COMMUNICATION PATTERNS AMONG SHEEPFARMERS IN TWO NORTH ISLAND DISTRICTS OF NEW ZEALAND.

by

D. B. GIBBS

Thesis Presented in Partial Fulfilment of the Requirements for the Degree of Master of Agricultural Science at Massey University, Palmerston North.

December, 1970

ACKNOWLEDGEMENTS

The author wishes to thank Mr A.H. Hughes for his advice and guidance during this study. Thanks are also extended to Mr W.G. Payne, Miss M. Gordon and Professor R.E. Munford, for their helpful comments and assistance.

The assistance and support of the New Zealand Department of Agriculture from whom the author held a study award on full pay is gratefully acknowledged. Also the assistance of Head Office staff, in particular Miss R. Meldrum, (Assistant Librarian) in obtaining references and Misses B. Foggart and A. Parsonage who traced the figures and diagrams and arranged the printing is gratefully acknowledged, as is the assistance of the staff of the Rotorua and Palmerston North Offices of the Department of Agriculture.

The award of a research grant by Messrs Merck Sharp and Dohme (New Zealand) Ltd is also gratefully acknowledged.

Thanks must also be extended to the many people whose enquiries and interest in this study have been of encouragement to the author and particularly to the farmers in each survey area, for their willing co-operation and assistance during the farm surveys.

Finally thanks are due to Mrs M. Roderick, who typed this thesis and Mrs D.E. Halsey, for her willing assistance with the proof reading.

AUTOBIOGRAPHY

The author was born in 1941 and lived his first four years in Port Stanley, Falkland Islands while his father served there as Agricultural Advisor to the Colonial Government. When the family returned to New Zealand in 1947 his father took up a lectureship at Victoria University. The author's primary education was completed in Wellington and between 1956 and 1960 he attended Nelson College.

With the intention of taking an agricultural degree he enrolled for Agriculture Intermediate at Victoria University in 1961 and eventually decided to complete a B.Sc. degree there before carrying on to the Agricultural degree at Massey University. The B.Sc. degree was completed in 1964 and the author enrolled in the second year of the B.Agr.Sc. degree at Massey University in the following year. This degree, in the field of Farm Management and Economics was completed in 1967. During 1967 he held a bursary from the Department of Agriculture and in 1968 was posted as a Farm Advisory Officer to Rotorua.

An interest in the sociological aspects of extension and the influence of a farmer on his neighbours, which had developed during his last year at Massey University was fostered in Rotorua and resulted in an application for leave to undertake this study. A study award was granted by the Department of Agriculture and the author returned to Massey University in February 1969.

With the completion of this study the author has returned to farm advisory work with the New Zealand Department of Agriculture, stationed at Kaikohe.

TABLE OF CONTENTS

TABLE OF APPENDICIES

L I S T O F T A B L E S

LIST OF FIGURES

D E F I N I T I O N O F T E R M S

Acceptance - approval of, or agreement in principle with some practice or idea.

Active involvement with an information source - to actively seek a personal interaction or confrontation with a source of information.

Adoption - continued implementation or use (for a period) of some practice or idea.

Congruence - favourable disposition towards a new practice or idea as a result of familiarity with a functionally related practice or idea.

Farm Advisors, Extension workers and representatives of Commercial firms - are individuals primarily employed to provide advice, information and technical services to farmers. Extension workers include people such as Home Economists, Soil Conservationists and Specialist Advisers but the term has been used in a general way in this study to include all those individuals who serve farmers in an advisory capacity without emphasis on supervision or sales promotion.

Farming tradition - the practice and philosophy of farming, often specific to a particular area, which develops in a district.

Formal information sources - individuals or organisatio employed to provide advice and informatio to farmers virtually free of commercial influence or salesmanship.

Informal information sources - individuals, such as friends and neighbours, who are not employed to provide advice and information to farmers but from whom farmers may seek information.

Innovation - an idea or practice that is new because it differs from existing practices or ideas accepted in a defined situation.

Innovator - a person using an idea or practice which is substantially different from the generally accepted range of ideas or practices in a given area.

Monte Carlo simulation - a technique used to obtain a simulated sample. A simulated sample is usually taken because it would be either impossible, or too expensive to take an actual physical sample. The technique involves replacing the actual universe of items by its theoretical counterpart - usually described by some assumed probability distribution, and then sampling from this theoretical population by means of a random number table.

CHAPTER I.

I N T R O D U C T I O N.

Preface.

Farm Advisers, Extension workers and representatives of Commercial firms involved in the promotion of improvement or change in farming practices have been concerned with how widely their influence extends in a district. This concern has arisen for three general reasons:

(i) An attempt to determine the effectiveness of their efforts in order to decide if a change of methods or approach is necessary.

(ii) To provide material for records and reports required by administrators or controlling authorities.

(iii) For personal satisfaction (realisation that their job is indeed achieving its objectives and is a worthwhile one.)

Interest also centres on the role played by the extension workers' farmer contacts in further extending information. If these contacts are effective in extending information amongst other farmers then some duplication of effort by extension personnel could be avoided.

Scope of Study.

This study is concerned with the use of sources of information on several different farming topics by two geographically defined groups of New Zealand sheep farmers, one located south east of Rotorua and the other north west of Palmerston North. It seeks to determine the role of both extension personnel and individual farmers in supplying information on certain new farming techniques and materials within these two areas.

Consideration of some sociological factors that may affect farmer aspirations and their motivation to seek new information were also investigated.

Organisation.

Analysis of the responses obtained from a personal interview questionnaire administered to sixty farmers, forms the basis of this study which is organised into three broad categories :

(i) A review of literature pertinent to the diffusion, acceptance and adoption of innovations, including sources of information, family factors and motives affecting acceptance and adoption.

(ii) A discussion of the experimental method used. This includes choice, preparation, application and problems encountered.

(iii) An analysis and discussion of the results obtained.

CHAPTER II.

REVIEW OF LITERATURE.

Introduction.

A review of literature covering the dissemination, diffusion, acceptance and adoption of innovations and new practices, especially in rural situations, was made. The literature reviewed was chiefly from the fields of Agricultural Extension and Rural Sociology although some literature in the fields of Geography, Sociology and Anthropology were also included.

From this review of literature it became apparent that a specialised method of data collection would be required. A further review of literature concerning methods of data collection, questionnaire formulation, and interviewing was undertaken. Some of the more important conclusions drawn from this second review which formed the basis for the formulation and administration of the personal interview questionnaire actually used, are included but the review itself will be the subject of a separate paper.

SECTION 1.

Adoption and Diffusion.

Katz Levin and Hamilton (1963) defined the process of diffusion as the acceptance over a period of time of some specific idea or practice by individuals or other adopting units linked to a social structure with a given system of values or culture and specific information channels.

Inter-disciplinary Theory.

1. Anthropology.

The development of research into the process of diffusion is described by Rogers (1962). He points out that early workers in this field were anthropologists with an interest in "acculturation" studies (i.e. investigations of the acceptance and social consequences of modern Western innovations in primitive societies) and had initially considerable influence on the other sociological disciplines.

2. Geography.

This interest in "acculturation" has carried over to Geographers, most notably Hagerstrand (1967) who became involved with how the adoption of an innovation became widespread in a settlement, once it was introduced. Hagerstrand's study of diffusion is based on concepts of time and space. He considered that diffusion followed a pattern of :

(i) Local concentration of initial acceptances.

(ii) Radial dissemination outwards from these initial concentrations accompanied by the

rise of secondary concentrations while the original centres continue to intensify.

(iii) A saturation stage at which growth and diffusion ceases.

Keys (1969) suggests that as the diffusion pattern proposed by Hagerstrand is considered to be randomly determined within certain constraints, Monte Carlo simulation techniques can be used to formulate a probability type model of the diffusion process through space and time. Such models, however, have not as yet included analysis of personal characteristics of the population to which they are applied.

3. Sociology.

Rogers (1962) also credits the sociologist Gabriel Tarde with the suggestion that the adoption of new ideas follows a normal S-shaped curve over time. Rogers considers, however, that most of the early sociologists, with the exception of Raymond Bowers, did not emphasise the adoption process. Their interest was more toward defining the nature of relationships between interacting individuals, and from this inferring social networks and the organisation and theory of social institutions rather than elucidating the adoption/diffusion process. The networks of social relations and interaction are often depicted in the form of directed graphs or sociograms. Individuals are asked with whom they prefer to associate for specific activities or in particular situations. Responses show preferences and inter-group leaders who are deferred to by many. The general structure of such sociograms may help to determine the rate of spread

of an idea, or its path. However, as pointed out by Beal Bohlen and Raudabaugh (1962) although the sociogram may help to explain relevant social processes and institutions in a community it does not explain the underlying reasons for its structure.

Hinkle and Hinkle (1954) consider that the orientation of sociologists is swinging to more practical objectives and this is enhanced by the comments of Katz, Levin and Hamilton (1963). These workers consider that an interest by sociologists in the influence of mass media on social institutions has broadened with the result that there has been a revival of interest in the diffusion process. With this revival of interest has come an awareness of the considerable amount of literature available in the fields of Agricultural Extension and Rural Sociology.

4. Rural Sociology and Agricultural Extension.

It appears, from Gross, Wilkening et al (1952) and Jones (1967) that the development of research into diffusion and adoption in the Agricultural Extension and Rural Sociology fields arose initially from the interest of the U.S.D.A. Extension Service in evaluating the effectiveness of different methods of extension used by field officers.

Recently, Research has tended to concentrate on the importance of decision making and the time factor in the adoption and diffusion processes. This tendency may have been initiated as a result of the classical study of diffusion of hybrid Seed Corn in two Iowa communities by Ryan and Gross (1943). This study recognised that acceptance and adoption was a combination of several processes over a

period of time. They pointed out that the individual farmer appeared to progress from a stage of awareness of the new practice through a stage where he became convinced of its applicability to his situation so that he was prepared to try it. Assuming satisfaction was obtained from this trial, complete adoption followed.

The Adoption Process.

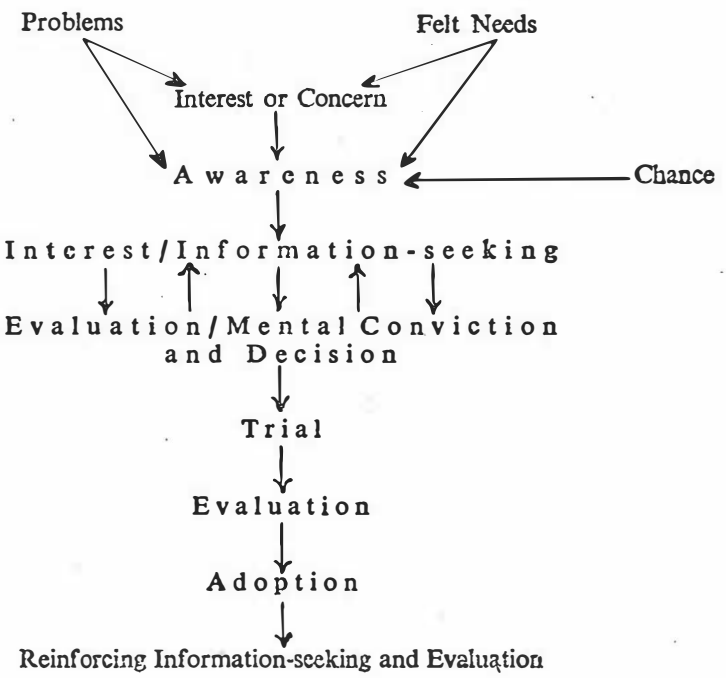
Wilkening (1953) proposed a paradigm of this process which has become known as the acceptance or adoption process. Wilkening's paradigm consisted of four stages; initial knowledge about a practice, its mental acceptance as a "good idea", its acceptance on a trial basis and finally its adoption. Reconsideration of Wilkening's initial outline resulted in the division of his first two stages into three. The resulting five stage process is now widely accepted possibly due to the wide circulation it was given particularly by the Sub-Committee for the Study of the Diffusion of Farm Practices, an adjunct of the North Central Rural Sociology Committee. Beal and Bohlen (1957) present a precise account of the various stages of the five step adoption process. The steps have been termed awareness, interest, evaluation, trial and adoption stages, and were derived on a purely theoretical basis. Beal, Rogers and Bohlen (1957) tested the concept of the five stages and concluded that they were, in fact, meaningful.

Campbell (1966) however, argues that the model tested by Beal, Rogers and Bohlen is not precise enough in its definition of the starting point in the adoption process

and neither does it allow for irrational decisions either to adopt, or reject a new idea. Hassinger (1959) also discusses the problem of why awareness arises and suggests that perhaps awareness is not the most important step in the adoption process. He suggests that extension efforts should be educative and directed toward problem solving thus initiating the adoption process by overcoming doubt or dissatisfaction with the new idea or practice.

Jones (1967) has developed a modification of the traditional five stage paradigm of the adoption process which makes some allowance for these criticisms, (Fig. 1).

Fig. 1 The Adoption Process.



Source, Jones (1967) p.9

Jones also points out that the majority of agricultural innovations are to some degree substitutes for alternatives for existing practices which must be discarded

for adoption to be complete. However, there have been few studies of this phenomenon. Similarly few studies have sought to determine reasons for non adoption.

(a) Acceptance but non-adoption.

Both Hassinger and Campbell raise the question of the individual who, after due consideration of a new idea or practice, fails to adopt it for either rational or irrational reasons. Such individuals are, in the traditional model of the adoption process, regarded as non adopters even though they may have proceeded part way through the adoption process. As Sheppard (1963) has noted, farmers who have not adopted some new idea or practice are seldom given an opportunity to explain why not. There may be technical as well as attitude of mind reasons for non adoption. Wilkening (1958) is the only other worker the author has come in contact with who questions the attitudinal counterparts of adoption. Tully, Wilkening and Presser (1964), Havens (1965) and Rivlin and Fliegel (1967) do, however, question the perception an individual may have of a new idea or practice and of its place in his system of farming. Wilkening (1958) appears, to the author, to be the only worker who makes any distinction between acceptance and adoption of a new idea or practice, although Wilkening, Tully and Presser (1962) appear to acknowledge a difference.

(b) Acceptance - adoption, synonymous?

It is this author's contention that acceptance and adoption can not be used as synonyms in discussion of the diffusion of new ideas or practices. Acceptance implies a change to, or development of, a favourable mental attitude

toward some new idea or practice and as such cannot be measured simply by observation or perusal of physical records. Adoption, however, implies some form of action which is manifest and hence can be recorded by observation or perusal of records.

Wilkening (1953) in his paradigm of the adoption process made some allowance for the attitudinal aspect of acceptance and adoption by calling one of his stages "Acceptance of practice as 'a good idea'". However no paradigm has as yet allowed for the situation where a new practice is thought to be "a good idea" but is not adopted.

(c) Requirements for adoption.

Adoption will generally involve some form of change, which may include, according to Bohlen et al (1955) -

(i) a change in the amount of human effort,

(ii) change in the amount of capital or physical material required,

(iii) change in manipulative skills,

(iv) change in management ability.

It is obvious that an individual could, while mentally accepting a new practice, rationally fail to adopt it because in his particular individual circumstances it is inappropriate or he feels he does not possess the resources required to effect one or several of the types of change required.

For the individual to overcome his concepts of inadequacy, extension needs to have provided him with the tools of the learning and decision making processes so that the changes that adoption of a practice will require are

seen to be possible, or the means of achieving them are readily obtainable (Campbell (1962)).

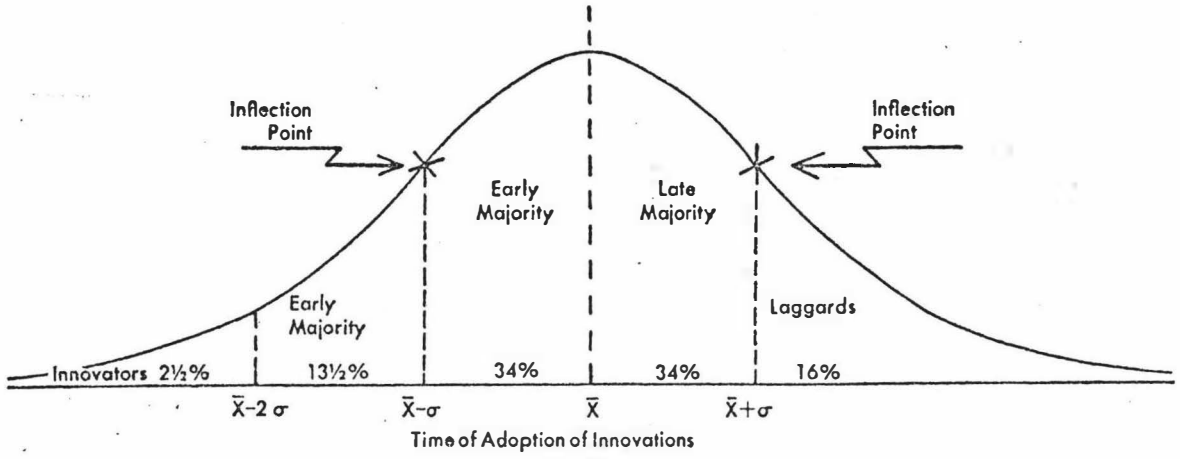
The Diffusion Process.

Acceptance and adoption are processes occurring over time and Ryan and Gross (1943) stated that their adoption data appeared to follow an "S" shaped curve over time. They found that there was a wide difference between their data and a normal frequency distribution and doubted if the normal distribution could be applied to what they termed diffusion studies. A diffusion study being the study of the spread of a new idea or practice through a community over time.

(a) Use of normal distribution curve.

In spite of these doubts as to the validity of the use of the normal distribution curve to describe the process of diffusion, it has become entrenched as a useful heuristic device. Rogers (1958) used it to categorise mathematically individual adopters according to their relative time of adoption. This he achieved by calculating the mean time of the diffusion process and dividing the area under a normal distribution curve into segments on the basis of standard deviations from the mean. See Fig. 2.

Fig. 2 Categorisation of Adopters on the Basis of their Relative Time of Adoption of Innovations.



Source, Rogers 1962 p. 162

Rogers termed the earliest 2½ percent (i.e. beyond two standard deviations from the mean time of adoption) innovators, the next 13½ percent between one and two standard deviations from the mean early adopters. The centre segments within one standard deviation on either side of the mean covering 68 percent of the total population he termed the early and late majority, while the final 16 percent were termed laggards.

Factors Affecting Adoption.

(a) Personal Characteristics.

With this definition of various stages or time sectors within the process of diffusion numerous workers including Bohlen et al (1955), Beal and Bohlen (1957) Lionberger in many papers from 1953 to 1960, summarised in his book "Adoption of New Ideas and Practices" (1960) and Rogers (1962) have related different information sources and personal characteristics to each sector.

Much work has centered on these features which are considered to differentiate the various adoption groups, and have been used in comparison of adoption rates in different communities. Ryan (1948) discussed community features with regard to the rapidity of adoption of Hybrid seed corn in Iowa, Copp (1956), Lionberger and Coughenor (1957), Gross (1949), Gross and Taves (1952), Rogers (1961) and Wilkening (1952) (1954) all discuss personal and family factors considered to influence adoption.

(b) Profitability of adoption.

Griliches (1960 a,b) is one of the few authors who have emphasised the economic consequences of adoption. He considers that the absolute profitability achieved by adoption of a new practice as compared with one it supersedes will govern the rate of adoption. Hence he argues that Brandner and Strauss (1959), who credited the rapid spread of hybrid sorgum in Kansas as being a result of congruence or prior experience with a similar innovation, failed to appreciate the profitability aspect. They argued that hybrid sorgum was an economic necessity in South West Kansas and hence assumed that since it was better than any other crop there, it would be rapidly adopted. However, its adoption proceeded more rapidly in the more fertile corn areas of the North West which suggested to Brandner and Strauss that this was due to the farmers' favourable experience with hybrid corn and not as a result of profitability. Griliches (1960 b) concludes that although congruence may be a factor the North West Kansas farmer who is in a high crop yielding area would obtain a

much greater absolute yield by switching to hybrid sorgum than his compatriot in the lower yielding South West Kansas and hence his profit motive is greater for adoption than a farmer in the South West.

Motivation.

(a) Theory.

The concepts of motive and motivation are subjects of much continuing research. Numerous psychologists have suggested various theories of motivation with the result that no single precise definition has been evolved. There appears to be a general concensus among psychologists that a motive is an activity arousing state which acts to direct and maintain an individual's behaviour toward a specific goal (Chaplin 1968). Newcomb (1964) suggests that a goal is a form of motive imposed or conditioned by environmental situations in contrast to a drive which is considered to have a biological basis. A motive is not an observable entity but rather an inference or hypothetical construct used to account for an individual's behaviour, although it can also be applied to group activities as well. Murry (1955) lists the various needs he considers influence motives and Haller (1968) discusses the cognitive aspects of goal directed or motivated behaviour generally referred to as aspiration. However, with regard to the rural situation very little research has been carried out on the question of farmers' motives or aspirations.

(b) Farmers' Motives.

Ashby (1926) considered that the concept of the "economic man" whose sole interest was that of self, and seeking material gain is not generally true of farmers. He suggests that five instincts or emotions which may influence farmers' motives are -

(i) Fear - in the form of privation and of uncertainties in both weather and market prospects.

(ii) Parental instinct - results in a continuing shielding of offspring from responsibilities, through into adulthood (e.g. Father and son farm where father (70 years) refers to son (50 years) as "the boy".)

(iii) Instinct of acquisition - a desire to acquire wealth in either economic terms or simply because of pride of possession.

(iv) Instinct of construction - is chiefly related to one's concepts of self as exhibited in attempts to achieve craftsmanship-like ideals and efforts. It is often noted particularly in pride of stockmanship.

(v) Emulation - a desire to excel or do well especially in comparison to others, this being known as ambition.

(c) Role of Money.

Ashby notes that the desire for wealth is often desired as a proof of success rather than for its own sake.

Also such a desire for wealth or economic advantage may be for the achievement of economic advantage for the family rather than the individual. Blum and Naylor (1968) discuss the role of money as a motivating influence and conclude that of itself it does not have an overall motivating influence. This contention is also borne out by Gellerman (1968) who considers that for money to have a major motivating influence in todays affluent society it would have to be made available in considerable sums.

(d) Research into farmer motivation.

In spite of a general interest in motivation little experimental work has been carried out in the Agricultural field. Neill and Rogers (1963) describe a method of testing for achievement motivation or ambition and Emery and Oeser (1958) discuss past experiences or urbanisation as an influence upon motivation to seek information. Wilkening (1954) discussed farm family values as they influence decisions on alternative courses of action on the farm. Generally family factors were placed before farm factors except in a few cases where the farm item was regarded as a means to family objectives.

(e) Influence of neighbourhood norms on the individual.

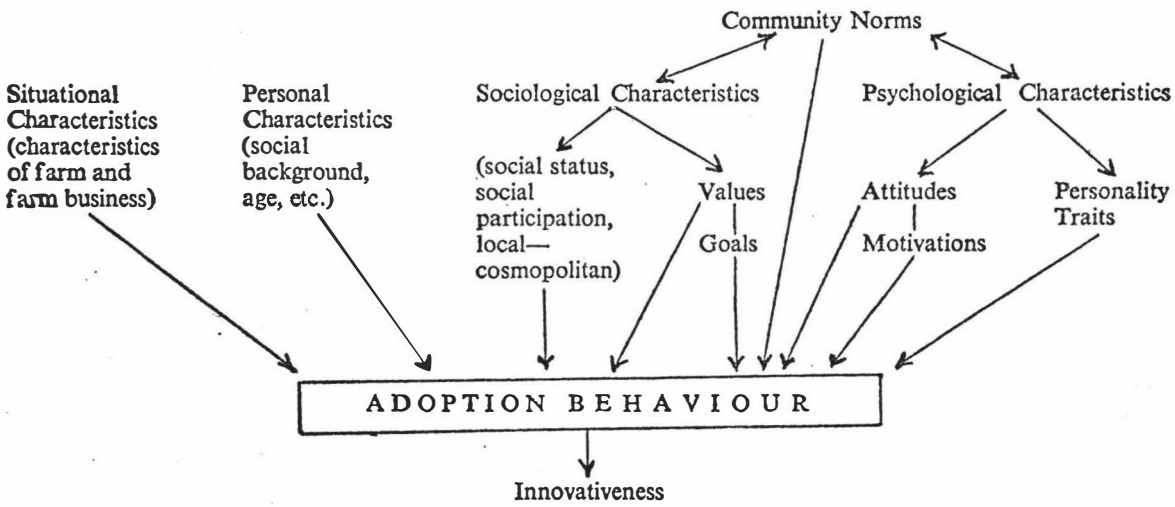
Neighbourhood and group influences upon the individual have also been considered especially by Lionberger (1953, 1954, 1959, 1960), Marsh and Coleman (1954 a.b.c), Rogers (1962), Tully (1966 a), and Wilkening (1952). These studies all suggest that adoption is enhanced when the community norms are favourable towards change and innovativeness. Communities with a very rigid social

organisation and few outside contacts were considered to be less favourably disposed toward change and also less likely to be aware of new ideas and practices.

Summary of the Adoption and Diffusion Processes.

Jones (1967) summarised the results of research to date on adoption and diffusion and derives a simplified paradigm (Fig. 3 below). This indicated the main groups of factors which research studies have shown to be related to farmers adoption behaviour and to their position in the diffusion process.

Fig. 3 Summary of Factors Influencing Adoption and Diffusion.



Source, Jones (1967) p.16

Jones' general conclusions were -

(i) The larger the farm enterprise or business and the more specialised it is the sooner the farmer tends to adopt new or improved practices.

