of the four information categories chosen at the community level. The

four categories are: (1) farming in general; (2) herd production; (3) keeping records; and (4) money and finances. These significant other probes appear on all 1977 instruments only.

The demographic package was taken from Kucker (1970) and includes items numbered 1-3, 5-9, 20, 21, 23, and 24 from page 114 and items 1-3, 21 and 23 from page 115. These items are listed on the demographic sheet of all questionnaires, page two (see Appendix B). In the 1977 random sample, 1,796 Galileo and 200 semantic differential instruments were split four ways to reduce respondent fatigue and to increase the response rate. The Galileo questionnaires are identified as Q-type 1-4, and the semantic differential questionnaires are identified as Q-type 5-8. The designation of the questionnaires as to Q-type is only for the convenience of identification. Therefore questionnaires designated as Q-type 1, Q-type 2, and Q-type 3, as well as Q-types 5, 6 and 7, each contain 36 pair-comparison responses; while Q-type 4 and Q-type 8 each contain 41 items.

There were also 164 Galileo instruments mailed in the Lansing and Grand Rapids areas, with the sample being drawn from the respective telephone books. Each dairyman in the areas listed above was called and asked to fill out a questionnaire; those who responded positively were mailed an instrument. After an interval of two weeks had expired, each of the 164 dairymen were called back and asked if they

had received the instrument, and if so would they please fill out the questionnaire and return it. This instrument was split two ways, and designated as Q-types 9 and 0; Q-type 9 contained 59 pair-comparison items and Q-type 0 contained 64 items.

The first five pairs on all 1977 instruments included the criterion pair followed by four practice items. The questionnaire begins with item 6. Additionally, pair 13-14, useful and DHIA, were inadvertently not included on any 1977 instrument.

The 1978 questionnaires were an improvement of the 1977 Q-types 9 and 0. These instruments were precoded for keypunching, and have the appropriate addressors in the extreme left hand columns. The 1978 instruments were designated as Q-type 1 and 2 and contain 64 and 67 pair items, respectively.

The main wave sample for 1977 was drawn from the 1976 list of 7400 grade A producers by DHIA and included 1996 names and addresses printed on address labels. The 1978 sample was similarly drawn and included 2003 names and addresses from the 1977 list of 7100 grade A producers in Michigan. Table 2.5 presents the mailing schedule for all three samples.

The demographic data were analyzed by the SPSS version 7.0 computer program. The Galileo scale data were analyzed by the Galileo version 3.95 computer program.

Table 2.5. Mailing Schedule for All Data Sets

DATA SET I	
GALILEO INSTRUMENTS	
100/day for 8 days	March 28, 1977 - April 8, 1977
40/day for 22 days	April 11, 1977 - April 26, 1977
80/day for 1 day	April 27, 1977
36/day for 1 day	April 28, 1977
SEMANTIC DIFFERENTIAL INSTRUMENTS	
40/day for 1 day	April 26, 1977
80/day for 2 days	April 27 & 28, 1977
1996 total	
DATA SET II	
GALILEO INSTRUMENTS	
LANSING AREA	
45/day for 1 day	May 5, 1977
GRAND RAPIDS AREA	
63/day for 1 day	May 10, 1977
56/day for 1 day	May 11, 1977
164 total	
DATA SET III	
GALILEO INSTRUMENTS	
10/day for 10 days	January 19, 1978 - January 31, 1978
20/day for 95 days	February 2, 1978 - June 16, 1978
2003 total	

The significant other data were compiled and analyzed by the author.

The Galileo analysis produced a precise and accurate mental map of the cognitive space of Michigan dairymen's attitudes toward DHIA, as well as a set of persuasive messages designed to reduce the heterophily between the dairymen of Michigan and the change agency, DHIA. Additionally, the significant other data will allow the agency to channel persuasive messages through the opinion leaders of the community, as well as through the mass media channels and interpersonal typically used by the change agency, DHIA, and the Michigan Cooperative Extension Service.

CHAPTER III

RESULTS

In Chapter I, the objective stated was to find a practical solution to the low rate of diffusion of DHIA by designing persuasion which, if utilized, would function to change Michigan dairymen's attitudes toward DHIA. In this chapter the relevant findings of the Galileo surveys and their respective sample demographics and significant other data, taken from three samples of dairymen over two years, will be presented.

From February 14 through February 23, 1977, 29 non-directive personal interviews with representative members of the population of Michigan dairymen were conducted (for sampling data see Chapter II). Respondents were asked to discuss in detail DHIA and their attitudes toward the innovation.

A content analysis of the responses from these twenty-nine people showed that over 80% of all statements about DHIA made reference to only twelve concepts. Those twelve concepts were:

01	Accurate Information	04	Keeping Records
02	Good	05	Culling
03	Convenient	06	Breeding

07	Measuring Production	10	Inexpensive
08	Necessary	11	Computers
09	Profit	12	Useful

This number of concepts, twelve, is consistent with past research experience in diffuse topic areas.

To these twelve concepts were added the object, or target, concept DHIA Production Testing and the self-concept You which were included in a Galileo type pair-comparison questionnaire (see Appendix B). The Galileo type questionnaire asked respondents to measure the distance between concepts using the Galileo scale, a simple, but accurate and precise, continuous, ratio scale. The greater the perceived difference, or distance, between two concepts, the greater the number reported by the respondent. Pairs perceived as identical (no difference) are assigned zeros. The questionnaires were administered by mail in three data sets.

Table 3.1 lists the major responses to the four Significant Other probes. Those responses which did not constitute at least 10% of all responses were eliminated from Table 3.1.

These responses may be viewed as indicative of those who comprise the dairymen's information networks for the four areas in question. They therefore indicate the communication channels through which some interpersonal messages may be successfully transmitted to the dairymen not presently enrolled in any production testing program. These

Table 3.1. Significant Other Data. Including All Responses which Totaled Ten Percent or More of Returns. Numbers Alone Represent Count, Numbers in Parentheses are the Percent of the Total Number of Questionnaires Returned with Significant Other Data. Total Questionnaires Returned with S.O. Data = 239.

QUESTIONS \ RESPONSES	EXTENSION SERVICE	OTHER FARMERS	FAMILY MEMBERS	NO ONE	PRODUCTION CREDIT ASSOCIATION	ARTIFICIAL INSEMINATION	DHIA	VETERINARIAN	SALESMEN	PUBLICATIONS	TELEFARM	ACCOUNTANT	BANKER	ROW TOTALS
GENERAL FARMING INFORMATION	123	82	9	9	3	3	2	6	54	25				316
	(52)	(34)	(4)	(4)	(1)	(1)	(1)	(3)	(23)	(11)				(132)
RECORD KEEPING INFORMATION	44	22	21	28		5	25	3			28	28		204
	(18)	(9)	(9)	(12)		(2)	(10)	(1)			(12)	(12)		(85)
HERD PRODUCTION INFORMATION	55	39	8			29	43	23	71	11				279
	(23)	(16)	(3)			(12)	(18)	(10)	(30)	(4)				(117)
MONEY & FINANCIAL INFORMATION	3	9	22	10	76							149		269
	(1)	(3)	(9)	(4)	(32)							(62)		(112)
COLUMN TOTALS	225	152	60	47	79	37	70	32	125	36	28	28	149	1068
	(94)	(63)	(25)	(20)	(33)	(16)	(29)	(14)	(53)	(15)	(12)	(12)	(62)	(447)

"significant others" are the most talked to, and should prove to be important in persuading those dairymen who are recalcitrant towards DHIA to change their behavior and enroll in some sort of testing program.

The Galileo and demographic responses of the 421 completed instruments were keypunched onto computer cards and input into the Galileo version 3.95 computer program and the SPSS version 7.0 computer program, respectively. These analyses may be found in Appendix C, demographics, and Appendix C, Galileo. The analyses yielded three primary results: (1) a precise and accurate "map" of the way Michigan dairymen perceive DHIA; (2) an accurate description of the demographic variables concerning those dairymen who responded; and (3) a number of alternative strategies for improving the position of DHIA with Michigan dairymen.

Perceptions of DHIA

In Galileo studies the attitudes toward any concept are measured by the distance between the aggregate self-concept "you" and any other concept. The greater the distance between the self-concept and any other concept in the multidimensional space, the less favorable the attitude toward that concept. Therefore, groups with unfavorable attitudes toward DHIA will report greater distances between themselves and DHIA, while groups holding favorable attitudes will report smaller distances.

The distances measured between the self-concept, DHIA, and all other concepts are presented in Table 3.2 for data sets one, two and three. Row one of Table 3.2 presents the distances between the "you" and all other concepts for data set one; row two (parenthesis) details the percent error of measurement for the distances found in row one. Row three presents the distances between DHIA and all other concepts in the space, while row four represents the concommitant percent error. These numbers cannot be judged as high or low in and of themselves; the criterion for these judgments was that "dairy farming and crop farming is 100 units apart." This was the criterion used by the dairymen to make the initial measurements which appear here in the aggregate. The next to the last entry in Table 3.2, row one, shows that the distance between "you" and "computers" is 133 units, the largest distance in data set one. This is greater than the distance between dairy farming and crop farming and is considered to represent a strong negative attitude toward computers by those dairymen responding. Indeed, since the criterion pair compares what is really two different types of farming, any distance greater than the criterion distance of 100 units could be seen as perceived by the dairy farmers as not related to dairy farming. Thus, all Michigan dairymen discern the distance from themselves to DHIA as being 106 units, plus or minus 15% (or a 95% c.i. between 90 and 122 units). Rows five through eight present

Table 3.2. Self-Concept and DHIA Vector Lengths with Their Respective Percent Error Below in Parentheses

	SAMPLE \ CONCEPTS	ACCURATE INFORMATION	YOU	GOOD	CONVENIENT	RECORD KEEPING	CULLING	BREEDING	MEASURING PRODUCTION	NECESSARY	PROFIT	INEXPENSIVE	COMPUTERS	USEFUL
DATA SET 1	YOU	49		42	51	58	47	45	46	36	70	69	133	36
	% ERROR	(16)		(10)	(8)	(16)	(14)	(14)	(11)	(10)	(15)	(12)	(10)	(12)
	DHIA	76	106	59	81	50	35	33	61	43	53	59	37	
	% ERROR	(38)	(15)	(22)	(19)	(34)	(36)	(23)	(40)	(21)	(22)	(22)	(31)	
DATA SET 2	YOU	65		34	54	49	46	45	69	43	65	53	145	42
	% ERROR	(18)		(20)	(14)	(17)	(16)	(15)	(15)	(17)	(16)	(16)	(15)	(20)
	DHIA	41	96	48	67	65	54	68	63	73	66	71	66	
	% ERROR	(31)	(14)	(27)	(24)	(28)	(34)	(29)	(33)	(26)	(30)	(30)	(25)	
DATA SET 3	YOU	45		40	51	46	42	37	41	43	46	55	111	38
	% ERROR	(9)		(8)	(8)	(11)	(8)	(9)	(13)	(18)	(10)	(10)	(12)	(12)
	DHIA	51	68	56	60	39	46	54	48	67	65	80	65	50
	% ERROR	(17)	(15)	(17)	(14)	(28)	(24)	(24)	(27)	(22)	(22)	(18)	(27)	(15)

the same data for data set two, rows nine through twelve the data in data set three.

Comparing columns two and twelve over time, reading downward across rows, we discover that while the distance between "you" and "DHIA" is decreasing the distance between "you" and "computers" is changing only slightly. The motion observed in the space between "you" and "DHIA" could be a reflection of the diffusion campaign of October and November, 1977, conducted by DHIA, but not related to this research. There is the additional factor that approximately 2,400 of the 7,400 dairymen in Michigan producing grade A milk were contacted in the spring of 1977 and asked to respond with their attitudes toward DHIA; i.e. given the above factor, DHIA had been much discussed within the target population for the entire year preceding the 1978 data collection. At the same instant the distance between "DHIA" and "computers" is almost doubling, while other distances remain relatively stable. Notice also the motion of the concept "profit" over the time span of the three data sets. There was little, if any, real improvement in the attitudes of dairymen toward the concept "computers"; the distance remains large, and any perceived change that seems present may only resemble Brownian movement in the measured attitudes of the population, caused by conflicting messages about the concept.

Table 3.3 contains the distances for the categories adopters, discontinuers, and non-adopters for the 1978

Table 3.3. Self-Concept and DHIA Vector Lengths for 1978 Data, Split by Adopter Category, Percent Error in Parentheses.

	SAMPLE \ CONCEPTS	ACCURATE INFORMATION	YOU	GOOD	CONVENIENT	KEEPING RECORDS	CULLING	BREEDING	MEASURING PRODUCTION	NECESSARY	PROFIT	INEXPENSIVE	COMPUTERS	USEFUL
NON-ADOPTERS	YOU	54	39	54	49	51	49	57	40	55	70	148	43	
	% ERROR	(17)	(16)	(13)	(19)	(16)	(17)	(18)	(27)	(18)	(22)	(18)	(32)	
	DHIA	91	181	114	107	81	91	109	117	142	141	153	137	107
	% ERROR	(35)	(20)	(31)	(25)	(37)	(37)	(46)	(45)	(39)	(40)	(36)	(41)	(49)
DISCONTINUERS	YOU	62	41	53	45	32	37	73	45	37	46	163	46	
	% ERROR	(27)	(20)	(17)	(18)	(21)	(21)	(27)	(44)	(25)	(28)	(32)	(36)	
	DHIA	93	138	100	121	93	101	76	63	111	100	109	79	79
	% ERROR	(38)	(26)	(39)	(26)	(62)	(56)	(38)	(46)	(27)	(31)	(28)	(47)	(40)
ADOPTERS	YOU	38	40	50	45	41	34	30	43	46	52	89	35	
	% ERROR	(10)	(11)	(10)	(15)	(11)	(12)	(19)	(23)	(13)	(13)	(15)	(11)	
	DHIA	30	22	30	35	18	24	27	20	26	28	46	36	21
	% ERROR	(14)	(17)	(14)	(13)	(21)	(17)	(20)	(27)	(22)	(17)	(16)	(26)	(24)

data--data set three (these distances appear in Appendix C in their entirety in the mean distance matrix). Specifically, note should be taken of the distances between DHIA and all concepts across adopter categories. This supports the contention that the Galileo scale is based upon peoples' viewing those concepts with which they have experience, or have received increased amounts of communication about, as being closer to themselves and to their own position, than those things which are either foreign or objects they have received very little communication about.

It was stated in Chapter I that the standard deviation is a quantitative measure of heterophily. Accordingly, Table 3.4 lists the vector lengths and their respective standard deviations for the self-concept "you" and the target concept "DHIA" for the 1978 data split by adopter category. As is indicated in Table 3.4, most self-concept vectors are stable and reflect a degree of homophily, with the specific exceptions being the vectors representing the distances between "you" and "computers." This distance is large for all categories, increasing in the categories "discontinuers" and "non-adopter." It should be noted that the self-concept vectors for all adopter categories, excepting "you" and "computers," are stable and exhibit a degree of homophily. Yet, the vectors representing DHIA and all other concepts for the categories discontinuers and non-adopters demonstrate a large degree of heterophily.

Table 3.4. Standard Deviation as a Measure of Heterophily. Vector Lengths in Parentheses, 1978 Data Split by Adopter Category

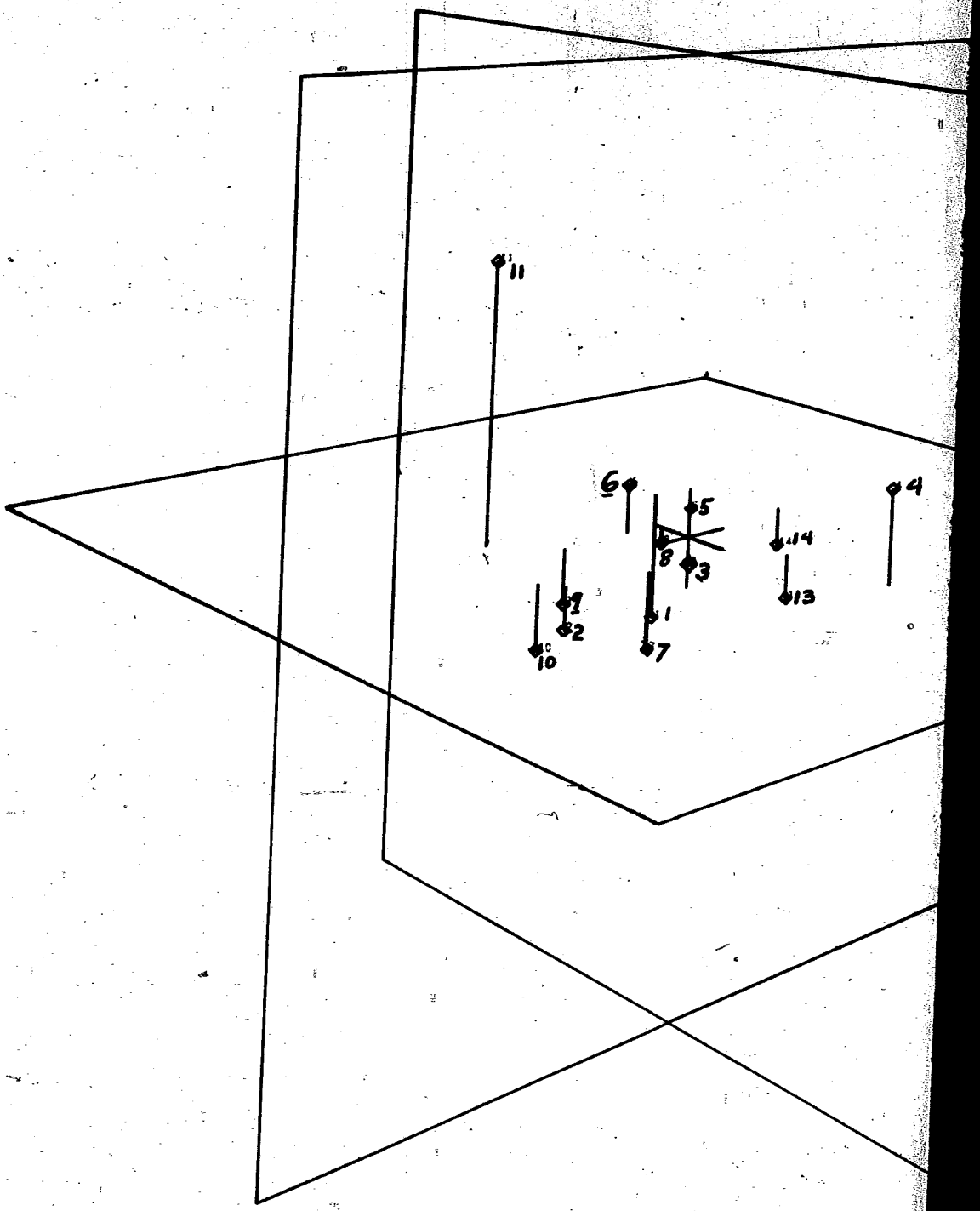
	SAMPLE	ACCURATE INFORMATION	YOU	GOOD	CONVENIENT	KEEPING RECORDS	CULLING	BREEDING	MEASURING PRODUCTION	NECESSARY	PROFIT	INEXPENSIVE	COMPUTERS	USEFUL
ADOPTERS	σ	40		46	54	73	46	42	60	102	63	70	143	39
	YOU	(38)		(40)	(50)	(45)	(41)	(34)	(30)	(43)	(46)	(52)	(89)	(35)
	σ	41	40	45	36	30	34	40	38	41	35	50	66	36
	DHIA	(30)	(22)	(30)	(35)	(18)	(24)	(27)	(20)	(26)	(28)	(45)	(36)	(2)
DISCONTINUERS	σ	92		43	48	45	35	40	98	99	46	63	262	85
	YOU	(62)		(41)	(53)	(45)	(32)	(37)	(73)	(45)	(37)	(46)	(163)	(46)
	σ	191	180	195	122	221	218	119	120	122	129	126	152	131
	DHIA	(93)	(138)	(100)	(121)	(93)	(101)	(76)	(63)	(111)	(100)	(109)	(79)	(79)
NON-ADOPTERS	σ	51		35	41	53	45	45	56	60	54	82	146	75
	YOU	(54)		(39)	(54)	(49)	(51)	(49)	(57)	(40)	(55)	(70)	(148)	(43)
	σ	178	199	187	97	108	116	219	223	238	237	235	238	225
	DHIA	(91)	(181)	(114)	(107)	(81)	(91)	(109)	(117)	(143)	(141)	(153)	(137)	(107)

Other concept vectors remain stable and exhibit homophilic relationships. Some exceptions for the aggregate 1978 data are "profit" and "accurate information," vector length 64 units and S.D. = 126; "inexpensive" and "accurate information," vector length 77 units and S.D. = 108. Additionally, most vectors relating computers and all other concepts (see mean distance matrix Appendix C) exhibit a high degree of heterophily. Heterophily is the status quo for DHIA in the aggregate for 1978 data as may be predicted from Table 3.4.

Message Strategies

The Galileo mean distances may be presented in a map, but due to the multidimensionality of the map, it is highly complex and not like the common physical maps most of us are accustomed to using, e.g., road maps. Thus, the accompanying plots, maps, are physical presentations of the data and will only represent the first three principal planes of the space and, therefore, are only approximate. Figure 3.1, 3.2, 3.3, and 3.4 represent the first three principal planes of data sets one, two and three respectively. A perusal of these maps will add to the comprehensibility of the space and make the measurements more meaningful.

The strategy is to decrease the distance (in the map) between the target and the self-concept, DHIA and you. This requires moving the concepts toward each other in the space. The Automatic Message Generator (AMG) provides a system to sort all possible combinations of concepts in the space,


11
6
5
4
8
3
14
13
1
2
7
10

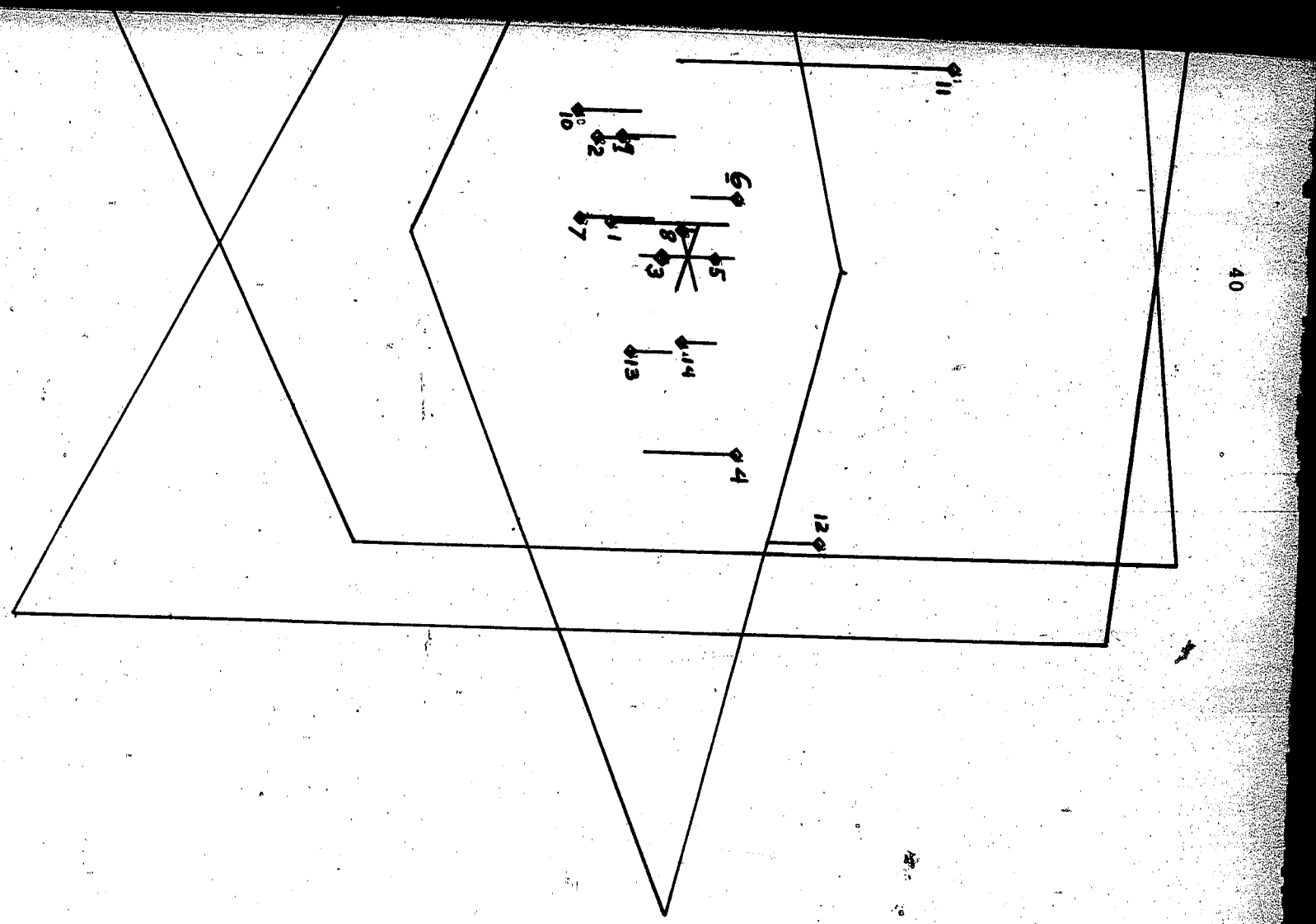
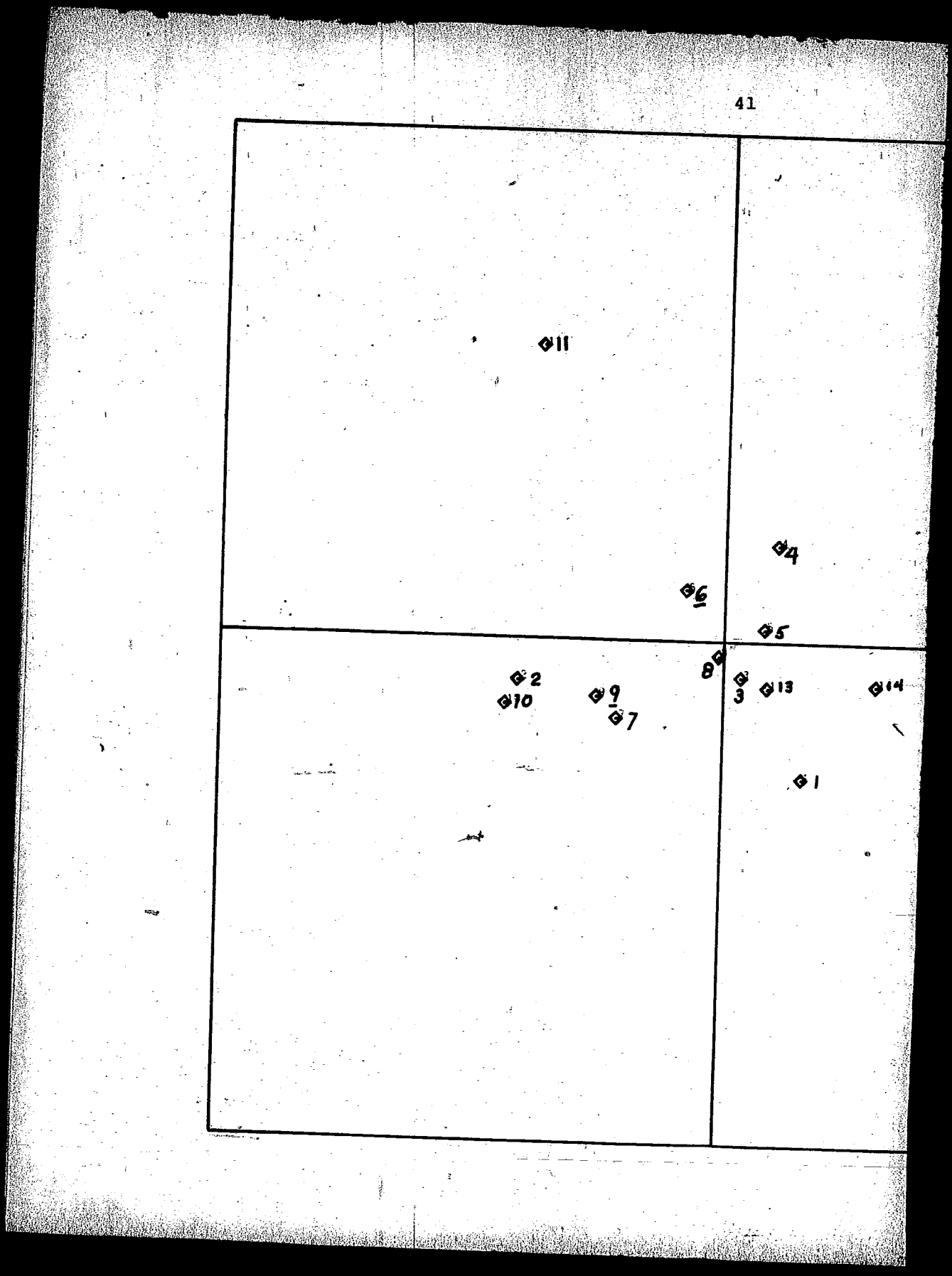


FIGURE 3.1. The Plot, or map, of the First Three Principal Planes for the 1978 Data, Data Set Three. (see page 45 for concept list)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4
6
5
8
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9
7
3
13
14
1

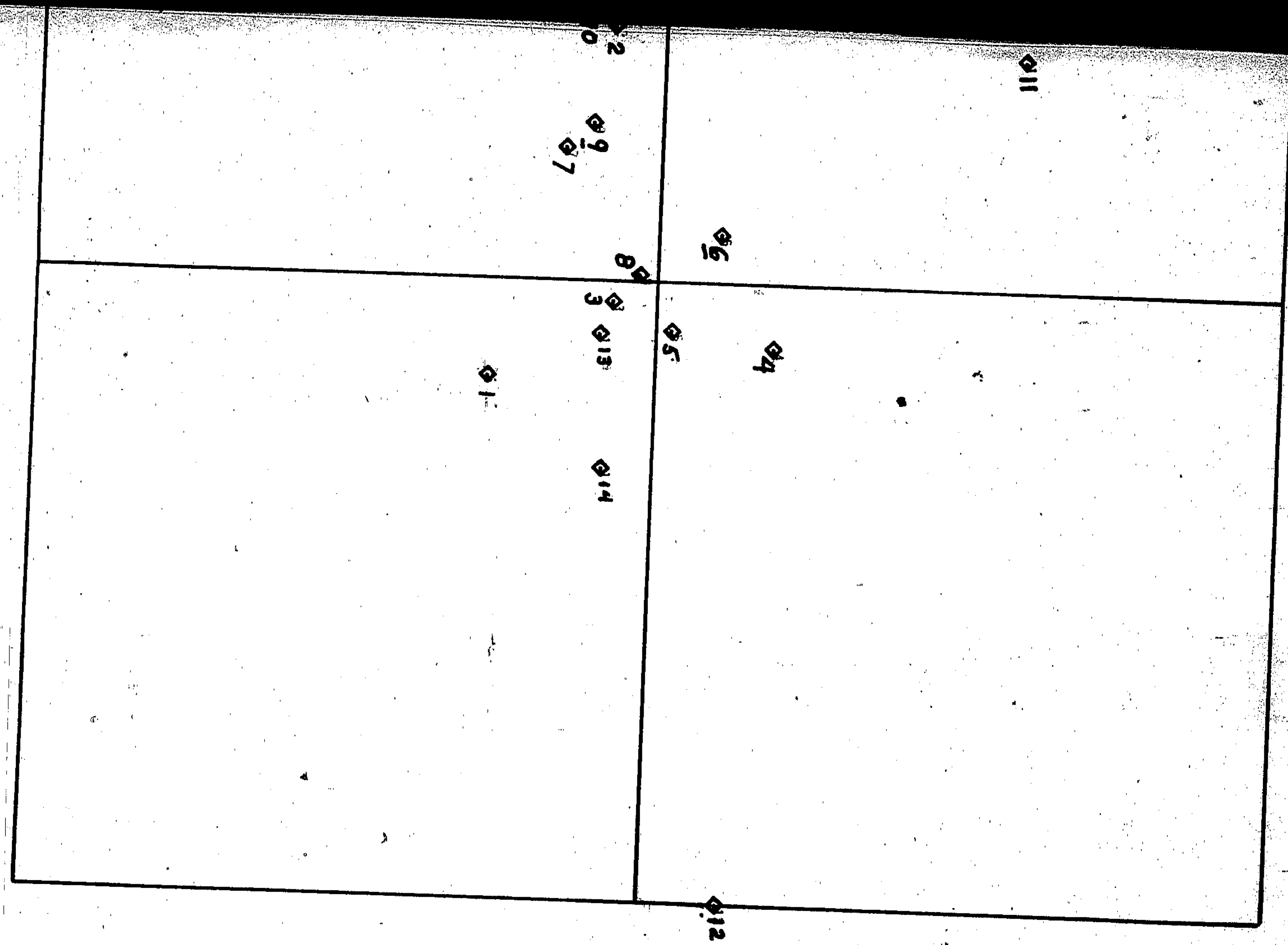
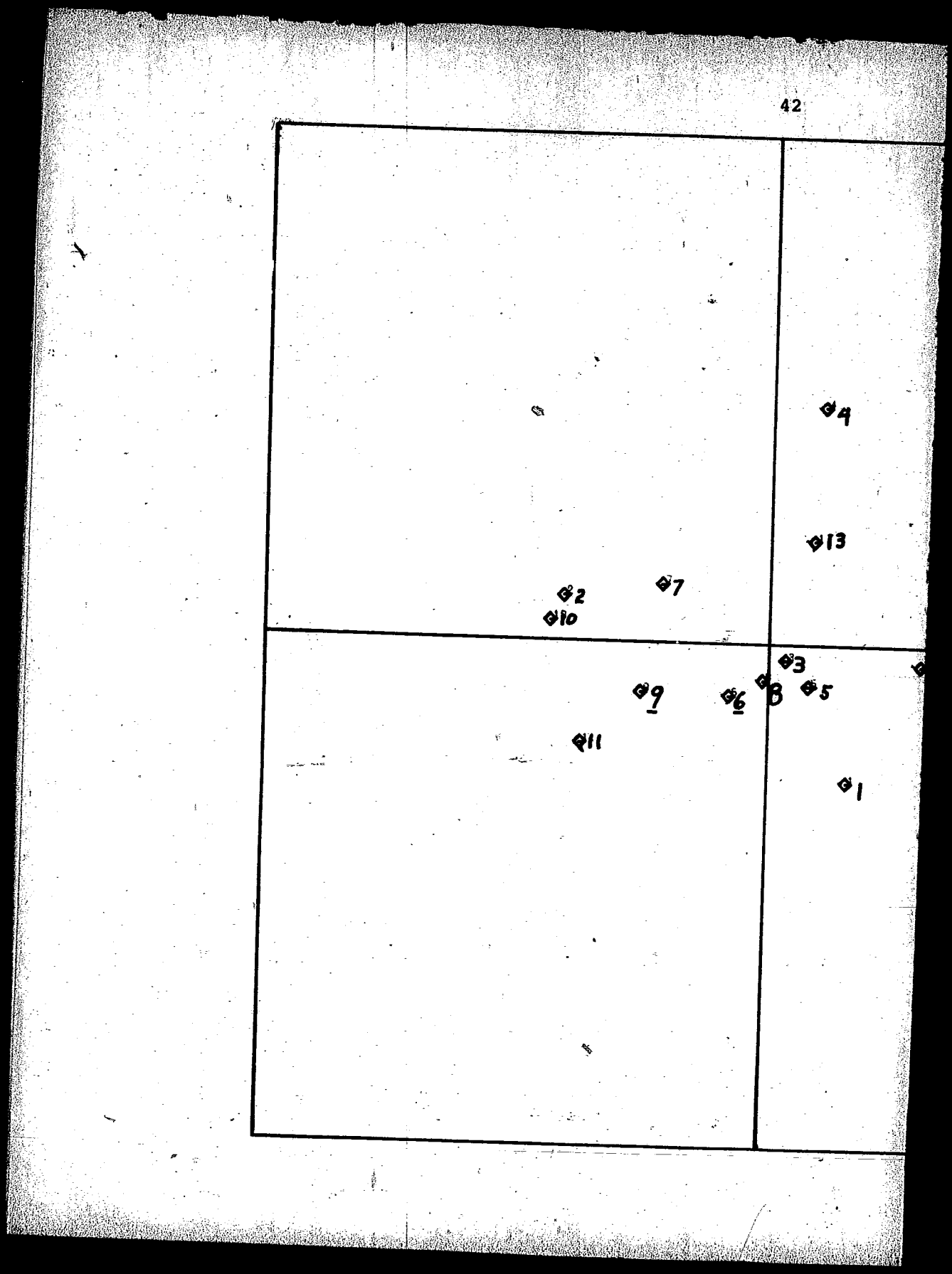


FIGURE 3.2. Plot of x-y Plane for 1978 Data


42
4
13
2
10
7
3
8
9
6
5
11
1

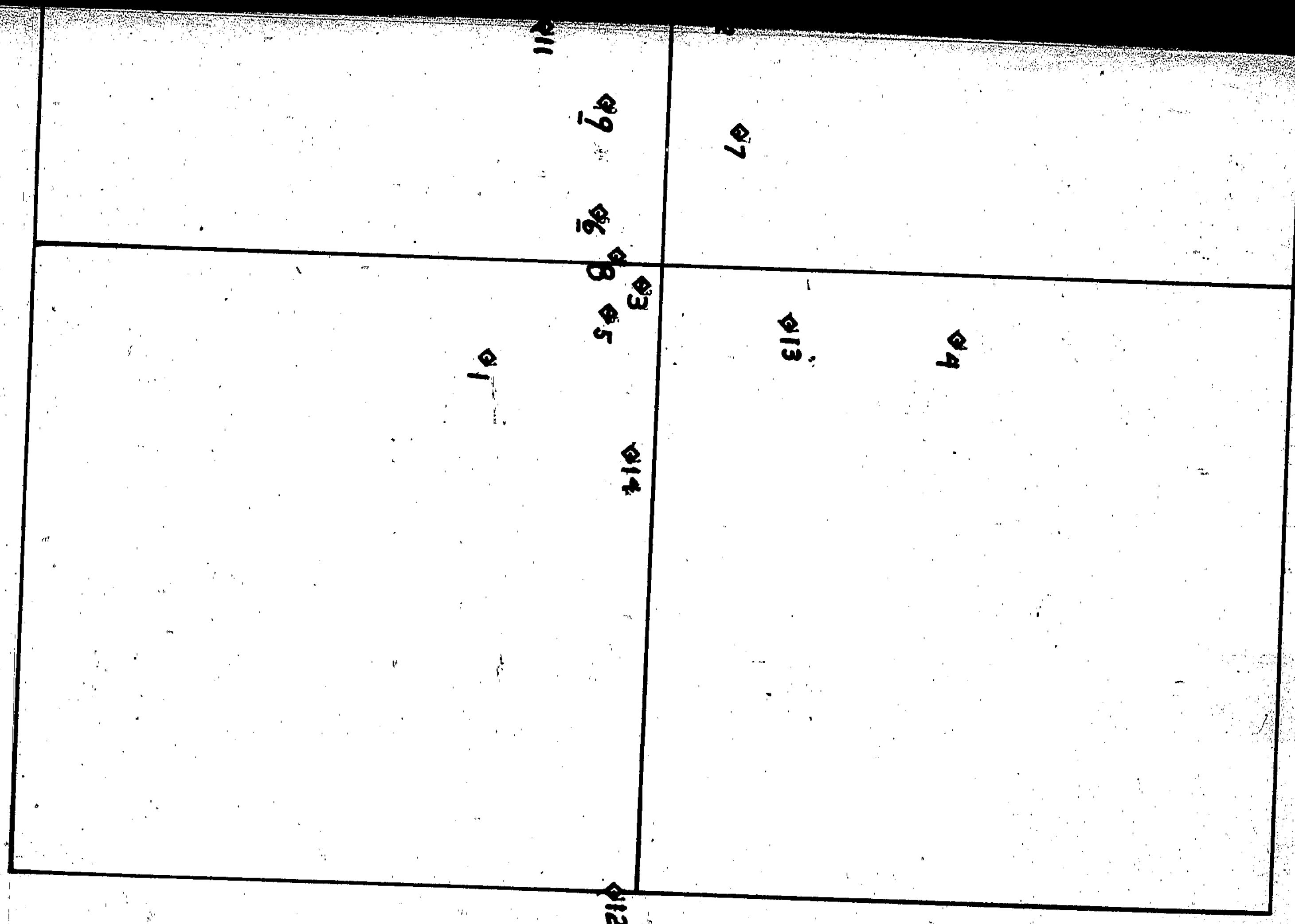
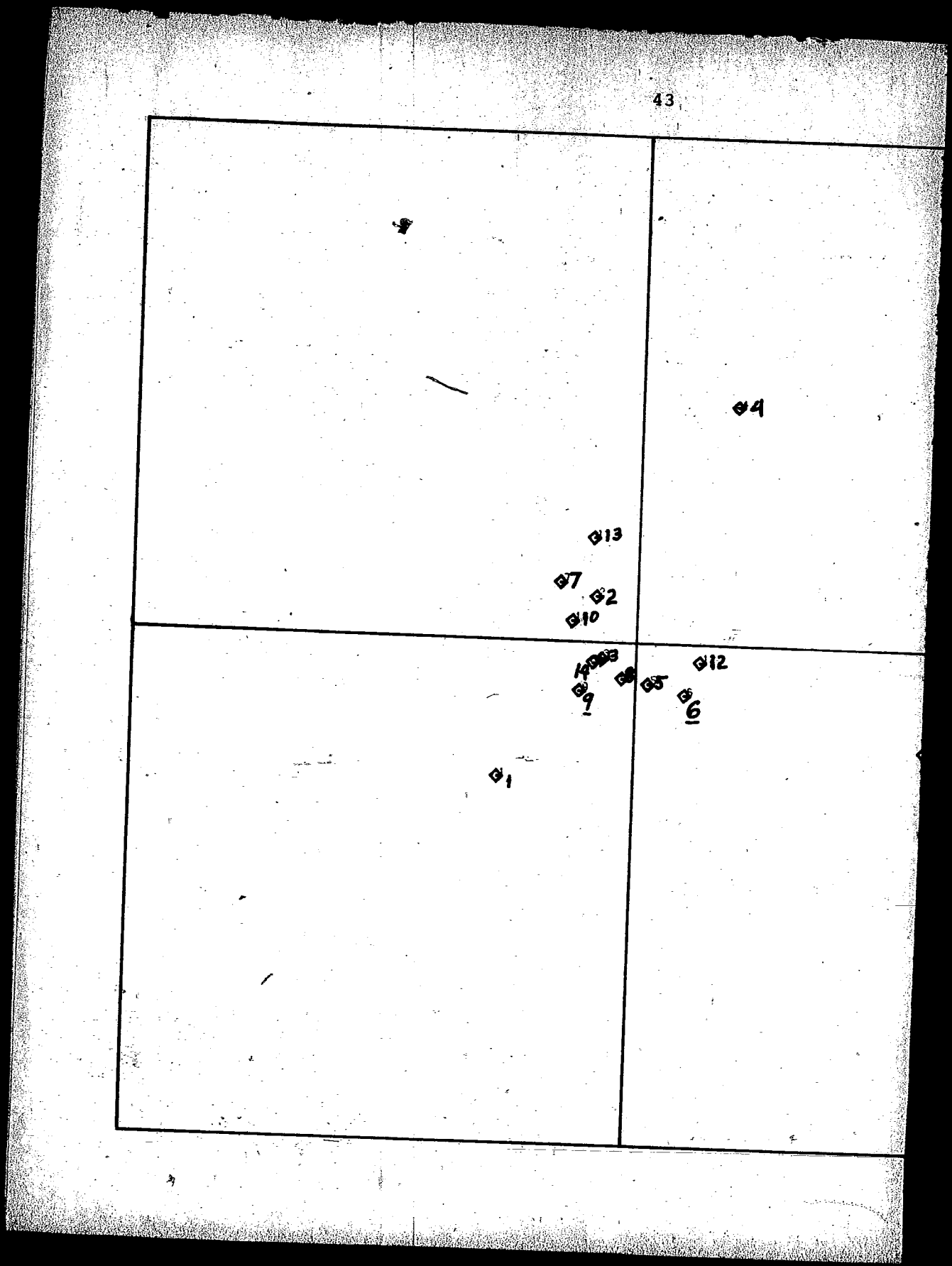