(ii) Innovativeness appears to be related to several personal characteristics. The relationship to age or number of years farming appears to be inconsistent but there were positive relationships to a relatively high level of education and the existence of non-rural experience in the individual's background.

(iii) Correlations have also been found between sociological characteristics and innovativeness. For example the more cosmopolitan the farmers social life and contacts are, the more innovative he appears to be. Similarly the higher his social status and the greater his participation in social activities especially outside his own locality the more adoptive rather than innovative he tends to be.

(iv) Aspects of the individuals personality, his attitudes and motivations influence his innovativeness. Favourable attitudes towards change, innovations and the use of credit all appear to be correlated with earliness of adoption.

(v) A congruence of the above features with the norms and attitudes of the community enhances early adoption.

The above summary lists features which may be termed the social controls on adoption and diffusion of new or improved farming practices. However, basic to diffusion

is communication.

Information and Communication Channels.

There has been considerable research into the extent to which various channels of communication are used at various stages of the adoption process. Most of the authors cited previously have included some discussion of this.

(a) Classification.

Generally communication channels have been grouped into three forms (Jones 1967).

(i) Mass media includes radio, T.V., newspapers, journals, etc.

(ii) Personal contact with professional advisers, technical representatives or extension personnel, either individually or in group situations.

(iii) Interpersonal contacts between friends and neighbours, these usually being other farmers.

This classification differs slightly from that proposed by Wilson and Gallup (1955) who proposed a classification in terms of the method used. The classification suggested by Jones appears to coincide more closely with the divisions observed in current literature.

(b) Role of various channels.

These divisions have been tied into the various sectors of the diffusion process proposed by Beal and Bohlen (1957) and Rogers (1958). These workers suggest that as

progress is made through the adoption process the importance of impersonal and technical channels of communication falls off and interpersonal social - neighbour type contacts are more important. The same trend is also considered to occur through the diffusion process.

Innovators and early adopters are considered to make greater use of impersonal and technical communication channels while later adopters use more personal channels. Young and Marsh (1956) also came to this conclusion after studying the results of five years of adoption surveys in Kentucky.

(c) Conflict of terms.

Sheppard (1965) has suggested that communication channels should be more finely defined in terms of the medium of communication and the source from which it comes. He feels that the terms medium and source may also be misunderstood and suggests the use of method of communication and communicator. As an example of this dilemma he uses the instance of a technical exhibit at an Agricultural Show - is this a medium or a source of information? Sheppard would suggest it is a medium since it is transmitting data from a research station source. The overall effect of this general research into information sources used in the diffusion process has been to suggest that advisers and other personnel wishing to gain acceptance or adoption of new ideas or practices should use those methods of communication which are applicable to the various stages of the adoption process.

(d) Quantity and quality of information.

Smith (1964) argues, however, that intensity of an information source has a major bearing on its effectiveness. Intensity of an information source he considers to be a composite of the number and quality of stimuli originating from an information source. Although research reports mention the percentages of different information media named as first sources of information, Smith points out that the intensity of information available about some topic can vary considerably according to the source of information. This difference arising due to the different interests of the various information sources or in Sheppard's terms "communicators".

(e) Intensity of information.

The degree to which some source of information is used by farmers appears to depend upon the intensity of that source. Increasing the intensity appears to result in an increase in the use made of that source as was observed in the Michigan Township Experiment. This experiment involved decreasing the ratio of farmers to advisory officers in five townships from 2-4000 farmers per officer by appointing five officers to work with from 49 to 175 farmers each. In comparison with other officers in surrounding districts dealing with farmers on the high ratio level the work load increased twenty-five times for the officers serving smaller numbers of farmers.

(f) Communication methods.

Wilson and Gallup (1955) have defined methods of communication according to the number and nature of the

contacts inherent in their use, (i.e.) Individual Methods, Group Methods, and Mass Methods. They consider the general effectiveness of the various methods, but make no attempt to relate the effectiveness of each method to the various stages of the adoption process. The contention that there is a variation in the effectiveness of each method at different stages of the adoption process is implied by Beal and Bohlen (1957) who refer to both communication channels and methods of communication simultaneously.

While their discussion no doubt consolidated the general contention that mass methods of communication are most effective at the awareness stage and individual methods at the trial and adoption stage it must be remembered that they were not explicitly discussing communication methods.

This contention that at certain stages in the adoption process only particular communication methods are appropriate is disputed by Smith who quotes an example where increased intensity of information communicated by mass media methods had a marked effect at the trial stage of the adoption process where theoretically it is supposed to have little influence. The point is made that the information supplied at this stage was qualitatively more detailed than that distributed at the early stages of the programme. Presser and Russel (1965), however, feel, in common with many other researchers, that more personal methods of communication are more effective at the later stages of the adoption process. However, no other workers appear to have made the differentiation that Smith has of the quality of information supplied by mass media methods

at various stages through the adoption process.

New Zealand practice: In the author's opinion in the New Zealand context advisers and extension personnel do not appear to have adjusted their methods to those proposed by the theorists for use at each stage of the adoption process. The New Zealand adviser tends continually to use all methods to varying degrees (i.e. uses a method media mix) the proportions in which they are used depending in part on his particular skills in using the various methods and media and in part on his assessment of the appropriateness of the various methods in conveying the information required.

Face to face contacts have been suggested by McMillion (1960) as being apparently the most effective means of communication in New Zealand but in the author's opinion the influence of group and mass media must be considerable, if the number of farm discussion groups and the size of attendance at technical farmers' conferences is considered. Also the reading and listening habits of New Zealand farmers as suggested by surveys by Hockey (1962), Chu (1967), Hill (1967) and Hughes (1967), appears to indicate a farming population which, compared with that of other countries, is relatively well aware of change and progress and prepared to make an effort to become informed.

(g) Contacts with "other farmers".

Beal and Bohlen (1957) suggest that contact with other farmers is an important source of farm information especially in the later stages of the adoption process. However research on the extent and impact of such contacts is limited.

The influence of other farmers as sources of information will depend partly on what is known of the "other farmers'" practices. As Sheppard (1963b) points out if a new idea or practice is put into operation where it can be readily observed there is greater likelihood of the individual farmer being used as a source of information than if the practice is in the "back paddock" or is not sufficiently novel to be noticed by the casual observer.

(h) Characteristics of individuals sought as sources of Information.

Hay and Ensminger (1949), Lionberger (1960), Marsh and Coleman (1954a), Mason (1963, 1964), Wilkening (1950, 1952), and Young and Coleman (1959) describe characteristics of individuals who are sought by others as sources of information. This interpersonal flow of information has led to the suggestion by Katz (1957) of a two step flow of communication. Those more "exposed" to external media may act as opinion leaders or influentials on others not so exposed to external information media. The early adopters and innovators perform a leadership function which Jones (1964) divides into three types - the innovator, the communicator and the legitimiser. This discrimination allows for a feature observed by Tully (1966 b) and also mentioned by Rogers (1961), in which early adoption by an individual resulted in his being considered a deviant in farming matters by his neighbours and hence his rejection as a source of information. Jones' "legitimiser" may be a later adopter than the innovator and also may be considered a farming authority in the area so that his action of adoption puts a "stamp of approval" on the new idea or

practice. The research generally would suggest that farmers are prepared to seek information from any other farmers regardless of relative social positions, but in the final analysis the social structure, family and group norms of an area determine who is sought as an interpersonal source of information.

Conclusions.

(a) Relevance of paradigms.

Research into the spread of new ideas and practices has provided two useful concepts - the paradigms of adoption and diffusion. These have formed a basis to which work on social and personal characteristics, information sources, and communication media have been related. The relevance of such work to the field of agricultural advice and extension is obvious, especially in the light of the expanding World population and its demands for increasing outputs of agricultural products. Ultimately such demands will only be met by the use of new or improved agricultural techniques or practices which will require diffusion among and adoption by farmers.

(b) Further research.

Some fields in which research appears to be deficient include consideration of the motivating influences on farmers, through which enhanced adoption rates may be achieved. Related to this is the problem of acceptance but non adoption which has generally been disregarded. Finally further work on the role of different communication media in the diffusion process especially with reference to the intensity of use, may be rewarding.

SECTION 2.

Further Review of Literature.

As mentioned on page 3 the author found it necessary to make a further review of literature concerning methods of data collection, questionnaire formulation and interviewing. The following discussion is a very brief summary of this review covering points of particular relevance to this study.

Methods of Data Collection.

The literature would suggest that the various methods of data collection could be divided into two general categories; those involving varying degrees of personal contact between researcher and respondent and those of an impersonal nature. Gallup (1959) briefly lists the advantages and disadvantages of the various methods.

(a) Criteria for selection of method.

The method finally chosen must naturally be the best for achieving the objectives of the study, given the types of device used to obtain the data, the method of contact and representativeness of the respondents and the time and resources available.

Measurement of Knowledge, Skills and Attitudes.

Data required may be purely in the form of physical records. However, the knowledge, skills or attitudes of the respondents may be required. Knowledge can be measured by direct questioning and skills by observation, although measurement of the skill of management is difficult and, in

fact, has not been adequately resolved as yet. Attitudes however, constitute the most difficult field from which to obtain valid information. There is continuing discussion and research into methods of measuring attitudes with the result that the method used is governed partly by the objectives of the study and partly by the training of the researchers.

(a) Osgood's semantic differential scale.

It appeared from the literature that an attitude evaluating technique known as the Semantic Differential would be the most suitable device to use in attempting to evaluate farmers' attitudes to a number of commercial firms which manufacture stock remedies and veterinary products. Clevenger, Lazier and Clark (1965) actually discuss the use of the semantic differential in this way and suggest that it was more sensitive than other methods of measuring the image of two prominent corporations.

Semantic differential scales were initially used in the determination of word meaning (Osgood 1953). However, its use as a method of attitude measurement was expounded by Osgood Suci and Tannerbaum (1957). They contend that attitudes can be attributed to some basic continuum with a neutral or zero central reference point and two opposite extremes at either end. Hence both direction and intensity of attitude can be quantified on a bipolar continuum.

Procedure: The respondent is presented with a set of descriptive polar terms (e.g.)

rough . . . . . smooth

good . . . . . bad

weak . . . . . strong

and a concept (e.g.) a worker's performance, and asked to indicate the degree to which the concept is like one or other of the polar descriptors. This is indicated by marking the appropriate point on a line joining the polar descriptors. In this way both direction and intensity of the association between the concept and the polar descriptors is obtained.

With a series of bipolar adjectives the distribution of the respondents judgements serves to differentiate the attitudinal aspects of one concept from another. Also using the same concept and series of adjectives differences in attitude among a number of respondents can be analysed.

(b) Criteria for selection of a measuring device.

When constructing an evaluation device a number of criteria must be considered. These include the validity of the device, its reliability, objectivity, practicability and simplicity. The degree to which these criteria are met will depend chiefly on the degree of accuracy required within the limits of the resources available.

Questionnaire Formulation.

The final formulation of the questions used, of which there are several types, is covered in great detail by Payne (1951). Basically attention should be given to ensuring that the questions retain a unanimity of interpretation among all respondents. To this end the use of words and concepts commonly used and understood by the respondents is vital. Leading questions should be avoided as should a question order which predisposes answers. A

general suggestion is to proceed from the general to the specific with question order.

Interviewing.

In the face to face situation the approach of the researcher and his method of presentation of the questionnaire will have considerable bearing on the successful completion of the questionnaire. The literature suggests that a friendly non-judgemental approach is best. Adequate identification both of the purpose of the survey and of the person undertaking it also helps acceptance.

Questions must, of course, be asked exactly as set out in the questionnaire. If probing is required it would appear that some training is necessary to avoid biasing responses.

(a) Acceptance or refusal.

The literature suggests that fear of a large number of refusals is unfounded if a friendly approach with adequate identification is used and the anonimity of the respondent stressed.

Conclusions.

This brief summary of the review of literature concerning methods of data collection and interviewing provides the basic concepts upon which the final questionnaire used in this study was formulated.

Researchers intending to conduct any form of sociological study will find Festinger and Katz (1953)

and Sellitz, Jahoda et al (1960)both provide a much more detailed set of useful guiding principles. However this author does not consider these two texts stress adequately the necessity for the intending researcher to have a very clear idea of his objectives and the type of information required to fulfil these objectives. With clear objectives the researcher is better able to recognise if the general principles or suggestions offered by the texts will require any alteration to allow for the local conditions and requirements of a specific survey.

Also these two texts could lay much greater emphasis on adequate and exhaustive pre-testing of the questionnaire and of the methods of analysis. This will help pinpoint any shortcomings in the methods used or gaps in the information collected and may highlight the necessity to record and identify volunteered information which might initially be thought to be beyond the scope of the questionnaire.

Adequate pre-testing of the methods of analysis should also simplify the final analysis and reporting of the results.

Finally, if the researcher has little or no interviewing experience he would be well advised, if he intends to use an interview method, to make some reference to an interviewers' manual prepared by V.V. Monroe and a "Manual for Interviewers" prepared for the U.S.D.A. by the Survey Research Centre of the University of Michigan.

CHAPTER III.

EXPERIMENTAL METHOD.

Introduction.

This study of the use of information sources and the role of extension personnel and individual farmers in disseminating information on certain new farming techniques required the use of a wide ranging method of data collection. Some use was made of sociometric techniques but information was also sought about farmers aspirations, family circumstances and general farming practices.

Method of Data Collection.

From a review of literature it was apparent that the attributes of a personal interview questionnaire gave it an advantage over other methods of data collection for this particular study.

(a) Advantages of Interview Questionnaires:

The advantages of a personal interview technique were seen as:-

(1) The researcher can observe and study the respondents more directly

(2) Questionnaires provide a more valid comparison between respondents since they answer each question in the same order and context (i.e. the same standardised method is used with all respondents).

(3) Annotation of responses is simplified by the use of a questionnaire.

(b) Disadvantages of Interview Questionnaires:

The disadvantages of a personal interview questionnaire were not considered to outweight the advantages, but are listed briefly:

(1) Expense in time and transport involved in contacting respondents and completing interviews. These were reduced in this study by the fact that respondents in the two areas were all neighbours and therefore reasonably close together.

(2) Interviewer variability - in this study is a constant variable as the author was the only interviewer involved.

(3) Lack of flexibility in following up unusual replies imposed by the use of a questionnaire. This was reduced through careful planning and pre-testing of the questionnaire and the provision of many probing "reason why" type questions.

(4) A tendency to only record responses considered to be directly relevant to the questions because the researcher under-estimates the possible significance or value of

additional volunteered information and comment. This could be overcome by providing adequate spacing between questions to record volunteered information and ensuring the interviewer keeps complete notes of all replies and comments.

Questionnaire Formulation.

(a) Categories of Information:

Nine hypotheses were formed on topics which were considered to have an influence on the subject of this study (See Appendix A). In order to obtain information to test these hypotheses information in three broad categories was sought from each farmer respondent. These three categories were:

(1) General farming practice and systems of management.

(2) Personal attitudes to sources of information, and motivation in seeking or accepting advice.

(3) General sociological background of the respondent and his family including their aspirations, education and social participation.

(b) Questionnaire Organisation

Within this frame-work imposed by the hypotheses and the categories of information required a questionnaire was formulated (Appendix B) along guidelines obtained from a survey of literature, (bibliography of which is included as Appendix C).

The questions were placed in a sequence which, it was hoped, would enhance rapport. Specific questions concerning sources of information were included where they arose naturally during the course of questioning on a specific topic or farm practice. Therefore the questionnaire can not be divided into three distinct parts corresponding to the categories of information required.

(c) Questionnaire Contents

The questionnaire contains sections dealing broadly with:

(1) General farm situation, including area, topography, subdivision and race systems, ownership and finance.

(2) Field husbandry including crops grown, grazing systems, chemical methods of pasture renovation, fertiliser and trace element use, nitrogen use and silage making.

(3) Ranking of preferred information sources.

(4) Live stock figures.

(5) Sheep management policies including selection, ewe hogget mating, lambing and grazing management, disease problems, remedies used and the influence of advertising on these.

(6) Cattle management policies including bull selection, mating yearling heifers, autumn calving, disease problems, remedies used and the influence of advertising on these.

(7) General management including the keeping and use of records, budgeting and assessment

of future problems.

(8) Personal information including non farming experience, age, education, marital status, children, educational and vocational aspirations for children and self. The role of family in decision making on farm problems, attitude to discussion of farm problems and techniques with visitors, attitudes to innovators and ideas on public image.

(9) A series of hypothetical situations involving conflict between farm and family oriented values with respect to education, finance, labour and vacations, derived from Wilkening (1954).

(10) Participation and involvement in formal and informal organisations and social contacts.

(11) Degree of contact with various forms of advisory media.

(12) An attitudinal measure of the image of a number of Government departments and Veterinary product manufacturers obtained through the use of an Osgood Semantic Differential Scale.

(d) Subdivision of Questionnaire

Inspection of the questionnaire will show that although these broad sections do occur there is no definite division between sections. This is deliberate as the literature suggested rapport between the researcher and

the respondent was more readily maintained if the interview could proceed smoothly like a conversation without abrupt changes of subject. Such changes are more likely to occur if some strict division into different sections is attempted.

(e) Question Sequence

Considerable care was taken with question sequence. This was particularly so where respondents were asked to name both other farmers carrying out a practice and also to whom they would go for more information about the practice. It was considered there could be a predisposition to name farmers carrying out a practice as also being sought as sources of further information. Where questions were asked in this order they were separated by two or more questions relevant to the topic in the hope that any predisposition would be reduced. However it was considered if questions concerning information sources were asked first, the predisposition also to name any farmers that were mentioned as being users of the particular practice was negligable, since use implies an observable fact.

It should be noted the wording of questions seeking sources of information was such that the answers can only be interpreted as a prediction of the possible sources which might be used, if respondents decided to seek further information on a particular topic. The sequence of questions in the cases mentioned above were varied throughout the questionnaire in order to prevent the respondent recognising the question sequence and anticipating the next question. Also the literature suggested a variation in order helps to maintain the interest of the respondent.

(f) Question Type

Various types of questions were used in the questionnaire, not only to provide variety and interest but also to aid annotation afterwards. Where possible, coding of alternative replies was included in the preparation of the questionnaire. This meant that, where possible, simple "yes - no" type questions or multiple choice questions were used in preference to completely open ended questions. However, in many cases although the question had been coded into the form of a multiple choice question it was asked as an open ended question and the response assigned to one of the categories which had been pre-defined. A specific example of this method is question number 84 regarding cattle policy. The question was asked simply as "What is your cattle policy" and the reply assigned to one of the categories listed, or if none were relevant, noted and categorised later. The various alternative categories provided for in pre-coding the questions were derived by the author on the basis of his past field experience with farmers. However, allowance was also made for alternatives which had not initially been considered.

"Flash cards" were provided for three questions which required a ranking in order of preference of a number of alternatives. These were questions 45, 46 and 141.

(g) Question Wording

Considerable time and thought was applied to the problem of question wording in an attempt to ensure there would be unanimity of understanding between all respondents. This involved consideration of synonyms of some words in an effort to find those which were relatively simple and easily

understood, and which could be assumed to be in common usage within the survey areas.

Many questions were rephrased during the early stages of formulating the questionnaire to avoid leading questions or any implication of "right" or "wrong" responses.

(h) Special Sections

Two specific sections of the questionnaire for which further explanation is considered necessary are section eight, concerned with a series of hypothetical situations involving conflict between farm and family values and section eleven concerning the use of the Osgood Semantic Differential Scale to evaluate attitudes towards a number of Government Departments and Veterinary Product Manufacturers.

Hypothetical Situations: The questions in section eight were derived from those used by Wilkening to assess farm family values as reported in 1954. He considered that values exhibited on family matters would influence the motivation to adopt or reject changes in farm technology. The author considered that Wilkening's ideas on the role of the farm family were reasonably applicable to the New Zealand situation. Wilkening's approach appeared to be a useful method of assessing farm family values. Therefore, with some modification for New Zealand farming conditions most of the questions posed by Wilkening were also applied to farmers in this survey.

Osgood Semantic Differential Scale: The Osgood Semantic Differential Scale, or list of bipolar adjectives used were derived from a scale prepared by McArthur in his

unpublished lecture notes for Lincoln College B.Agr.Sc. candidates (1964). Two pairs of bipolar adjectives were added to McArthur's scale with the aim of including an assessment of the integrity of the various departments and manufacturing companies being considered. The words added were, honest/deceptive and reliable/unreliable.

It was decided to reduce the width of the intensity scale from the more usual seven segments to five. It was considered this would bring out strong opinions more sharply because of a reduction in the "middle ground" area of weak associations.

The order of the pairs of adjectives was similar to that derived by McArthur. However, allocation to either side of the scale of each adjective of a pair was achieved through the use of random numbers. All the adjectives considered to be favourable or approving were listed on the left hand side and assigned numbers from a table of random numbers. Those pairs of adjectives with an odd number were then reversed with the result that half the favourable or approving adjectives on the left were replaced by their opposite disapproving forms. This was done to avoid a respondent marking one degree of association with a vertical row of checks without some consideration of each pair of adjectives.

This measuring device was included because, with the requirements of the Stock Remedies Act (1967) and the necessity for most veterinary products to be registered, it was felt that the efficacy of most products, for example sheep drenches, would be very similar. Also because of competition, prices of similar products would be virtually the same. Therefore, it was considered that the impact of

quality or price may not have as great an influence on the decision to use one product in preference to another as is generally supposed. The influence of advertising, sources of information other than advertising and the attitude of the respondents towards the different manufacturers may all, in varying degrees, influence the choice of one product in preference to another. Hence the inclusion of a measure of attitude towards the various manufacturers.

The opportunity was also taken to ascertain the attitudes of the respondents to three Government Departments with which they may have had some contact, especially in the Reporoa survey area.

Pre-testing.

(a) First Pre-test.

The completed questionnaire, with the exception of sections four, nine, eleven and twelve concerned with livestock figures, hypothetical conflict situations, the degree of contact with advisory media and the Osgood Semantic Differential, was pre-tested on three sheep farmers in the Pahiatua-Manawatu districts. These farmers were personally known to the author and readily made time available for an interview at very short notice. Complete answers obtained to the questionnaire from these farmers were not recorded, but notes were made of the difficulties encountered with each question and the extent to which probing was required to obtain an adequate response.

(b) Alterations.

As a result, four questions which provided information on farm water supply, shelter and the distance

from a general store were deleted as it was considered this physical information was irrelevant. Questions asking for the ranking of information sources on specific topics were deleted and a general question substituted. This general question was itself split into two parts to accord in some degree with the general theory of the use of information sources at various stages in the adoption process. The two questions involved are numbers 45 and 46.

The questions concerned with methods of control of various diseases in sheep and cattle initially consisted of a longer list of diseases. It was found that some of the diseases listed rarely occurred and the overall length of each list was too long to retain the respondents interest. Therefore the list of sheep diseases was reduced by deleting sleepy sickness, bearing troubles, milk fever and tetanus, and the list of cattle diseases by deleting brucellosis, milk fever and leptospirosis.

An attempt was made to measure the respondents attitudes to a number of veterinary product manufacturers by asking them to rank the companies in order according to the respondent's idea of their relative reputations as manufacturers. This question completely failed to obtain a meaningful response. If a ranking was obtained and respondents were then asked to explain why one manufacturer was placed ahead of another the ranked order was invariably altered, or, no explanation of the order could be made. Consequently, it was decided to use a more indirect method of achieving this ranking by using the Semantic Differential.

Finally a question which sought to define the respondent's aims in terms of group and family values and social norms gave inconclusive responses and was deleted.

It was replaced by the series of questions involved in section nine covering hypothetical conflict situations and asking for a ranking of which of five family goals or values meant most to the respondent.

(c) Second Pre-test.

With these major alterations to the questionnaire and some minor changes of wording and question order the modified questionnaire was re-tested on a further two sheep farmers known to the author in the Rangitikei-Taihape districts. To reduce the time taken and also because it was thought the sections were straightforward and could be easily applied, sections eleven and twelve were not included in this second testing. As a result of this second testing virtually no alterations were considered necessary and the questionnaire was printed, with space being allowed to write in responses under each question and a margin left for coding of responses on the questionnaire form.

In its final form the questionnaire consisted of 162 questions covering 20 pages with an additional eight pages of individual semantic differential scales.

Selection of Survey Areas.

Because of restrictions on the amount of time available for this study it was decided to limit the total number of personal interview questionnaires completed to about 60. Therefore the survey was restricted to two areas containing approximately 30 farmers each. Within each area it was intended to interview all the farmers to gain an idea of their personal interactions. To determine a limit

to the size of each area in which personal interactions and contacts were considered, each area was defined within geographical boundaries. These boundaries were defined in terms of changes in farming pattern, major changes in contour or soil type and natural or man-made geographical boundaries.

(a) Selection.

The Reporoa survey area was chosen as a result of the author's experience in the area as a Farm Advisory Officer for the Department of Agriculture during 1968. This area appeared to suit the purpose of the study very well, by providing a small group of sheep farmers within clearly defined boundaries.

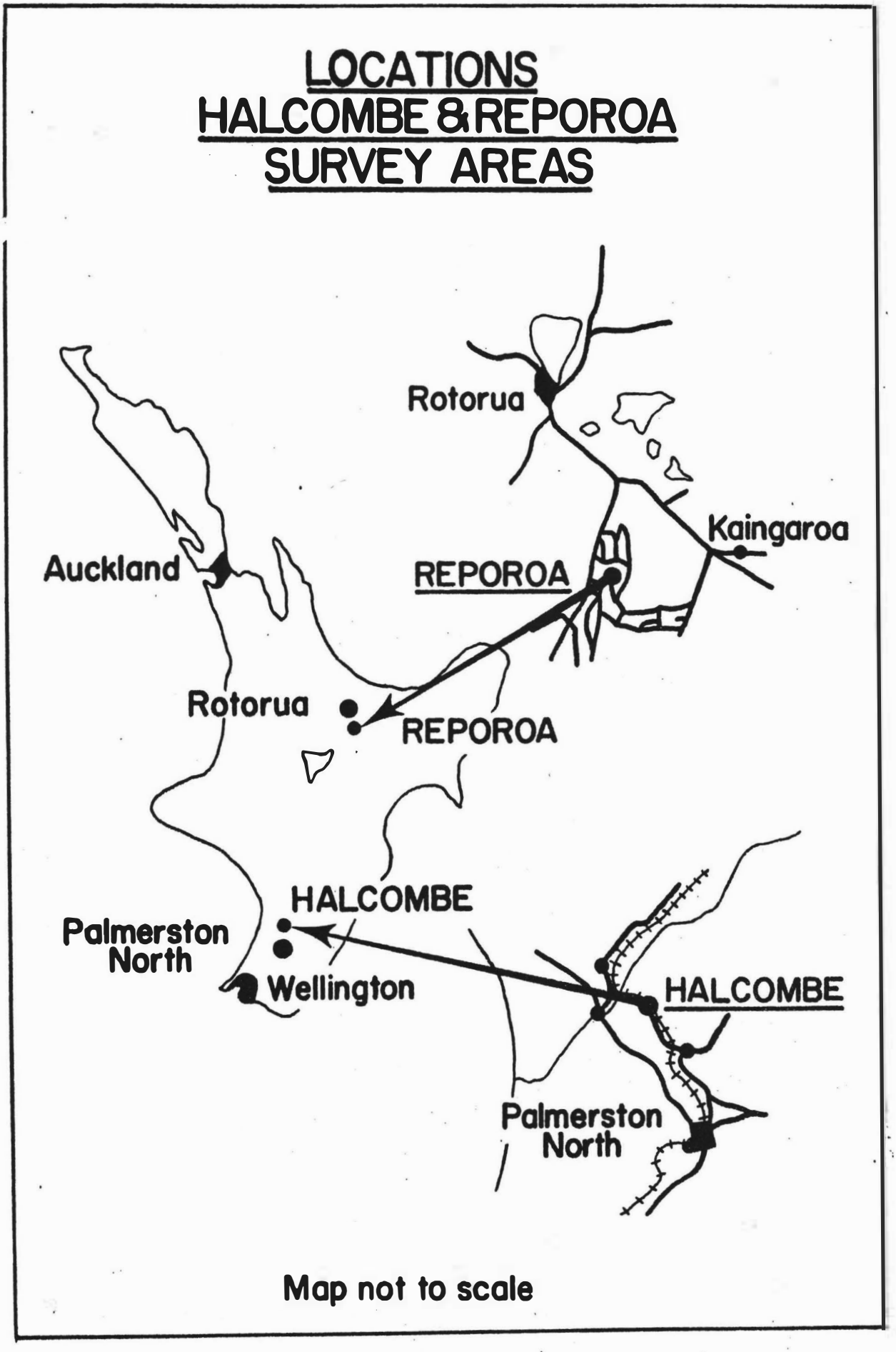
However data provided by a survey of one small area can only be considered in absolute terms. There is no basis from which to compare the results or extrapolate the conclusions to a more general situation and so the data has limited general applicability. Therefore a second survey area of a similar physical and farming type to the area chosen first was sought.

(b) Criteria.

This involved looking for a relatively well geographically defined area, containing about 30 commercial sheep farmers on relatively rolling or dissected country who did not participate in "discussion" groups. Also to reduce travel and accommodation costs such an area had to be reasonably close to Palmerston North.

Non participation in a discussion group by the farmers of a survey area was considered necessary as it was held that such participation could disrupt or hide the

Figure 4


LOCATIONS
HALCOMBE & REPOROA
SURVEY AREAS
Rotorua
Kaingaroa
Auckland
REPOROA
Rotorua
REPOROA
HALCOMBE
Palmerston North
Wellington
HALCOMBE
Palmerston North
Map not to scale

naturally developed inter-farmer communication patterns which this study was seeking.

(c) Alternatives Considered.

Three possible areas were considered near Palmerston North, after rejection of a number of others due to the influence of discussion groups. A group of farmers near Beaconsfield were rejected as the group could not be enlarged to a sufficient number within the geographically imposed boundaries. A second group in the Santoft area was rejected due to the exceptional diversity of farming in the area. Finally, after discussion with local F.A.O's. of the Department of Agriculture, the plateau area between Halcombe and Stanway was selected. See Fig. 4 page 44 for the general locations of the two survey areas.

Reporoa Survey Area.

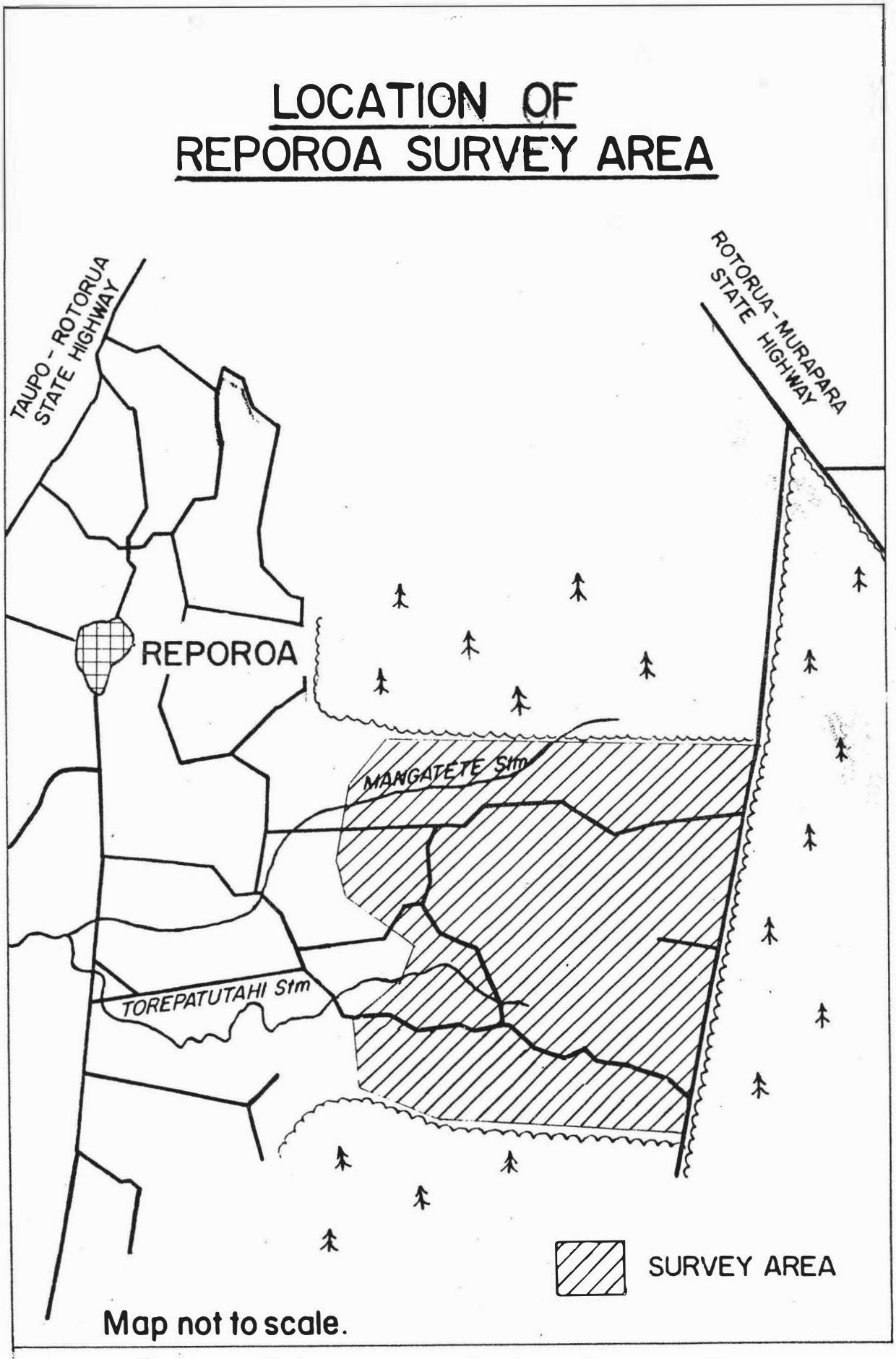
(a) Location.

This survey area near Rotorua was located four miles south east of the Reporoa township which is 25 miles south of Rotorua on the Rotorua-Taupo State Highway. Figs. 5 and 6 on pages 46 and 47 show the location of the Reporoa survey area and an outline of the individual farm properties.

(b) Boundaries.

Definite geographical boundaries limited the area which was on the Kaingaroa Plateau at an elevation of between 1500 and 1800 ft. above sea level. The Kaingaroa State Forest forms a boundary on three sides of this area while on the west the plateau falls away to the Reporoa

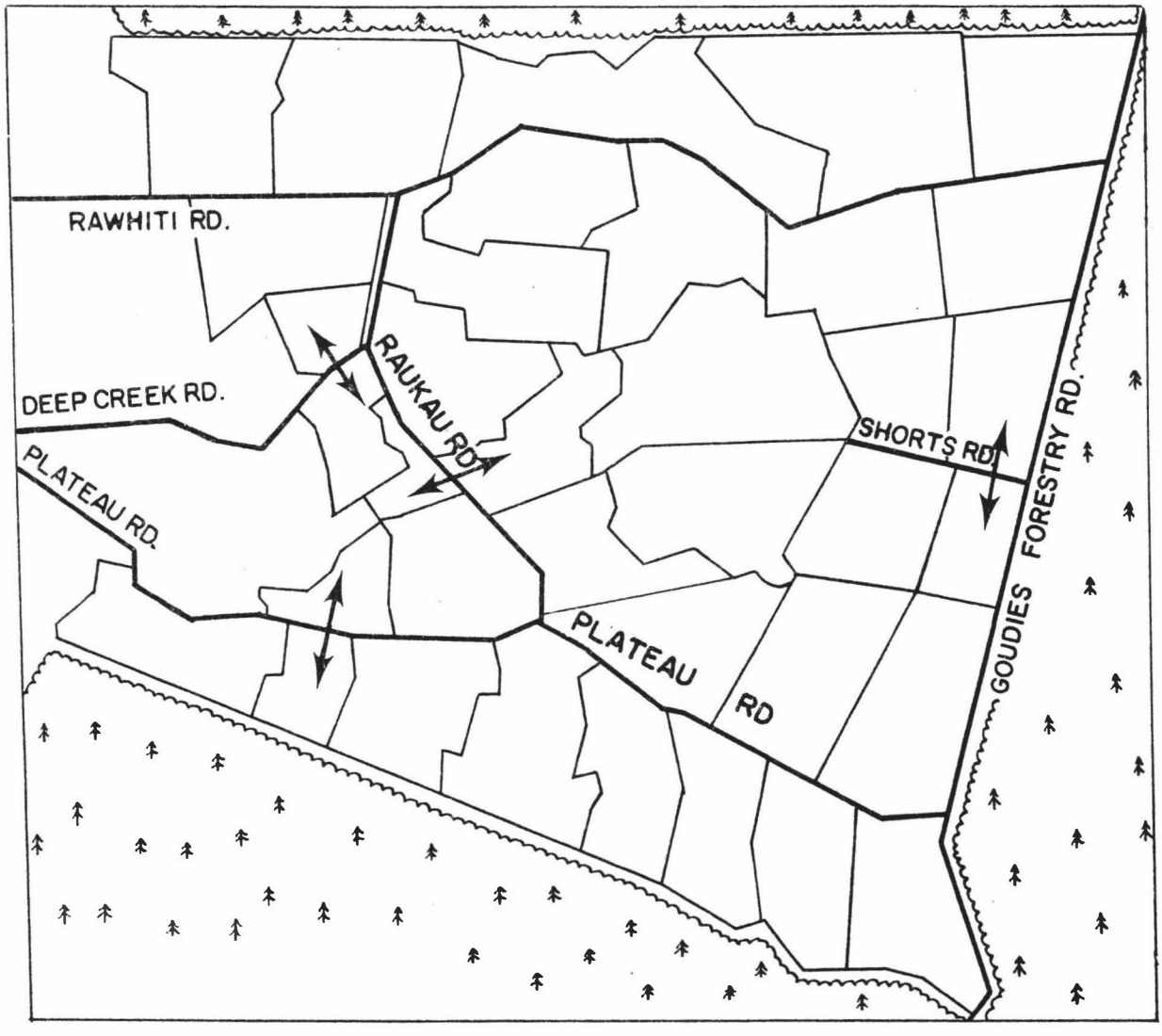
Figure 5



Source: Rotorua Jaycee's Farm Settlers Map

Figure 6

REPOROA SURVEY AREA FARM BOUNDARIES



Map not to scale.

Source: Cadastral Maps N.Z.M.S. 13, Survey District Series; South Auckland Nos. 80, 81, 92 and 93.

Valley and sheep farming gives way to intensive dairy units. A steep bluff thought to have been formed by deep faulting cuts across the area but does not form a boundary.

(c) Soils.

Soils are derived from Taupo pumice and are included in the broad classification of yellow brown pumice soils. These soils are relatively light and friable, have little structure and are low in most plant nutrients and minor elements. Both cobalt, included in the topdressing, and selenium, included in drenches, is required for stock health and phosphate and potash for high pasture production.

Because the soils are free draining with little moisture retaining ability lucerne is grown by a number of farmers specifically to supply hay and some grazing.

With increasing intensification and the development of a dense pasture sward, run off has increased and is creating an erosion problem in these light soils.

(d) Climate.

Rainfall averages about 44 inches per annum but heavy cloud bursts occur from time to time aggravating the erosion problem. Farmers consider the climate to be a good one for stock with a warm summer and a cold but reasonably dry winter. Snow can be expected but seldom lies long. Frosts are common and as a result grass growth virtually stops between May and September in most years, consequently some form of winter crop is generally grown.

(e) Settlement.

Historically this is a young farming area having been settled under Government settlement schemes only since

1957 (See appendix D for details of the various settlement schemes). Hence, although well formed, and frequently graded the roads are as yet unsealed.

Rotorua is the nearest major business centre being on average about 40 miles by road from the farmers in this survey area. Primary and Secondary schools, stores, post office and garage are available at Reporoa some six to seven road miles away.

Halcombe Survey Area.

(a) Location.

This area is 16 miles to 20 miles by road north of Palmerston North. Figs. 7 and 8 on pages 50 and 51 show the location of the Halcombe Survey area and an outline of the individual farm properties included in the survey area.

(b) Boundaries.

The boundaries limiting this area were not as clearly defined as for the Reporoa area. On the east a fault scarp which forms the crest of the Feilding anticline (Whatman 1961) and the Makino Road were used since these both seemed to indicate fairly abrupt changes in contour. Makara Road and Makino Road were also used to define the Northern boundary. On the west where the anticline slopes down to the Rangitikei River farms on the western side of Stanway Road formed the boundary although an extra three farmers were included, whose properties bounded those of farmers on Junction Road West. These three farmers were referred to either as possible sources of information or

Figure 7

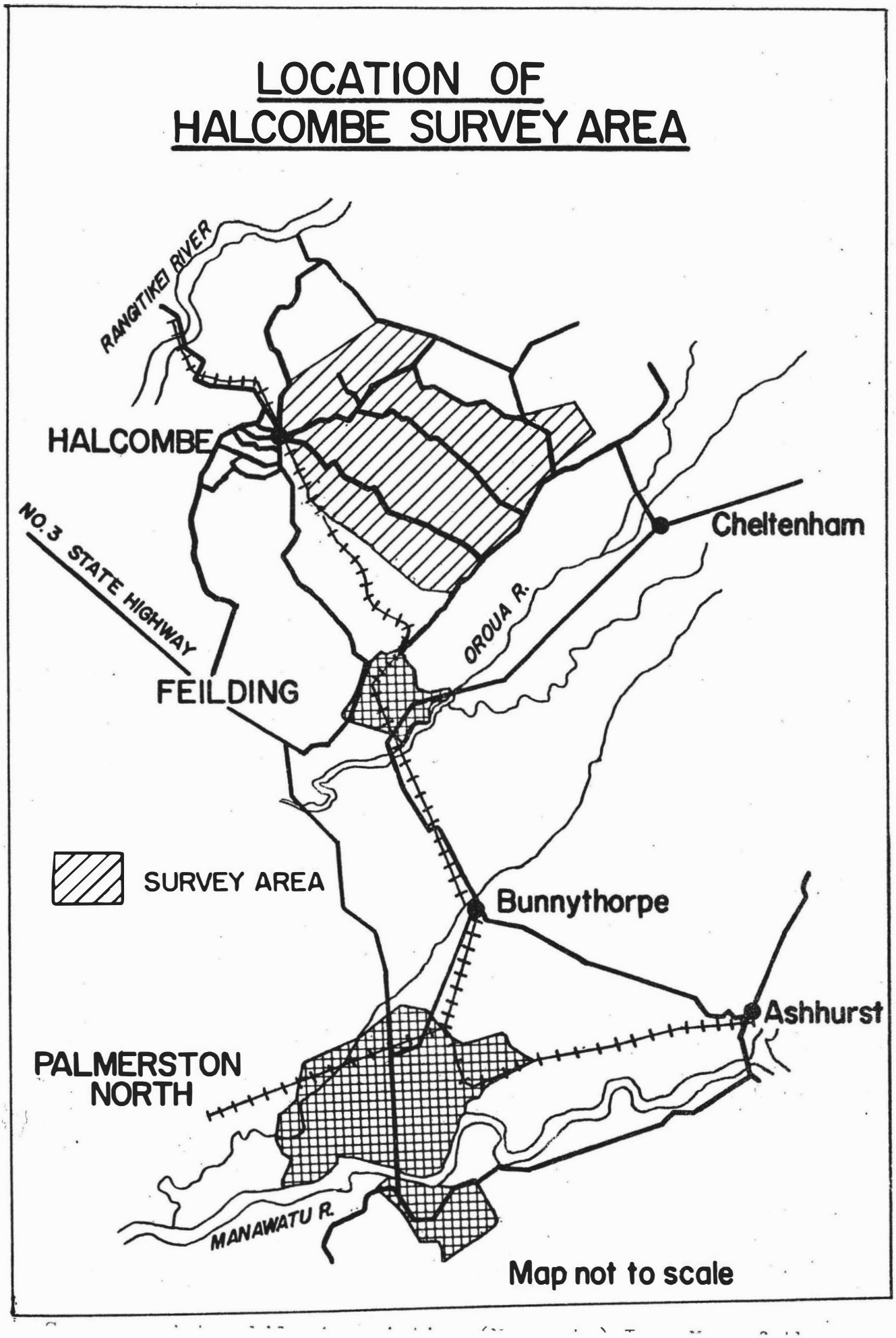
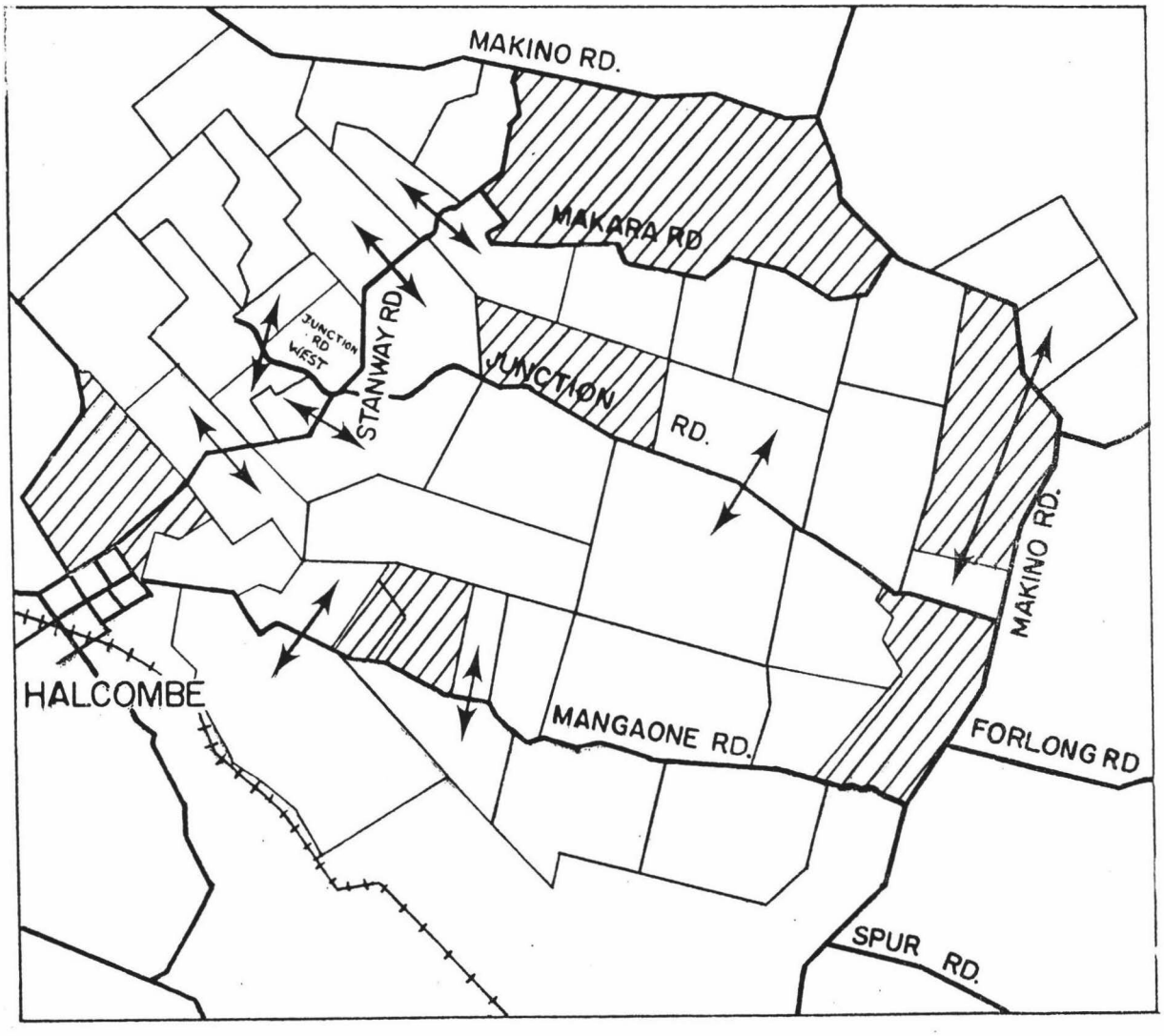

LOCATION OF
HALCOMBE SURVEY AREA
RANGITIKEI RIVER
HALCOMBE
NO.3 STATE HIGHWAY
FEILDING
OROUA R.
Cheltenham
SURVEY AREA
Bunnythorpe
Ashhurst
PALMERSTON
NORTH
MANAWATU R.
Map not to scale

Figure 8

HALCOMBE SURVEY AREA FARM BOUNDARIES



Farms not included in Survey.

Map not to Scale.

Source: Cadastral Map N.Z.M.S. 13, Survey District Series; Wellington No. 48.

merely as friends by respondents over the whole area and in particular by those whose properties bounded them. Their inclusion seemed justified not only to increase the number of respondents but also because they appeared to be an integral part of the interactions within the area being studied.

An increase in the importance of grain cropping, and an easier contour occur further westwards. The plateau falls away to the south of Mangone Road and thus farms along this road formed the southern boundary.

(c) Soils.

The terrace soils of this plateau, at an altitude of about 450 ft. above sea level, are grouped in the yellow grey earths. They have rather weak structured, light topsoils, over fairly compact subsoils which tend to dry out readily in the summer and become impervious to water in the wet winter. Winter pasture pugging is a considerable problem and drainage is required for high production. The soils are naturally fertile having developed under native broadleaf and podocarp forest.

(d) Climate.

Rainfall averages about 37 inches per annum but the summer months tend to be droughty especially with the strong drying westerlies common in late summer and autumn. Frosts do occur, but with adequate drainage, and summer moisture, pasture growth continues virtually all year round.

(e) Settlement.

Settlement of the area occurred in the late 1890's and early 1900's, after completion of the railway from

Wellington through to Wanganui. Some of the properties have, in fact, been farmed by the same family for two generations. The age and prosperity of the area is indicated by the wide sealed roads which give ready access to Feilding, a large town servicing the surrounding farming community about six to eight miles from the area and the small settlement of Halcombe with its General stores, hotel and post office, almost within the survey area.

Survey Method.

(a) Identifying Respondents.

The location and names of the farmers in each survey area were obtained before proceeding into the area to conduct the interviews. A settlers map had been prepared by Rotorua Jaycee's of the whole Rotorua district and the location and names of farmers not previously known to the author were obtained from this. In Palmerston North a similar type of map was in the process of publication but was not available. Therefore location and names of the farmers in this survey area were obtained from the Valuation Department, Palmerston North and the Oroua County Council, Feilding.

(b) Contacting Respondents.

Contact with the respondents in the Reporoa survey area was initially by telephone with those already known to the author. Arrangements were made for an interview and after this was completed the author made several door to door calls of nearby neighbours arranging further interviews until all respondents had been interviewed. Some of the interview arrangements were confirmed by telephone and some new contacts made if there were empty periods in a forthcoming day's schedule of interviews.

The same general pattern was followed in the Halcombe survey area except that initial interviews were arranged as a result of face to face contact while the author was familiarising himself with the area.