Figure 3.3. Plot of y-z Planer 1978 Data


43
4
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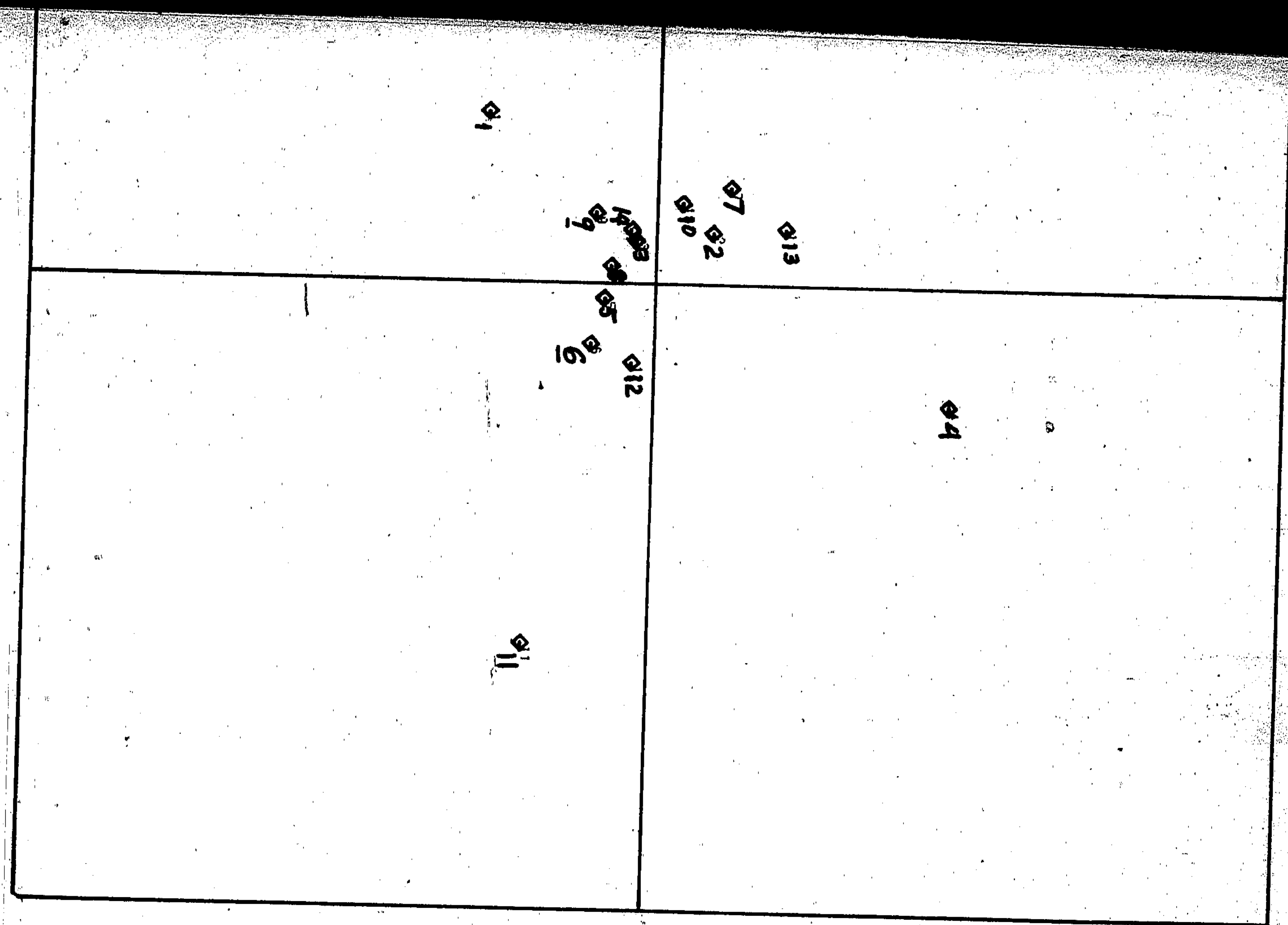


Figure 3.4. Plot of x-z Plane for 1978 Data

taken one, two, three and four at a time, to find those messages, combinations of concepts in the map, that will move DHIA toward the concept you in the space.

Table 3.5 lists the best one, two and three concept messages for each data set. The four-concept messages were generated but did not produce any results which were superior to the best three-concept messages and so were not listed. This has been the experience of many researchers on diffuse topic areas. By reading through the table from left to right it may be seen how the messages' strategies have changed over time.

When two concept messages are considered, the best message for 1978 data is "accurate information" and "convenient" which could theoretically reduce the distance from 68 units to 29 units. Yet, here we find that all best messages include the concept "accurate information" and the distances are all similar. These two-concept messages all represent very good strategies.

Now consider the three-concept messages. Again the concept "accurate information" is included in all the best three-concept messages. Within the three-concept messages, two are best for the 1978 data: (1) accurate information, convenient and proft; (2) accurate information, inexpensive and useful. Both these messages are excellent messages and would be capable of greatly improving the attitudes of Michigan dairymen toward DHIA, reducing the theoretical

distance from 68 units to 23 units (Table 3.5). As may be gleaned from Table 3.5, there are six three-concept messages which are better than any of the one- or two-concept messages generated.

Concept List for Interpreting Figures and Tables

01	ACCURATE INFORMATION - ACC INFO
02	YOU - YOU
03	GOOD - GOOD
04	CONVENIENT - CONV
05	KEEPING RECORDS - KEP REC
06	CULLING - CUL
07	BREEDING - BREE
08	MEASURING PRODUCTION - MEAS PROD
09	NECESSARY - NEC
10	PROFIT - PROFIT
11	INEXPENSIVE - INEX
12	COMPUTERS - CMPTRS
13	USEFUL -USFL
14	DHIA PRODUCTION TESTING - DHIA

Table 3.5. Best Messages for Data Set 1, Data Set 2 and Data Set 3

DATA SET 1			DATA SET 2			DATA SET 3		
MESSAGE	CONCEPT	OUTCOME	MESSAGE	CONCEPT	OUTCOME	MESSAGE	CONCEPT	OUTCOME
				ONE CONCEPT MESSAGES				
5	Keeping records	17 units	6	Culling	25 units	13	Useful	37 units
8	Measuring production	12 units	13	Useful	19 units	3	Good	40.3 units
						6	Culling	40.7 units
						8	Meas prod	40.8 units
						9	Necessary	40.9 units
				TWO CONCEPT MESSAGES				
3- 4	Good-Conv	15 units	4- 6	Conv-Cull	13 units	1- 4	Acc info-Conv	29 units
4- 5	Conv-Keep rec	19 units	6-13	Cul-Usfl	12 units	1-10	Acc info-Profit	30 units
4-10	Acc info-Profit	25 units	5-13	Kep rec-Usfl	16 units	1-11	Acc info-Index	32 units
			4-11	Conv-Inex	17 units	1-13	Acc info-Usfl	32 units

Table 3.5 (cont'd.)

MESSAGE	DATA SET 1 CONCEPT	OUTCOME	MESSAGE	DATA SET 2 CONCEPT	OUTCOME	MESSAGE	DATA SET 3 CONCEPT	OUTCOME
			THREE CONCEPT MESSAGES					
1- 3- 4	Acc info-Good Conv	5 units	4- 6- 9	Conv-Cull-Nec	4 units	1- 4-10	Acc info-Conv-Profit	23 units
1- 4- 5	Acc info-Conv-Kep rec	20 units	1- 4- 7	Acc info-Conv-Bree	6 units	1-11-13	Acc info-Inex-Usfl	23 units
1- 8-11	Acc info-Meas prod-Inex	15 units	3- 8-11	Good-Meas prod-Inex	6 units	1-10-13	Acc info-Profit-Usfl	26 units
5- 8-11	Kep rec-Meas prod-Inex	12 units	3- 4- 8	Good-Conv-Meas	8 units	1- 4-11	Acc info-Conv-Inex	26 units
5-10-11	Kep rec-Profit-Inex	20 units	4- 9-13	Conv-Nec-Usfl	12 units	1- 7-11	Acc info-Bree-Inex	27 units
			1- 4-10	Acc info-Conv-Profit	13 units	1-10-11	Acc info-Profit-Inex	27 units
			4-10-11	Conv-Profit-Usfl	15 units	1- 4- 7	Acc info-Conv-Bree	29 units

CHAPTER IV

DISCUSSION

These analyses show that DHIA is in a difficult position within the two groups, discontinuers and non-adopters. While adopters see DHIA as close to their own position, they see computers as very far from themselves. It seems that much of the dissatisfaction with DHIA is tied to the computerization of the record-keeping device. This study, and previous research by Houghaboom and Kucker, suggests that the reason for this dissatisfaction is a lack of the dairymen's understanding of exactly what information is available from the computerized print-out they receive as a result of enrolling in the testing program. The impersonal, even intimidating, appearance of a computer print-out to an individual who has never seen a print-out before, or has never had the print-out explained in detail, could in and of itself be a strong barrier to adoption. As discussed in Chapter I, previous research has shown that the computerized results of the test has caused many farmers to discontinue enrollment in DHIA programs.

Much of the dissatisfaction with DHIA seems to stem from concerns with accurate information and convenience. If the information is in a form which is inconvenient,

confusing or incomprehensible, then any series of messages which attempts to convince dairymen that the opposite is true will only prove to further entrench the already negative attitudes held toward DHIA.

Since economic factors frequently turned up, i.e. the concepts profit and inexpensive, these concepts were included in most of the best three concept messages. The hard facts of doing business in a highly competitive market demands that any innovation which may be adopted be profitable and/or inexpensive. These two concepts are very similar in light of the impact of an innovation upon a small business. This is so much the case that an innovation that presents itself to the operator, if not comprehensible in the short term, will not be adopted in the long term.

An advertising prospectus was presented to Meadows and DHIA in the spring of 1978. The prospectus included two taped radio editorials, three advertisements, six print editorials, direct mail brochures and milk check stuffers (brochures).

While many other considerations not within the scope of this research must enter the agency's final decision, the data collected in this research indicate that in addition to the persuasive messages in the advertising prospectus above, the best strategy which comes out of the findings has three requirements. (1) Either the computer print-out must be changed in some way to make it more personal; (2) an

extensive educational campaign needs to be initiated to educate the dairymen of Michigan as to how the information on the print-out can be used and what additional information may be gleaned from a perusal of the data available; and (3) an extensive interpersonal and media campaign should be launched, to alert Michigan dairymen of the efforts and results of the efforts to make DHIA more convenient and profitable, and to provide the dairymen with the accurate information that is required for the successful operation of his farm.

Furthermore, since the record keeping innovation must be computerized for the processing of large amounts of redundant information, it may be necessary to generate messages to reduce the distance or amount of heterophily, between the dairymen of Michigan and computers.

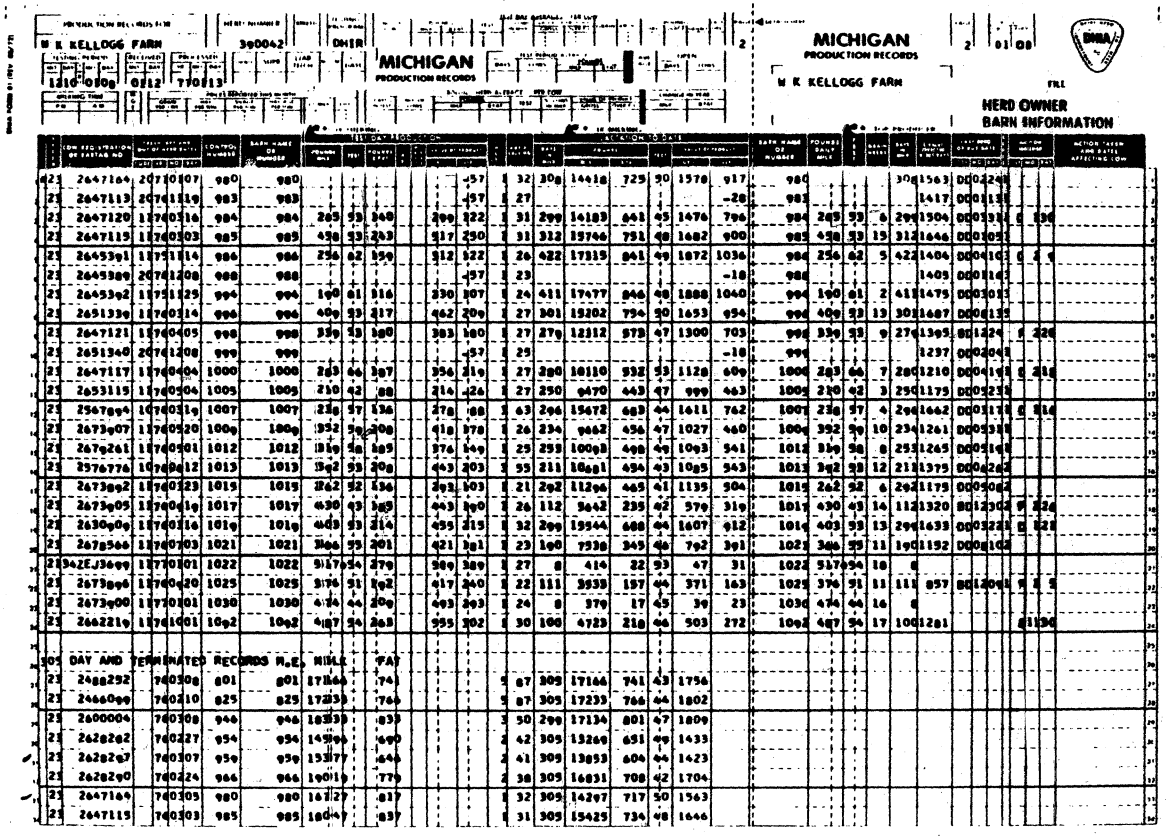
As analysis of the significant other data indicates a further recommendation of informing local bank loan officers, if not bank presidents, of the obvious economic advantages of enrollment in DHIA. The above strategies should increase enrollment in DHIA, by decreasing heterophily between DHIA and Michigan's dairymen. The three requirements outlined in Chapter I have been met; to find a practical solution to the heterophilic relationship, identify opinion leaders, and as a result of the above two resolutions increase the rate of adoption of DHIA.

It is also recommended that annual measurements be taken of the dairymen's attitudes toward the innovation, concurrently and following any campaign to attract new adopters. This should be accomplished with two goals in mind: (1) to add to the body of knowledge being accumulated of how social and sub-cultural groups respond to communication regarding any innovation; and (2) to be able to discern any changes in the attitudes of Michigan dairymen toward DHIA and the subsequent change in message strategies which would result in the continued increase of adoption of this important innovation. Such an effort as outlined above will have an almost guaranteed likelihood of success at this time.

Finally, as to further research, this researcher feels it is imperative to continue the Galileo type metric multidimensional scaling research in the area of American agriculture, as the most feasible way of collecting data on diffusing agricultural innovations to the American farming community. Any tool which enables a greater amount of production with a reduced energy input will tend toward a better situation for the farmer and the consumer.

APPENDIX A: THE PRODUCT

1-A The BARN SHEET (data received by the dairyman from DHIA) for the M.S.U. Kellogg Guernsey herd


W K KELLOGG FARM
MICHIGAN
PRODUCTION RECORDS
MICHIGAN
PRODUCTION RECORDS
W K KELLOGG FARM
HERD OWNER
BARN INFORMATION

APPENDIX B: QUESTIONNAIRES

A- 1977 Galileo Questionnaire
(complete with cover letter)

B- 1977 Semantic Differential Questionnaire
(cover letter same as A above)

C- 1978 Galileo Questionnaire
(complete with cover letter)

COOPERATIVE EXTENSION SERVICE
MICHIGAN STATE UNIVERSITY and
U.S. DEPARTMENT OF AGRICULTURE COOPERATING

DEPARTMENT OF DAIRY SCIENCE
EAST LANSING • MICHIGAN • 48824

March 25, 1977

Dear Sir:

The Department of Dairy Science at Michigan State University spends most of its research time investigating methods of improving profit on the dairy farm. When useful information is found it must be brought to you for application.

A major problem for us has been to communicate with you. To improve our system of communication we have enlisted the help of other departments on the campus. The enclosed questionnaire is part of the effort.

We would appreciate very much if you would complete the enclosed questionnaire. The information will assist us in doing a better job for you.

Sincerely,

Clinton E. Meadows

Clinton E. Meadows
Extension Specialist

CEM/lb
Enc.

March 22

1. What is your age? _____
2. Are you married? _____
3. What was the last year of school you completed? _____
4. How many years have You been farming? _____
5. How many years have You been dairy farming? _____
6. Did you grow up on a dairy farm? _____
7. Have you always farmed in Michigan? _____
8. What is the total number of acres you operate? _____
9. How do you market your milk? Grade "A"____Grade "B"____
10. What percent of your labor is hired? _____
11. How would you describe your dairy operation? Circle those which suit your operation.
    1. Stanchion barn
    2. Stanchion & free stalls
    3. Stanchion & loose housing
    4. Stanchion & parlor
    5. Parlor & free stalls
    6. Parlor & loose housing
12. What was the approximate average production per cow last year in pounds of milk? _____
13. How many cows do you milk? _____
14. Has your herd ever been on test? _____
15. Is your herd on a milk test program now? _____
16. Which testing program are you now enrolled in? Circle one.
    1. DHIA
    2. DHIR
    3. Owner sampler
    4. Tri-monthly testing
    5. Private test
17. How long has your herd been on test? _____
18. Have you always been on the present form of testing? _____

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We would like you to give us your opinion about some ideas related to dairy farming. You can help by comparing these ideas to each other to tell how different or far apart they are. For example, we might ask, "How different are dairy farming and crop farming?" You could answer with a number. If the two ideas are very different, you would write a large number. If they are very similar, you would write a small number. If they are identical, you would write zero (no difference).

To help you judge how large the differences are, we'll say that the amount of difference between dairy farming and crop farming is 100 units. Try to keep this difference in mind when comparing the other pairs of words. If two words are further apart than crop farming and dairy farming, write a number larger than 100. If they are twice as far apart, write 200, and so on. YOU MAY WRITE ANY NUMBER YOU WANT. Remember, there are no wrong answers, only your opinion.

1. How far apart are DAIRY FARMING and CROP FARMING? 100 units
2. How far apart are the EXTENSION SERVICE and MICHIGAN STATE U.? _____ units
3. How far apart are the EXTENSION SERVICE and YOU? _____ units
4. How far apart are MICHIGAN STATE UNIVERSITY and YOU? _____ units
5. How far apart are the AVERAGE FARMER and YOU? _____ units
6. How far apart are ACCURATE INFORMATION and YOU? _____ units

7. How far apart are GOOD and YOU? _____ units
8. How far apart are CONVENIENT and YOU? _____ units
9. How far apart are KEEPING RECORDS and YOU? _____ units
10. How far apart are CULLING and YOU? _____ units
11. How far apart are BREEDING and YOU? _____ units
12. How far apart are MEASURING PRODUCTION and YOU? _____ units

13. How far apart are NECESSARY and YOU? _____ units
14. How far apart are PROFIT and YOU? _____ units
15. How far apart are INEXPENSIVE and YOU? _____ units
16. How far apart are COMPUTERS and YOU? _____ units
17. How far apart are USEFUL and YOU? _____ units
18. How far apart are DHIA PRODUCTION TESTING SERVICE and YOU? _____ units

QType 1

19. How far apart are ACCURATE INFORMATION and GOOD? _____units
20. How far apart are ACCURATE INFORMATION and CONVENIENCE? _____units
21. How far apart are ACCURATE INFORMATION and KEEPING RECORDS? _____units
22. How far apart are ACCURATE INFORMATION and CULLING? _____units
23. How far apart are ACCURATE INFORMATION and BREEDING? _____units
24. How far apart are ACCURATE INFORMATION and MEASURING PRODUCTION? _____units

25. How far apart are ACCURATE INFORMATION and NECESSARY? _____units
26. How far apart are ACCURATE INFORMATION and PROFIT? _____units
27. How far apart are ACCURATE INFORMATION and INEXPENSIVE? _____units
28. How far apart are ACCURATE INFORMATION and COMPUTERS? _____units
29. How far apart are ACCURATE INFORMATION and USEFUL? _____units
30. How far apart are ACCURATE INFORMATION and DHIA PRODUCTION TESTING SERVICE? _____units

31. How far apart are GOOD and CONVENIENCE? _____units
32. How far apart are GOOD and KEEPING RECORDS? _____units
33. How far apart are GOOD and CULLING? _____units
34. How far apart are GOOD and BREEDING? _____units
35. How far apart are GOOD and MEASURING PRODUCTION? _____units
36. How far apart are GOOD and NECESSARY? _____units

37. Who do you USUALLY SPEAK WITH when you need INFORMATION ABOUT FARMING?
Name & Address

_____

_____

38. Who do you USUALLY SPEAK WITH when you need INFORMATION ABOUT HERD PRODUCTION?

_____

_____

39. Who do you USUALLY SPEAK WITH when you need INFORMATION ABOUT KEEPING RECORDS?

_____

_____

40. Who do you USUALLY SPEAK WITH when you need INFORMATION ABOUT MONEY & FINANCES?

_____

_____

_____

QType 2

19. How far apart are GOOD and PROFIT? _____units
20. How far apart are GOOD and INEXPENSIVE? _____units
21. How far apart are GOOD and COMPUTERS? _____units
22. How far apart are GOOD and USEFUL? _____units
23. How far apart are GOOD and DHIA PRODUCTION TESTING SERVICE? _____units
24. How far apart are CONVENIENCE and KEEPING RECORDS? _____units

25. How far apart are CONVENIENCE and CULLING? _____units
26. How far apart are CONVENIENCE and BREEDING? _____units
27. How far apart are CONVENIENCE and MEASURING PRODUCTION? _____units
28. How far apart are CONVENIENCE and NECESSARY? _____units
29. How far apart are CONVENIENCE and PROFIT? _____units
30. How far apart are CONVENIENCE and INEXPENSIVE? _____units

31. How far apart are CONVENIENCE and COMPUTERS? _____units
32. How far apart are CONVENIENCE and USEFUL? _____units
33. How far apart are CONVENIENCE and DHIA PRODUCTION TESTING SERVICE? _____units
34. How far apart are KEEPING RECORDS and CULLING? _____units
35. How far apart are KEEPING RECORDS and BREEDING? _____units
36. How far apart are KEEPING RECORDS and MEASURING PRODUCTION? _____units

37. Who do you USUALLY SPEAK WITH when you need INFORMATION ABOUT FARMING?
Name & Address

_____

_____

38. Who do you USUALLY SPEAK WITH when you need INFORMATION ABOUT HERD PRODUCTION?

_____

_____

39. Who do you USUALLY SPEAK WITH when you need INFORMATION ABOUT KEEPING RECORDS?

_____

_____

40. Who do you USUALLY SPEAK WITH when you need INFORMATION ABOUT MONEY & FINANCE?

_____

_____

_____

QType 3

19. How far apart are KEEPING RECORDS and NECESSARY? _____units
20. How far apart are KEEPING RECORDS and PROFIT? _____units
21. How far apart are KEEPING RECORDS and INEXPENSIVE? _____units
22. How far apart are KEEPING RECORDS and COMPUTERS? _____units
23. How far apart are KEEPING RECORDS and USEFUL? _____units
24. How far apart are KEEPING RECORDS and DHIA PRODUCTION TESTING SERVICE? _____units

25. How far apart are CULLING and BREEDING? _____units
26. How far apart are CULLING and MEASURING PRODUCTION? _____units
27. How far apart are CULLING and NECESSARY? _____units
28. How far apart are CULLING and PROFIT? _____units
29. How far apart are CULLING and INEXPENSIVE? _____units
30. How far apart are CULLING and COMPUTERS? _____units

31. How far apart are CULLING and USEFUL? _____units
32. How far apart are CULLING and DHIA PRODUCTION TESTING SERVICE? _____units
33. How far apart are BREEDING and MEASURING PRODUCTION? _____units
34. How far apart are BREEDING and NECESSARY? _____units
35. How far apart are BREEDING and PROFIT? _____units
36. How far apart are BREEDING and INEXPENSIVE? _____units

37. Who do you USUALLY SPEAK WITH when you need INFORMATION ABOUT FARMING?
Name & Address

_____

_____

38. Who do you USUALLY SPEAK WITH when you need INFORMATION ABOUT HERD PRODUCTION?

_____

_____

39. Who do you USUALLY SPEAK WITH when you need INFORMATION ABOUT KEEPING RECORDS?

_____

_____

40. Who do you USUALLY SPEAK WITH when you need INFORMATION ABOUT MONEY & FINANCE?

_____

_____

_____

QType 4

19. How far apart are BREEDING and COMPUTERS? _____units
20. How far apart are BREEDING and USEFUL? _____units
21. How far apart are BREEDING and DHIA PRODUCTION TESTING SERVICE? _____units
22. How far apart are MEASURING PRODUCTION and NECESSARY? _____units
23. How far apart are MEASURING PRODUCTION and PROFIT? _____units
24. How far apart are MEASURING PRODUCTION and INEXPENSIVE? _____units

25. How far apart are MEASURING PRODUCTION and COMPUTERS? _____units
26. How far apart are MEASURING PRODUCTION and USEFUL? _____units
27. How far apart are MEASURING PRODUCTION and DHIA PRODUCTION TESTING SERVICE? _____units
28. How far apart are NECESSARY and PROFIT? _____units
29. How far apart are NECESSARY and INEXPENSIVE? _____units
30. How far apart are NECESSARY and COMPUTERS? _____units

31. How far apart are NECESSARY and USEFUL? _____units
32. How far apart are NECESSARY and DHIA PRODUCTION TESTING SERVICE? _____units
33. How far apart are PROFIT and INEXPENSIVE? _____units
34. How far apart are PROFIT and COMPUTERS? _____units
35. How far apart are PROFIT and USEFUL? _____units
36. How far apart are PROFIT and DHIA PRODUCTION TESTING SERVICE? _____units

37. How far apart are INEXPENSIVE and COMPUTERS? _____units
38. How far apart are INEXPENSIVE and USEFUL? _____units
39. How far apart are INEXPENSIVE and DHIA PRODUCTION TESTING SERVICE? _____units
40. How far apart are COMPUTERS and USEFUL? _____units
41. How far apart are COMPUTERS and DHIA PRODUCTION TESTING SERVICE? _____units

42. Who do you USUALLY SPEAK WITH when you need INFORMATION ABOUT FARMING?
Name & Address

_____

_____

43. Who do you USUALLY SPEAK WITH when you need INFORMATION ABOUT HERD PRODUCTION?

_____

_____

44. Who do you USUALLY SPEAK WITH when you need INFORMATION ABOUT KEEPING RECORDS?

_____

_____

45. Who do you USUALLY SPEAK WITH when you need INFORMATION ABOUT MONEY & FINANCES?

_____

_____

_____

March 22

1. What is your age? _____
2. Are you married? _____
3. What was the last year of school you completed? _____
4. How many years have You been farming? _____
5. How many years have You been dairy farming? _____
6. Did you grow up on a dairy farm? _____
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Clinton E. Meadows
Extension Specialist

We would like you to give us your opinion about some ideas related to Dairy farming. You can help by comparing these ideas to each other to tell how different or similar they are. For example, we might ask, "How different, or similar, are Dairy Farming and Crop Farming?" If the two ideas are very different then you could check or X the space to the extreme right, if they are very similar check the space at the extreme left. If they are between very similar or very different check the appropriate space. The example is below:

CROP FARMING AND DAIRY FRAMING /___/___/___/___/___/___/ X /
very similar very different

1. EXTENSION SERVICE AND MICHIGAN STATE U.? /___/___/___/___/___/___/___/
very similar very different

2. EXTENSION SERVICE AND YOU? /___/___/___/___/___/___/___/
very similar very different

3. MICHIGAN STATE UNIVERSITY AND YOU? /___/___/___/___/___/___/___/
very similar very different

4. AVERAGE FARMER AND YOU? /___/___/___/___/___/___/___/
very similar very different

5. ACCURATE INFORMATION AND YOU? /___/___/___/___/___/___/___/
very similar very different

6. GOOD AND YOU? /___/___/___/___/___/___/___/
very similar very different

7. CONVENIENT AND YOU? /___/___/___/___/___/___/___/
very similar very different

8. KEEPING RECORDS AND YOU? /___/___/___/___/___/___/___/
very similar very different

9. CULLING AND YOU? /___/___/___/___/___/___/___/
very similar very different

10. BREEDING AND YOU? /___/___/___/___/___/___/___/
very similar very different

11. MEASURING PRODUCTION AND YOU? /___/___/___/___/___/___/___/
very similar very different

12. NECESSARY AND YOU? /___/___/___/___/___/___/___/
very similar very different

13. PROFIT AND YOU? /___/___/___/___/___/___/___/
very similar very different

14. INEXPENSIVE AND YOU? /___/___/___/___/___/___/___/
very similar very different

15. COMPUTERS AND YOU? /___/___/___/___/___/___/___/
very similar very different

16. USEFUL AND YOU? /___/___/___/___/___/___/___/
very similar very different

17. DHIA PRODUCTION TESTING SERVICE AND YOU? /___/___/___/___/___/___/___/
very similar very different

Q TYPE 5

18. ACCURATE INFORMATION AND GOOD?
19. ACCURATE INFORMATION AND CONVENIENCE?
20. ACCURATE INFORMATION AND KEEPING RECORDS?
21. ACCURATE INFORMATION AND CULLING?
22. ACCURATE INFORMATION AND BREEDING?
23. ACCURATE INFORMATION AND MEASURING PRODUCTION?
24. ACCURATE INFORMATION AND NECESSARY?
25. ACCURATE INFORMATION AND PROFIT?
26. ACCURATE INFORMATION AND INEXPENSIVE?
27. ACCURATE INFORMATION AND COMPUTERS?
28. ACCURATE INFORMATION AND USEFUL?
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30. GOOD AND CONVENIENCE?
31. GOOD AND KEEPING RECORDS?
32. GOOD AND CULLING?
33. GOOD AND BREEDING?
34. GOOD AND MEASURING PRODUCTION?
35. GOOD AND NECESSARY?

/___/___/___/___/___/___/___/
very similar very different

QTYPE 6

19. GOOD AND PROFIT

20. GOOD AND INEXPENSIVE

21. GOOD AND COMPUTERS

22. GOOD AND USEFUL

23. GOOD AND DHIA PRODUCTION TESTING SERVICE

24. CONVENIENCE AND KEEPING RECORDS

25. CONVENIENCE AND CULLING

26. CONVENIENCE AND BREEDING

27. CONVENIENCE AND MEASURING PRODUCTION

28. CONVENIENCE AND NECESSARY

29. CONVENIENCE AND PROFIT

30. CONVENIENCE AND INEXPENSIVE

31. CONVENIENCE AND COMPUTERS

32. CONVENIENCE AND USEFUL

33. CONVENIENCE AND DHIA PRODUCTION TESTING SERVICE

34. KEEPING RECORDS AND CULLING

35. KEEPING RECORDS AND BREEDING

36. KEEPING RECORDS AND MEASURING PRODUCTION

very similar / very different

Q TYPE 8

55. BREEDING AND COMPUTERS — very similar ___/___/___/___/___/very/different/

56. BREEDING AND USEFUL — very similar ___/___/___/___/___/___/___ very different

57. BREEDING AND DHIA PRODUCTION TESTING SERVICE — very similar ___/___/___/___/___/___/___ very different

58. MEASURING PRODUCTION AND NECESSARY — very similar ___/___/___/___/___/___/___ very different

59. MEASURING PRODUCTION AND PROFIT — very similar ___/___/___/___/___/___/___ very different

60. MEASURING PRODUCTION AND INEXPENSIVE — very similar ___/___/___/___/___/___/___ very different

61. MEASURING PRODUCTION AND COMPUTERS — very similar ___/___/___/___/___/___/___ very different

62. MEASURING PRODUCTION AND USEFUL — very similar ___/___/___/___/___/___/___ very different

63. MEASURING PRODUCTION AND DHIA PRODUCTION TESTING SERVICE — very similar ___/___/___/___/___/___/___ very different

64. NECESSARY AND PROFIT — very similar ___/___/___/___/___/___/___ very different

65. NECESSARY AND INEXPENSIVE — very similar ___/___/___/___/___/___/___ very different

66. NECESSARY AND COMPUTERS — very similar ___/___/___/___/___/___/___ very different

67. NECESSARY AND USEFUL — very similar ___/___/___/___/___/___/___ very different

68. NECESSARY AND DHIA PRODUCTION TESTING SERVICE — very similar ___/___/___/___/___/___/___ very different

69. PROFIT AND INEXPENSIVE — very similar ___/___/___/___/___/___/___ very different

70. PROFIT AND COMPUTERS — very similar ___/___/___/___/___/___/___ very different

71. PROFIT AND USEFUL — very similar ___/___/___/___/___/___/___ very different

72. PROFIT AND DHIA PRODUCTION TESTING SERVICE — very similar ___/___/___/___/___/___/___ very different

73. INEXPENSIVE AND COMPUTERS — very similar ___/___/___/___/___/___/___ very different

74. INEXPENSIVE AND USEFUL — very similar ___/___/___/___/___/___/___ very different

75. INEXPENSIVE AND DHIA PRODUCTION TESTING SERVICE — very similar ___/___/___/___/___/___/___ very different

76. COMPUTERS AND USEFUL — very similar ___/___/___/___/___/___/___ very different

77. COMPUTERS AND DHIA PRODUCTION TESTING SERVICE — very similar ___/___/___/___/___/___/___ very different

Q TYPE 7

37. KEEPING RECORDS AND NECESSARY — very similar ___/___/___/___/___/___/___ very different

38. KEEPING RECORDS AND PROFIT — very similar ___/___/___/___/___/___/___ very different

39. KEEPING RECORDS AND INEXPENSIVE — very similar ___/___/___/___/___/___/___ very different

40. KEEPING RECORDS AND COMPUTERS — very similar ___/___/___/___/___/___/___ very different

41. KEEPING RECORDS AND USEFUL — very similar ___/___/___/___/___/___/___ very different

42. KEEPING RECORDS AND DHIA PRODUCTION TESTING — very similar ___/___/___/___/___/___/___ very different

43. CULLING AND BREEDING — very similar ___/___/___/___/___/___/___ very different

44. CULLING AND MEASURING PRODUCTION — very similar ___/___/___/___/___/___/___ very different

45. CULLING AND NECESSARY — very similar ___/___/___/___/___/___/___ very different

46. CULLING AND PROFIT — very similar ___/___/___/___/___/___/___ very different

47. CULLING AND INEXPENSIVE — very similar ___/___/___/___/___/___/___ very different

48. CULLING AND COMPUTERS — very similar ___/___/___/___/___/___/___ very different

49. CULLING AND USEFUL — very similar ___/___/___/___/___/___/___ very different

50. CULLING AND DHIA PRODUCTION TESTING SERVICE — very similar ___/___/___/___/___/___/___ very different

51. BREEDING AND MEASURING PRODUCTION — very similar ___/___/___/___/___/___/___ very different

52. BREEDING AND NECESSARY — very similar ___/___/___/___/___/___/___ very different

53. BREEDING AND PROFIT — very similar ___/___/___/___/___/___/___ very different

54. BREEDING AND INEXPENSIVE — very similar ___/___/___/___/___/___/___ very different

41. Who do you USUALLY SPEAK WITH when you need INFORMATION ABOUT FARMING?
Name & address

42. Who do you USUALLY SPEAK WITH when you needINFORATION ABOUTHERD PRODUCTION?

43. Who do you USALLY SPEAK WITH when you need INFORMATION ABOUT KEEPING RECORDS?

44. Who do you USUALLY SPEAK WITH when you need INFORMATION ABOUT MONEY & FINANCES

COOPERATIVE EXTENSION SERVICE
MICHIGAN STATE UNIVERSITY and
U.S. DEPARTMENT OF AGRICULTURE COOPERATING

DEPARTMENT OF DAIRY SCIENCE
EAST LANSING • MICHIGAN • 48824

December 1, 1977

Dear Sir:

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We would appreciate very much if you would complete the enclosed questionnaire. The information will assist us in doing a better job for you.

Sincerely,

Clinton E. Meadows

Clinton E. Meadows
Extension Specialist

CEM/lb
Enc.

1. Today's Date _____

2. What is your age? _____

3. Are you married? _____

4. What was the last year of school you completed? _____

5. How many years have You been farming? _____

6. How many years have You been dairy farming? _____

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8. Have you always farmed in Michigan? _____

9. What is the total number of acres you operate? _____

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12. How would you describe your dairy operation? Circle those which suit your operation.

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INSTRUCTIONS

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ID# 1-6

CARD #00 7-8

		How far apart are	Units
2021	09-17	Dairy Farming and Crop Farming	100
2223	18-26	Extension Service and Michigan State Univ.	
2202	27-35	Extension Service and You	
2402	36-44	The Average Farmer and You	

ID# 1-6

CARD #01 7-8

		How far apart are	Units
0102	09-17	Accurate Information and You	
0103	18-26	Accurate Information and Good	
0104	27-35	Accurate Information and Convenient	
0105	36-44	Accurate Information and Keeping Records	
0106	45-53	Accurate Information and Culling	
0107	54-62	Accurate Information and Breeding	
0108	63-71	Accurate Information and Measuring Production	
0109	72-80	Accurate Information and Necessary	

Duplicate 1-6

CARD #02 7-8

		How far apart are	Units
0110	09-17	Accurate Information and Profit	
0111	18-26	Accurate Information and Inexpensive	
0112	27-35	Accurate Information and Computers	
0113	36-44	Accurate Information and Useful	
0114	45-53	Accurate Information and DHIA Production Testing	
0203	54-62	You and Good	
0204	63-71	You and Convenient	
0205	72-80	You and Keeping Records	

REMEMBER: DAIRY FARMING AND CROP FARMING ARE 100 UNITS APART.