Only two farmers in the Reporoa area had any prior knowledge of the author's intention to conduct a survey in their area but none of the other farmers in either area received any warning apart from that passed on by word of mouth by other farmers once the survey was underway.

(c) Method of Introduction.

The author introduced himself as being a student of Massey University and the survey as part of the requirements for his course of study. The general purpose of the survey was outlined, the anonimity of the respondents' replies stressed, and a request for an interview at some convenient time made. Since the interview took approximately two to two and a half hours the author stressed his willingness to come at any time of the day or night, any day of the week. It was felt this willingness to come at any time enhanced the respondents' willingness to make time available.

(d) Rejections.

At the time of the survey in Reporoa farmers were involved with crutching and in Halcombe it was shearing and lamb drafting time. However, only one farmer in each district was not interviewed because a suitable time could not be arranged. From both areas only one farmer refused to co-operate in the survey and in the Halcombe survey area three other farmers were not interviewed, one being an absentee owner, another because of deafness and the third was accidentally killed before an interview was arranged.

(e) Interviewing.

The interviews were carried out in the order prescribed by the questionnaire. An attempt to establish and maintain the respondents interest and co-operation was made by following the guides to interviewing obtained from the literature, especially those of V.V. Munroe. Although there is no check on the accuracy of the replies it was felt that the serious approach of the author to the questionnaire resulted in the respondents treating the interview seriously and trying to answer the questions honestly. Throughout the interview, and in any probing which may have been required, an effort was made to avoid any indication of approval or disapproval of the answers or attitudes expressed. The literature suggests that such a permissive atmosphere enhances the chances of the respondent answering in terms of his true feelings.

(f) Location of Interview.

Generally the interviews were conducted in the respondent's home and on two occasions the respondents were actually confined to bed, one of which being in a hospital. Two interviews were conducted in the farmer's wool shed and one at the Department of Agriculture office in Rotorua. Occasionally the wife or some members of the family were present during the interview but they were not considered to be a hinderance and in some cases prompted their reticent or modest husbands to fuller replies. However, only replies by the farmer himself were noted. If the response could not be classified according to the pre-coded responses included in the questionnaire it was recorded verbatum for coding later.

(g) Farm Inspection.

The respondents' farms were not inspected because the interest of this study is with each individual respondent and his attitudes rather than with his farm. However, with the intensive travelling within each area and also the use of aerial photographs a picture of farm layout and contour problems were obtained.

(h) Incomplete Responses.

No respondents refused to answer any of the questions, although because of time limitations one farmer in each area failed to fill in the Osgood Semantic Differential.

(i) Problems With Pre-coding.

Because the farmers involved in pre-testing were not completely comparable with the farmers actually interviewed in the survey, problems were experienced with some of the pre-coded answers. This was particularly so with question 35 where the pre-coded responses had not been fully tested by the pre-tests and hence required recoding. Some shortcomings were also found in the two sections which had not been pre-tested. The contact with advisory media question required a stronger definition of degree of contact and two extra categories were included to allow for people who exchanged magazines and who knew the Farm Advisory Officer and had had contact with him but not in the last three years.

(j) Problems in Applying Semantic Differential.

It was also found that problems arose in introducing and explaining the Semantic Differential device but this was partly overcome by altering the introduction to include the statement, "I have trouble explaining this but.....".

Also because each scale or list of bipolar adjectives was printed and given to the respondent to fill in, no firm control could be obtained over the speed at which they considered each pair of adjectives, and inaccuracies may have occurred as a result of some thought rather than simple association being applied. Since eight different concepts, or firms were presented, the respondents became familiar with the layout of the adjectives on the scale and some markings of the degree of association may have been purely repetitive on the basis of a previous marking. Randomising the line order of the pairs of adjectives for each concept for each respondent, and some form of reading device which only allowed a brief period in which to make a decision on the bipolar pairs would have been needed to overcome these two problems.

The order in which the eight concepts were presented was determined by the author mixing eight cards on which the concepts were printed and then reading them out according to the order achieved. The flash cards which were used in questions 45, 46 and 141 were also treated in this way in an attempt to ensure presentation in a random order to each respondent.

Analysis

(a) Preparation of Data

The responses to pre-coded questions were recorded directly onto the questionnaire but to ensure a uniformity in coding, responses to questions seeking attitudes ideas or opinions were not coded until both the Reporoa and Halcombe areas had been surveyed. All responses for this type of question were considered simultaneously as it was

considered uniformity in coding may not have been achieved if the responses from each area had been coded when the survey of the area was completed. This was because a period of about five months elapsed between the date of completion of the survey in the Reporoa area and the date of completion of the Halcombe area survey.

The code numbers were punched on to computer cards directly from each page of the questionnaire. A total of twelve cards were used for each respondent in coding the responses to the questionnaire and a further three were required for each respondent in coding responses to the Osgood Semantic Differential.

(b) Methods of Analysis

Physical data such as acreages, stock numbers, lambing percentages, fertiliser tonnages and numbers of children were analysed with a computer programme prepared by Mr W.G. Payne of the Farm Management Department, Massey University. From this programme, sums, means, the highest and lowest values in a data field and the number of entries in that field were obtained. Tables 5, 6 and 9 in Chapter IV were constructed from the results obtained from this programme.

Analysis of the number of respondents answering a question according to a specific code was done by hand from list printings of each card, because the total number of respondents was not large and this also gave some opportunity to check any unusual codings.

Stock ratios and ewe equivalent figures were computed using a programme prepared by the author. The conversion rates for stock units to ewe equivalents were

derived from the Department of Agriculture Stock Unit Tables, prepared by the Economics Section of the Farm Advisory Division. Appendix E lists the actual conversion rates used.

Sociograms indicating the lines and direction of interpersonal communication between respondents in each area on different farming topics were prepared. These sociograms, presented in Appendix F, are discussed briefly in relation to their specific topics in Chapter IV. A simple computer programme which provided a listing of specific fields which were related to a similar topic from several cards simplified the preparation of the sociograms. The layout of each sociogram was standardised for each area on the basis of the roading pattern so that adjacent sections of the sociogram indicate neighbouring farmers. Thus farmers who were separated over the greatest distance in the survey area are also generally the furtherest apart across each sociogram.

The programme giving listings of specified fields was also used to provide the information in such Tables as numbers 26 and 27 in Chapter IV, concerned with the extent of each respondents knowledge of the adoption by other farmers of a particular practice in each area, and the predicted sources of further information.

(c) Statistical Tests

From question numbers 45 and 46 in the questionnaire* a table of the number of "firsts, seconds and thirds" for each alternative was constructed. However to obtain an overall ranking for each question on the basis of the number of firsts and seconds and so on is, as Kendall (1963 p.101)

suggests invalid. Such a procedure is not self consistent. Kendall suggests that the "best" estimate of the overall ranking is to rank according to the sums of the allotted ranks of each alternative.

Kendall's Coefficient of Concordance: Before such a ranking can be formed however a measure of the degree to which the respondents agree in their individual rankings of the various alternatives is required. This is to ensure that the respondents are ranking the alternatives according to similar criteria. The respondents are in fact acting as judges and Kendall's coefficient of concordance W will provide a measure of the variation between judges which is necessary before an overall ranking can be derived.

W. is calculated according to the formula:-

$$W = \frac{S}{\frac{1}{12}k^2(N^3-N)-k\Sigma T}$$

Where N = the number of entities to be ranked

k = the number of judges assigning ranks

ΣT = the sum of T_i the correction factor for tied** observations of rank i. calculated -

$T_i = \frac{t^3-t}{12}$ t = the number of observations tied for a given rank

---

*45) While still obtaining information and making up your mind whether to try some new practice or not, would you rank three of these (ten alternative information sources were provided) in the order in which you would place most trust in their evaluation of a new practice?

46) Having made a decision to try some new farm practice would you rank three of these (alternative information sources) in the order in which you would place most trust in their advice when attempting to put it into practice, or overcoming any problems which may arise?

**tied observations are two or more observations which have been assigned the same rank or score value.

$S = \sum_{j=1}^{N} (\overline{R}_j - \frac{R_j}{N})^2$ (i.e.) the sum of the squares of the deviations of the means of

R_j = the sum of the ranks assigned to each entity and

$\overline{R}_j$ = the means of the sum of all R_j

The computational procedures are outlined in Siegel (1956) page 229-238, who also notes that for N larger than seven the expression

$$X^2 = \frac{S}{\frac{1}{12}kN(N+1)} = k(N-1)W$$

is approximately distributed as chi square with N-1 degrees of freedom and hence chi square can be calculated and used to test the significance of the value obtained for W.

A high or significant value of W may be interpreted as meaning that the observers or judges are applying essentially the same standards in ranking the N objects under study. However significance does not necessarily mean that the orderings are correct, but simply that the judges all employ the same criterion in ordering the various objects.

Kendall suggests that if W is significant then the "true" ranking is provided by the order of the various sums of ranks R_j. Siegel also considers this provides a standard method of ordering entities according to consensus when there is no objective order of entities available. Accordingly this method of obtaining a rank ordering of information sources was used in this study.

A small programme was devised to convert the raw data into the k x N array of ranks required for the calculation of W. Because the respondents had only been

asked to rank three of the entities the remaining unranked entities were assigned the mean rank of the "tied" positions (i.e. 7). For simplification the unranked positions left by two Reporoa respondents and four Halcombe respondents who did not provide a complete ranking of three entities were also assigned a rank position of seven.

The two k x N tables derived for each area and the values calculated for W and X^2 are included in Appendix G, while the rankings derived from the sum of the R_j are indicated in Tables 45 and 46 in Chapter IV.

L Statistic: A similar problem of assigning overall rankings occurred when respondents were asked to rank five family goals or values according to which meant most to them if only one could be achieved at a time. It was assumed that because of the wording of the question all the respondents would answer it in similar terms even if they had actually achieved a number of the values or goals they were asked to rank. On the basis of this assumption a rank order was hypothesised and the ranking statistic L devised by Page (1963) used to test the hypothesis. This statistic is computationally simple and Page considered it to be more accurate and appropriate then the Friedman test in testing an expected ordering among treatments or entities. Also because more than two treatments or entities are involved the t-test's 'one-sided' nature is lost. The alternative hypothesis is usually not adjusted for any a priori prediction of the order of experimental results so that when the null hypothesis is false statistical significance is more difficult to achieve. Hence the statistic L was used to test the ordered hypothesis.

L is calculated according to the following formula:-

$$L = \sum_{j=1}^{N} (y_j - R_j)$$

where y_j = the predicted rank of each of N entities being ranked, based on the hypotheses concerning the predicted ordering of the experimental results.

R_j = the sum of the ranks assigned to each entity by the k judges.

L is thus the summation of the products of the predicted ranking of each entity by its sum of ranks. Chi square can be calculated by the formula

$$\chi^2 = \frac{(12L - 3kN(N+1)^2)^2}{kN^2(N^2-1)(N+1)}$$

but Page provides tables for the direct estimation of the significance of L with an outline of the computational procedure in his article. These tables indicate the maximum value of L associated with a given probability. Should L have a value equal to or greater than that in the table, then L is significant at that level. The null hypothesis can be rejected in favour of the ordered alternative and the conclusion, that the data does agree with the predictions.

A similar computer programme to that used for Kendall's coefficient of concordance was required to convert the raw data into the k x N arrays of ranks, (included in Appendix H, with their appropriate L values) for each survey area and assign a mean tied ranking of 4.5 to the unranked entities.

Discussion of the hypothesised rankings and the predictive assumptions used are included in Chapter IV.

Analysis of the results of the Osgood Semantic differential was simplified. An overall indication of the regard in which the various companies and government departments were held was required rather than a comparison of the particular factors which were involved in each respondent's concept of the image of the various concerns. Therefore instead of analysing each pair of bipolar adjectives individually to determine their position in semantic space the intensity and direction of the responses to each bipolar description were scored on a scale from +2 for "strong association" to a favourable description (e.g. up to date) through 0 for "no association" to -2 for "strong association" to an unfavourable descriptor (e.g. out of date). Before these scores could be summed to give a total score for each individual's attitude to each firm or department it was necessary to ensure that each pair of adjectives were indeed correlated and thus constituted part of the same measuring device.

Spearman rank correlation: The Spearman rank correlation coefficient r_s was selected to determine if the twelve bipolar adjectives were associated. Association is determined according to the disparity between the rankings of two sets of variables and the correlation obtained is considered to be only 9 percent less efficient than the parametric correlation Pearson's r.

Computation of the Spearman rank correlation coefficient is usually by the formula

$$r_s = 1 - \frac{6\Sigma d^2}{N^3 - N}$$

However if, as occurred in this survey, a large number of tied scores occur for each variable some correction for

ties is necessary. (Tied scores are assigned the average of the rank positions to which they would have been assigned if no ties had occurred.) The correction factor for tied ranks is the same as that used previously:-

$$T_i = \frac{t^3-t}{12}$$

Where T_i = correction factor of ties for a given rank i.

t = number of observations tied for a given rank

r_s is then calculated according to the following formula:-

$$r_s = \frac{\Sigma x^2+\Sigma y^2-\Sigma d^2}{\sqrt{\Sigma x^2 \Sigma y^2}}$$

Where $\Sigma x^2 = \frac{N^3-N}{12} - \Sigma T_x$

$$\Sigma y^2 = \frac{N^3-N}{12} - \Sigma T_y$$

ΣT_x and ΣT_y = the sum of T for each set of tied ranks within each variable, X and Y.

$-\Sigma d^2$ = the sum of the square of the disparities or differences between ranks of the X and Y variables for each of the N observations.

N = the number of observations.

Siegel pages 202-213 outlines the computational procedure and provides a table of critical values of r_s for samples where N=4 to 30.

If the value of r_s is equal to or exceeds the value in the table then the null hypothesis that there is no association between the variables can be rejected and the variables assumed to be associated.

A computer programme included in Appendix I was formulated which converted the raw data from each Osgood

Semantic Differential scale into a form which could be utilised in a Spearman rank correlation test. The output from this programme is shown in Appendix J and includes the weighted score for each row of the eight semantic differential scales. The score being weighted according to the intensity scale of +2 to -2 as discussed earlier.

These weighted scores provided the in-put data for the Spearman rank correlation programme provided by Miss N. Gordon of the Massey University Computer Unit. The data was processed in the form of eight observations (provided by each of the eight firms and government departments on which the scale was used) on each of twelve variables (i.e. the twelve bipolar descriptors).

The correlation matrix derived from this programme is included as Appendix K.

From Siegel's tables it was seen that the correlation coefficients were on the whole significant except for the bipolar descriptor 'Understaffed - overstaffed'. For this pair of adjectives all correlation coefficients with the other pairs of adjectives were not significant and therefore the scores from this descriptor were discarded as they were not considered to be associated with the other scores in determining the respondents idea of the corporate image of the eight firms and government departments.

Mann-Whitney U test: The test described above justified, with the one correction mentioned, the summing of the weighted score for each pair of bipolar adjectives to give a total score for each firm. However the question arises of whether there is a difference between these scores. A test which makes greatest use of the data and

in fact will compare the respondents individual scores for one firm or government department against the individual scores for another is the Mann-Whitney U test. This test is similar to the parametric t test but does not necessitate the assumption of normality of distribution required by the t test.

For samples larger than twenty the sampling distribution of U rapidly approaches a normal distribution and the significance of an observed value of U can be calculated by the following formula. This formula was used in the Mann-Whitney U test computer programme included in Appendix L.

$$Z = \frac{U - \frac{n_1 n_2}{2}}{\sqrt{\left(\frac{n_1 n_2}{N(N-1)}\right)\left(\frac{N^3 - N}{12} - \Sigma T\right)}}$$

Where U = Man-Whitney U = $n_1 n_2 + \frac{n_1(n_1+1)}{2} - R_1$

or U = $n_1 n_2 + \frac{n_2(n_1+1)}{2} - R_2$

with R_1 = the sum of the ranks assigned to group for each of n_1 observations.

R_2 = sum of the ranks assigned to group for each of n_2 observations

$N = n_1 + n_2$

ΣT = sum over all groups of tied observations of the correction factor for ties T found by the standard formula previously presented.

The value of U required in the computation of Z is the smaller of the two different U's derived above. Siegel discusses the test and the computational proceedures

on page 116-126 and also provides tables from which the significance of the computed value of Z can be ascertained. Should Z prove to be significant the null hypothesis that the two groups, or in this case firms or government departments, which were compared both have the same distribution can be rejected and the two groups assumed to be different.

To provide data for the Mann-Whitney U test programme a further computer programme was devised, included in Appendix M which converted the original raw data into summed weighted scores for each individual and each firm. Only eleven of the weighted scores for each bipolar descriptor in the scale were included in the summation for each firm. It will be recalled that on the basis of the Spearman rank correlation coefficient one of the twelve bipolar descriptors had been rejected as not being associated with the other eleven.

The individual respondents summed weighted scores for each firm provided the input data for the Mann-Whitney U test programme. A matrix of the Z values for each survey area is provided in Appendix N.

Analysis of Variance: The analysis of variance technique is a basic parametric statistical test which can be used to subdivide the variation between and within sets of observations and to test whether the variation between sets includes the effect of a real difference between the set means. The significance of any differences between sets is measured by the F ratio.

An analysis of variance computer programme included in Statcs System Version 2 (Munford 1970) was used to analyse whether there was a significant difference

between the Repcroa and Halcombe areas with regard to the extent of knowledge respondents had of the farm practices carried out by other individuals within their survey area.

To ensure the requirement for a normal distribution of the data was not severely strained, the data was transformed according to the following formula:

$$x_t = \sqrt{(x + 1)}$$

Where x_t = transformed data

x = original data

The sample variances obtained with the transformed data are of the same order in the two areas so it can be assumed that a reasonable approximation to normality exists.

The F ratio of the variance between survey areas in the number of respondents who knew of individuals in their area carrying out a given practice was obtained and are listed in Appendix O.

To ensure that this knowledge was not simply a function of a greater number carrying out the practice in one area and not the other, an analysis of the variance between areas in the number of respondents who were actually carrying out, or had tried a practice was also computed.

Values obtained for the F ratio would indicate whether there is a significant difference between groups at the probability level chosen.

Fisher's Exact Probability Test: In order to ensure the between area differences was due solely to differences in knowledge between the areas, a test for any difference in the relationship between the number carrying out a practice and the number who knew of this was also

included. A computer programme provided by Miss N. Gordon was used. This programme combined both Fisher's Exact Probability Test and Chi-square test for two independent samples, corrected for continuity. Siegel (1956) page 110, suggests that Chi-square is valid to use when N, (the sum of each group of marginal totals in a 2 x 2 contingency table) is greater than 20 and all expected frequencies are 5 or more. If the expected frequencies are less than 5 or if N is less than 20 Fisher's test should be used. The computer programme used tested the data and determined which test was appropriate.

Contingency tables were set up for each practice as indicated in Appendix P. Fisher's test determines the probability (p) of the occurrence of the initial distribution of frequencies in the contingency table or one even more extreme and is calculated according to the following formula (Siegel p. 96 -101).

$$p = \sum p_i = \frac{(A+B)!(C+D)!(A+C)!(B+D)!}{N!A!B!C!D!}$$

Where p_i = the probability of occurrence of the initial distribution of frequencies or 1 to i-1 more extreme distributions.

A,B,C,D = the cell values of the contingency table.

N = the sum of one group of marginal totals.

The X^2 test for two independent samples has an improved approximation of the computed X^2 distribution, and is calculated as follows, (Siegel p. 104- 110).

$$X^2 = \frac{N(|AD-BC| - \frac{N}{2})^2}{(A+B)(C+D)(A+C)(B+D)}$$ with 1 degree of freedom

The symbols are common with the Fisher test formula.

The probability of obtaining the given X^2 value was calculated by the computer programme, which listed the probabilities obtained from both tests and indicated the degree of significance of any difference between survey areas in their relationships between the number carrying out a practice and the number who knew of it.

Regression Analysis: Regression analysis enables a test of the predictive relationship of one variable on another to be made. In this study the technique was used to evaluate the degree to which the sources of information on a number of topics were associated with, and could therefore be predicted from the individuals urbanisation index discussed in the next section. The conventional regression analysis technique was included in the computer Statcs System Version 2 mentioned above.

Data for each respondent consisted of an urbanisation index score and the number of contacts that the individual predicted he would have with different types of information sources. The square root transformation of the data was applied in this case and the results obtained are included in Table 66. Significant values for the regression would indicate that for a given value of the urbanisation index the predominantly prefered type of information source could be predicted as is suggested by hypothesis four.

(d) Urbanisation Index

A number of the hypotheses postulated at the beginning of this study, (see Appendix A) require the formulation of an urbanisation index. Emery and Oeser

(1958) describe urbanisation as being a product of past learning and experience. Factors which they consider predispose urbanisation include whether the family orientation is a rural or an urban one, the extent of formal education, employment other than as a rural worker and length of war service, or other extended periods away from a rural environment.

In constructing an urbanisation index for each individual respondent the author has included the following factors:

1) Whether respondent was brought up on a farm or in a town environment.
2) Father's employment or occupation.
3) Respondent's non farming employment.
4) Respondent's educational attainments.
5) Respondent's years of war service.
6) The number of Agricultural, Sporting or Community organisations in which the respondent has held an elected office.
7) Pre marriage employment of the respondent's wife.

These factors were considered to be the major ones which would influence an individual to recognise that knowledge can be achieved by impersonal means as arise readily in an urban context.

This broadening of perception implicit in the factors used for the index is considered to occur more readily in an urban environment. Such an environment normally provides an individual with a greater variety of experience than a rural one. Also within an urban context the pursuit of knowledge as an end in itself rather than the means to an end is accepted.

Knowledge does not have to be achieved solely by personal practice and experience as suggested by the traditional rural comments of "book learning is no use - must have practical experience". The factors considered for the urbanisation idex, apart from those concerned with the individual's family background, all act to broaden his outlook. Each has been assigned a weighted score according to the degree to which (in the author's opinion) each factor would have stimulated the respondent and led to the development of an enquiring and flexible mental attitude. In other words the development of a method of thinking based on deduction and hypothesis rather than one based solely on prejudice and past experience. Appendix Q lists the score values derived for the various factors used in compiling the urbanisation index.

Discussion of the conclusions drawn about the hypotheses is included in Chapter IV.

CHAPTER IV

R E S U L T S

Introduction

A comprehensive analysis of the results of the interviews of 31 farmers in the Reporoa area carried out between the 4 - 25 July, 1969 and 29 farmers in the Halcombe area interviewed between November 18 - December 23, 1969, is presented.

The first three sections of the results, concerned with the general farm situation in each area and the family factors of the respondents are presented in some detail for two reasons:-

(1) It was considered necessary to establish whether the physical situations, farming patterns and family characteristics were comparable in both areas as a basis for understanding any differences which may become apparent in the overall communication patterns of each survey area.

(2) It was considered the physical and sociological information obtained by the survey could be of practical value to farm advisers and extension personnel working with sheep farmers in each of the two districts. Also the data could serve as a benchmark for future surveys which might be made in either area.

The three remaining sections of the results are concerned with the respondents' knowledge of various practices, their predicted sources of further information, the reasons for selection of specific animal health products and the influence of advertising and company image on this selection and finally a discussion of the hypotheses. A brief summary is included at the end of each section but discussion of the results and presentation of the conclusions drawn is presented in Chapter V.

General Farm Information

(a) Acquisition.

The time at which the respondents took over managerial responsibilities for their farms varies considerably between each area.

In Reporoa as a result of Government settlement schemes respondents took over their farms between 1957 and 1963 with the major inflow of 12 respondents taking up their farms in 1962. One respondent moved into a managerial capacity in 1968 upon the death of the farm owner.

Respondents in the Halcombe area took over their farms at various times from 1929. There were 13 changes of managerial responsibility in the Halcombe area over the 1957-69 period, these being mainly as a result of private purchases. Three of these changes occurred in 1969, one being the return of a father to the family farm when a son decided to obtain a larger property with greater opportunities and the remaining two were the result of the original owner selling out.

The average date on which farms were taken over in the Reporoa survey area was 1961 and in the Halcombe area 1955.

The method by which the farm was acquired by the respondents in the Reporoa area was as a result of various Government settlement schemes except for the one change in 1968. (See Table 1.) In the Halcombe area acquisition was chiefly as a result of private purchase, sometimes within the family. Nearly half of these private purchases have occurred in the last ten years.

TABLE 1. Method by which Farm Property Acquired.

Method of Acquisition	Area	
	Reporoa N = 31	Halcombe N = 29
Private purchase	-	14
Private lease	-	2
Inheritance	-	5
Serviceman (Lease	15	5
Settler (purchase	4	1
Civilian (lease	11	-
Settler (purchase	-	-
Family trust	1	-
N.A. Manager	-	2

(b) Tenure.

The present form of land tenure in each area is given in Table 2 where it can be seen that many of the Reporoa respondents have converted their previously leasehold properties to freehold status.

Farms which are leased from other members of the respondent's family, of which there were two in the

TABLE 2. Comparison of Original and Present Forms of Tenure.

Area	Original Tenure		Present Tenure	
	Freehold	Lease	Freehold	Lease
Reporoa N = 31	5	26	17	14
Halcombe N = 29	24	5	24	5

Halcombe area, have been included as freehold properties in this table as has the farm acquired through a family trust in the Reporoa area.

(c) Ownership.

The form of farm ownership and the role of the respondent on the farm are shown in Tables 3 and 4 where some complexity becomes apparent in the Halcombe area.

TABLE 3. Form and Organisation of Farm Ownership.

Form of Ownership	Reporoa N = 31	Halcombe N = 29
1. Owner operator	24	17
2. Private Cos.	1	2
3. Estate	-	2
4. Trust	1	1
5. Partnership with wife	5	3
6. Partnership with others	-	2
7. Combination 2 & 4	-	1
8. Not known	-	1

TABLE 4. Respondents Position on Survey Farm.

Respondents Position	Reporoa N = 31	Halcombe N = 29
Owner Operator	30	24
Partner	-	2
Manager (family)	1	1
Manager (Non family)	-	2

Physical Farm Information.

(a) Areas.

Physical features of the farms in the two areas are shown in Table 5.

TABLE 5. Comparison of Farm Areas in the Two Survey Areas.

	Reporoa N = 31	Halcombe N = 29
Total Acres	12,917	11,103
Avg. farm size -	417	383
Range	338 - 720	156 - 1256
Avg. area waste	52 (10)	10 (10)
Avg. Non wheel tract/farm	118 (27)	152
Avg. Nos. of paddocks	23	21

Figures in brackets indicate number of farms on which the particular item is applicable.

It is apparent that farms in both areas are relatively similar although the Reporoa farms are of a more even size and are on average 30 - 60 acres larger.

They have been subdivided to a slightly greater degree possibly because they are in general of easier contour. However, the Reporoa farms have larger unproductive areas on the farms on which it occurs (10 in each area). In the Halcombe survey area the total acreage which respondents considered was at present unproductive but could carry stock was only 90 acres while land classified in a similar way in the Reporoa area totalled 433 acres. Therefore, it would appear that this difference between the two survey areas is basically a result of the length of settlement of the two areas. Many of the Reporoa respondents are farming properties which have only been run as single units for little more than ten years, while many of the farms in the Halcombe survey area could have been farmed as individual units for nearly thirty years.

(b) Live Stock Numbers.

Stock numbers carried in each area are shown in Table 6 (see page 80) where it is apparent that there are a much greater number of cattle carried in the Reporoa area. In fact, seven farmers in the Halcombe area do not run any cattle at all.

The Halcombe area has a much wider range in flock ewe numbers as would be anticipated with the wider range in farm size. Four Halcombe properties run over 2100 flock ewes while only one does so in the Reporoa area. This is a real difference between the two areas, however, because on average the respondents in the Halcombe area carry about 1.5 more flock ewes per acre than their Reporoa counterparts.

TABLE 6. Comparison of Stock Numbers in the Two Survey Areas.

	Reporoa N = 31	Halcombe N = 29
Total Sheep	53,188	58,973
Avg/farm	1,716	2,033
Avg. Nos. flock ewes	1,270	1,619
Range of flock ewe Nos.	680 - 2,230	500 - 5,100
Avg. Nos. ewe hgts.	406 (26)	452* (17)
Avg. Nos. wether hgts.	20 (25)	69 (26)
Farms with Romney rams	23	12
Avg. %age Rams	2.3	1.9
Total Cattle	4,335	1,954
Avg/farm	140	99 (22)
Nos. farms with run cows	22	5
Avg. sheep/cattle ratio	16.1	37.0 (22)
Avg. cattle/acre	0.32	0.23 (22)
Avg. EE/acre	5.5	5.8
Range of EE acre	3.6 - 7.5	4.4 - 8.7

Figures in brackets indicate the number of farms on which the particular item occurs.
*This average figure reduces to 375 if one atypical farmer who winters 1477 ewe hoggets is deleted.

(c) Live Stock Policies.

As would be anticipated from the different emphasis on various classes of stock, notably the difference in the number of farmers using Romney rams and

the difference in cattle numbers between the two districts, there is some difference in stock policies as shown in Tables 7 and 8.

TABLE 7. Comparison of Sheep Policies Between the Survey Areas.

Sheep Policy	Reporoa N = 31	Halcombe N = 29
1. Breeding and store lambs	-	2
2. Fat lambs and breeding rep.	19	11
3. Fat lambs and buying rep. as 2ths	4	3
4. Fat lambs and buying rep. as aged ewes	3	7
5. Fat lambs and buying rep. as M.A. ewes	2	5
6. Item 1 and stud	-	1
7. Item 2 and stud	5	1
8. Item 5 and stud	-	1

Discrepancies between the number of respondents carrying beef breeding cows shown in Table 6 and the number indicating they are following a breeding cow policy in Table 8 occur. In Reporoa this is due to two farmers who are switching from a policy involving breeding cows to one of buying weaners to 18 months old cattle and fattening them, and one who anticipates buying weaners and selling these fat at 18 months. In the Halcombe area one farmer is also switching from run cows to a policy of buying weaners to sell fat at 18 months.

TABLE 8. Comparison of Cattle Policies Between the Survey Areas.

Cattle Policy	Reporoa N = 31	Halcombe N = 29
1. Breeding reps. selling weaners	7	-
2. Breeding reps selling 18 mnths fat	3	1
3. Breeding reps selling Items 1 & 2 fat and forward	4	-
4. Buy rep cows selling weaners	1	1
5. Buy rep cows selling 18 mnth fat	2	-
6. Buy weaners fatten to 18 mnths	3	1
7. Buy weaners fatten to 18-30 mnths fat	3	3
8. Buy weaners or 12-18 mnths and fatten	5	10
9. Stud breeding only	-	1
10. Stud and Items 2 & 6	1	-
11. Stud and Items 4 & 6	1	-
12. Dairying	1	-
13. 2½ yr. steers May - Sept. cows and calves Nov - April	-	2
14. Store - fat cattle over summer	-	4
15. Dairy beef breed and rear till fat	-	3
16. Cattle not carried	-	3

All these cattle policies are flexible and some cattle may be bought or sold in different age groups or condition than indicated depending upon the season and the markets or schedule prices relevant at the time.

(d) Cropping.

Crop acreages are generally comparable in both areas although more Halcombe respondents grow some form of cereal crop (wheat or barley) than in Reporoa. Also Reporoa farmers favour a mixed winter crop of choumolier and swedes while the Halcombe farmers seem to prefer choumolier on its own.

TABLE 9. Comparison of Number of Individuals and Average Acreage of Various Crops they Grow in each Survey Area.

Type of Crop	Reporoa N = 31		Halcombe N = 29	
	Nos. growing	Avg. Acres	Nos. growing	Avg. Acres
Cereal	9	20	17	31
Swedes	3	21	1	11
Choumolier	3	20	11	17
Swede/Choumolier	25	26	6	21
Turnip/New Grass	2	27	6	31*
Lucerne	23	18	0	-

*One respondent grows considerably larger quantities of these two crops than is typical among the Halcombe respondents. If his areas of 200 acres of wheat and 120 acres of turnips and new grass are discounted the average acreage of these two crops grown by the remainder is 21 acres of cereals and 12 acres of turnips and new grass.

(e) Fertilizers.

An average of 62 tons of phosphatic fertilizer is applied to each farm in the Reporoa area giving an average rate of 3.1 cwt/acre while an average of only 41 tons is applied to 27 farms in the Halcombe area giving an average rate of 2.2 cwt/acre. This difference in average rates of application of phosphatic fertilizer is indicative of the higher soil fertility levels found in the Halcombe area in comparison with the Reporoa area.

Trial results in the Reporoa area have also indicated the necessity to apply other elements as well as phosphates to improve the virtually non-existent levels of some of these required plant nutrients. Consequently much greater use is regularly made of elements other than phosphate in the fertilizer applied in the Reporoa area in comparison with the Halcombe area. Table 10 indicates the number of respondents using various elements regularly on either pasture or crops.

TABLE 10. Comparison of the use of Various Elements in Fertilizer.

Area	Elements							
	K	Mg	Mo	S	B	Co	Cu	N
Reporoa N = 31	29	22	0	2	31	31	6	1
Halcombe N = 29	17	4	0	0	0	0	0	2

Family Information.

(a) Background.

As a result of the recent settlement of the Reporoa area only three of the respondents had been brought

up either within the area or in districts close to it. Of the respondents in the Halcombe area 17 had been brought up within the immediate vicinity of the area and a further six in districts near by. The majority of respondents in both areas considered they were brought up in the country rather than a town and as Table 11 shows the majority in each case were actually sons of farmers.

TABLE 11. Comparison of the Occupations of Respondent's Father in each Area.

Father's Occupation	Reporoa N = 31	Halcombe N = 29
Farmer	20	24
On land as contractor/labourer	3	-
Own business, Shop	2	-
Wharehouseman	2	-
Engineering	2	2
Accountant/Lawyer	2	-
Teacher	-	1
Freezing works buyer/manager	-	2

(b) Previous Work Experience.

Respondents in both districts had been engaged predominantly in farm labouring work but a larger proportion of the Reporoa respondents had had a number of other diverse jobs as shown in Table 12. (See page 86.)

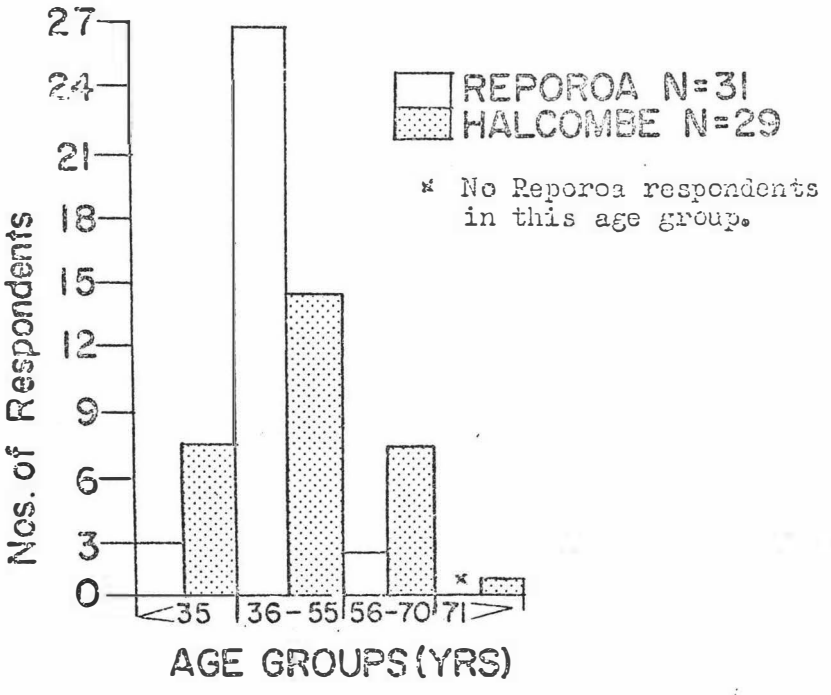
(c) Age Distribution.

Age distributions of the respondents in the two districts are indicated in the histogram on page 86.

TABLE 12. Comparison of Previous Occupational Experience of Respondents.

Type of Work	Reporoa	Halcombe
Farm or forestry labour	14	21
Agricultural contractor	6	2
Storeman driver	3	1
Wool or stock buyer	1	2
Tradesman	3	3
Own business	2	-
Government Department	2	-

Fig. 9. Comparison of the Distribution of Respondents' Age Groups in Each Survey Area.



The histogram in Fig. 9. shows the marked concentration of ages within the one group in Reporoa

while there is a wider spread within the Halcombe area.

(d) Educational Attainment.

The degree of education of respondents in each district was remarkably similar as shown in Table 13.

TABLE 13. Comparison of Respondents' Educational Attainment.

Amount of education	Reporoa N = 31	Halcombe N = 29
Minimal	4	-
To cert. of proficiency	9	10
Some secondary	6	6
Attempt S.C.	10	7
Attempt U.E.	1	3
Univ. Degree course	-	1
Completed degree	-	-
Univ. Diploma	1	2

One respondent in each district was unmarried and wives of the remainder provided a similar distribution in both areas over a number of professions, with nurses and office clerks appearing to be the most popular!

(e) Family size.

The number of children per family in each district and the number of children still at home and dependent upon the respondent is indicated in histograms in Figs. 10 and 11. (See page 88.)

Although there are a greater proportion of families with three children in the Halcombe area the general distribution of family size is fairly similar between the two survey areas. However, from Fig. 11 it

Fig. 10. Number of Children per Family in Each Survey A

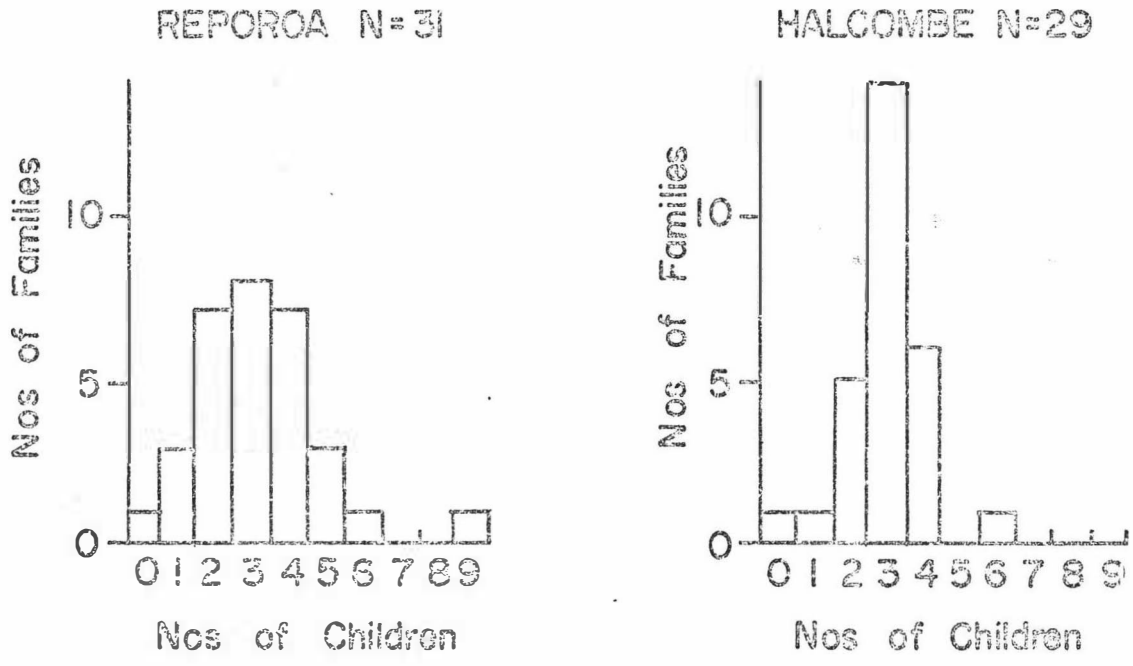
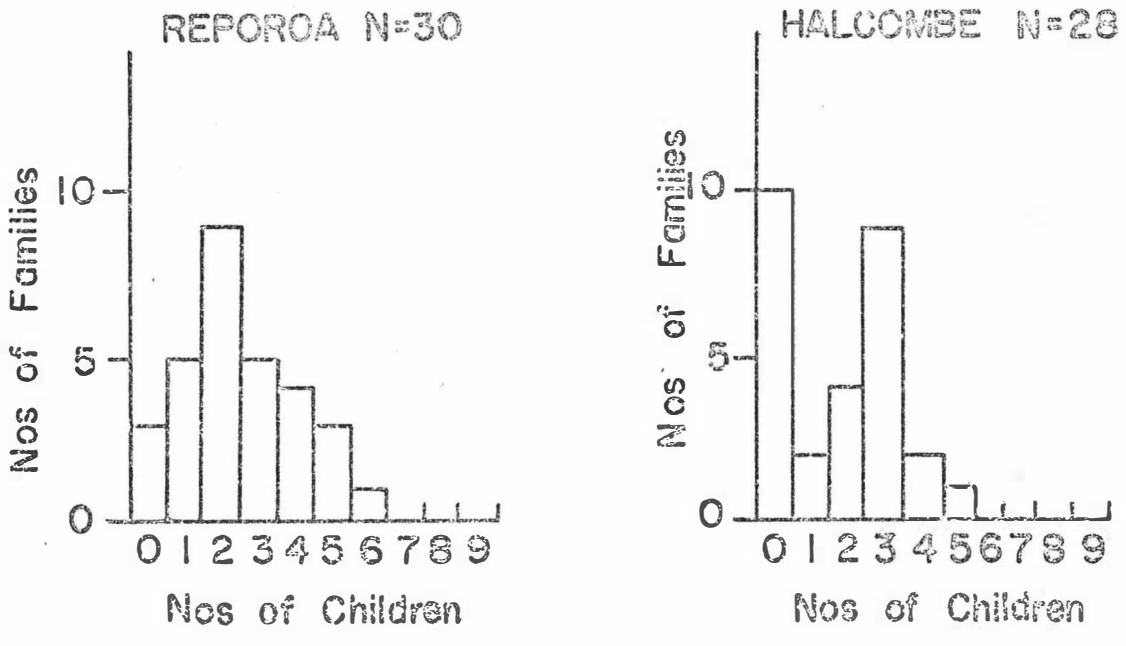


Fig. 11. Number of Children Still at Home and Dependent on Parents.



would appear that the Halcombe families are somewhat older in view of the number of families without any dependent children still at home, than the Reporoa families.

Two respondents in Reporoa and four at Halcombe had sons working for them on their properties but these have not been included in the number of dependent children in each family shown in Fig. 11.

(f) Age Distribution of children.

If the children are categorised into age classes on the basis of which is the predominant age group in the family, differences between families in each area become more apparent as is shown in Table 14.

TABLE 14. Age Classes of Respondents' Children.

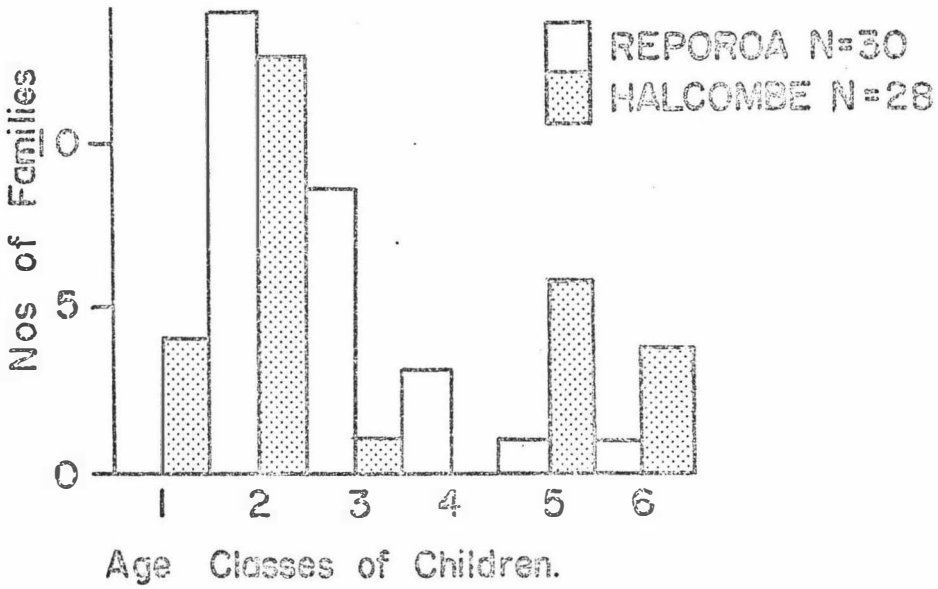
Age Class	Reporoa N = 30	Halcombe N = 28
1. Pre Primary school	2	4
2. Primary	14	13
3. Secondary	9	1
4. University/ training college or similar	3	-
5. Under 22 but not dependent	1	6
6. Over 22 but not dependent	1	4

This different is accentuated if it is depicted as a histogram (Fig. 12, page 90), using numbers to indicate the various age classes as shown in Table 14.

(g) Family Aspirations.

The majority of respondents in both areas did not see the future requirements of their farms conflicting in any way with their vocational aspirations for their children's futures. Both districts had respondents (2 in

Fig. 12. Comparison of the Distribution of Age Classes of Respondents' Children in Each Survey Area.



Reporoa, 3 in Halcombe) who wondered if they would have sufficient finance to do what they would like for their children. Nine of the Halcombe respondents also doubted if the size of their farms would be adequate either because of a number of sons showing an interest in farming or because of the necessity to provide some form of retirement income for the respondent if or when a son took over. Only three of the Reporoa respondents were concerned about this..

Respondents' aspirations for their children were similar in both areas although in the Reporoa area the majority have or would wish to see their children continue

their schooling for a longer period than would the majority of Halcombe respondents as indicated in Table 15. Traditionally rural youth in New Zealand received a relatively limited education before leaving school to work on the land. This attitude towards education still appears to predominate in the Halcombe survey area although a more progressive attitude seems to be apparent among the respondents in the Reporoa survey area.

TABLE 15. Minimum Amount of Schooling Respondents wish their Children to Receive.

Minimum amount of schooling preferred	Area	
	Reporoa N = 31	Halcombe N = 29
Up to minimum leaving age	0	0
Attempt School Certificate	5	9
Pass School Certificate	3	4
Attempt University Entrance	2	7
Pass University Entrance	21	9

The vocational aspirations respondents had for their children as indicated in Table 16 (page 92) are those which it was either hoped would be, or had been, achieved.

In each survey area those respondents stressing they hoped their children would not take up farming did not appear to have different backgrounds or values or to be any less successful as farmers than the other respondents.

TABLE 16. Respondents Vocational Aspirations for their Children.

Vocational Aspiration	Reporoa N = 31	Halcombe N = 29
Nothing in particular - would help do anything	10	8
Hope son interested in farming	14	12
Hope gain a technical qualification	1	4
Hope gain professional qualification	4	3
Hope gain qualification - NOT in farming	2	1

(h) Respondents' Personal Ambitions.

The personal hopes or ambitions of the respondents in each area are indicated in Table 17. (See page 93.) A marked similarity between areas is apparent.

(i) Pride in Farming Operations.

A large number of the Reporoa respondents did not admit to being proud of any particular aspect of their farming operations while the majority of Halcombe respondents were proud of some particular aspect of their farming operations. Examples of this were subdivision, regrassing programmes, drainage and buildings. Table 18 (page 93) summarises the various aspects of which respondents in each area were proud.

(j) Objectives and Reasons for Farming.

When questioned as to what their major objective was in farming, whether it was as a satisfying way of

TABLE 17. Respondents' Personal Hopes or Ambitions.

Hope or Ambition	Reporoa N = 31	Malcombe N = 29
None in particular	3	6
Happy retirement and old age	7	5
Money for tour, luxuries, help children	5	6
To expand farm enterprise	5	4
Own a model farm	3	2
Be a successful farmer	4	4
Successful stud breeder/exhibitor	2	1
Community service	2	1

TABLE 18. Aspects of Farming Operations in which Respondents Take Pride.

Pride taken in-:	Reporoa N = 30	Malcombe N = 28
Nothing really	12	3
Whole farm as unit	4	3
Specific farming achievements	5	19
Stockmanship	6	3
Wool quality	1	-
House surrounds	2	-

life or something more than that, the majority of respondents in both survey areas seemed to consider their major objective in farming as a satisfying way of life.

However, two interesting observations were obtained from some of the respondents indicating a possible change in their approach to farming. A number

of respondents held the view that farming was once a business but now could only be considered a way of life, due to declining profit margins, while others suggested that because of declining profits farming could now no longer be considered as a way of life but must be viewed as a business. Unfortunately these observations cannot be discussed further as no identification was kept of which respondents made the comments.

The view that farming is a satisfying way of life is supported to some degree by the results in Table 19 which indicate that the majority of respondents in each area took up farming because they enjoyed it and the opportunity it gives to lead a relatively free outdoor life in which the individual is responsible only to himself.

TABLE 19. Reasons for Taking up Farming as an Occupation.

Reason Farming	Reporoa N = 31	Halcombe N = 29
Was ambition - love it	27	21
Fortuitous - War, Health	4	2
Brought up to it	-	3
Brought up to it - dissatisfied	-	3

(k) Ranking of family goals or values.

Ranking family goals or values in the order in which they meant most to the respondent was tested against a hypothesised ranking by the method discussed briefly in Chapter III.

The assumptions which formed the basis for the hypothesised ranking were:-

(1) That each respondent would place the highest value on providing his children with a good education, even to the extent of foregoing some on farm expenditure.

(2) That ensuring that his farm was in good order and at a high level of production would be each respondent's next most important consideration.

(3) That after the items in 1 and 2 each respondent would be more concerned with ensuring the continuing improvement or growth of his equity position through the reduction of debt than with purchasing further household conveniences or providing the family with opportunities for travel and/or recreation outside the district.

These assumptions were considered to be a reasonably accurate representation of the priorities of New Zealand farm families. Education of the children ensures a reasonable chance of success for them in adult life and a productive farm, although an end in itself, should also be generating income to service other family goals or values. Of these other family goals or values it is generally unlikely that extra household conveniences and luxuries or opportunities for travel will be provided if it involves greatly increasing

indebtedness. Traditionally society, and in particular those who experienced the effects of the economic depression of the 1930's, have placed a high value on the accumulation of debt free assets.

Table 20 shows the hypothesised rank order and the observed rankings for each survey area derived from the sum of the rank positions for each family goal or value. Page's L statistic (see page 62) indicates that the hypothesised ranking is significantly similar to the respondents' ranking of family goals or values in both survey areas.

TABLE 20. Rank Positions of Five Family Goals or Values.

Family Goal or Value	Hypothesised Rank	Observed Rank	
		Reporoa	Halcombe
Providing children with good education	1	1	1
Having farm tidy, productive and well equipped	2	2	2
Owning farm, free of debt	3	3	3
Providing self and family with opportunity for travel	4.5	4	5
Having more modern conveniences in the home	4.5	4	5

As discussed on Page 61, the sums of ranks can be used to assign an observed ranking, as presented in Table 20, only if Kendall's coefficient of concordance W is significant for the various sums of ranks. Appendix H includes the sums or ranks and the significant values of W which were calculated.