ID# 1-6

CARD #03 7-8

		How far apart are	Units
0206	09-17	You and Culling	
0207	18-26	You and Breeding	
0208	27-35	You and Measuring Production	
0209	36-44	You and Necessary	
0210	45-53	You and Profit	
0211	54-62	You and Inexpensive	
0212	63-71	You and Computers	
0213	72-80	You and Useful	

Duplicate 1-6

CARD #04 7-8

		How far apart are	Units
0214	09-17	You and DHIA Production Testing	
0304	18-26	Good and Convenient	
0305	27-35	Good and Keeping Records	
0306	36-44	Good and Culling	
0307	45-53	Good and Breeding	
0308	54-62	Good and Measuring Production	
0309	63-71	Good and Necessary	
0310	72-80	Good and Profit	

Duplicate 1-6

CARD #05 7-8

		How far apart are	Units
0311	09-17	Good and Inexpensive	
0312	18-26	Good and Computers	
0313	27-35	Good and Useful	
0314	36-44	Good and DHIA Production Testing	
0405	45-53	Convenient and Keeping Records	
0406	54-62	Convenient and Culling	
0407	63-71	Convenient and Breeding	
0408	72-80	Convenient and Measuring Production	

Q Type 1

REMEMBER: DAIRY FARMING AND CROP FARMING ARE 100 UNITS APART.

ID# 1-6

CARD #06 7-8

		How far apart are	Units
0409	09-17	Convenient and Necessary	
0410	18-26	Convenient and Profit	
0411	27-35	Convenient and Inexpensive	
0412	36-44	Convenient and Computers	
0413	45-53	Convenient and Useful	
0414	54-62	Convenient and DHIA Production Testing	
0505	63-71	Keeping Records and Culling	
0507	72-80	Keeping Records and Breeding	

Duplicate 1-6

CARD #07 7-8

		How far apart are	Units
0508	09-17	Keeping Records and Measuring Production	
0509	18-26	Keeping Records and Necessary	
0510	27-35	Keeping Records and Profit	
0511	36-44	Keeping Records and Inexpensive	
0512	45-53	Keeping Records and Computers	
0513	54-62	Keeping Records and Useful	
0514	63-71	Keeping Records and DHIA Production Testing	
0607	72-80	Culling and Breeding	

Duplicate 1-6

CARD #08 7-8

		How far apart are	Units
0608	09-17	Culling and Measuring Production	
0609	18-26	Culling and Necessary	
0610	27-35	Culling and Profit	
0611	36-44	Culling and Inexpensive	
0612	45-53	Culling and Computers	
0613	54-62	Culling and Useful	
0614	63-71	Culling and DHIA Production Testing	
0708	72-80	Breeding and Measuring Production	

REMEMBER: DAIRY FARMING AND CROP FARMING ARE 100 UNITS APART: Q Type 2

ID # 1-6

CARD #09 7-8

		How far apart are	Units
0709	09-17	Breeding and Necessary	
0710	18-26	Breeding and Profit	
0711	27-35	Breeding and Inexpensive	
0712	36-44	Breeding and Computers	
0713	45-53	Breeding and Useful	
0714	54-62	Breeding and DHIA Production Testing	
0809	63-71	Measuring Production and Necessary	
0810	72-80	Measuring Production and Profit	

Duplicate 1-6

CARD #10 7-8

		How far apart are	Units
0811	09-17	Measuring Production and Inexpensive	
0812	18-26	Measuring Production and Computers	
0813	27-35	Measuring Production and Useful	
0814	36-44	Measuring Production and DHIA Production Testing	
0910	45-53	Necessary and Profit	
0911	54-62	Necessary and Inexpensive	
0912	63-71	Necessary and Computers	
0913	72-80	Necessary and Useful	

Duplicate 1-6

CARD #11 7-8

		How far apart are	Units
0914	09-17	Necessary and DHIA Production Testing	
1011	18-26	Profit and Inexpensive	
1012	27-35	Profit and Computers	
1013	36-44	Profit and Useful	
1014	45-53	Profit and DHIA Production Testing	
1112	54-62	Inexpensive and Computers	
1113	63-71	Inexpensive and Useful	
1114	72-80	Inexpensive and DHIA Production Testing	

Q Type 2-Cont.

Duplicate 1-6

CARD #12 7-8

		How far apart are	Units
1213	09-17	Computers and Useful	
1214	18-26	Computers and DHIA Production Testing	
1314	27-35	Useful and DHIA Production Testing	

APPENDIX C: STATISTICS

A- Discriminate Analysis
(stepwise procedure)

B- Galileo Means, Standard Deviations, Standard Errors, Skewness, Kurtosis, Count, Minimum-Maximum Values, Percent Error, Galileo Means Matrix, Coordinates for the Multidimensional Space for Data Sets I, II and III as well as Data Set Three Split Three Ways by Adopter Category

STEP NUMBER	VARIABLE ENTERED	REMOVED	F TO ENTER OR REMOVE	NUMBER INCLUDED	WILKS LAMBDA	SIG.	RAOS V	CHANGE IN RAOS V	SIG.
1	PCTHIRE		8.20262	1	.94071	.000	18.40525	18.40525	.000
2	TYPLOP		1.67633	2	.92999	.000	21.92551	3.52026	.172
3	ACRES		4.13546	3	.90420	.000	30.53783	8.61232	.013
4	YRSOFARM		1.83651	4	.89286	.000	34.44705	3.90922	.142
5	YRSFARM		.54706	5	.88948	.000	35.57963	1.13257	.568
6	ALWAYSFM		.32779	6	.88745	.001	36.26365	.58403	.710
7	AVPROD		11.68395	7	.82042	.000	62.42187	26.15802	.000
8	EDUC		.45946	8	.81778	.000	63.48310	1.06142	.588
9	MARSTAT		.47469	9	.81505	.000	64.60757	1.12447	.570
10	GROWDF		.71153	10	.81098	.000	66.33156	1.72400	.422
11	COWS		.12411	11	.81026	.000	66.63313	.30157	.860
12	AGE		.43143	12	.80778	.000	67.70606	1.07293	.585

CLASSIFICATION FUNCTION COEFFICIENTS

	GROUP 1	GROUP 2	GROUP 3
AGE	.78818	.76677	.78333
MARSTAT	8.8231	9.2953	8.5180
EDUC	.67971	.66019	.70105
YRSFARM	-.40270	-.43178	-.44332
YRSOFARM	.25941E-02	.36958E-01	.64158E-01
GROWDF	4.1268	3.6987	4.3284
ALWAYSFM	12.586	12.676	11.820
ACRES	.34860E-02	.41658E-02	.22623E-02
PCTHIRE	-.48200E-01	-.30865E-01	-.38141E-01
TYPLOP	.63007	.75095	.83309
AVPROD	.24125E-02	.26989E-02	.24703E-02
COWS	-.49070E-02	-.62315E-02	-.41455E-02
CONSTANT	-45.256	-49.076	-46.076

NUMBER REMOVED	EIGENVALUE	CANONICAL CORRELATION	PERCENT OF TRACE	WILKS LAMBDA	CHI-SQUARE	D.F.	SIGNIFICANCE
0	.20170	.40969	87.0	.80778	61.15679	24	.000
1	.03017	.17114	13.0	.97071	8.51709	11	.666

2 FUNCTIONS WILL BE USED IN REMAINING ANALYSES

STANDARDIZED DISCRIMINANT FUNCTION COEFFICIENTS

	1	2
AGE	.23912	.05212
MARSTAT	-.15116	.14769
EDUC	.14117	-.19392
YRSFARM	.20089	.89203
YRSOFARM	-.16073	-1.36091
GROWDF	.17956	-.14199
ALWAYSFM	-.10784	.35691
ACRES	-.34953	.64236
PCTHIRE	-.35166	-.34829
TYPLOP	-.08574	-.59936
AVPROD	-.70301	-.12160
COWS	.09858	-.08912

AMG DMIA 3 DATA SETS --GALILEO MEANS MATRIX SET NO. 1

	1	2	3	4	5	6	7	8
1	0.000							
2	48.739	0.000						
3	41.579	42.184	0.000					
4	53.000	51.358	45.135	0.000				
5	35.897	57.608	34.865	54.400	0.000			
6	36.184	46.604	31.622	54.388	41.531	0.000		
7	30.385	44.665	32.027	51.800	34.300	29.833	0.000	
8	53.487	45.978	31.216	58.878	38.000	26.396	26.133	0.000
9	32.564	35.825	37.568	66.633	31.479	21.208	12.889	31.318
10	62.179	70.399	42.551	80.760	50.170	25.383	21.114	31.951
11	49.258	69.989	100.680	98.000	30.432	23.738	46.395	42.195
12	71.974	132.882	97.140	112.900	63.000	73.070	57.619	55.119
13	29.625	36.333	42.600	63.860	21.362	26.295	31.390	36.707
14	76.447	106.386	56.900	80.714	50.000	34.500	32.976	61.318

AMG DMIA 3 DATA SETS --GALILEO MEANS MATRIX SET NO. 1

	9	10	11	12	13	14
9	0.000					
10	25.122	0.000				
11	60.902	52.625	0.000			
12	73.333	66.250	101.205	0.000		
13	42.375	33.500	50.500	61.081	0.000	
14	43.333	53.898	59.125	36.459	50.055	0.000

STATISTICS FOR AMG OMIA 3 DATA SETS

SET NUMBER 1

ROW	COL	MEAN	STAN. DEV.	STD. ERR	SKEWNESS	KURTOSIS	COUNT	MIN. VAL	MAX. VAL	PCT. ERR
2	1	48.739	86.950	6.554	7.816	82.496	176	0.0	1000.0	13.4
3	1	41.579	47.380	7.686	1.258	4.174	38	0.0	200.0	18.5
3	2	42.184	53.877	4.084	4.116	31.764	174	0.0	500.0	9.7
4	1	53.000	60.112	9.505	2.028	8.253	40	0.0	300.0	17.9
4	2	51.358	51.569	3.854	1.675	6.459	179	0.0	300.0	7.5
4	3	45.135	51.642	8.490	1.637	5.034	37	0.0	200.0	18.8
5	1	35.897	54.571	8.738	1.705	4.948	39	0.0	200.0	24.3
5	2	57.600	125.319	9.315	5.647	41.548	181	0.0	1000.0	16.2
5	3	34.865	41.419	6.803	1.216	3.294	37	0.0	150.0	19.5
5	4	54.400	60.147	8.506	1.671	7.233	50	0.0	300.0	15.5
6	1	36.184	54.525	8.845	1.905	5.592	38	0.0	200.0	24.4
6	2	46.604	86.219	6.391	7.755	82.925	182	0.0	1000.0	13.7
6	3	31.622	42.839	7.043	2.004	7.277	37	0.0	200.0	22.3
6	4	54.388	79.704	11.386	3.735	20.350	49	0.0	500.0	20.9
6	5	41.531	45.347	6.478	1.147	3.985	49	0.0	200.0	15.6
7	1	30.385	44.251	7.886	1.908	6.495	39	0.0	200.0	23.3
7	2	44.665	86.944	6.445	7.688	80.681	182	0.0	1000.0	14.4
7	3	32.027	45.119	7.418	1.885	6.328	37	0.0	200.0	23.2
7	4	51.800	81.931	11.587	3.577	18.578	50	0.0	500.0	22.4
7	5	34.388	40.890	5.783	.903	2.129	50	0.0	130.0	16.9
7	6	29.833	44.204	6.380	1.932	6.506	48	0.0	200.0	21.4
8	1	53.487	162.801	26.069	5.112	29.362	39	0.0	1000.0	48.7
8	2	45.978	67.233	4.997	2.787	12.688	181	0.0	480.0	10.9
8	3	31.216	45.876	7.542	2.040	6.704	37	0.0	200.0	24.2
8	4	58.078	56.901	7.968	1.044	3.374	51	0.0	200.0	13.7
8	5	38.000	54.754	7.743	1.651	4.943	50	0.0	200.0	20.4
8	6	26.396	74.511	10.755	5.411	34.043	48	0.0	500.0	40.7
8	7	26.133	42.003	6.262	2.486	9.122	45	0.0	200.0	24.0
9	1	32.564	38.060	6.094	1.231	3.727	39	0.0	150.0	18.7
9	2	35.825	47.480	3.631	2.228	9.641	171	0.0	300.0	18.1
9	3	37.560	56.024	9.213	2.932	13.359	37	0.0	300.0	24.5
9	4	66.633	75.054	10.722	2.111	8.948	49	0.0	400.0	16.1
9	5	31.479	58.338	8.420	2.051	5.949	48	0.0	200.0	26.7
9	6	21.208	34.633	4.999	1.686	4.844	48	0.0	125.0	23.6
9	7	12.869	35.156	5.241	4.008	19.454	45	0.0	200.0	40.7
9	8	31.310	63.752	9.837	2.684	9.907	42	0.0	300.0	31.4
10	1	62.179	161.324	25.832	5.096	29.337	39	0.0	1000.0	41.5
10	2	70.399	138.604	10.389	4.712	28.512	178	0.0	1001.0	14.8
10	3	42.551	83.398	11.914	3.741	19.236	49	0.0	500.0	28.8
10	4	88.760	120.667	17.065	2.555	8.987	50	0.0	500.0	21.1
10	5	58.170	147.955	21.581	5.656	36.128	47	0.0	1000.0	43.0
10	6	25.383	45.119	6.581	2.214	7.242	47	0.0	200.0	25.3
10	7	21.114	35.204	5.307	2.085	6.423	44	0.0	150.0	25.1
10	8	31.951	65.768	10.271	4.330	23.986	41	0.0	400.0	32.1
10	9	25.122	52.225	8.156	3.723	18.993	41	0.0	300.0	32.5
11	1	49.250	52.148	8.245	1.294	4.154	40	0.0	200.0	16.7
11	2	68.989	107.972	8.162	5.008	37.264	175	0.0	1000.0	11.8
11	3	100.600	165.743	23.440	3.739	18.716	50	0.0	1000.0	23.3
11	4	98.000	160.378	22.681	3.500	20.897	50	0.0	1000.0	23.1
11	5	30.432	50.409	7.599	2.115	6.792	44	0.0	200.0	25.0
11	6	23.736	32.445	5.006	1.738	5.075	42	0.0	125.0	21.1

11	7	48.395	96.844	14.769	4.385	24.616	43	0.0	600.0	38.5
11	8	42.195	59.990	9.369	2.452	9.831	41	0.0	300.0	22.2
11	9	60.902	92.956	14.517	2.451	13.276	41	0.0	500.0	23.8
11	10	52.625	56.225	8.890	1.008	3.103	40	0.0	200.0	16.9
12	1	71.974	165.484	26.845	4.700	26.077	38	0.0	1000.0	37.3
12	2	132.882	177.282	[illegible]	3.078	14.065	178	0.0	1002.0	18.8
12	3	97.140	167.278	23.657	3.688	18.345	50	0.0	1000.0	24.4
12	4	112.900	179.025	25.318	3.170	14.021	50	0.0	1000.0	22.4
12	5	63.000	73.379	10.939	1.766	5.742	45	0.0	388.0	17.4
12	6	73.070	96.140	14.661	2.423	10.093	43	0.0	500.0	20.1
12	7	57.619	73.874	11.399	2.636	11.760	42	0.0	400.0	19.8
12	8	55.119	68.465	10.564	1.612	5.464	42	0.0	300.0	19.2
12	9	73.333	87.971	14.087	1.879	6.513	39	0.0	400.0	19.2
12	10	66.250	73.636	11.643	1.760	5.753	40	0.0	300.0	17.6
12	11	101.205	171.689	27.492	3.806	19.515	39	0.0	1000.0	27.2
13	1	29.625	44.291	7.003	2.072	7.086	40	0.0	280.0	23.6
13	2	36.333	58.511	4.514	4.308	29.070	168	0.0	500.0	12.4
13	3	42.600	61.492	8.696	1.662	4.467	58	0.0	280.0	20.4
13	4	63.860	114.084	16.134	3.263	14.168	58	0.0	600.0	25.3
13	5	21.362	40.329	5.883	2.624	10.837	47	0.0	280.0	27.5
13	6	26.295	57.978	8.740	3.179	13.427	44	0.0	380.0	33.2
13	7	31.390	54.354	8.489	3.112	14.856	41	0.0	380.0	27.8
13	8	36.707	57.026	8.906	2.529	11.389	41	0.0	380.0	24.3
13	9	42.375	65.096	10.293	2.208	7.931	48	0.0	380.0	24.3
13	10	33.500	53.866	8.517	3.129	15.219	48	0.0	380.0	25.4
13	11	58.588	74.982	11.856	2.997	13.146	48	0.0	480.0	23.5
13	12	61.881	79.629	13.091	2.382	9.656	37	0.0	480.0	21.4
14	1	76.447	179.535	29.124	3.947	19.249	38	0.0	1000.0	38.1
14	2	106.386	211.957	15.977	3.778	19.051	176	0.0	1470.0	15.8
14	3	58.900	91.789	12.981	2.724	12.001	58	0.0	500.0	22.8
14	4	88.714	106.330	15.190	2.542	10.895	49	0.0	500.0	18.8
14	5	50.000	113.988	16.992	2.987	11.348	65	0.0	500.0	34.8
14	6	34.588	82.186	12.378	4.376	23.911	64	0.0	500.0	35.3
14	7	32.976	48.465	7.478	2.063	7.892	42	0.0	280.0	22.7
14	8	61.318	159.628	24.631	4.925	28.557	42	0.0	1000.0	48.2
14	9	43.333	57.863	9.269	1.598	4.562	39	0.0	280.0	21.4
14	10	53.098	74.777	11.678	1.932	6.350	41	0.0	300.0	22.8
14	11	59.125	82.203	12.997	2.362	8.775	48	0.0	480.0	22.8
14	12	36.459	70.192	11.540	3.867	19.637	37	0.0	480.0	31.7

AVERAGE OBSERVATIONS PER CELL 61.8791

GALILEO COORDINATES OF 14 VARIABLES IN A METRIC MULTIDIMENSIONAL SPACE FOR DATA SET 1

NORMAL SOLUTION

		1	2	3	4	5	6	7	8
1	ACC INFO	-10.396	1.806	-26.115	-16.145	-14.148	-7.645	-5.446	-4.731
2	YOU	-60.560	11.675	6.289	-9.782	-.388	.886	.946	2.933
3	GOOD	-22.211	-35.128	14.746	-.704	-4.616	8.763	2.084	-5.604
4	CONV	-37.378	-30.911	-19.601	20.147	10.573	-5.749	-3.358	3.068
5	KEEP REC	2.180	4.030	-16.778	1.928	1.341	14.066	16.237	-1.242
6	CUL	-1.789	3.665	6.856	12.920	-1.289	-2.074	-11.957	-9.648
7	BREE	3.035	-3.624	2.561	.461	-2.583	-10.956	1.006	12.239
8	MEAS PPO	1.358	1.420	7.492	-9.926	25.274	-6.041	4.882	-4.698
9	NEC	-3.184	-.524	13.083	-4.471	-14.947	-9.626	10.997	-1.838
10	PROFIT	11.926	5.490	29.127	-6.176	1.499	1.633	-4.530	3.168
11	INEX	4.621	58.065	-6.574	11.167	2.795	-.842	1.052	-.428
12	CMPTRS	70.732	-17.214	-10.297	-16.835	4.296	-3.127	-1.123	-.384
13	USFL	.435	3.847	-5.410	-11.953	-.740	17.799	-10.596	5.787
14	DHIA	41.251	-7.597	4.621	29.377	-7.068	2.992	.597	1.369

EIGENVALUES (ROOTS) OF EIGENVECTOR MATRIX--

12566.058 6206.262 2933.819 2504.251 1284.785 959.169 726.854 387.218

NUMBER OF ITERATIONS TO DERIVE THE ROOT--

5 8 37 6 13 18 5 7

PERCENTAGE OF DISTANCE ACCOUNTED FOR BY INDIVIDUAL VECTOR--

45.332 22.389 10.584 9.034 4.635 3.460 2.622 1.397

CUMULATIVE PERCENTAGES OF REAL DISTANCE ACCOUNTED FOR--

45.332 67.721 78.305 87.339 91.974 95.434 98.056 99.453

CUMULATIVE PERCENTAGES OF TOTAL (REAL AND IMAGINARY) DISTANCE ACCOUNTED FOR--

64.317 96.063 111.099 123.517 130.493 135.482 139.122 141.184

TRACE 19537.636

NUMBER OF DIMENSIONS IN REAL SPACE 10

EXCLUSION WORD IS 7777777777777740000

GALILEO COORDINATES OF 14 VARIABLES IN A METRIC MULTIDIMENSIONAL SPACE FOR DATA SET 1

NORMAL SOLUTION

		9	10	11	12	13	14
1	ACC INFO	3.203	.003	1.913	-10.135	6.684	-17.160
2	YOU	-3.640	.019	.599	5.174	32.922	11.364
3	GOOD	2.073	-.058	6.428	-4.080	-11.065	24.638
4	CONV	1.395	-.051	-5.635	-2.587	-4.335	11.068
5	KEEP REC	3.021	.007	-1.223	11.053	1.099	-17.382
6	CUL	-1.145	.014	-.296	19.205	-4.737	-11.732
7	BREE	1.018	-.006	6.565	10.431	-12.837	-18.979
8	MEAS PRO	-2.387	.002	2.436	-8.927	-3.565	-21.353
9	NEC	-4.138	-.001	-6.345	-2.553	-16.731	1.092
10	PROFIT	7.524	.009	-5.168	-3.351	8.385	-6.659
11	INEX	1.511	.096	1.660	-5.960	-9.946	29.788
12	CMPTRS	-1.194	-.029	-1.193	7.445	10.635	28.636
13	USFL	-4.307	.006	-1.830	-4.715	-17.561	-8.236
14	OHIA	-2.934	-.013	2.088	-10.999	20.252	-12.869