Assigning a hypothesised mean ranking of 4.5 to the last two family goals or values was necessary because when asking the question only three goals or values were required to be ranked by the respondents. The observed rankings also suggest that assigning a mean ranking of 4.5 was justified. However, if the sum of rankings for each survey area are considered (See Appendix H) it is obvious that there is virtually no difference in the rank scores in the Halcombe area for the last two family goals or values. The Reporoa respondents, however, definitely ranked opportunities for travel and recreation outside the district ahead of more modern conveniences in the home suggesting wider, more outgoing, interests and values amongst the Reporoa respondents than amongst the Halcombe respondents.

(l) Hypothetical Conflict Situations.

Table 21 (see page 98) presents the responses obtained to the six hypothetical situations in which the respondents were asked to make a choice.

From this table it would appear that little difference exists between the two survey areas with regard to the respondents' action in a number of hypothetical conflict situations. The responses also appear to confirm the hypothesised ranking shown in Table 20.

(m) Formal Social Participation.

The degree of participation of individuals in various formal community and social activities such as organisations and clubs related to Agriculture, Sport or Community affairs such as School, Church and Hall

TABLE 21. Responses to Hypothetical Situations Involving a Choice Between Farm and Family Items.

Hypothetical Situation	Reporoa N=31	Halcombe N=29
1. Suppose you wished to send your daughter or son to a Business College, University, Trade School, Farm Institute or something like that and at the same time you needed to spend money on the farm or farm home. Which would you do first?-		
Spend on the farm.	2	4
Send child to college.	26	20
Don't know.	3	5
2. Suppose you don't have all the field machinery you need but have enough to get along with and at the same time the family would like some new furniture in the house. What would you do?-		
Buy machinery first.	12	15
Buy furniture.	15	11
Don't know.	4	3
3. Suppose you wanted to paint the woolshed and outbuildings and the family wanted a trip or vacation. Would you?-		
Paint the buildings.	8	14
Take the family on a vacation.	11	12
Don't know.	12	3
4. Suppose you have a son who is over 15 years of age and has the ability, but who hasn't finished secondary school. He would <u>like</u> to carry on at secondary school but is interested in farming. You need him to help you on the farm. Would you?-		
Encourage him to leave school and help you on the farm.	1	1
Encourage him to complete his schooling.	29	27
Don't know.	1	1
5. Suppose you have a son who wishes to take a short course in farming, yet this will mean harder work for you. Would you?-		
Not encourage him to take the course.	3	1
Encourage him to take the course.	28	27
Don't know.	-	1
6. Suppose you have a child who wants to take time off during the harvesting period to attend a function, e.g. sports meeting or camp on which his heart is set. Would you?-		
Not encourage him to go.	9	11
Encourage him to go.	17	15
Don't know.	5	3

Committees, Service Clubs and involvement in local government is indicated in the following table.

TABLE 22. Participation in Formal Organisations.

Organisation	Area	Nos. of Organisations in which - Have active membership					Have held Office				
		0	1	2	3	4	0	1	2	3	4
Agriculture	Reporoa	22	4	3	1	1	20	8	1	-	2
	Halcombe	17	7	4	1	-	17	10	1	-	1
Sport	Reporoa	20	-	2	-	-	15	13	2	1	-
	Halcombe	14	11	4	-	-	18	9	2	-	-
Community	Reporoa	21	9	1	-	-	19	9	2	1	-
	Halcombe	18	6	4	1	-	20	4	4	1	-

This table indicates slightly less involvement by the Reporoa respondents in formal off-farm activities but this may be a reflection of the relative inconvenience of participation in the Reporoa area with its greater distance and poorer roading to community facilities as compared with the Halcombe survey area. However, the Reporoa respondents seem to have been more active in the leadership of the various clubs and organisations to which they have belonged.

(n) Work Exchange Arrangements.

Regular arrangements between neighbours to help each other with large jobs such as shearing and dipping have been common amongst farmers in the past. This was particularly so in the early stages of settlement of the Reporoa area when facilities such as woolsheds and stock yards had to be shared amongst a number of farmers. Once each farmer has his own facilities he tends to become more independent of his neighbours. However, although

only eight farmers in the Reporoa survey area and six in the Halcombe area regularly have any arrangement to help each other in some form of work exchange which might be regarded as a formal obligation, most respondents would generally assist a neighbour to complete a job if asked to.

(o) Informal Family Visiting and Social Contacts.

The degree of social contact between neighbours within each area is shown in Table 23 to be greater in the Reporoa area than in the Halcombe survey area.

TABLE 23. Inter-family Social Contacts.

Area	Nos. of families Visited within survey areas.					
	0	1	2	3	4	5
Reporoa N = 31	3	10	7	3	5	3
Halcombe N = 28	8	2	7	8	3	-

One Halcombe respondent had not been in the district long enough to make any strong social contacts, two said neighbours generally were visited and did not specify names and five named families just outside the survey area with whom they had social contacts.

The sociograms on Pages xxv-xxvi of Appendix F depict the extent and pattern of inter-family visiting within each area. From these sociograms the greater involvement of all the respondents in the Reporoa area becomes more apparent.

(p) Concern with Public Image.

Concern with the quality of their image as farmers amongst their neighbours was not very great in the respondents in either area. Six, and five, respondents respectively in Reporoa and Halcombe expressed any concern about the quality of their image as farmers. However, these figures increased to thirteen and nine in each area respectively when questioned about their concern with the quality of their image as people amongst their neighbours.

Farm Practices and Sources of Information.

(a) Introduction.

The results presented so far have all been aimed at establishing whether the two areas surveyed can be regarded as comparable in physical features, farming patterns and the individual family situations of the respondents. These results form the basis upon which any differences noticed in the extent to which farmers in each area are informed about their neighbours' practices, the degree to which they make use of various sources of information, both formal and informal, and their degree of contact with various forms of advisory media can be compared. A number of practices which have at some time been either adopted by farmers or recommended through various forms of extension media were considered. The attitude of the respondents to each new practice, the extent of their knowledge of their neighbours use of the practices and their possible sources of further

information are considered for each practice individually.

(b) Farm Race System.

An internal farm race is considered by the author to be a useful device to ease the work load and enhance the workability of heavily stocked sheep units especially if there is only one labour unit. The majority of farms in the Reporoa area could advantageously have some form of race system. The advantages seen for a race system in the Reporoa area apply equally well, in the author's opinion, in the Halcombe survey area too. However, farms in the Halcombe area would have greater problems in installing and operating a race system due to more broken contour and poor soil drainage which could give pugging problems in the winter.

The favourable and unfavourable attitudes towards race systems obtained from responses to questions 15 and 16, are indicated in Tables 24 and 25.

TABLE 24. Perceived advantages of a Farm Race System.

Advantages of Race	Reporoa N = 31	Halcombe N = 29
Ease of stock movement not disturbing set mobs	25	23
Ease of access and reduction of pasture fouling	3	3
Ease of access plus enhances cropping - by-pass	-	1
Don't see any advantage	3	2

TABLE 25. Perceived Disadvantages of a Farm Race System.

Disadvantages of Race	Reporoa	Halcombe
None	12	11
Only cost of erection	5	2
None if wide enough to keep turf	9	-
Loss of grazing area	1	4
Maintenance and erosion problems	2	7
Costs, grazing loss, tracking and pugging	2	4
Contour problems	-	1

From these tables it would appear that race systems generally are considered in a favourable light.

Because of a problem in definition, respondents who have either a race or a narrow paddock acting as a lane are combined in Table 26, (see page 104). This allows for respondents who name an individual as having a race system to be correct if the individual has some form of fencing designed to enable stock to be moved along some defined access race or lane.

Table 26 indicates the number of respondents who have a race or lane system and the extent to which this is known of by the rest of the respondents in each district.

From this table it appears that a slightly larger proportion of the Reporoa respondents could correctly name a larger proportion of the individuals in their district who had race or lane systems on their farms than could Halcombe respondents.

TABLE 26. Extent and Accuracy of Knowledge of Individuals in each Survey Area who have a Farm Race or Lane.

	Repcroa N = 31	Halcombe N = 29
1. Nos. of individuals with race or lane	8	10
2. Nos. of different individuals whom respondents (in Item 3) claim are carrying out practice.	6	5
3. Nos. of respondents naming individuals in Item 2.	26	21
4. Nos. of respondents naming at least one individual correctly	26	21
5. Nos. of respondents naming at least one individual who did not have a race	0	0

The predicted sources of possible further information concerning farm race systems are listed for each area in Table 27, (see page 105).

Some respondents gave up to three alternative information sources, indicating for example that they would discuss a race system with one or two named individuals, but would also seek other individuals, as yet unknown, who have had experience with race systems. The sociograms in Appendix F indicate the relative location of individuals in each district referring to others in the district as information sources. It is apparent that although immediate or near neighbours are

TABLE 27. Predicted Sources of Further Information on Farm Race Systems.

Information Source	Reporoa N = 31	Halcombe N = 29
Nobody	2	2
Self own knowledge	12	8
Men with experience	9	7
Ag. Dept. Adviser	6	12
Private/Club Adviser	2	2
Named individuals*	11	6

* The named individuals from each district (3 in Reporoa, 1 in Halcombe) and the number of times they were referred to is indicated in sociograms in Appendix F, pages xxvii-xxviii.

considered as information sources on some topics the importance of individuals who can only be classed as neighbourhood acquaintances or distant "neighbours" is also high.

From Table 27 it appears that in the Reporoa area respondents would make greater use of neighbourhood contacts than respondents in the Halcombe area.

(c) "Intensive" use of Fodder Crop.

The author considered that a method of feeding off a winter crop observed on one farm in the Reporoa area in 1968 could have advantages in ensuring complete use of the crop and a more complete spelling of pasture (as a result of the survey the author subsequently found one respondent in the Halcombe area who was also using the practice). This method involved break feeding the crop with several different groups of stock at the one time. The groups were arranged on the crop which had been

partially fed off, in order of their relative importance. Young stud stock, and young replacement stock were given a leafy break, flock ewes and fattening cattle had the next break of some leaf and first pick of the roots while run cattle and rams were on the last break virtually cleaning up what roots were left. With all these groups on at once pastures are effectively spelled and possible pugging damage reduced in contrast to systems which involve shifting stock on and off the crop. Admittedly in shifting stock on and off some degree of preference is given to various classes of stock so that they have their turn on the crop in order of their relative importance. The author was, however, interested to see the extent to which this innovation of intensive stocking and use of a crop had diffused around the area. Table 28 (see page 107) derived from the answers given to question 37, indicates the attitude of respondents in each area to such a practice.

As could be anticipated because of pugging problems in winter, a fewer number growing winter crops and the more limited range of classes of stock carried, the Halcombe respondents are not as positive in their attitude as the Reporoa respondents. The degree of knowledge of this practice in the Halcombe area is also less than in the Reporoa area.

(d) Chemical Methods of Pasture Renovation.

Renovation of pasture by chemical means, known as "chemical ploughing" has been advocated widely in New Zealand. One of the major proponents of the practice, Mr. L. Blackmore, resides in Palmerston North and has

TABLE 28. Attitudes towards "Intensive" Use of a Fodder Crop.

Does practice have a place?	Reporoa N = 31	Halcombe N = 29
Don't know	2	5
Yes - better utilisation of crop	7	4
Yes - ease of stock movement	5	-
Yes - save grass	3	1
Yes - but labour a problem	2	1
Yes - if changed stock policy	-	2
Total favourable responses	17	8
No - not at all	1	1
No - not the stock classes to try it	3	4
No - wouldn't feed crop to all stock	4	3
No - excessive labour requirement	4	5
No - physical problem- contour, drainage	-	3
Total unfavourable responses	12	16

been responsible for a number of trials in the Manawatu. Although none of these have been carried out in the Halcombe area, there have been trials within twelve miles of the survey area. Trials by a commercial firm have, however, been carried out within the Reporoa survey area.

The author considers this practice is one farmers should be aware of and one which could have a place in areas where pasture renovation is required in paddocks which have already been levelled by cultivation

TABLE 29. Extent and Accuracy of Knowledge of Individuals in each Survey area who were using an Intensive Crop Feeding System.

	Reporoa N = 31	Halcombe N = 29
1. Nos. of individuals carrying out practice	3	1
2. Nos. of different individuals whom respondents (in Item 3) claim are carrying out practice	5	3
3. Nos. of respondents naming individuals in Item 2	8	5
4. Nos. of respondents naming at least one individual correctly	6	-
5. Nos. of respondents naming at least one individual who was not carrying out practice	4	5

at an earlier date. It appears to be useful in altering the composition of the sward for a particular purpose or for introducing special purpose species such as the winter growing clovers, 'Grasslands 4700', or 'Grasslands Tama' Westerwolds rye grass.

The responses to question 39 are indicated in Table 30 (see page 109) where it is apparent that the attitudes displayed in each area towards "chemical ploughing" are very similar.

Opinions numbers 3 and 4 may point to specific problems in each district. Reporoa farmers are

TABLE 30. Attitudes towards Chemical Renovation of Pasture.

	Reporoa N = 31	Halcombe N = 29
1. Cost is too excessive	1	3
2. Plough gives better result	4	1
3. May have place where is weed problem	5	11
4. O.K. for renovation of levelled paddocks	11	4
5. O.K. if on unploughable contour	6	3
6. Dislike use of chemicals	4	3
7. Don't know	-	4

definitely concerned about possible reversion of their pasture to lower producing pasture species while the Halcombe farmers may well be concerned about general weed infestation in their pastures.

The question of what would actually induce trial of chemical methods of pasture renovation by the respondents provides a further indication of their attitudes toward the practice.

Table 31 (see page 110) appears to indicate an acceptance of this practice as an idea, but actual adoption is dependent upon economic considerations and individual farm situations.

The extent to which adoption has occurred and is known about in each area is indicated in Table 32, (see page 111).

TABLE 31. Situations in which Respondents may try chemical methods of Pasture Renovation.

	Reporoa N = 31	Halcombe N = 29
Nothing, ploughing is better	8	7
Paddock requires renovation but can't plough	4	6
Proved more economic and better than present practice	8	10
Have gear - quicker than conventional	2	-
To introduce special species - fatten lambs	1	1
To boost clover growth	-	1

Two individuals in each area were carrying out the practice. However, the proportion of respondents who knew of these activities in their respective areas was greater in the Reporoa than in the Halcombe survey area. Also if the extent of interpersonal discussion of the practice, indicated in the sociograms in Appendix F pages xxxix-xl can be used as a guide, "chemical ploughing" appears to have created greater interest among respondents in the Reporoa area.

Table 33 (see page 112) suggests that despite this interpersonal contact, both areas indicated they would prefer to make use of more formal sources for further information on chemical methods of pasture renovation.

The predicted use of the manufacturer's technical representative as a source of information in the Reporoa

TABLE 32. Extent and Accuracy of Knowledge of Individuals in each Survey Area who have tried Chemical Renovation of Pastures.

	Reporoa N = 31	Halcombe N = 29
1. Nos. of individuals who have tried "chemical ploughing"	2	2
2. Nos. of different individuals whom respondents (in Item 3) claim have carried out practice	3	3
3. Nos. of respondents naming individuals in Item 2	9	4
4. Nos. of respondents naming at least one individual correctly	8	2
5. Nos. of respondents naming at least one individual who had not tried "chemical ploughing"	1*	2

* This one respondent who incorrectly named an individual as having carried out "chemical ploughing" may have been confused by the question. The individual he named had not actually carried out any "chemical ploughing" himself but a paddock had been used for trial purposes by a commercial firm.

area may be partly due to the fact that a commercial firm had "chemical ploughing" trials in the area and that the scientific and technical staff responsible for these trials were very approachable. Two properties were used for trials in the area and a total of twelve respondents knew the location of at least one of the trial sites.

TABLE 33. Predicted Sources of Further Information on Chemical Methods of Pasture Renovation.

Information Source	Reporoa N = 31	Malcombe N = 29
Nobody	2	2
Neighbours generally	-	3
Ag. Dept. Adviser	17	8
Private/Club Adviser	1	4
Manufacturer's Tech. Rep.	6	-
Specific produce firm	4	4
Other stock/ produce firms	1	7
Contractor	-	1

(e) Use of Nitrogenous Fertilizers on Pasture.

Increasing interest is being displayed in New Zealand in the use of artificial nitrogen to boost pasture growth, especially in the late autumn or early spring. Recent papers by Ball and McKenzie (1970) and Ball and Rose (1970) would suggest that the use of artificial nitrogen fertilisers can be considered to be economically feasible in periods of anticipated feed shortage. The author considers that the use of artificial nitrogen is a practice of which farm managers should be aware. Only one respondent in Reporoa and two in the Malcombe survey areas have used nitrogenous fertilisers (Table 10) but the knowledge and attitudes of respondents in the two areas is indicated in the following tables.

Table 34 (see page 113) indicates the respondents ideas about, and attitudes towards, the use of nitrogenous fertilisers on their properties while

TABLE 34. Respondents' Perception of the use of Nitrogenous Fertilisers on his Property.

Ideas About Nitrogenous Fertilisers	Reporoa N = 31	Malcombe N = 29
Gives feed boost but need heavier more fertile country than this	3	3
Soil temps. would limit effectiveness here	8	-
Think price is excessive	4	5
Could have place despite cost for boosting spring/ autumn growth	7	11
Haven't seen results that warrant its use - especially if good clover growth	4	6
Has place in intensive cropping system	-	1
Don't know	5	3

Table 35 (see page 114) indicates what would induce them to actually try some, these tables being derived from the responses to questions 51 and 52 respectively.

The Reporoa respondents appear to be slightly more aware of the possible physical limitations to effective use of nitrogenous fertilisers in their district. Respondents in both areas recognise the possibility of using nitrogenous fertilisers for specific problems or purposes, and Table 36 (see page 114) indicates they would tend to obtain further information about it from the more formal rather than informal or neighbourhood sources of information.

TABLE 35. Situations in which Respondents may try Nitrogenous Fertilisers.

Inducements to try Nitrogenous Fertilisers	Reporoa N = 31	Malcombe N = 29
Nothing	4	3
Results show is economically sound	8	7
Feed shortage	5	1
Paddock not doing as well as should	6	4
Late new grass	4	1
Special purposes or crops	4	10
When have built up general fertility levels	-	1
Test or Adviser says is required	-	2

TABLE 36. Predicted Sources of Further Information on Nitrogenous Fertilisers.

Information Source	Reporoa N = 31	Malcombe N = 29
Neighbours generally	2	2
Scientist DSIR/ University	-	1
Ag. Dept. Adviser	24	10
Private/Club Adviser	1	4
Manufacturer's Tech. Rep.	2	-
Specific produce firm	2	9
Other stock/ produce firms	-	3

It is interesting to note that no respondents in either area indicated they would not bother seeking information on this topic.

(f) Vacuum Packed Silage.

Conservation of surplus pasture as silage has not been very common on sheep farms in New Zealand in the past. However, in recent years farming magazines have carried numerous articles concerned with the use of silage on sheep farms. These articles generally stress the need to be able to self feed the silage and generally suggest its use for supplementary cattle feed rather than for sheep. Extensive research into the making and storage of silage has been carried out and reported to farmers by officers of the Ruakura Animal Research Centre.

Vacuum packed silage, that is silage made by enclosing a stack of grass in a large plastic sheet, and extracting most of the air from this sealed bag so that compaction is in part achieved by atmospheric pressure and aerobic fermentation inhibited through lack of air, had been advocated as the ideal method of making silage. However, the expense involved, the problem of keeping the pack air-tight and the fact that a conventionally made stack, if well compacted and covered, provided silage of very similar quality has resulted in vacuum packed silage losing favour. Since the survey showed that one farmer in each area had actually made silage by this method it was of interest to ascertain the extent to which other respondents in each area knew about these vacuum packed silage making efforts.

With their slightly easier contour and greater cattle numbers the Reporoa respondents had slightly more experience of silage making than the Halcombe respondents. Six of the 31 respondents in the Reporoa area were making silage and three had done so in the past, while only one of the 29 respondents in the Halcombe area was making silage although two others had done so in the past.

Table 37 indicates the extent of the knowledge neighbours had of individuals who were actually making vacuum packed silage.

TABLE 37. Extent and Accuracy of Knowledge of Individuals in each Survey Area who have made Vacuum packed silage.

	Reporoa N = 31	Halcombe N = 29
1. Nos. of individuals making vacuum silage	1	1
2. Nos. of different individuals whom respondents (in Item 3) claim were carrying out practice	4	2
3. Nos. of respondents naming individuals in Item 2	16	4
4. Nos. of respondents naming at least one individual correctly	14	3
5. Nos. of respondents naming at least one individual who was not making vacuum silage	2	1

The difference noted here in the extent of the knowledge respondents had of one individual's practice within each area may only be a function of time. The individual in Reporoa making vacuum silage had been doing so for three years while the individual in the Halcombe area had only made it for the first time in the 1968-69 season.

The majority of respondents in the Reporoa area predict they would, if the occasion were to arise, make silage by some method other than vacuum packing while the majority of the respondents in the Halcombe area were uncertain what method they would use. Both areas expressed uncertainty as to what would induce them to make silage of any sort. However, Table 38 (see page 118) shows there was a positive attitude toward seeking further information about vacuum packed silage as very few respondents indicated that they would not seek information if they thought the practice was applicable to their situation.

More informal discussion about vacuum packed silage had occurred within the Reporoa area where one respondent had spoken with his neighbours generally, three had spoken to other named individuals who were making silage in a conventional manner and eight had discussed it with the one individual using vacuum packing. In the Halcombe area only two respondents had spoken with their neighbours generally and three with the individual making silage by the vacuum pack method.

TABLE 38. Predicted Sources of Further Information on Vacuum Packed Silage.

Information Source	Reporoa N = 31	Malcombe N = 29
Nobody	1	3
Unnamed men with experience	5	7
Ag. Dept. Adviser	21	12
Private/Club Adviser	2	3
Specific produce firm	-	3
Other stock/ produce firms	3	6
Magazines	3	-
Named individual	5	-

(g) Mating Ewe Hoggets.

Recent research at Ruakura Animal Research Station, Lincoln College and Massey University has suggested that if ewe hoggets can be grown to a weight of about 90 lbs by the autumn then these sheep can be mated and may reasonably successfully rear a lamb with little ill effect. Consequently an increasing number of farmers who rear their own replacements are carrying out this practice. If the weight gain necessary over the first six to eight months can be achieved and an adequate level of feeding of the pregnant hogget maintained over the winter the author considers this practice is a useful way of enhancing profitability on farms breeding their own replacements.

From Table 8 it is apparent that 24 respondents in the Reporoa area and 15 in the Malcombe area could conceivably mate ewe hoggets since their sheep policy

includes this class of sheep. In fact 17 respondents in Reporoa and ten in the Halcombe area have tried it. Four respondents at Reporoa and six at Halcombe are continuing to mate their ewe hoggets. Of the 13 respondents in the Reporoa area who discontinued the practice only one did so because he had changed his sheep policy and did not run ewe hoggets. The remaining 12 all considered that their hoggets were small and stunted as adult sheep as a result of mating them as hoggets, and would not repeat the practice. Similar comments were made by four Halcombe respondents who had discontinued the practice too.

Despite this apparent dissolusionment with the practice in both survey areas, the author still considers it could have a place on some sheep breeding properties. However, the farmer must be sure an adequate level of feeding of the pregnant hogget can be maintained over the winter. Also, only hoggets of sufficient size should be mated and this may require the use of scales to provide a more objective estimate of body weight than present practice generally allows.

The majority of respondents in each area who had not tried the practice claimed this was because they did not consider their hoggets grew big enough, nor were they sure the ewe hoggets could be fed well enough over the winter if they were pregnant. Nine respondents in the Halcombe area had not carried this class of stock so could not have tried the practice.

The extent to which respondents could name other individuals within each area who had, or were mating ewe

hoggets is indicated in Table 39.

TABLE 39. Extent and Accuracy of Knowledge of Individuals in each Survey Area who have or are Mating Ewe Hoggets.

	Reporoa N = 51	Halcombe N = 29
1. Nos. of individuals who are or have mated ewe hoggets	17	10
2. Nos. of different individuals whom respondents (in Item 3) claim had carried out the practice	12	8
3. Nos. of respondents naming individuals in Item 2	26	13
4. Nos. of respondents naming at least one individual correctly	26	12
5. Nos. of respondents naming at least one individual who had not mated ewe hoggets	2	2

Informal interpersonal discussion of this topic had occurred in both districts with just over half the Reporoa respondents having discussed it with their neighbours generally and with nine named individuals. While a similar proportion in the Halcombe area had discussed mating ewe hoggets the proportion naming specific individuals was less. This is shown in the sociograms in Appendix F, pages xli-xlii.

The predicted sources of further information about mating ewe hoggets is listed in Table 40. (See page 121.)

TABLE 40. Predicted Sources of further Information on Mating Ewe Hoggets.

Information Source	Reporoa N = 31	Malcombe N = 29
Nobody	3	3
Self from experience	10	5
Unnamed men with experience	6	8
Named farmer outside district	-	3
Scientist/DSIR University	-	1
Ag. Dept. Adviser	3	4
Private/Club Adviser	1	3
Stud breeders	-	2
Named individuals*	9	5

* The named individuals from each district (9 in Reporoa, 3 in Malcombe) and the number of times they were referred to is indicated in sociograms in Appendix F, pages xliii-xliv.

(h) Mating Yearling Beef Heifers.

It has been customary in New Zealand to mate beef heifers at two years of age or older. Arguments similar to those for the mating of ewe hoggets have been advanced over recent years suggesting that if the heifer is well grown and put out to a small bull enhanced productivity may be obtained by mating as a yearling.

The attitudes towards mating beef heifers at this age was similar in both districts to the attitudes towards mating ewe hoggets and is summarised in Table 41, (see page 122).

With the lower number of farmers actually carrying out the practice in the Malcombe area (one only)

TABLE 41. Attitudes of Respondents towards Mating Yearling Heifers of Traditional Beef Breeds.

	Reporoa N = 31	Halcombe N = 29
Insufficient feed - would stunt growth	15	22
Poor growth - basis of past experience	12	-
Depends on season, O.K. if big enough	4	5
Doing it in Dairy Beef set up	-	1
Don't know	-	1

and the smaller number of beef cows in the area there is a probability that further information would be sought from more formal sources than in the Reporoa area where cattle numbers generally and of beef cows in particular are higher. Table 42 lists the predicted sources of further information.

TABLE 42. Predicted Sources of Further Information on Mating Yearling Heifers of Beef Breeds.

	Reporoa N = 31	Halcombe N = 29
Nobody	9	5
Self - own experience	9	2
Unnamed men with experience	6	7
Scientist, DSIR/ University	-	1
Ag. Dept. Adviser	4	8
Private/Club Adviser	1	3
Stud breeder	-	2
Named individuals	5	-

Only one respondent in the Malcombe area is mating yearling heifers, although they are of dairy origin, and his activities are unknown to any other respondents in the area. In the Reporoa area, however, 16 individuals are, or have in the past mated yearling heifers. Fourteen respondents gave the names of 13 individuals whom they thought had or were carrying out the practice. All the 14 respondents providing names were correct with at least one of the individuals they named although two named at least one individual who had not tried the practice.

(i) Autumn Calving.

In the late 1950's and early 1960's the practice of calving beef cows in the autumn, partly in an effort to avoid grass staggers or hypomagnasemia problems was popular. With its naturally low Magnesium levels some farmers in the Reporoa area tried this practice. It is now slowly going out of fashion in this area because it is difficult to feed the cow and calf well over the winter. Also the use of sepentine rock in the topdressing has increased soil magnesium levels, and in the farmers' opinion reduced the risk of grass staggers.

The degree to which other farmers know about the six who tried the practice was extensive. Twenty-five of the 31 respondents in the Reporoa area named eight individuals whom they thought had carried out autumn calving. Of the 25 who provided names 24 gave at least one name correctly and only two named an individual who had not tried the practice.

In the Halcombe area this practice is not applicable under the present stock policies as the majority of respondents running cattle are fattening young stock rather than breeding them. Of the five respondents carrying breeding cows only one had tried autumn calving and none of the other respondents in the Halcombe survey area were aware of this.

(j) Information Sources for Technical and Financial Problems.

The responses obtained to the question:- "If you had a particular technical farming problem is there any farmer around about here from whom you would seek advice?" are presented as sociograms in Appendix F, pages xlvi-xlvii. It is interesting to note, however, that the Halcombe respondents appear to be more self-sufficient in this regard as 14 of them claim they would not seek advice from anyone in contrast to nine respondents in the Reporoa area with the same answer. Table 43 (see page 125) lists the reasons for the various choices shown in the sociograms.

As a follow up to the question concerning a technical farming problem the respondents were also asked - "If you had a particular financial farming problem is there any particular farmer or other person around about here from whom you would seek advice?".

The sources of information the respondents suggested might be used to overcome a financial farming problem were all closely related to the monetary and banking sectors of the community and the extent to which respondents in either area would turn to the professional

TABLE 43. Respondents Explanation of Reasons for Selection of Particular Sources of Information to overcome a Technical Farming Problem.

	Reporoa N = 31	Malcombe N = 29
No experts, everyone has similar knowledge	11	11
An experienced and successful farmer	7	7
Similar farming system same problems	3	4
A friendly neighbour	6	1
Professional adviser or experts paid to know - should have answers	3	1
Go outside area, avoid conflicts and jealousies	1	-
Been here long enough - use common sense	-	4
Pride in solving own problems	-	1

advisory sources such as Farm Consultants, Improvement Club Advisers or Department of Agriculture Advisers was negligible.

Table 44 (see page 126) lists the preferred sources for financial information.

(k) Ranked Sources of Information at interest and trial stages of the adoption process.

Table 45 (see page 126) lists the overall rankings for the sources of information in which the respondents would place most trust when considering whether to try a new practice or not. The various

TABLE 44. Predicted Sources of Information on Financial Farming Problems.

Information Source	Reporoa N = 31	Halcombe N = 29
Banker	10	7
Accountant	11	15
Major Mortgagor, e.g. S.A.C. or L.S.	6	-
Stock Firm	2	2
Lawyer	-	1
Private/Club Adviser	2	1
Named Company Director	-	2
Named farmer outside area	-	1

TABLE 45. Information Sources Ranked According to the Respondents' Trust in their Evaluation of a New Practice.

Information Source	Reporoa		Halcombe	
	Sum*	Rank	Sum*	Rank
Ag. Dept. Adviser	69	1	107	1
Farmer who has tried practice independently.	120	2	115	2
Farmer whose farm used for trial purposes by Ag. Dept.	143	3	121	3
Farmer known to make use of Ag. Dept. Adviser.	172	4	153	5
Cos. Technical Representative.	182	5	146	4
Private or Club Adviser.	189	6	179	7
Farmer known to make use of Private or Club Adviser.	205	7	198	9
Farmer whose farm used for trial purposes by commercial firm.	208	8	176	6
Cos. salesman.	213	9	197	8

* Sum is the sum of the rank position Rj given for each information source by the respondents. See Appendix G.

information sources are listed in descending order of greatest trust.

The assigned rankings, based on the sum of the individual respondent's rankings (which are listed in the table) is considered to be valid because of the significant values obtained for Kendalls W, (see page 61 and Appendix G).

From Table 45 it is apparent that the first five information sources are ranked in essentially the same order by the respondents in both survey areas. However, after the first five positions comparison of the rank order between survey areas is inconclusive.

A similar ranking of information sources at the trial stage of the adoption process was obtained. This was based on the degree of trust the respondent would place in the various sources of advice and information when attempting to put a new practice into operation, or overcoming any problems which may arise.

The rankings shown in Table 46 (see page 128) are very similar for both areas and do not show any marked variation from the rank order obtained in Table 45.

Appendix G lists the k x N arrays and the sums of the assigned ranks R_j from which the overall rank orders in Tables 45 and 46 were derived.

The literature suggests that at different stages of the adoption process different sources of information will be preferred. However, the results in Tables 45 and 46 do not suggest this variation occurs in the two areas surveyed. This may be due to the fact

TABLE 46. Information Sources Ranked According to the Respondents' Trust in their Advice when attempting to put a New Practice into Operation or Overcoming Problems that may arise.

Information Source	Reporca		Halcombe	
	Sum*	Rank	Sum*	Rank
Ag. Dept. Adviser.	62	1	102	1
Farmer who has tried practice independently.	124	2	106	2
Farmer whose farm used for trial purposes by Ag. Dept.	153	3	138	3
Farmer known to make use of Ag. Dept. Adviser.	174	4	153	5
Cos. Technical Representative.	177	5	144	4
Private or Club Adviser.	188	6	179	6
Farmer known to make use of Private or Club Adviser.	209	7=	193	8
Farmer whose farm used for trial purposes by commercial firm	209	7=	190	7
Cos. salesman	213	9	197	9

* Sum is the sum of the rank positions R_j given for each information source by the respondents. See Appendix G

that the first two choices differ so greatly, one being a contact with a formal advisory agency and the other informally with an acquaintance or neighbour. In explaining their reasons for the ranks, the respondents claimed that the Department of Agriculture Adviser was paid to know the answers, or had the contacts and research backing to find out. The farmer who had tried independently could explain the practical problems and pitfalls encountered while the farmer whose property was used for trial purposes by the Department of Agriculture presumably had the best of two worlds, both the technical advice and the practical experience, assuming of course that the new practice had been the subject of a farm trial.

a new idea progress in an area could be slow. A small number of respondents referred to innovators as being people making fools of themselves but fortunately this rather negative attitude was not very prevalent.

Since the majority of respondents in both areas attribute a trial and learning role to the innovators in an area it would be anticipated that the respondents would be prepared to discuss new farming practices with innovators. Support for this contention is shown in Table 50.

TABLE 50. Discussion of Farming and New Practices with Innovating Farmers.

Discussion	Reporoa N = 31	Malcombe N = 29
Would if was an innovator nearby	20	21
Do - (named individuals)	9	7
Would not	2	-

The individuals within each area who were classified by the other respondents in the area as innovators is shown in the sociograms on pages xlviii-xlix of Appendix F.

(n) Contact with Forms of Advisory Media.

As mentioned in Chapter III, the definition in this study of the frequency of contact with the various forms of advisory media was not precise enough. There will be a variation between respondents in what they consider are 'frequent' contacts as compared with 'sometimes' and 'occasional' contacts. However, Tables 51 and 52 (see pages 132 and 133) show the

TABLE 51. Reporoa Respondents Frequency of Contact with Various Forms of Advisory Media (N=31).

Media	Frequ.	Some times	Occas.	Hardly ever	Never	Don't use or receive
Listen to: radio farm programme	12	6	9	-	4	-
See: TV farm programme	28	2	-	-	-	1
Read: Ag. page local newspaper	16	7	4	-	-	4
"Jnl. of Agric."	17	1	-	-	-	13
"Farmer"	18	1	2	-	-	10
"Straight Furrow"	15	3	4	-	-	9
Attend: Nat. Conference	3	-	18	-	10	-
Local Conference	5	4	15	-	7	-
Field days	2	5	20	-	4	-
Consult: Accountant	8	16	7	-	-	-
Pvt.Club Adviser	3	2	-	-	-	26
Ag.Dept. Adviser	-	2	16	9	4	-
Sheep & Wool Inst.	-	3	9	1	18	-
Livestock Inst.	1	1	7	1	21	-
Visited by: Reps. of Stock Firm	10	3	16	-	2	-
Prod. Firm	9	6	7	-	9	-
Chem. Firm	4	7	17	-	3	-

'frequency' of contacts in the two survey areas. It is apparent that similar listening, viewing and reading habits occur between both areas but that the Reporoa respondents make more frequent contact with group and individual sources of information than do the Halcombe respondents.

TABLE 51. Reporoa Respondents Frequency of Contact with Various Forms of Advisory Media (N=31).

Media	Frequ.	Some times	Occas.	Hardly ever	Never	Don't use or receive
Listen to: radio farm programme	12	6	9	-	4	-
See: TV farm programme	28	2	-	-	-	1
Read: Ag. page local newspaper	16	7	4	-	-	4
"Jnl. of Agric."	17	1	-	-	-	13
"Farmer"	18	1	2	-	-	10
"Straight Furrow"	15	3	4	-	-	9
Attend: Nat. Conference	3	-	18	-	10	-
Local Conference	5	4	15	-	7	-
Field days	2	5	20	-	4	-
Consult: Accountant	8	16	7	-	-	-
Pvt.Club Adviser	3	2	-	-	-	26
Ag.Dept. Adviser	-	2	16	9	4	-
Sheep & Wool Inst.	-	3	9	1	18	-
Livestock Inst.	1	1	7	1	21	-
Visited by: Reps. of Stock Firm	10	3	16	-	2	-
Prod. Firm	9	6	7	-	9	-
Chem. Firm	4	7	17	-	3	-

'frequency' of contacts in the two survey areas. It is apparent that similar listening, viewing and reading habits occur between both areas but that the Reporoa respondents make more frequent contact with group and individual sources of information than do the Halcombe respondents.

TABLE 52. Halcombe Respondents Frequency of Contact with Various Forms of Advisory Media. (N=29)

Media	Frequ.	Some times	Occas.	Hardly ever	Never	Don't use or receive
Listen to: radio farm programme	13	6	8	-	2	-
See: TV farm programme	23	4	1	-	-	1
Read: Ag. page local newspaper	15	9	2	-	1	2
"Jnl. of Agric."	11	3	2	-	-	13
"Farmer"	13	4	1	-	-	11
"Straight Furrow"	9	11	5	-	-	4
Attend: Nat. Conference	4	4	4	-	17	-
Local Conference	-	1	7	-	21	-
Field days	-	3	16	1	9	-
Consult: Accountant	5	7	15	-	1	1
Pvt. Club Adviser	4	-	-	-	-	25
Ag. Dept. Adviser	1	1	6	5	16	-
Sheep & Wool Inst.	-	-	4	-	25	-
LivestockInst.	-	-	10	2	17	-
Visited by: Reps. of Stock Firm	11	3	13	-	2	-
Prod. Firm	6	6	9	-	8	-
Chem. Firm	2	2	10	-	15	-

If the two tables are compared, with special reference to the number in each area indicating they never have any contact with certain forms of advisory media, some difference is apparent between the two survey areas. The media with which the Halcombe respondents indicate they have a lower frequency of contacts than the Reporoa respondents are all ones requiring some personal effort to enable contact to occur. It could be said that these contacts were the result of active

seeking of information, while reading and radio listening could be considered to be a passive seeking of information.

This division of information seeking behaviour into an active and a passive form is based on the degree of involvement of the individual respondent in seeking information. Considerable time and effort may be involved in arranging a meeting with a farm adviser or attending a conference or field day, whereas radio, TV and farming magazines are generally in the home and can be read or watched purely as relaxation yet still result in imparting information to the respondent.

(o) Summary.

In Tables 53 and 54 the predicted sources of information for the various topics and the individuals with whom discussion has occurred on a number of these topics was tabulated for each survey area. From these tables any general trend towards a particular information source can be observed. Also information sources preferred for specific topics or for technical or scientific information become apparent. It appears that the Halcombe respondents are more self sufficient in that they make less use of all possible contacts than the Reporoa respondents. Informal neighbour type sources of information appear to be preferred for information on the more practical animal husbandry topics, while Department of Agriculture Advisers are sought for technical sources of information. The professional sources such as farm advisers were not, however, referred to by large numbers as preferred sources of information

Table 53. Summary of the Reporoa Respondents Contacts and Predicted Sources of Information for the Various Farm Practices

Persons or organisations with whom respondents have discussed topic, or from whom predict would seek information	PRACTICE OR TOPIC												
	Farm Race Info.	"Chem Ploughing"		N2 Fert. Info.	Vac. Silage		Mating Hoggets		Mating Yrling. Hfs. Info.	Information on		Nos. of different Individuals Referring to Others	Named as Innovators
		Discuss	Further Info.		Discuss	Further Info.	Discuss	Further Info.		Tech. Farm prob.	Financial Farm prob.		
N.A., Nobody	2	15	2	-	19	1	15	3	9	9	-		17
Self, own experience	12	-	-	-	-	-	-	10	9	-	-		-
Neighbours generally	-	3	-	2	1	-	2	-	-	-	-		-
Unnamed men with experience	9	-	-	-	3	5	-	6	6	-	-		-
Named farmer outside survey area	-	-	-	-	-	-	-	-	-	7	-		-
Scientist, D.S.I.R., Univ.	-	-	-	-	-	-	-	-	-	-	-		-
Dept. Agriculture Adviser	6	-	17	24	-	21	-	3	4	2	-		-
Private/Club Adviser	2	-	1	1	-	2	-	1	1	2	2		-
Cos. Tech. Representative	-	-	6	2	-	-	-	-	-	-	-		-
Named Produce Firm	-	2	4	2	-	-	-	-	-	-	-		-
Other Firms (stock & station)	-		1	-	-	-	-	-	-	-	2		-
Contractor	-	-	-	-	-	-	-	-	-	-	-		-
Stud breeder	-	-	-	-	-	-	-	-	-	-	-		-
Magazines	-	-	-	3	-	-	-	-	-	-	-		-
Banker	-	-	-	-	-	-	-	-	-	-	10		-
Accountant	-	-	-	-	-	-	-	-	-	-	11		-
Lawyer	-	-	-	-	-	-	-	-	-	-	-		-
Major Mortgagor S.A.C., L & S	-	-	-	-	-	-	-	-	-	-	6		-
Named Company Director	-	-	-	-	-	-	-	-	-	-	-		-
Farmer within area A	5	5	-	-	-	-	7	3	1	2	-	9	13
" B	-	-	-	-	8	5	-	-	-	-	-	8	-
" C	-	2	-	-	-	-	-	-	1	-	-	2	4
" D	-	1	-	-	-	-	-	1	-	-	-	2	-
" E	-	1	-	-	-	-	-	-	-	-	-	1	-
" F	-		-	-	-	-	3	2	-	-	-	4	-
" G	2	-	-	-	-	-	4	4	1	-	-	7	-
" H	-	1	-	-	-	-	2	1	-	-	-	3	-
" I	-	-	-	-	-	-	-	1	1	-	-	1	-
" J	-	1	-	-	-	-	-	-	-	2	-	3	-
" K	4	-	-	-	-	-	3	3	-	-	-	5	-
" L	-	-	-	-	-	-	-	-	-	1	-	1	-
" M	-	-	-	-	-	-	2	-	-	2	-	3	1
" N	-	1	-	-	-	-	-	-	-	1	-	1	-
" O	-	-	-	-	-	-	-	-	-	1	-	1	-
" P	-	-	-	-	-	-	2	-	-	-	-	2	-
" Q	-	-	-	-	-	-	-	1	-	-	-	2	-
" R	-	-	-	-	-	-	1	-	-	1	-	2	-
" S	-	3	-	-	-	-	-	-	-	1	-	3	-
" T	-	-	-	-	-	-	-	-	-	1	-	1	-
" U	-	-	-	-	-	-	-	-	1	-	-	2	-
" V	-	1	-	-	-	-	-	-	-	-	-	1	-
(Not Interviewed) W	-	1	-	-	-	-	-	2	1	-	-	3	-

Table 54: Summary of the Halcombe Respondents Contacts and Predicted Sources of Information for the various Farm Practices.

Persons or organisations with whom respondents have discussed topics or from whom predict would seek information	PRACTICE OR TOPIC												
	Farm Race Info.	"Chem Ploughing"		N2 Fert. Info.	Vac Silage		Mating Hoggets		Mating Yrling Hfrs. Info.	Information on		Nos of Different Individuals Relating to Others	Named as Innovator
		Discuss	Further Info.		Discuss	Further Info.	Discuss	Further Info.		Tech. Farm prob.	Financial Farm prob.		
N.A., Nobody	2	21	2	-	24	3	11	3	3	14	-		19
Self, own experience	8	-	-	-	-	-	-	5	2	-	-		-
Neighbours generally	-	2	3	2	2	-	12	-	-	3	-		-
Unnamed men with experience	7	-	-	-	-	7	-	8	7	-	-		-
Named farmer outside survey area	-	-	-	-	-	-	-	3	-	4	1		3
Scientist, D.S.I.R., Univ.	-	-	-	1	-	-	-	1	1	-	-		-
Dept. Agriculture Adviser	12	-	8	10	-	12	-	4	8	1	-		-
Private/Club Adviser	2	-	4	4	-	3	-	3	3	-	1		-
Cos. Tech. Representative	-	2	-	-	-	-	-	-	-	-	-		-
Named Produce Firm	-	-	4	9	-	3	-	-	-	-	-		-
Other Firms (Stock & Station)	-	-	7	3	-	6	-	-	-	-	2		-
Contractor	-	-	1	-	-	-	-	-	-	-	-		-
Stud breeder	-	-	-	-	-	-	-	2	2	-	-		-
Magazines	-	-	-	-	-	-	-	-	-	-	-		-
Banker	-	-	-	-	-	-	-	-	-	-	7		-
Accountant	-	-	-	-	-	-	-	-	-	-	15		
Lawyer	-	-	-	-	-	-	-	-	-	-	1		
Major Mortgagor S.A.C., L & S	-	-	-	-	-	-	-	-	-	-	-		-
Named Company Director	-	-	-	-	-	-	-	-	-	-	2		-
Farmer within area A	-	-	-	-	-	-	-	1	-	-	-	1	-
" B	-	2	-	-	-	-	-	-	-	1	-	2	-
" C	-	-	-	-	3	-	-	-	-	-	-	3	-
" D	-	1	-	-	-	-	-	-	-	-	-	1	-
" E	-	-	-	-	-	-	2	-	-	-	-	2	-
" F	-	1	-	-	-	-	-	-	-	-	-	1	-
" G	6	-	-	-	-	-	-	2	-	6	-	11	7
" H	-	-	-	-	-	-	1	-	-	-	-	1	2
" I	-	-	-	-	-	-	3	-	-	-	-	3	1
" J	-	-	-	-	-	-	-	-	-	1	-	1	-
" K	-	-	-	-	-	-	-	-	-	1	-	1	-
" L	-	-	-	-	-	-	1	1	-	-	-	1	-
(Not interviewed) M	-	-	-	-	-	-	1	-	-	-	-	1	-
Farmer within area N	-	1	-	-	-	-	-	-	-	-	-	1	-

on general farm problems or financial problems.

The second to last column of each table indicates the number of different respondents referring to a particular named individual within the survey area. In the Reporoa area it is apparent that nearly a third of the respondents refer to farmer A as being a source of information on a wide range of topics while farmer G in the Halcombe area is considered in a corresponding light. Both these individuals were considered by local people connected with the respective areas to be exceptionally good efficient farmers. However, although farmer A in the Reporoa survey area was referred to as a source of general information and a good man with whom to discuss farming topics, only two Reporoa respondents claimed they would seek his assistance in solving some technical farming problem. Farmer A does not spend very much time off his farm socially and therefore the limited extent to which other respondents in his area would seek his assistance in a problem solving capacity may be limited by their lack of knowledge of him as a person. Also the author gained the impression that there may be some jealousy or resentment of this farmer's success. Theoretically most of the other Reporoa respondents could have achieved the same success having all been settled under similar conditions on comparable farm units. The Halcombe farmer G, however, came from a local family with a reputation for efficient farming and his success would not engender resentment or jealousy to the same extent as might occur if he had been a settler in the Reporoa survey area.

The tables also show a general consensus of opinion in each survey area as to which of the three individuals named as innovators in each district were most frequently considered to be innovators.

A total of 26 of the 31 Reporoa respondents referred to 23 other individuals in the survey area with whom they had discussed various farm topics or from whom they predict they would seek further information. Of the 29 respondents in the Halcombe area only 20 referred to 14 individuals in the survey area.

Tables 55 and 56 (see pages 139 and 140) summarise the extent of knowledge respondents had of the activities of other respondents in their particular area.

These two tables appear to indicate that the Reporoa respondents are better informed about their neighbours' farming practices than the Halcombe respondents. This would suggest that possibly more farmers are using the practice in Reporoa but also that there is greater interaction among neighbours as was apparent when Tables 53 and 54 were compared.

As described on Page 68 an analysis of variance test was applied to this data to determine if there was a difference between the survey areas in the number of individuals each respondent knew were carrying out a given practice. A significant F ratio was obtained indicating there was a difference between areas in the extent of knowledge respondents had of the farm practices of others in their survey area.

This difference may have occurred as a result of different numbers carrying out the practice in each area but the F ratios obtained from an analysis of

TABLE 55. Summary of the Extent of Knowledge of Individuals in the Keporoa Survey Area Carrying out Various Practices.

	Practice				
	Farm Race	Intensive use of crop.	"chem. plough"	Vacuum Silage	Mate Ewe Hgts.
1. Nos. of individuals who tried or carry out the practice	8	3	2	1	17
2. Nos. of different individuals whom respondents (in Item 3) claim are carrying out practice	6	5	3	4	12
3. Nos. respondents naming individuals in Item 2	26	8	9	16	26
4. Nos. of respondents naming at least one individual correctly	26	6	8	14	26

variance were not significant in all cases except possibly ewe hogget mating and this source of variation can therefore be discounted.

It was also established through the use of Fisher's Exact Probability Test (page 69) that there was no significant difference between survey areas in their relationship between the number carrying out a practice and the number who knew of it. That is to say no multiplier effect was observed in this study between the number knowing of a practice being carried out and the number actually carrying out the practice.

TABLE 56. Summary of the Extent of Knowledge of Individuals in the Helcombe Survey Area Carrying out Various Practices.

	Practice				
	Farm Race	Intensive use of crop	"chem. plough"	Vacuum Silage	Mate Ewe Hgts.
1. Nos. of individuals who tried or carry out practice	10	1	2	1	10
2. Nos. of different individuals whom respondents (in Item 3) claim are carrying out practice	5	3	3	2	8
3. Nos. respondents naming individuals in Item 2	21	5	4	4	13
4. Nos. of respondents naming at least one individual correctly	21	-	2	3	12

Therefore the difference between areas in knowledge of the activities of neighbours is a function of the areas themselves and the interaction of respondents within each area.

Selection of Animal Health Products.

(a) Introduction.

The results presented above have all been concerned with farm practices where there have been clear alternative methods for each practice and the farmer has been free to choose. With regard to animal health and methods of disease prevention, however, the farmer has

in many cases virtually no choice. He either takes the prescribed method of preventative or corrective action or suffers lowered production.

A specific example of this situation is the control of internal parasites. This is a continuing problem where the farmer has two courses of action. He can ignore the problem with the possible result of a decrease in production from his livestock, or he can drench his stock.

The majority of respondents in the two areas studied placed internal parasites of both sheep and cattle amongst the top three sheep or cattle diseases which cost them the most in terms of loss of production or deaths. Control of this recognised problem is generally considered to be best achieved by drenching. The farmer has a number of alternative drenches he could use but apart from the protection he is offered by the provisions of the Animal Remedies Act (1967) he must virtually put his faith in the manufacturers and their claims for their products, and his own practical experience or evaluation of the product.