EIGENVALUES (ROOTS) OF EIGENVECTOR MATRIX--

151.521 .017 -286.565 -1084.210 -2754.028 -4137.515

NUMBER OF ITERATIONS TO DERIVE THE ROOT--

4 13 8 18 19 8

PERCENTAGE OF DISTANCE ACCOUNTED FOR BY INDIVIDUAL VECTOR--

.547 .000 -.745 -3.911 -9.935 -14.926

CUMULATIVE PERCENTAGES OF REAL DISTANCE ACCOUNTED FOR--

100.000 100.000 99.255 95.344 85.408 70.482

CUMULATIVE PERCENTAGES OF TOTAL (REAL AND IMAGINARY) DISTANCE ACCOUNTED FOR--

141.880 141.880 140.823 135.273 121.177 100.000

TRACE 19537.636

NUMBER OF DIMENSIONS IN REAL SPACE 10

EXCLUSION WORD IS 7777777777777740000

AMG OHIA 3 DATA SETS --GALILEO MEANS MATRIX SET NO. 2

	1	2	3	4	5	6	7	8
1	0.000							
2	64.774	0.000						
3	66.522	34.442	0.000					
4	72.609	53.942	51.667	0.000				
5	38.478	48.691	45.381	69.800	0.000			
6	29.565	45.891	29.591	53.840	38.400	0.000		
7	39.348	44.727	33.619	48.600	25.440	35.758	0.000	
8	39.348	69.000	46.857	61.320	26.400	34.481	42.708	0.000
9	30.000	43.858	33.300	63.480	48.370	29.111	25.000	36.083
10	39.565	64.455	41.923	70.480	46.964	23.185	26.875	40.259
11	57.391	53.000	67.720	72.720	61.538	35.040	49.524	49.591
12	85.000	145.418	106.440	116.480	88.462	102.154	140.435	105.682
13	32.609	41.725	37.440	47.320	41.111	21.087	34.208	42.508
14	41.136	95.566	48.043	67.125	64.808	53.696	68.043	62.826

AMG OHIA 3 DATA SETS --GALILEO MEANS MATRIX SET NO. 2

	9	10	11	12	13	14
9	0.000					
10	28.455	0.000				
11	56.714	61.136	0.000			
12	107.318	120.455	115.952	0.000		
13	27.545	31.818	64.091	98.636	0.000	
14	72.689	66.087	70.952	75.682	56.360	0.000

STATISTICS FOR AMG OHIA 3 DATA SETS

SET NUMBER 2

ROW	COL	MEAN	STAN. DEV.	STD. ERR	SKEWNESS	KURTOSIS	COUNT	MIN. VAL	MAX. VAL	PCT ERR
2	1	64.774	82.374	11.315	3.213	16.164	53	0.0	500.0	17.5
3	1	66.522	65.032	13.560	.945	2.596	23	0.0	200.0	20.4
3	2	34.442	50.287	6.974	2.105	7.043	52	0.0	200.0	20.2
4	1	72.609	65.306	13.617	1.014	2.670	23	0.0	200.0	18.8
4	2	53.942	52.739	7.314	1.284	4.088	52	0.0	200.0	13.6
4	3	51.667	57.432	12.533	1.522	4.330	21	0.0	200.0	24.3
5	1	38.478	59.845	12.478	1.716	4.714	23	0.0	200.0	32.4
5	2	48.691	60.751	8.192	2.041	7.569	55	0.0	300.0	16.8
5	3	45.381	61.602	13.443	1.432	3.860	21	0.0	200.0	29.6
5	4	69.800	63.961	12.792	2.011	7.496	25	0.0	300.0	18.3
6	1	29.565	48.632	10.140	2.172	7.059	23	0.0	200.0	34.3
6	2	45.891	54.894	7.402	1.632	4.946	55	0.0	200.0	16.1
6	3	29.591	47.667	10.163	2.269	7.792	22	0.0	200.0	34.3
6	4	53.840	70.778	14.156	2.138	6.965	25	0.0	300.0	26.3
6	5	38.400	46.838	9.368	2.257	7.691	25	0.0	200.0	30.8
7	1	39.348	59.441	12.394	1.697	4.713	23	0.0	200.0	31.5
7	2	44.727	49.965	6.737	1.618	5.443	55	0.0	200.0	15.1
7	3	33.619	48.810	10.651	2.006	6.724	21	0.0	200.0	31.7
7	4	48.600	60.125	13.625	2.361	8.386	25	0.0	300.0	28.0
7	5	25.440	44.500	8.900	2.610	9.823	25	0.0	200.0	35.0
7	6	35.750	46.528	8.793	1.766	6.094	28	0.0	200.0	24.6
8	1	39.348	61.314	12.785	1.593	4.219	23	0.0	200.0	32.5
8	2	69.000	77.643	16.566	1.860	7.287	54	0.0	400.0	15.3
8	3	46.857	67.301	14.686	1.557	3.802	21	0.0	200.0	31.3
8	4	61.320	85.624	17.125	2.653	10.165	25	0.0	400.0	27.9
8	5	26.480	42.907	8.581	2.778	11.018	25	0.0	200.0	32.5
8	6	34.481	48.970	9.424	1.674	5.371	27	0.0	200.0	27.3
8	7	42.708	73.442	14.991	2.264	7.283	24	0.0	300.0	35.1
9	1	30.000	47.745	10.179	2.247	7.662	22	0.0	200.0	33.9
9	2	43.058	53.297	7.391	1.482	4.671	52	0.0	200.0	17.2
9	3	33.300	50.124	11.208	1.971	6.396	28	0.0	200.0	33.7
9	4	63.400	59.122	11.824	1.024	3.106	25	0.0	200.0	18.7
9	5	40.370	58.562	11.270	1.529	4.288	27	0.0	200.0	27.9
9	6	29.111	45.172	8.693	2.235	8.065	27	0.0	200.0	29.9
9	7	25.000	36.306	7.587	1.382	3.120	23	0.0	100.0	30.3
9	8	36.883	47.314	9.658	1.873	6.425	24	0.0	200.0	26.8
10	1	39.565	65.920	13.745	1.766	4.520	23	0.0	200.0	34.7
10	2	64.455	74.140	9.997	1.526	4.851	55	0.0	300.0	15.5
10	3	41.923	63.611	12.475	1.699	4.420	26	0.0	200.0	29.9
10	4	70.480	72.141	14.428	1.512	5.042	25	0.0	300.0	20.3
10	5	46.964	57.311	10.831	1.310	3.854	28	0.0	200.0	23.1
10	6	23.185	33.836	6.512	1.472	3.531	27	0.0	100.0	28.1
10	7	26.875	37.132	7.580	1.194	2.629	24	0.0	100.0	28.2
10	8	40.250	49.327	10.069	1.502	5.003	24	0.0	200.0	25.0
10	9	28.455	33.954	7.239	1.116	2.791	22	0.0	100.0	25.4
11	1	57.391	73.822	15.393	2.056	6.239	23	0.0	300.0	26.8
11	2	53.000	68.456	8.384	1.964	7.393	53	0.0	300.0	15.7
11	3	67.720	86.547	17.309	2.421	9.108	25	0.0	400.0	25.5
11	4	72.720	53.699	10.740	.777	3.139	25	0.0	200.0	14.8
11	5	61.538	59.465	11.662	1.532	5.169	26	0.0	250.0	19.8
11	6	35.040	35.458	7.092	.736	2.044	25	0.0	100.0	20.2

11	7	49.524	74.513	16.260	2.127	6.829	21	0.0	300.0	32.8
11	8	49.591	64.859	13.828	2.558	10.129	22	0.0	300.0	27.9
11	9	56.714	75.956	16.575	2.643	10.564	21	0.0	350.0	29.2
11	10	61.136	51.807	11.045	.829	3.109	22	0.0	200.0	18.1
12	1	85.000	87.334	18.620	.931	2.441	22	0.0	300.0	21.9
12	2	145.418	162.082	31.855	2.958	15.016	35	0.0	1000.0	15.8
12	3	108.440	125.554	25.111	1.733	5.204	25	0.0	500.0	23.2
12	4	116.400	159.327	31.865	1.837	5.181	25	0.0	600.0	27.4
12	5	88.462	113.067	22.174	2.043	7.345	26	0.0	500.0	25.1
12	6	102.154	123.849	24.283	1.833	5.677	26	0.0	500.0	23.8
12	7	140.435	114.939	23.960	1.257	4.760	23	0.0	500.0	17.1
12	8	105.682	127.103	27.098	1.528	4.776	22	0.0	500.0	25.6
12	9	107.318	133.037	28.364	1.643	4.736	22	0.0	500.0	26.4
12	10	120.455	119.230	25.420	1.585	5.236	22	0.0	500.0	21.1
12	11	115.952	126.896	26.382	1.695	5.405	21	0.0	500.0	22.9
13	1	32.609	48.249	10.061	1.972	6.645	23	0.0	200.0	30.9
13	2	41.725	59.333	8.308	1.790	5.075	51	0.0	200.0	19.9
13	3	37.440	57.013	11.403	1.644	5.376	25	0.0	200.0	30.5
13	4	47.320	54.582	10.916	1.656	5.045	25	0.0	200.0	23.1
13	5	41.111	58.108	11.183	1.542	4.335	27	0.0	200.0	27.2
13	6	21.087	28.359	5.913	1.819	5.279	23	0.0	100.0	28.8
13	7	34.208	48.074	9.813	1.872	6.321	24	0.0	200.0	28.7
13	8	42.500	59.919	12.775	1.613	4.424	22	0.0	200.0	30.1
13	9	27.545	45.269	9.651	2.615	9.803	22	0.0	200.0	35.8
13	10	31.818	49.188	10.487	1.992	6.548	22	0.0	200.0	33.8
13	11	64.091	75.883	16.178	1.738	5.183	22	0.0	300.0	25.2
13	12	98.636	122.235	26.061	1.676	5.960	22	0.0	500.0	26.4
14	1	41.136	60.226	12.840	1.647	4.486	22	0.0	200.0	31.2
14	2	95.566	98.950	13.592	.999	3.188	53	0.0	400.0	14.2
14	3	48.043	63.155	13.163	1.702	4.354	23	0.0	200.0	27.4
14	4	67.125	79.444	16.216	1.476	4.149	24	0.0	300.0	24.2
14	5	64.808	92.169	18.076	2.378	8.336	26	0.0	400.0	27.9
14	6	53.646	87.666	18.280	2.811	10.855	23	0.0	400.0	34.0
14	7	68.843	95.037	19.817	2.372	7.964	23	0.0	400.0	29.1
14	8	62.826	98.000	20.434	2.280	7.530	23	0.0	400.0	32.5
14	9	72.609	89.938	18.753	2.189	7.974	23	0.0	400.0	25.8
14	10	66.087	94.891	19.786	2.448	8.211	23	0.0	400.0	29.9
14	11	70.952	97.427	21.260	2.356	7.572	21	0.0	400.0	30.8
14	12	75.682	87.844	18.728	1.420	4.096	22	0.0	300.0	24.7

AVERAGE OBSERVATIONS PER CELL 27.6264

GALILEO COORDINATES OF 14 VARIABLES IN A METRIC MULTIDIMENSIONAL SPACE FOR DATA SET 2

NORMAL SOLUTION

		1	2	3	4	5	6	7	8
1	ACC INFO	14.223	-20.472	-3.895	3.243	-18.782	-7.070	10.351	3.478
2	YOU	-46.420	11.291	20.601	-16.292	.647	-9.815	7.201	-.125
3	GOOD	-9.836	20.534	-10.349	-6.070	25.036	-5.304	-1.028	3.932
4	CONV	-11.519	43.520	3.250	5.738	-16.268	12.451	-6.065	-.458
5	KEEP REC	5.094	-12.407	5.235	-18.453	7.847	15.657	15.499	-6.086
6	CUL	-4.666	-4.601	4.898	3.265	3.865	-7.663	-6.268	-9.364
7	BREE	-37.654	-5.246	-13.502	9.005	-3.285	7.802	11.819	2.088
8	MEAS PRO	-1.668	-13.957	-1.252	4.349	3.642	24.813	-10.842	2.297
9	NEC	-10.869	-11.693	-3.847	-15.960	-3.108	-5.392	-8.632	14.289
10	PROFIT	-15.629	-18.106	-22.931	2.571	1.839	-6.049	-12.218	-6.948
11	INEX	-11.127	-12.701	34.856	27.152	4.789	-4.225	-3.916	1.831
12	CMPTRS	98.356	3.209	9.912	-11.622	.250	-.425	-2.728	.174
13	USFL	-2.391	6.330	-7.278	-12.536	-12.784	-8.262	-3.645	-6.276
14	DHIA	34.106	14.299	-16.506	27.210	6.233	-6.517	10.471	2.839

EIGENVALUES (ROOTS) OF EIGENVECTOR MATRIX--

15383.958 4140.418 2966.896 2858.615 1582.971 1504.352 1103.125 455.518

NUMBER OF ITERATIONS TO DERIVE THE ROOT--

4 8 64 6 41 13 6 41

PERCENTAGE OF DISTANCE ACCOUNTED FOR BY INDIVIDUAL VECTOR--

51.202 13.780 9.872 9.514 5.269 5.007 3.671 1.516

CUMULATIVE PERCENTAGES OF REAL DISTANCE ACCOUNTED FOR--

51.202 64.982 74.854 84.368 89.636 94.643 98.315 99.831

CUMULATIVE PERCENTAGES OF TOTAL (REAL AND IMAGINARY) DISTANCE ACCOUNTED FOR--

60.860 77.239 88.973 100.282 106.544 112.496 116.860 118.662

TRACE 25277.600

NUMBER OF DIMENSIONS IN REAL SPACE 10

EXCLUSION WORD IS 7777777777777740000

GALILEO COORDINATES OF 14 VARIABLES IN A METRIC MULTIDIMENSIONAL SPACE FOR DATA SET 2

NORMAL SOLUTION

		9	10	11	12	13	14
1	ACC INFO	1.015	-.010	5.346	4.551	-13.360	-15.554
2	YOU	1.785	.051	1.979	7.055	6.227	22.915
3	GOOD	.595	-.026	.511	.256	-17.102	-14.115
4	CONV	-2.054	.008	1.301	3.048	-.377	-9.426
5	KEEP REC	-1.558	.013	-1.512	1.019	8.798	-20.043
6	CUL	-1.148	.012	8.942	-10.131	2.285	1.780
7	BREE	-1.63C	-.033	-3.101	-7.084	-10.474	26.417
8	MEAS PRO	3.634	-.003	2.619	.542	.921	6.925
9	NEC	-1.838	-.006	-.112	-4.279	13.167	-5.712
10	PROFIT	-1.821	-.057	-2.337	11.056	1.478	5.057
11	INEX	-.515	.086	-5.165	.051	-3.512	-10.048
12	CMPTRS	-1.025	.024	-1.521	.768	-6.129	20.563
13	USFL	3.240	-.018	-7.241	-7.320	.203	-9.189
14	DHIA	1.321	-.041	.292	.467	17.882	.431

EIGENVALUES (ROOTS) OF EIGENVECTOR MATRIX--

50.844	.018	-220.155	-428.914	-1248.336	-2870.703

NUMBER OF ITERATIONS TO DERIVE THE ROOT--

4	33	4	5	14	488

PERCENTAGE OF DISTANCE ACCOUNTED FOR BY INDIVIDUAL VECTOR--

.169	.000	-.733	-1.428	-4.155	-9.554

CUMULATIVE PERCENTAGES OF REAL DISTANCE ACCOUNTED FOR--

100.000	100.000	99.267	97.840	93.685	84.131

CUMULATIVE PERCENTAGES OF TOTAL (REAL AND IMAGINARY) DISTANCE ACCOUNTED FOR--

118.863	118.863	117.992	116.295	111.357	100.088

TRACE 25277.000

NUMBER OF DIMENSIONS IN REAL SPACE 10

EXCLUSION WORD IS 7777777777777740000

AMG DMIA 3 DATA SETS --GALILEO MEANS MATRIX SET NO. 3

	1	2	3	4	5	6	7	8
1	0.000							
2	44.939	0.000						
3	40.782	40.384	0.000					
4	67.765	50.966	51.559	0.000				
5	36.657	45.774	32.530	48.697	0.000			
6	38.177	41.647	33.598	45.273	28.378	0.000		
7	43.349	36.916	30.840	43.042	24.511	29.157	0.000	
8	37.778	41.377	32.209	48.788	28.387	29.787	38.593	0.000
9	42.644	42.562	32.107	56.183	31.667	26.330	25.523	35.402
10	64.628	46.257	36.086	61.720	26.204	22.234	29.382	36.876
11	76.790	54.693	62.152	69.140	52.065	42.663	61.798	58.069
12	67.589	111.382	66.779	71.613	59.731	76.304	94.607	75.238
13	44.497	37.896	33.160	38.533	24.247	38.280	30.172	36.149
14	50.977	67.866	55.640	59.670	39.130	45.543	53.764	47.898

AMG DMIA 3 DATA SETS --GALILEO MEANS MATRIX SET NO. 3

	9	10	11	12	13	14
9	0.000					
10	48.588	0.000				
11	59.821	63.862	0.000			
12	98.667	113.609	108.558	0.000		
13	44.671	48.747	69.302	68.621	0.000	
14	66.483	65.261	80.487	65.442	50.368	0.000

STATISTICS FOR AMG DHIA 3 DATA SETS

SET NUMBER 3

ROW	COL	MEAN	STAN. DEV.	STD. ERR	SKEWNESS	KURTOSIS	COUNT	MIN. VAL	MAX. VAL	PCT ERR
2	1	44.939	55.389	4.128	4.044	29.194	180	0.0	500.0	9.2
3	1	40.782	60.431	4.581	4.175	27.639	174	0.0	500.0	11.2
3	2	40.384	43.303	3.302	2.020	10.433	172	0.0	300.0	8.2
4	1	67.765	73.635	5.504	2.902	15.533	179	0.0	500.0	8.1
4	2	50.966	51.227	3.884	1.870	8.546	174	0.0	300.0	7.6
4	3	51.559	52.827	4.163	1.679	6.540	161	0.0	300.0	8.1
5	1	36.657	58.588	4.355	3.652	24.232	181	0.0	500.0	11.3
5	2	45.774	65.838	4.949	4.081	26.625	177	0.0	500.0	10.8
5	3	32.530	42.413	3.311	1.929	7.234	164	0.0	200.0	10.2
5	4	48.697	53.006	4.127	1.696	8.254	165	0.0	300.0	8.5
6	1	38.177	55.359	4.115	3.689	20.774	181	0.0	500.0	10.8
6	2	41.647	44.656	3.456	1.766	6.441	167	0.0	200.0	8.3
6	3	33.598	44.254	3.456	2.274	9.219	154	0.0	250.0	10.3
6	4	45.273	51.965	4.045	2.196	9.519	165	0.0	300.0	8.9
6	5	28.370	45.332	4.726	2.329	8.259	92	0.0	200.0	16.7
7	1	43.149	69.597	5.173	4.113	25.009	181	0.0	500.0	12.9
7	2	36.916	42.710	3.305	1.680	6.208	167	0.0	200.0	9.8
7	3	38.840	39.823	3.119	1.895	7.301	153	0.0	200.0	10.1
7	4	43.042	48.935	3.610	2.027	8.491	165	0.0	300.0	8.9
7	5	24.511	36.868	3.844	2.334	8.989	92	0.0	200.0	15.7
7	6	29.157	37.456	3.970	1.399	4.191	89	0.0	150.0	13.5
8	1	37.778	59.855	4.461	3.673	23.605	168	0.0	500.0	11.8
8	2	41.377	68.565	5.306	4.057	25.146	167	0.0	500.0	12.8
8	3	32.209	49.622	3.887	2.662	13.422	163	0.0	300.0	12.1
8	4	48.788	61.971	4.824	2.285	9.105	165	0.0	300.0	9.9
8	5	28.387	62.390	6.470	5.077	36.118	93	0.0	500.0	22.3
8	6	29.787	39.639	4.088	1.660	5.849	94	0.0	200.0	13.7
8	7	38.593	65.947	6.913	4.179	27.357	91	0.0	500.0	17.3
9	1	42.644	74.848	5.625	4.097	24.200	177	0.0	500.0	13.2
9	2	42.562	95.082	7.470	7.188	67.256	162	0.0	1000.0	17.6
9	3	32.187	48.814	3.871	3.634	23.378	159	0.0	400.0	12.1
9	4	56.183	54.093	5.609	1.673	6.928	93	0.0	300.0	19.8
9	5	31.667	63.834	6.536	4.882	33.658	93	0.0	500.0	20.6
9	6	26.330	44.021	4.540	2.093	7.220	94	0.0	200.0	17.2
9	7	25.523	53.391	5.757	4.399	28.886	86	0.0	400.0	22.6
9	8	35.402	50.901	5.457	1.883	5.725	87	0.0	200.0	15.4
10	1	64.028	126.238	9.462	5.187	35.937	178	0.0	1000.0	14.8
10	2	46.257	59.077	4.571	2.589	11.971	167	0.0	400.0	9.3
10	3	36.086	55.702	4.363	3.111	16.489	163	0.0	400.0	12.1
10	4	61.720	65.527	6.795	2.072	9.383	93	0.0	400.0	11.8
10	5	26.204	60.732	6.298	5.416	48.398	93	0.0	500.0	24.8
10	6	22.234	42.811	4.416	2.688	10.397	94	0.0	200.0	19.3
10	7	29.382	43.465	4.607	1.966	6.898	89	0.0	200.0	15.7
10	8	36.876	52.105	5.523	1.816	5.751	89	0.0	200.0	15.8
10	9	48.588	115.905	12.572	6.659	53.725	85	0.0	1000.0	25.9
11	1	76.790	108.497	8.178	4.676	33.989	176	0.0	1000.0	10.7
11	2	54.693	71.575	5.606	2.554	15.078	163	0.0	500.0	10.3
11	3	62.152	63.799	4.982	2.315	11.255	164	0.0	400.0	8.0
11	4	69.140	75.408	7.819	3.013	15.988	93	0.0	500.0	11.3
11	5	52.065	65.517	6.831	2.663	12.188	92	0.0	400.0	13.1
11	6	42.663	56.373	5.877	3.186	18.756	92	0.0	400.0	13.8
11	7	61.798	110.984	11.764	6.833	57.481	89	0.0	1000.0	19.8

11	8	58.069	75.828	8.130	3.151	16.138	97	0.0	500.0	14.8
11	9	59.821	66.576	7.264	1.973	7.137	84	0.0	300.0	12.1
11	10	63.862	86.512	9.275	2.730	11.721	87	0.0	500.0	14.5
12	1	67.589	85.979	6.499	2.722	12.120	175	0.0	500.0	9.6
12	2	111.382	170.517	13.275	3.735	18.684	165	0.0	1000.0	11.9
12	3	66.779	80.907	6.337	2.505	14.195	163	0.0	500.0	9.5
12	4	71.613	116.900	12.122	5.688	43.572	93	0.0	1000.0	16.9
12	5	59.731	117.749	12.210	5.793	44.584	93	0.0	1000.0	20.4
12	6	76.304	125.153	13.049	4.592	34.234	92	0.0	1000.0	17.1
12	7	94.607	157.755	16.722	4.431	24.927	89	0.0	1000.0	17.7
12	8	75.230	129.146	13.846	4.652	31.322	87	0.0	1000.0	18.4
12	9	98.667	224.072	24.448	7.361	61.861	84	0.0	2000.0	24.8
12	10	113.609	243.403	26.096	5.972	43.592	97	0.0	2000.0	23.0
12	11	108.558	224.407	24.198	7.079	58.892	86	0.0	2000.0	22.3
13	1	44.497	66.667	5.040	4.165	26.771	175	0.0	500.0	11.3
13	2	37.896	56.460	4.422	3.609	21.874	163	0.0	400.0	11.7
13	3	33.160	38.443	3.011	1.281	4.355	163	0.0	200.0	9.1
13	4	38.533	42.650	4.467	1.596	5.741	92	0.0	200.0	11.6
13	5	24.247	37.717	3.911	1.984	7.183	93	0.0	200.0	16.1
13	6	38.280	57.988	6.013	2.558	18.602	93	0.0	300.0	15.7
13	7	38.172	41.980	4.501	2.036	7.648	87	0.0	200.0	14.9
13	8	36.149	45.212	4.847	1.739	6.811	87	0.0	200.0	13.4
13	9	44.671	52.809	5.728	2.094	8.864	85	0.0	300.0	12.1
13	10	48.747	79.738	8.549	3.484	17.476	87	0.0	500.0	17.5
13	11	69.382	87.548	9.441	2.544	10.723	96	0.0	500.0	13.6
13	12	68.621	96.403	10.336	2.814	11.724	87	0.0	500.0	15.1
14	1	58.977	117.121	8.803	5.822	42.826	177	0.0	1000.0	17.3
14	2	67.866	132.237	10.331	4.395	26.988	164	0.0	1000.0	15.2
14	3	55.640	121.185	9.463	5.465	38.531	164	0.0	1000.0	17.8
14	4	59.670	77.894	8.166	3.110	15.824	91	0.0	500.0	13.7
14	5	39.130	105.962	11.047	6.383	48.877	92	0.0	900.0	20.2
14	6	45.543	106.759	11.130	6.025	46.819	92	0.0	900.0	24.4
14	7	53.764	122.519	12.987	5.755	42.013	89	0.0	1000.0	24.2
14	8	47.098	123.892	13.207	5.772	41.735	88	0.0	1000.0	27.6
14	9	66.483	134.887	14.461	4.629	28.962	87	0.0	1000.0	21.8
14	10	65.261	133.008	14.179	4.797	30.458	88	0.0	1000.0	21.7
14	11	80.487	134.955	14.553	4.446	27.436	86	0.0	1000.0	18.1
14	12	65.442	143.704	15.496	4.304	24.435	86	0.0	1000.0	23.7
14	13	58.368	126.395	13.551	5.531	38.710	87	0.0	1000.0	26.9

AVERAGE OBSERVATIONS PER CELL 124.5934

GALILEO COORDINATES OF 14 VARIABLES IN A METRIC MULTIDIMENSIONAL SPACE FOR DATA SET 3

NORMAL SOLUTION

		1	2	3	4	5	6	7	8
1	ACC INFO	12.017	-21.443	-20.493	-15.320	9.854	.280	.880	1.184
2	YOU	-36.927	-6.241	6.755	-15.971	17.683	-10.644	.179	2.353
3	GOOD	2.604	-5.343	-2.287	-6.406	-16.314	-9.140	2.348	12.459
4	CONV	7.935	14.330	35.524	-5.277	2.491	7.030	6.756	.632
5	KEEP REC	6.091	1.904	-6.031	8.739	-6.621	-1.583	-11.571	-7.869
6	CUL	-5.947	7.408	-7.634	6.696	-2.074	6.783	5.368	5.853
7	BREE	-16.164	-11.636	8.718	2.161	-2.533	10.388	-8.329	2.123
8	MEAS PRO	-.805	-2.099	-5.303	1.579	-.794	-6.716	16.484	-11.674
9	NEC	-19.202	-8.448	-7.293	-12.792	-9.169	18.792	1.747	-4.186
10	PROFIT	-32.930	-9.783	3.045	23.827	-12.632	-7.640	2.186	.522
11	INEX	-28.162	43.693	-15.064	-2.855	4.496	-1.757	-4.418	.338
12	CMPTRS	75.718	9.631	-2.602	-4.267	-7.327	-1.992	-.363	.494
13	USFL	6.719	-6.824	15.408	-5.800	.111	-8.699	-10.648	-5.603
14	DMIA	23.053	-6.149	-2.744	25.687	22.828	4.978	.253	3.374

EIGENVALUES (ROOTS) OF EIGENVECTOR MATRIX--

10061.090 3142.320 2472.599 2136.179 1576.889 963.891 693.889 459.613

NUMBER OF ITERATIONS TO DERIVE THE ROOT--

4 8 20 10 6 12 8 7

PERCENTAGE OF DISTANCE ACCOUNTED FOR BY INDIVIDUAL VECTOR--

45.858 14.323 11.270 9.746 7.183 4.393 3.159 2.095

CUMULATIVE PERCENTAGES OF REAL DISTANCE ACCOUNTED FOR--

45.858 60.181 71.451 81.197 88.380 92.774 95.933 98.028

CUMULATIVE PERCENTAGES OF TOTAL (REAL AND IMAGINARY) DISTANCE ACCOUNTED FOR--

53.028 69.589 82.621 93.691 102.197 107.278 110.931 113.353

TRACE 19973.297

NUMBER OF DIMENSIONS IN REAL SPACE 11

EXCLUSION WORD IS 7777777777777740000

GALILEO COORDINATES OF 14 VARIABLES IN A METRIC MULTIDIMENSIONAL SPACE FOR DATA SET 3

NORMAL SOLUTION

		9	10	11	12	13	14
1	ACC INFO	6.911	-2.561	.020	.259	12.429	-5.860
2	YOU	-.339	-.183	-.051	-2.538	-11.582	13.765
3	GOOD	-7.941	-.086	.004	-.139	.937	-15.007
4	CONV	2.431	-2.216	.013	-1.654	7.151	-9.201
5	KEEP REC	.333	-2.727	.010	-4.080	-6.766	-18.073
6	CUL	10.152	3.958	-.010	.491	-11.132	-11.632
7	BREE	-.789	-4.165	-.026	5.004	-7.492	4.650
8	MEAS PRO	-3.260	-.994	-.001	2.645	-4.362	-6.554
9	NEC	-5.438	3.086	-.031	-2.269	2.345	10.211
10	PROFIT	4.511	-.508	-.054	-1.179	8.435	19.338
11	INEX	-1.831	-.528	-.046	1.476	6.329	3.782
12	CMPTRS	1.244	-.390	.124	-.062	-4.889	23.158
13	USFL	.790	5.907	.011	2.489	5.232	-5.889
14	OHIA	-6.774	1.408	.038	-.442	2.565	-1.888

EIGENVALUES (ROOTS) OF EIGENVECTOR MATRIX--

332.613	100.039	.027	-73.298	-752.873	-2140.008

NUMBER OF ITERATIONS TO DERIVE THE ROOT--

4	10	8	4	23	1261

PERCENTAGE OF DISTANCE ACCOUNTED FOR BY INDIVIDUAL VECTOR--

1.516	.456	.000	-.334	-3.432	-9.754

CUMULATIVE PERCENTAGES OF REAL DISTANCE ACCOUNTED FOR--

99.544	100.000	100.000	99.666	96.234	86.480

CUMULATIVE PERCENTAGES OF TOTAL (REAL AND IMAGINARY) DISTANCE ACCOUNTED FOR--

115.106	115.633	115.633	115.247	111.279	100.000

TRACE 18973.297

NUMBER OF DIMENSIONS IN REAL SPACE 11

EXCLUSION WORD IS 7777777777777740000

78 ADOPTORS --GALILEO MEANS MATRIX SET NO. 1

	1	2	3	4	5	6	7	8
1	0.000							
2	38.034	0.000						
3	35.395	40.446	0.000					
4	67.436	49.623	43.944	0.000				
5	36.017	44.957	27.523	46.500	0.000			
6	38.729	41.396	33.349	45.455	23.730	0.000		
7	42.331	33.514	24.771	41.336	22.540	29.144	0.000	
8	31.410	30.268	27.706	44.318	25.547	24.154	28.283	0.000
9	40.184	42.804	30.794	50.234	30.000	21.769	33.725	26.275
10	58.362	46.081	35.248	55.625	27.297	18.769	31.415	30.698
11	77.544	52.339	57.845	62.266	44.453	36.797	73.774	57.212
12	52.327	89.064	57.936	61.406	49.844	63.538	85.943	54.327
13	36.248	34.533	30.872	37.381	21.719	31.172	33.824	32.885
14	30.085	21.955	30.192	35.238	18.125	24.308	26.887	19.811

78 ADOPTORS --GALILEO MEANS MATRIX SET NO. 1

	9	10	11	12	13	14
9	0.000					
10	34.500	0.000				
11	60.000	63.269	0.000			
12	104.900	116.040	108.385	0.000		
13	44.140	43.577	71.765	59.769	0.000	
14	25.673	28.356	45.490	35.824	21.250	0.000

STATISTICS FOR 78 ADOPTORS

SET NUMBER 1

ROW	COL	MEAN	STAN. DEV.	STD. ERR	SKEWNESS	KURTOSIS	COUNT	MIN. VAL	MAX. VAL	PCT ERR
2	1	38.034	40.266	3.723	2.579	16.176	117	0.0	300.0	9.8
3	1	35.395	50.215	4.703	4.039	26.678	114	0.0	400.0	13.3
3	2	40.446	45.579	4.307	2.199	11.382	112	0.0	300.0	10.6
4	1	67.436	79.699	7.368	3.211	16.418	117	0.0	500.0	10.9
4	2	49.623	54.488	5.103	2.252	9.700	114	0.0	300.0	10.3
4	3	43.944	51.110	4.918	2.221	9.366	108	0.0	300.0	11.2
5	1	36.017	62.486	5.752	4.154	27.589	118	0.0	500.0	16.0
5	2	44.957	73.190	6.825	4.361	26.450	115	0.0	500.0	15.2
5	3	27.523	36.765	3.521	2.281	9.992	109	0.0	200.0	12.8
5	4	46.500	53.362	5.088	2.383	10.806	110	0.0	300.0	10.3
6	1	38.729	61.504	5.662	4.112	28.266	118	0.0	500.0	14.6
6	2	41.396	45.979	4.364	1.896	6.808	111	0.0	200.0	10.5
6	3	33.349	46.220	4.427	2.449	9.796	109	0.0	250.0	13.3
6	4	45.455	55.155	5.259	2.466	10.353	110	0.0	300.0	11.6
6	5	23.730	42.407	5.343	2.832	11.076	63	0.0	200.0	22.5
7	1	42.331	68.895	6.342	3.562	23.449	118	0.0	500.0	15.0
7	2	33.514	42.072	3.993	1.945	7.393	111	0.0	200.0	11.9
7	3	29.771	38.655	3.702	2.019	8.064	109	0.0	200.0	12.4
7	4	41.336	48.258	4.601	2.475	11.235	110	0.0	300.0	11.1
7	5	22.540	34.410	4.335	2.858	12.925	63	0.0	200.0	19.2
7	6	29.344	36.658	4.694	1.298	3.760	61	0.0	150.0	16.0
8	1	31.410	58.758	5.432	4.687	36.846	117	0.0	500.0	17.3
8	2	30.268	59.903	5.668	5.027	35.729	112	0.0	500.0	18.7
8	3	27.706	48.936	4.687	3.693	19.300	109	0.0	300.0	16.9
8	4	44.318	64.093	6.111	2.604	10.072	110	0.0	300.0	13.8
8	5	25.547	68.483	8.560	5.490	36.685	64	0.0	500.0	33.5
8	6	24.154	34.703	4.304	1.622	4.924	65	0.0	150.0	17.9
8	7	28.203	41.602	5.200	1.925	6.724	64	0.0	200.0	18.4
9	1	40.184	75.080	7.032	4.250	25.187	114	0.0	500.0	17.5
9	2	42.804	102.066	9.867	7.802	72.445	107	0.0	1000.0	23.1
9	3	30.794	50.169	4.850	4.270	29.017	107	0.0	400.0	15.7
9	4	50.234	51.466	6.433	2.156	10.146	64	0.0	300.0	12.8
9	5	30.000	66.965	8.371	5.485	38.017	64	0.0	500.0	27.9
9	6	21.769	35.414	4.393	1.729	5.044	65	0.0	150.0	20.2
9	7	33.725	64.313	9.005	3.817	20.971	51	0.0	400.0	26.7
9	8	26.275	45.974	6.438	2.436	8.641	51	0.0	200.0	24.5
10	1	58.362	114.983	10.676	5.586	41.447	116	0.0	1000.0	18.3
10	2	46.081	62.635	5.945	2.783	13.198	111	0.0	400.0	12.9
10	3	35.248	59.167	5.667	3.466	16.312	109	0.0	400.0	16.1
10	4	55.625	66.482	8.310	2.627	12.523	64	0.0	400.0	14.9
10	5	27.297	67.897	8.487	5.429	36.941	64	0.0	500.0	31.1
10	6	18.769	36.290	4.501	2.768	11.564	65	0.0	200.0	24.8
10	7	31.415	43.420	5.964	1.839	6.244	53	0.0	200.0	19.0
10	8	30.658	46.931	6.446	2.072	7.012	53	0.0	200.0	21.8
10	9	34.500	47.741	6.752	1.861	6.362	50	0.0	200.0	19.6
11	1	77.544	116.717	10.932	5.115	36.832	114	0.0	1000.0	14.1
11	2	52.339	69.581	6.665	3.245	18.249	109	0.0	500.0	12.7
11	3	57.845	58.445	5.573	2.466	12.799	110	0.0	400.0	9.5
11	4	62.266	74.072	9.259	3.450	19.726	64	0.0	500.0	14.9
11	5	44.453	54.487	6.811	2.411	10.046	64	0.0	300.0	15.3
11	6	36.797	38.643	4.830	.933	2.728	64	0.0	150.0	13.1

11	7	73.774	136.101	18.695	5.941	40.461	53	0.0	1000.0	25.3
11	8	57.212	81.432	11.293	3.631	18.524	52	0.0	500.0	19.7
11	9	60.000	66.851	9.454	2.082	7.530	50	0.0	300.0	15.8
11	10	63.269	74.044	10.268	2.552	10.749	52	0.0	400.0	16.2
12	1	52.327	62.586	5.888	2.486	11.936	113	0.0	400.0	11.3
12	2	89.064	142.506	13.650	4.523	30.964	109	0.0	1000.0	15.3
12	3	57.936	71.341	6.831	3.417	19.082	109	0.0	500.0	11.8
12	4	61.406	126.486	15.811	6.426	47.410	64	0.0	1000.0	25.7
12	5	49.944	128.050	16.005	6.424	47.397	64	0.0	1000.0	32.1
12	6	63.538	127.160	15.772	6.188	45.304	65	0.0	1000.0	24.8
12	7	85.943	141.695	19.463	5.096	32.771	53	0.0	1000.0	22.6
12	8	54.327	76.297	10.580	2.286	9.271	52	0.0	400.0	19.5
12	9	104.900	279.495	39.527	6.243	42.244	50	0.0	2000.0	37.7
12	10	106.000	274.457	38.060	6.328	43.588	52	0.0	2000.0	35.9
12	11	108.385	270.603	37.526	6.557	45.869	52	0.0	2000.0	34.6
13	1	38.348	44.310	4.132	2.380	12.771	115	0.0	300.0	18.8
13	2	34.533	38.612	3.733	1.267	4.642	107	0.0	200.0	10.8
13	3	30.672	35.367	3.388	1.151	3.288	109	0.0	150.0	11.0
13	4	37.381	39.479	4.974	1.716	6.497	63	0.0	200.0	13.3
13	5	21.719	30.838	3.855	1.557	4.234	64	0.0	180.0	17.7
13	6	31.172	50.434	6.384	3.099	14.926	64	0.0	300.0	20.2
13	7	33.824	42.647	5.977	1.753	6.270	51	0.0	200.0	17.7
13	8	32.885	45.514	6.312	1.952	6.556	52	0.0	200.0	19.2
13	9	44.140	50.900	7.198	1.474	4.579	50	0.0	200.0	16.3
13	10	43.577	66.198	9.180	3.265	16.877	52	0.0	400.0	21.1
13	11	71.765	91.757	12.849	2.553	12.768	51	0.0	500.0	17.9
13	12	59.769	72.441	10.046	2.680	11.896	52	0.0	400.0	16.5
14	1	38.085	44.587	4.122	2.015	6.954	117	0.0	200.0	13.7
14	2	21.955	39.921	3.806	2.495	9.463	110	0.0	200.0	17.3
14	3	30.182	45.095	4.300	2.689	13.591	110	0.0	300.0	14.2
14	4	35.238	35.806	4.511	1.124	3.383	63	0.0	150.0	12.8
14	5	18.125	30.227	3.778	1.655	5.078	64	0.0	100.0	20.9
14	6	24.388	33.534	4.159	1.283	3.217	65	0.0	110.0	17.1
14	7	26.887	39.576	5.436	1.528	3.952	53	0.0	150.0	28.2
14	8	19.811	38.313	5.263	2.713	10.891	53	0.0	200.0	26.5
14	9	25.673	40.715	5.646	2.180	7.783	52	0.0	200.0	22.0
14	10	28.358	35.258	4.843	1.507	4.566	53	0.0	150.0	17.1
14	11	45.490	50.413	7.059	2.531	13.094	51	0.0	300.0	15.5
14	12	35.624	66.263	9.279	3.656	18.851	51	0.0	480.0	25.9
14	13	21.250	36.240	5.026	2.851	12.714	52	0.0	200.0	23.5

AVERAGE OBSERVATIONS PER CELL 81.3736

78 DISCONTINUERS --GALILEO MEANS MATRIX SET NO. 1

	1	2	3	4	5	6	7	8
1	0.000							
2	62.097	0.000						
3	50.233	41.286	0.000					
4	63.226	53.250	53.958	0.000				
5	22.903	45.067	32.308	54.231	0.000			
6	29.194	32.308	26.154	38.462	30.625	0.000		
7	41.613	37.308	24.480	45.577	34.375	31.333	0.000	
8	43.387	73.000	31.000	60.962	32.500	34.375	66.333	0.000
9	42.323	44.604	23.478	67.813	23.438	22.500	7.188	52.059
10	29.900	37.115	30.600	74.689	19.698	24.688	11.176	43.824
11	50.500	46.250	63.000	78.750	62.333	56.000	46.176	76.176
12	84.833	162.692	75.200	31.250	65.938	96.000	146.765	138.529
13	41.500	46.038	31.000	31.250	15.313	53.750	13.235	35.294
14	92.828	138.200	100.400	121.000	92.667	101.333	75.882	62.647

78 DISCONTINUERS --GALILEO MEANS MATRIX SET NO. 1

	9	10	11	12	13	14
9	0.000					
10	44.412	0.000				
11	73.125	62.647	0.000			
12	111.563	163.529	116.875	0.000		
13	49.412	51.471	64.824	89.706	0.000	
14	110.588	100.000	138.529	78.824	79.118	0.000

STATISTICS FOR 78 DISCONTINUERS SET NUMBER 1

ROW	COL	MEAN	STAN. DEV.	STD. ERR	SKEWNESS	KURTOSIS	COUNT	MIN. VAL	MAX. VAL	PCT ERR
2	1	62.697	92.141	16.549	3.536	16.608	31	0.0	500.0	26.7
3	1	50.233	92.714	16.927	3.793	18.438	30	0.0	500.0	33.7
3	2	41.286	42.845	8.097	1.822	7.175	28	0.0	200.0	19.5
4	1	63.226	64.640	11.610	1.700	6.649	31	0.0	300.0	18.4
4	2	53.250	47.979	9.067	.928	3.638	28	0.0	200.0	17.0
4	3	53.958	32.755	6.686	-.052	1.832	24	0.0	100.0	12.4
5	1	22.903	32.423	5.823	1.424	3.866	31	0.0	110.0	25.4
5	2	45.067	44.562	8.136	1.400	5.414	30	0.0	200.0	18.1
5	3	32.308	41.999	8.237	1.511	4.375	26	0.0	150.0	25.5
5	4	54.231	50.795	9.962	1.017	3.470	26	0.0	200.0	18.4
6	1	29.194	33.627	6.040	1.121	3.048	31	0.0	115.0	20.7
6	2	32.308	35.171	6.898	1.861	6.384	26	0.0	150.0	21.3
6	3	26.154	32.026	6.438	1.364	3.938	26	0.0	120.0	24.6
6	4	38.462	39.364	7.720	.654	1.811	26	0.0	115.0	20.1
6	5	30.625	43.369	10.842	1.525	4.239	16	0.0	150.0	35.4
7	1	41.613	89.608	16.094	4.315	22.041	31	0.0	500.0	38.7
7	2	37.308	39.643	7.775	1.416	4.079	26	0.0	150.0	20.8
7	3	24.480	33.599	6.720	1.791	5.774	25	0.0	135.0	27.5
7	4	45.577	48.721	9.555	1.367	4.418	26	0.0	200.0	21.0
7	5	34.375	48.858	12.215	1.265	3.026	16	0.0	150.0	35.5
7	6	31.333	46.313	11.958	1.421	3.702	15	0.0	150.0	38.2
8	1	43.387	59.844	10.748	2.656	11.221	31	0.0	300.0	24.8
8	2	73.000	98.438	19.688	3.262	14.214	25	0.0	500.0	27.0
8	3	31.000	39.856	7.970	1.579	4.845	25	0.0	150.0	25.7
8	4	60.962	62.681	12.293	2.017	8.315	26	0.0	300.0	20.2
8	5	32.500	50.436	12.609	1.394	3.246	16	0.0	150.0	38.8
8	6	34.375	36.864	9.216	.865	2.178	16	0.0	105.0	26.8
8	7	66.333	122.603	31.656	2.892	10.275	15	0.0	500.0	47.7
9	1	42.323	90.291	16.217	4.191	21.248	31	0.0	500.0	38.3
9	2	44.600	98.640	19.728	3.915	18.885	25	0.0	500.0	44.2
9	3	23.478	32.216	6.718	1.367	3.792	23	0.0	110.0	28.6
9	4	67.813	62.374	15.594	.929	2.699	16	0.0	200.0	23.0
9	5	23.438	46.054	11.514	1.998	5.218	16	0.0	[illegible].0	49.1
9	6	22.500	43.481	10.870	2.006	5.517	16	0.0	150.0	48.3
9	7	7.188	18.112	4.528	3.243	12.115	16	0.0	75.0	63.0
9	8	52.059	57.010	13.827	1.189	3.289	17	0.0	200.0	26.6
10	1	29.900	47.014	8.583	2.112	7.027	30	0.0	200.0	28.7
10	2	37.115	46.455	9.110	1.843	6.403	26	0.0	200.0	24.5
10	3	30.600	47.840	9.568	2.135	7.179	25	0.0	200.0	31.3
10	4	74.688	60.557	15.139	.809	2.545	16	0.0	200.0	20.3
10	5	19.688	43.749	10.937	2.235	6.169	16	0.0	150.0	55.6
10	6	24.688	54.643	13.661	2.333	7.047	16	0.0	200.0	55.3
10	7	11.176	20.112	4.878	2.214	6.660	17	0.0	75.0	43.6
10	8	43.824	62.439	15.144	1.753	4.550	17	0.0	200.0	34.6
10	9	44.412	70.165	17.018	2.779	10.265	17	0.0	300.0	38.3
11	1	50.500	47.388	8.652	1.148	4.011	30	0.0	200.0	17.1
11	2	46.250	62.671	12.793	2.728	11.231	24	0.0	300.0	27.7
11	3	63.000	54.754	10.951	1.009	3.470	25	0.0	200.0	17.4
11	4	78.750	52.545	13.136	.373	2.605	16	0.0	200.0	16.7
11	5	62.333	65.137	16.818	1.026	2.754	15	0.0	200.0	27.0
11	6	56.000	60.117	15.522	.997	2.712	15	0.0	200.0	27.7

11	7	46.176	51.493	12.489	1.553	4.891	17	0.0	200.0	27.8
11	8	76.176	82.881	20.102	1.342	3.703	17	0.0	300.0	26.4
11	9	73.125	84.703	21.176	1.441	3.798	16	0.0	300.0	29.8
11	10	62.647	83.422	20.233	1.750	4.630	17	0.0	300.0	32.3
12	1	84.333	97.779	17.852	2.554	11.079	30	0.0	500.0	21.0
12	2	162.692	261.862	51.355	2.522	8.071	26	0.0	1000.0	31.6
12	3	75.263	96.544	19.764	3.127	13.616	25	0.0	500.0	26.2
12	4	91.250	68.202	17.051	.383	1.607	16	0.0	200.0	18.7
12	5	65.938	61.115	15.274	.559	2.081	16	0.0	200.0	23.2
12	6	96.000	123.642	31.924	2.223	7.543	15	0.0	500.0	33.3
12	7	146.765	245.770	59.608	2.561	8.664	17	0.0	1000.0	40.6
12	8	138.529	241.733	58.624	2.679	9.443	17	0.0	1000.0	42.3
12	9	111.563	123.171	30.793	2.077	6.442	16	15.0	500.0	27.6
12	10	163.529	236.816	57.436	2.583	9.101	17	10.0	1000.0	35.1
12	11	116.875	135.345	33.836	1.569	4.381	16	0.0	500.0	29.0
13	1	41.500	95.062	17.965	4.001	19.264	28	0.0	500.0	43.3
13	2	46.038	85.174	16.764	2.943	11.833	26	0.0	400.0	36.3
13	3	31.000	37.443	7.489	1.064	2.756	25	0.0	120.0	24.2
13	4	31.250	40.755	10.189	1.040	2.404	16	0.0	120.0	32.6
13	5	15.313	35.332	8.833	2.203	5.863	16	0.0	115.0	57.7
13	6	53.750	78.736	19.683	1.925	6.074	16	0.0	300.0	36.5
13	7	13.235	16.064	4.381	1.304	2.989	17	0.0	50.0	33.1
13	8	35.294	48.552	11.776	2.309	7.891	17	0.0	200.0	33.9
13	9	49.412	69.662	16.900	2.672	9.763	17	0.0	300.0	34.2
13	10	51.471	72.958	17.695	2.374	8.023	17	0.0	300.0	34.4
13	11	68.824	96.992	23.524	1.605	3.904	17	0.0	300.0	34.2
13	12	89.706	127.711	30.975	2.140	6.624	17	0.0	500.0	34.5
14	1	92.828	190.613	35.396	3.231	12.742	29	0.0	900.0	38.1
14	2	138.200	180.260	36.052	3.278	13.331	25	0.0	900.0	26.1
14	3	100.400	194.930	38.986	3.054	11.940	25	0.0	900.0	38.8
14	4	121.000	122.341	31.588	1.838	6.133	15	0.0	500.0	26.1
14	5	92.667	220.672	56.977	3.225	11.760	15	0.0	900.0	61.3
14	6	101.333	217.926	56.268	3.241	11.844	15	0.0	900.0	55.5
14	7	75.882	119.142	28.896	2.627	9.395	17	0.0	500.0	38.1
14	8	62.647	119.793	29.054	2.890	10.408	17	0.0	500.0	46.4
14	9	110.588	121.895	29.564	2.004	6.433	17	0.0	500.0	26.7
14	10	100.000	129.012	31.290	1.883	5.739	17	0.0	500.0	31.3
14	11	108.529	126.314	30.636	1.827	5.724	17	0.0	500.0	28.2
14	12	78.824	152.021	36.871	2.513	8.269	17	0.0	600.0	46.8
14	13	79.118	131.207	31.822	2.174	6.619	17	0.0	500.0	40.2

AVERAGE OBSERVATIONS PER CELL 21.0769

AMG 78 NON-ADOPTORS --GALILEO MEANS MATRIX SET NO. 1

	1	2	3	4	5	6	7	8
1	0.000							
2	53.563	0.000						
3	51.800	39.375	0.000					
4	73.548	53.750	77.931	0.000				
5	52.344	49.375	51.552	52.069	0.000			
6	44.444	50.667	41.207	50.690	48.077	0.000		
7	47.656	49.167	40.345	47.241	21.923	25.769	0.000	
8	55.625	56.500	50.172	54.828	37.308	52.308	59.333	0.000
9	51.719	40.000	43.793	71.154	50.000	53.846	18.947	45.000
10	116.563	54.833	43.966	75.769	28.846	36.538	40.000	47.895
11	98.750	70.000	77.759	91.154	77.692	56.154	42.368	43.684
12	105.313	148.000	92.759	97.692	100.769	120.833	72.105	75.833
13	69.219	42.933	43.621	53.077	47.692	59.231	35.526	46.389
14	90.677	181.379	113.621	107.308	80.769	90.833	108.947	116.667

AMG 78 NON-ADOPTORS --GALILEO MEANS MATRIX SET NO. 1

	9	10	11	12	13	14
9	0.000					
10	91.667	0.000				
11	47.500	66.722	0.000			
12	69.889	88.444	101.667	0.000		
13	91.667	61.111	62.778	74.278	0.000	
14	142.722	141.111	152.778	136.722	107.333	0.000

STATISTICS FOR AMG 7H NON-ADOPTORS SET NUMBER 1

ROW	COL	MEAN	STAN. DEV.	STD. ERR	SKEWNESS	KURTOSIS	COUNT	MIN. VAL	MAX. VAL	PCT ERR
2	1	55.563	50.701	8.963	1.525	4.963	32	0.0	200.0	16.7
3	1	51.800	51.791	9.456	1.431	4.745	30	0.0	200.0	18.3
3	2	39.375	34.635	6.123	.612	2.085	32	0.0	100.0	15.5
4	1	75.548	55.695	10.003	-.706	3.050	31	0.0	200.0	13.6
4	2	53.750	40.735	7.201	-.079	1.525	32	0.0	100.0	13.4
4	3	77.931	62.938	11.687	.630	2.483	29	0.0	200.0	15.0
5	1	52.344	59.739	10.560	1.272	3.691	32	0.0	200.0	20.2
5	2	49.375	53.367	9.434	1.334	4.274	32	0.0	200.0	19.1
5	3	51.552	55.228	10.256	1.201	3.871	29	0.0	200.0	19.9
5	4	52.069	51.054	9.852	.788	2.911	29	0.0	200.0	18.9
6	1	44.844	46.544	8.228	1.252	4.583	32	0.0	200.0	18.3
6	2	50.667	45.272	8.266	1.116	4.500	30	0.0	200.0	16.3
6	3	41.207	44.405	8.246	1.654	6.171	29	0.0	200.0	20.0
6	4	50.690	48.632	9.031	1.152	4.065	29	0.0	200.0	17.8
6	5	48.077	54.896	15.225	1.546	4.579	13	0.0	200.0	31.7
7	1	47.656	45.723	8.083	1.127	4.421	32	0.0	200.0	17.0
7	2	49.167	45.278	8.267	1.123	4.676	30	0.0	200.0	16.8
7	3	40.345	46.848	8.699	1.451	5.151	29	0.0	200.0	21.6
7	4	47.241	51.270	9.521	1.117	3.626	29	0.0	200.0	20.2
7	5	21.923	28.253	7.855	1.583	4.550	13	0.0	100.0	35.7
7	6	25.769	28.410	7.879	1.258	3.700	13	0.0	100.0	30.6
8	1	55.625	59.683	10.551	1.136	3.433	32	0.0	200.0	19.0
8	2	56.500	56.349	10.288	.916	3.178	30	0.0	200.0	18.2
8	3	50.172	55.405	10.289	1.224	3.951	29	0.0	200.0	20.5
8	4	54.828	50.008	9.286	.656	3.043	29	0.0	200.0	16.9
8	5	37.308	38.561	10.695	.661	1.692	13	0.0	100.0	28.7
8	6	52.308	54.548	15.129	1.370	4.233	13	0.0	200.0	28.9
8	7	59.333	54.695	15.789	1.197	3.743	12	0.0	200.0	26.6
9	1	51.719	53.889	9.526	1.172	3.909	32	0.0	200.0	18.4
9	2	40.000	39.540	10.870	2.830	12.265	30	0.0	300.0	27.2
9	3	43.793	52.468	9.745	1.747	5.609	29	0.0	200.0	22.2
9	4	71.154	50.389	13.975	.912	3.629	13	0.0	200.0	19.6
9	5	50.000	57.479	15.942	1.277	3.669	13	0.0	200.0	31.9
9	6	53.846	67.344	18.678	1.382	3.333	13	0.0	200.0	34.7
9	7	18.947	31.895	7.317	1.698	4.401	19	0.0	100.0	38.6
9	8	45.000	52.138	11.961	1.309	4.393	19	0.0	200.0	26.6
10	1	116.563	186.218	32.919	3.554	16.342	32	0.0	1000.0	28.2
10	2	54.833	53.813	9.823	1.113	3.879	30	0.0	200.0	17.9
10	3	43.966	47.095	8.745	1.279	4.671	29	0.0	200.0	19.9
10	4	75.769	62.186	17.225	.849	2.683	13	0.0	200.0	22.7
10	5	28.846	35.635	9.883	1.003	2.439	13	0.0	100.0	34.3
10	6	36.538	52.160	14.467	2.235	7.291	13	0.0	200.0	39.6
10	7	40.000	52.990	12.157	1.494	4.646	19	0.0	200.0	30.4
10	8	47.895	53.047	12.170	1.149	3.872	19	0.0	200.0	25.4
10	9	91.667	223.681	52.722	3.689	14.953	18	0.0	1000.0	57.5
11	1	98.750	113.908	20.136	2.007	6.716	32	0.0	500.0	20.4
11	2	70.000	82.401	15.044	2.258	9.067	30	0.0	400.0	21.5
11	3	77.759	84.635	15.716	2.000	7.786	29	0.0	400.0	20.2
11	4	91.154	97.155	26.945	2.288	7.786	13	0.0	400.0	29.6
11	5	77.692	99.007	27.460	2.542	8.490	13	0.0	400.0	35.3
11	6	56.154	102.040	28.301	2.882	9.720	13	0.0	400.0	50.4
11	7	42.368	51.564	11.830	1.487	4.880	19	0.0	200.0	27.9
11	8	43.444	40.263	9.490	.308	1.402	18	0.0	100.0	21.8
11	9	47.500	39.800	9.381	.136	1.315	18	0.0	100.0	19.7
11	10	66.722	117.272	27.641	2.807	10.321	18	0.0	500.0	41.4
12	1	105.313	122.913	21.728	1.879	5.622	32	0.0	500.0	20.6
12	2	148.000	145.846	26.628	1.338	3.827	30	0.0	500.0	18.0
12	3	92.759	90.892	16.878	1.385	5.073	29	0.0	400.0	18.2
12	4	97.692	107.732	29.880	1.634	4.825	13	0.0	400.0	30.6
12	5	100.769	107.950	29.940	1.515	4.638	13	0.0	400.0	29.7
12	6	120.833	100.288	28.951	1.659	5.041	12	0.0	400.0	24.0
12	7	72.105	96.091	15.327	.709	2.874	19	0.0	200.0	18.5
12	8	75.833	59.691	14.067	.507	2.560	18	0.0	200.0	18.5
12	9	69.889	52.379	12.345	.346	2.759	18	0.0	200.0	17.7
12	10	88.444	112.336	26.478	2.652	9.942	18	0.0	500.0	29.9
12	11	101.667	112.559	26.530	2.358	8.761	18	0.0	500.0	26.1
13	1	69.219	92.670	16.382	3.201	14.883	32	0.0	500.0	23.7
13	2	42.833	74.785	13.654	3.610	17.343	30	0.0	400.0	31.9
13	3	43.621	47.577	8.843	1.276	4.591	29	0.0	200.0	20.3
13	4	53.077	77.489	15.475	1.292	3.759	13	0.0	200.0	29.2

13	5	47.692	57.265	15.882	1.339	3.927	13	0.0	200.0	33.3
13	6	54.231	55.741	15.460	1.223	3.726	13	0.0	200.0	28.5
13	7	35.526	55.651	11.620	1.855	6.088	19	0.0	200.0	32.7
13	8	46.769	59.151	9.228	.198	1.497	18	0.0	100.0	19.9
13	9	41.667	57.818	4.576	.423	1.749	18	0.0	100.0	20.8
13	10	61.111	113.115	26.574	3.160	12.433	16	0.0	500.0	43.6
13	11	62.778	61.607	14.568	.924	2.903	18	0.0	200.0	23.2
13	12	74.278	115.947	27.565	2.641	9.732	18	0.0	500.0	37.1
14	1	90.677	179.796	32.113	4.217	21.530	31	0.0	1000.0	35.4
14	2	181.379	199.443	37.036	2.568	10.295	29	0.0	1000.0	20.4
14	3	113.621	197.170	34.757	3.730	17.471	29	0.0	1000.0	30.6
14	4	107.308	97.401	27.014	1.925	6.343	13	0.0	400.0	25.2
14	5	80.769	107.522	29.821	1.962	5.976	13	0.0	400.0	36.9
14	6	90.833	116.565	33.592	1.507	4.177	12	0.0	400.0	37.0
14	7	108.947	218.509	50.129	3.529	14.421	19	0.0	1000.0	46.0
14	8	116.667	223.402	52.656	3.384	13.443	18	0.0	1000.0	45.1
14	9	142.722	239.027	56.104	2.708	9.505	18	0.0	1000.0	39.3
14	10	141.111	237.080	55.880	2.763	9.733	18	0.0	1000.0	39.6
14	11	152.778	235.179	55.432	2.692	9.505	18	0.0	1000.0	36.3
14	12	136.722	238.039	56.106	2.780	9.781	18	0.0	1000.0	41.0
14	13	107.333	225.140	53.066	3.424	13.587	18	0.0	1000.0	49.4

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