(b) Reasons for Use of Specific Drenches on Sheep.

Table 57 (see page 142) indicates both the reasons for the choice of various drenches manufactured by different companies and the number of individuals using each drench.

In the above table it should be pointed out that some respondents in each area (13 in Reporoa and 2 in Halcombe) were using three different brands of drench. All the respondents used at least one drench

TABLE 57. Reasons for Use of Various Drenches on Sheep.

Reasons for Choice of Particular Brand of Drench	Brand of Drench Used in Each Area							
	Reporoa N = 31				Halcombe N = 29			
	1	2	3	4	1	2	3	4
Good results	15	1	-	-	16	1	-	-
Cheap and satisfactory	-	1	3	4	1	1	-	2
Satisfactory on lambs	1	-	1	-	-	-	-	-
For lungworm and varying treatment	-	8	-	-	-	2	-	-
Varying treatment	3	4	-	4	1	8	-	1
For pulpy kidney	-	-	-	5	-	-	-	2
Vet recommended	-	1	-	-	2	-	-	-
Not as good as first choice, cost/lungworm	3	2	-	-	1	-	-	-
To test but wouldn't repeat	1	1	4	-	-	1	-	-
Because of advt. handout	-	1	-	-	-	-	-	-
Easily administered	4	1	-	-	3	-	-	-
Recommended by other users	-	-	-	-	4	-	-	-
Cheapness	-	-	1	-	-	-	-	-
Dept. of Ag. recommendation	1	-	-	-	-	-	-	-
Result of observations when in Australia	-	-	-	-	-	-	1	-
On hand or supplied by owner	-	-	-	-	1	-	-	-
Total Nos. of Users	28	20	9	13	29	13	1	5

and 28 in Reporoa and 18 in Halcombe used at least two different brands of drench.

The drench used most frequently was chosen chiefly because continuing satisfactory results had been obtained by the respondents. In both areas when a second drench was also used this was chiefly because it

was felt desirable to alternate drenches as a precaution against an expressed fear of the internal parasites developing a resistance to any one drench. This fear may be founded on three reported occurrences of immunity in a strain of Haemonchus contortus. (Gibson, 1969.) Veterinary opinion suggests there is no reason to suppose it may not occur again. Also in some cases the second drench was used because of its efficacy against specific parasites and in fact Veterinarians suggest a variation of drenches is a good idea as it broadens the spectrum of parasites effected.

(c) Reasons for Use of Specific Drenches in Cattle.

The use of several kinds of drench on cattle was not very common. Six respondents in the Reporoa area and five in the Halcombe survey area used more than one drench but two at Reporoa and four at Halcombe used no drench at all on their cattle. A further four Halcombe respondents did not run cattle. The following table indicates the reasons for the choice of various drenches for cattle. All the drenches number one to four are the same as those used previously in Table 57. Drench number five is a more concentrated form of drench number one, especially formulated for cattle but manufactured by the same firm. Apart from this special case the drenches are all produced by different manufacturers.

There is an interesting contrast apparent in this table between the two areas. The Reporoa respondents with their larger number of cattle, have made a swing towards drench number five which was specially formulated as a cattle drench while the majority of the Halcombe

decision on what brand of drench to use appears to be small. Seven respondents in Reporoa and four in the Halcombe survey area claimed advertising had influenced them in a specific instance. The inducements which were effective in these specific instances were in the form of either a free drenching gun or extra quantities of drench free with a given bulk purchase. The majority of respondents in each area claimed that advertising had no influence on their decision to purchase a particular brand of either sheep or cattle drench. However, the large number of Reporoa respondents who used the special cattle drench (brand 5 in Table 58) suggests some influence due to advertising. Whether this influence resulted in a change from the previously used product of some other manufacturer is uncertain but advertising must certainly have influenced awareness of this product. The decision to use this drench may have been based simply on its greater convenience for cattle drenching when compared with the weaker formulation of the sheep drench produced by the same firm.

The majority of respondents in both areas considered there had not been any advertising which influenced them against a particular animal health product. However three respondents in each area objected to extravagant claims being made in advertisements and five respondents in the Reporoa area considered they received too much advertising material especially in the mail. This objection was prompted particularly by individual telegraphed invitations to attend a field day received from one drench manufacturer. Promotional

efforts on this scale were considered by these respondents to be excessive.

(e) Influence of Manufacturer's Reputation.

When asked to define what they thought the reputation of a stock remedies manufacturer was based on, the majority of respondents in both areas considered it was based on the performance of the product, as indicated in Table 59.

TABLE 59. Basis of Stock Remedy Manufacturer's Reputation.

Concept of Reputation	Reporoa N = 31	Halcombe N = 29
No idea	1	1
Results and efficiency of product	23	26
Results plus after-sales service and plausability of salesman	7	2

It appears from Table 60 (see page 147) that the respondents do have some regard to the concept of reputation when considering buying an animal health product of which there are several similar alternatives. Respondents were asked if the reputations of the manufacturing companies would influence their decision to buy a product, and if not, what would.

(f) Image of the Manufacturers.

Although the respondents stressed that product performance was the basic characteristic of reputation, the overall image of a firm or the attitude an individual has towards it consists of a number of

TABLE 60. Influence of Reputation when Purchasing a Drench

Would reputation influence decision to buy?	Reporca N = 31	Halcombe N = 29
No	10	16
No - influenced by price	4	2
Yes - price irrelevant	14	11
Yes - but seek Vet. advice too	1	-
Yes - but must consider price	1	-

characteristics. The Osgood Semantic Differential discussed on Page 38 includes in the bipolar adjectives a number of these characteristics which it was considered may influence an individual's attitude towards a particular firm. Table 61 (see page 148) lists the summed weighted scores for each of the five drench manufacturers considered, in descending order of favourability.

The code numbers used for the manufacturers correspond to the numbers used to signify different brands of drench in Tables 57 and 58 with the exception that cattle drench 5 is manufactured by Firm 1.

It is apparent when Tables 57 and 58 are compared with Table 61 that the manufacturer considered most favourably in each area also appears to have the largest number of purchasers of its product. This would appear to suggest that a favourable attitude toward a manufacturer is enhanced by satisfactory experience with its products. Therefore the image and reputation of a

TABLE 61. Comparison of the Images of Drench Manufacturers According to their Summed Osgood Differential Scores.

Firm Code Nos.	Osgood Differential Score		
	Reporoa	Malcombe	Total
1	377	330	707
4	359	325	684
2	267	246	513
6	297	159	456
3	48	104	152

manufacturer would appear to play an important role in the purchasing decisions of the respondents in this study. In fact the two concepts of image and reputation are linked together very well in this study as the firm with the most favourable image appears to have the largest number of users of its product. These users in the majority of cases claim that they are using the product because of its satisfactory performance which is how they define reputation. Appendix J lists the intensity matricies for each firm and from these the shortcomings within each firm's image may be assessed. Firm number 3 obviously had made very little impression at all since the majority of respondents had marked the no association column.

(g) Attitude Towards Multiple Drenching Plans.

A number of the manufacturers have been advocating multiple drenching plans involving a series of doses for young sheep but the majority of respondents claimed their attitude to such plans would not be influenced by the reputation of the company advocating

them. Only two of the 31 Reporoa respondents and three of the 29 Halcombe respondents considered the reputation of the manufacturing company advocating a multiple drenching plan would influence their attitude towards such a plan.

Although it has been suggested by some farmers that a multiple drenching programme is just a gimmick to increase sales the majority of respondents in both areas credited the manufacturing firms with some honesty and integrity in this respect as is shown in Table 62. page 150. Respondents were asked if they considered the multiple drenching programmes advocated for young sheep were a "fair enough" management practice or simply a sales gimmick.

Also 25 respondents in each area considered young cattle required at least one drench if not more, and none considered it was unnecessary.

(h) Promotional Activities Suggested to be Most Effective.

An attempt was made to assess what type of promotional and information supplying activity drench manufacturers could use which would be accepted by farmers. The respondents were asked to suggest what type of promotional activity they felt would best influence farmers to buy a particular drench. Table 63 (see page 151) indicates the responses from each area.

(i) Impact of Local Research.

The importance of having trials conducted in New Zealand under our practical farming conditions was stressed by nearly all the respondents. Local district

TABLE 62. Attitudes Towards Multiple Drenching Programmes for Young Sheep.

Are drenching programmes sales gimmicks or valid management practices?	Reporoa N = 31	Halcombe N = 29
Management - Firm tries to give good advice	4	11
Management - From experience seen is valid	11	5
Management - Necessary but reservations on frequency	6	8
Total respondents claiming valid management practice	21	24
Sales gimmicks	1	1
Sales - personal observation and judgement best	7	1
Sales - can be too frequent	2	3
Total respondents claiming sales gimmick	10	5

trials where unusual conditions exist were also suggested. Favourable mention was made by many respondents of the fact that one drench manufacturer had established an experimental farm from which trial results under practical New Zealand farming conditions are published. These experimental results are often used by this manufacturer to substantiate their advertising claims for New Zealand conditions and must be considered of benefit to this firm.

TABLE 63. Preferred Forms of Promotional Activity.

Suggested Promotional Activity	Reporoa N = 30	Malcombe N = 29
1. Present is sufficient, honesty, stand by product, free trials, reduce price.	4	-
2. N.Z. trials, field days and demonstrations	2	6
3. N.Z. trials - publicised by press	8	3
4. Combination of Items 2 & 3	3	4
5. Local trials, field days and demonstrations	1	1
6. Item 5 plus publicised in press	4	5
7. Independent verification of trials and endorsement by farmers in press.	-	2
8. Combination of Items 6 & 7	4	4
9. Individual Salesman with experimental results to back them	4	4

(j) Summary.

From the above discussion it appears that there is little difference between the two survey areas in the respondents' attitudes towards drench manufacturers, or their methods of evaluating which product to use. This may be due to the fact that drenching is generally considered to be a good farm management practice. Also the information about the various drenches can be obtained passively through reading magazine articles or advertisements and technical bulletins received in the mail from the various manufacturers.

The Hypotheses.

As mentioned on page 33 a number of hypothesis were formed and are listed in Appendix A. The following sections discuss the results as they apply to each hypothesis.

(a) Hypothesis 1.

The Reporoa respondents were all settled under similar conditions over a period of seven years and according to Hypothesis 1 it would be anticipated they would tend to consult each other about their problems. The Halcombe respondents, however, were not settled together under similar conditions and would not be expected to exhibit the same group self-help. Table 64 indicates both the number of respondents in each survey area referring to others as possible sources of information and the number of individuals referred to.

TABLE 64. Comparison of the Number of Information Contacts in Each Area.

	Reporoa N = 31	Halcombe N = 29
Nos. respondents referring to others as info. sources	24	13
Nos. of other respondents referred to	20	6

It is apparent from this table that only about half the number of Halcombe respondents in comparison with the Reporoa respondents would consult other farmers in their immediate vicinity, and even then would only talk to about a fifth of the number of other farmers that the Reporoa respondents would.

Therefore it is considered that Hypothesis 1 is true for the two survey areas considered.

(b) Hypothesis 2.

To test this hypothesis; that farmers considered by others to be successful farmers, see part of their role as assisting those who come to them for advice; only those individuals in each district who were referred to as, "farmers from whom (respondent) would seek advice on a technical farming problem", and were referred to as sources of information by more than three other respondents were considered.

Farmer A in the Reporoa survey area was referred to by nine other respondents and farmer G in the Halcombe survey area was referred to be eleven other respondents as sources of information.

Both these farmers considered neighbours called on them frequently, and were happy to discuss farming with other individuals even if they were, "trying to pick their brains". They also felt that they fostered or encouraged such discussion by suggesting a visit to the farmer to see his problem or by inviting him to their farm to see how they overcame a similar problem. Of the other eight individuals in the Reporoa area who were referred to as sources of assistance on a technical farming problem, only one claimed he would foster discussion on farming. The three other Halcombe farmers apart from Farmer G who were referred to as sources of assistance on a technical farming problem all claimed they fostered discussion. However, the reason given for referring to these particular individuals on a technical farming problem was because they were successful farmers or were farming under a similar system and therefore would have come across the same sorts of problems. The majority of the Reporoa respondents were referred to because they were friendly neighbours with only three being referred to for the same reasons as the Halcombe respondents gave.

It is apparent that the individuals fostering farm discussion in both districts are those who were referred to because they were considered to be successful farmers, or were farming under similar conditions, and presumably being successful. Therefore Hypothesis 2 is considered to hold true for the two areas surveyed.

(c) Hypothesis 3.

To test whether an innovator was concerned about the quality of his local public image it was first necessary to define who the innovators were. Apart from the three individuals in each area whom other respondents suggested were innovators, the author found a further five Reporoa respondents and one Halcombe respondent who could possibly also be regarded as innovators because they claimed other farmers in the area had copied a number of new ideas from them. However, since none of the ideas claimed to have been copied by other respondents coincided with the practices considered as innovations in this study, the extra six individuals were discarded as innovators for these particular practices.

Table 65 (see page 150) summarises the characteristics of the named innovators in each survey area.

From this table it could be suggested that the true innovators in their respective districts are farmers A and G, and that for themhypothesis 3 is true. However, only six farmers in the Reporoa area and five in the Halcombe area were concerned about the quality of their image as farmers with other farmers, and 13 in Reporoa and nine in Halcombe were concerned about the quality of their public image as people. Therefore it would appear that in the two areas surveyed, local public image does not concern farmers individually, regardless of whether they are prepared to change their farm practices or enterprises ahead of those in their district or not. The test of this hypothesis is thus

TABLE 65. Characteristics of Named Innovators.

Characteristics	Named Innovators in Each area:					
	Reporoa N = 51			Malcombe N = 29		
	A	C	M	G	H	I
Nos. of respondents naming particular individual as innovator	13	4	1	7	2	1
Nos. of new practices named innovator has tried	4	4	3	3	2	3
Nos. of new practices innovator claims others have copied	5	3	2	5	3	2
Are you concerned with image as a farmer, with other farmers?	No	No	No	No	No	No
Are you concerned with image as a person?	No	Yes	No	No	Yes	Yes

inconclusive in the two areas studied.

(d) Hypothesis 4.

A description of the formulation of the urbanisation index is given on page 71. In testing the hypothesis as to whether a respondent with a high urbanisation index score makes greater use of more formal sources of information than a respondent with a lower score some division of information sources was necessary. Formal information sources were considered to be those individuals or organisations which aimed to supply information to farmers virtually free of commercial influence or salesmanship. Included in this category were Scientists, Department of Agriculture and Improvement Club Advisers, Farm Management Consultants

and the Technical Representatives of Commercial Firms. Included in the category of informal information sources are all the other information sources listed in Tables 53 and 54 with the exception of those referred to on financial problems.

As discussed on page 71 a regression analysis was carried out to determine if the type of information source the respondents claimed they would use for a number of topics could be predicted from their urbanisation index scores. Table 66 lists the results for the data grouped together for both survey areas.

TABLE 66. Results of Regression Analysis.

Variable Pair I/X	Regression	Std. Error	Correlation	D. of F.
Urban Ind/ Formal Source	.2620	.2035	.1681	57
Urban Ind/ Informal Source	-.1063	.2263	-.0621	57

It is interesting to note from this result that the order of the two regressions is in the right direction for the hypothesis to be accepted but the values are not significant. Therefore in this study with its limited population size it appears there was no significant relationship between urbanisation index and the type of information source used, and thus for this study the hypothesis must be rejected.

(e) Hypothesis 5.

To test the hypothesis that family and personal aspirations would be higher for relatively "urbanised" farmers the urbanisation index scores were grouped in

intervals of five points. Table 67 (see page 159) indicates the total number of respondents from both survey areas in each score class and the hopes and aspirations they held.

It will be apparent from Table 67 that no clear cut relationship appears to exist between the Urbanisation Index and the respondents hopes or aspirations. The results are in fact inconclusive although it would appear there is no marked relationship between the urbanisation index and aspiration in the areas studied.

A more conclusive result may have been obtained if an index of aspiration could have been formulated for direct comparison with the urbanisation index in a regression analysis. Unfortunately it was not possible to construct an aspiration index from the responses given to the three questions concerning the respondents personal hopes for the future of both himself and his children, and what he considered to be the minimum schooling he would like them to have. Hopes and aspirations will be governed in part by the age and financial situation of the respondent, so that for the author to devise an index of aspiration would be purely arbitrary and probably tend to favour the younger farmers who are striving towards goals they consider attainable. Also since many of these goals are rather nebulous in definition such as "happiness in old age...." the use of the technique devised by McArthur (1964) of marking an individual on an "aspiration ladder" is not readily applicable. Therefore even though open ended questions failed to provide data which could be rigorously

TABLE 67. Relationship Between Urbanisation Index and Hopes or Aspirations.

Hope or Aspiration of Respondents	Urbanisation Index Score				
	1-5	6-10	11-15	16-20	21
Total Nos. Respondents in Class	10	28	13	8	1
Min. level of schooling for children					
Try S.C.	5	4	2	2	
Pass S.C.	1	3	1	2	
Try U.E.		6	3	4	
Pass U.E.	4	14	7		1
Univ.		1			
Aspirations for childrens future					
Not pushing in any direction	1	10	3	3	1
Interested in farming	4	13	5	4	
Gain tech. qualif.	2	1	2		
Gain profes. qualif.	2	3	2		
Qualif. but NOT in farming		1	1	1	
Personal Hopes or Aspirations					
None	3	5	1		
Happy retirement	3	6		1	
Money for tour, boat etc or to help children	2	3	4	1	
Expand farm enterprise		6	2	1	
Own a model farm	1	1	2	1	
Be a successful farmer	1	5	1	1	1
Success with stud stock		2		1	
Useful community service			1	2	

analysed, multiple choice questions may also fail because of the problem of definition of individuals' personal hopes or ambitions.

(f) Hypothesis 6.

Table 68 lists the number of respondents in each area referring to different sources of information when trying to solve some technical farming problem.

TABLE 68. Sources of Assistance in Solving a Technical Farming Problem.

Source of Assistance	Reporoa	Malcombe
Nobody	9	14
Named farmer outside survey area	7	4
Named farm within survey area	12	9
Neighbours generally (unnamed)	-	3
Agriculture Department Adviser	2	1
Private/Club Adviser	2	-

It is apparent from this table that the greatest proportion of respondents in both areas claimed they would contact other farmers when seeking advice on a technical farming problem. Also in the majority of cases those individuals named as being sources of information were chosen either because they were successful farmers, farming under a similar system or were friendly neighbours (Table 43).

Therefore it appears that the first part of hypothesis six holds, that is, that farmers with a technical farming problem would seek advice from farmer neighbours who were believed to be successful and sympathetic. This conclusion tends to support the contention in Hypothesis 2.

However, as shown in Table 44 the sources of assistance the respondents claimed they would seek when faced with a financial farming problem were not farmer neighbours but members of the traditional commercial and financial business sector.

Therefore the hypothesis that farmers would seek help on a financial problem from farmer neighbours must be rejected.

(g) Hypothesis 7.

A ranking of the order in which respondents would place most trust in various sources of information is contained in Tables 45 and 46. From these tables it is apparent that the use of a farmer's property for trial purposes by the Department of Agriculture or a Commercial Firm does not enhance the confidence neighbours may have in the individual as a source of information as much as if the farmer had tried a particular practice independently. However, a farmer whose farm was used for trial purposes by the Department of Agriculture was ranked well ahead of farmers whose farms were used for trial purposes by Commercial Firms.

Although respondents were given the choice of naming some other source of information none did. Also as shown in the sociograms the respondents from whom individuals claimed they would seek further information on a number of topics, were in practically all cases respondents who had tried, or were carrying out, the practice concerned. Therefore this hypothesis holds in the areas studied.

(h) Hypothesis 8.

As with Hypothesis 7 Tables 45 and 46 also provide the information for testing the hypothesis that confidence in a neighbour as a source of information is enhanced if it is known he makes use of advisory services.

The only advisory service which it appears respondents consider would enhance the confidence they place in a neighbour as a source of information is the Department of Agriculture. This may be because the Department tends to give a more generalised service in comparison to the more specific personal service given by Farm Consultants or Improvement Club Advisers.[*] In both areas the farmers referred to most frequently as sources of information have contact with both private and government advisory services.

However, it would appear in this study that for the hypothesis to be accepted it must be modified to define which advisory services. Thus the hypothesis that; confidence in a neighbour as a source of information is enhanced if it is known he makes use of the Department of Agriculture Advisory services; holds for this study.

(i) Hypothesis 9.

The respondents in each area who appear to have the most influence in terms of the number of other individuals who would contact them, are farmer A in the

[*] This ranking may have been caused by unfamiliarity with Farm Improvement Club Advisers and Private Consultants. Both areas had active Improvement Clubs operating but the extent of the respondents familiarity with them was not checked.

Reporoa area, and farmer G in the Halcombe survey area. Within the Reporoa area farmers G and K also appear to be minor influentials on a number of practices since they are referred to by five or more respondents. (The second to last column of Tables 53 and 54 indicates the number of different respondents referring to a specific individual. Reporoa farmer D however, appears to be influential in only one practice).

In all cases except farmer K the Reporoa influentials claimed they had occasional contact with Department of Agriculture Advisers. Therefore it would appear that this contact has not diminished their powers as influentials and in fact in view of the contention of Hypothesis 8 work by a Departmental adviser with farmer K may increase his influence.

Farmer G in the Halcombe area appears to be the only individual with some influence on a number of practices in the survey area. He makes use of both private and government advisory services and his influence does not appear to be diminished because of this. In the Halcombe area farmers N and I claim they have frequent contact with Department of Agriculture Advisory Officers but neither appear to be influential in the area.

These results suggest that providing effective recognition of an influential can be made, intensive work by an adviser with a co-operative influential could result in a rapid stream of information, and hence a rapid general acceptance of a new practice in the two areas surveyed. However, since no direct measure of the

effectiveness of other organised methods of extension was carried out, the hypothesis that working with influentials is more effective than any other method of extension in the areas surveyed, must be rejected. To have evaluated all other methods of extension is beyond the scope of this study and therefore the hypothesis is meaningless in this study.

If the hypothesis is amended so that a comparison is made between intensive work with influentials and intensive work at random with both co-operative individuals and those requesting visits, the hypothesis has a relevance to the results in this study. Despite Tully's (1966b) suggestion that influentials could become considered deviates and lose their power of influence the results suggest that the amended hypothesis would hold for this study. That is; that intensive work by an adviser with a co-operative influential will result in a more rapid general acceptance of a new practice than intensive work at random with both co-operative individuals and those requesting visits.

CHAPTER V

C O N C L U S I O N S A N D R E C O M M E N D A T I O N S

Conclusions.

From the results the following conclusions were drawn.

1. The general physical features and farming patterns of the two survey areas (acreages, stock numbers and general stock policies) are sufficiently similar for each area to be considered directly comparable for the purposes of this study. The cattle policies, crop varieties grown and use of fertilisers do vary slightly, but it was considered factors other than the variations in the farming patterns and physical features of the two surveyed areas would be the cause of any variations between areas in the communication patterns and information seeking behaviour of the respondents.

2. In the Malcombe district a large number of respondents were "locally bred", and their family age groupings were slightly older in comparison with Reporca. However, the two areas were considered to be similar in most personal and family characteristics, even though the minimum level of schooling desired by each respondent for his children, pride in farming effort, and informal family visiting habits, differed in the respective survey groups. It was considered

variations in the personal and family characteristics[*] were not indicative of marked individual behavioural differences between the respondents of the two surveyed areas.

3. The history of settlement, acquisition and development of properties within the two survey areas was very different. It was considered this could be a major cause of any variation in communication patterns and information seeking behaviour between the two surveyed areas.

4. There appeared to be a difference between the two survey areas in the extent to which it was predicted that both formal and informal (other respondents) sources of information on farming topics would be sought. This difference was considered to be due to factors other than the variation in physical features, farming patterns and personal and family characteristics occurring between the two surveyed areas.

This conclusion in fact supports the contentions of Hypothesis 1.

5. There appeared to be a difference between the two survey areas in the degree of contact respondents had with various forms of advisory media especially where active involvement with the media was required. However, this was not considered to be due to any variation between the districts in physical features, farming pattern or personal and family characteristics.

---

[*]The financial situation of the respondents was not investigated but it was not considered that respondents in the Reporoa area would be more motivated by financial considerations than respondents in the Malcombe area, or that this would be a major cause of variation between districts in their information seeking behaviour.

6. A tendency common to both areas, for formal information sources to be referred to for specific technical or scientific information, while more informal sources were referred to for practical stock husbandry topics, was noted.

7. Respondents in both survey areas appear to have similar ideas of what constitutes the reputation of a Veterinary Product Manufacturer and place some importance on the reputation of the manufacturer as well as their own experience when considering which brand to purchase.

Discussion.

(a) Influence of length of settlement.

It is apparent from the conclusions that an explanation of the difference observed between the two survey areas in conclusions numbers four and five must lie in the difference in time and method of settlement in the two areas.

The majority of respondents in the older Halcombe area grew up in the area or close to it and would tend to have a small number of close life long friends. This would also tend to encourage some social stratification which would restrict the extent of interpersonal contacts in the area.

As a result a general pool of common knowledge about individuals within such a district would be limited. However, the Reporoa respondents, thrown together through government settlement schemes, would tend initially to have many contacts within the area,

more as acquaintance than deep friends. As a result a considerable pool of common knowledge about each other could arise and general discussion on topics such as finance, which are often considered to be private, may occur.

(b) Interaction between respondents.

The interaction between respondents which conclusions four and five suggest occur in the Reporoa area, was in a way forced on them. In the first years of settlement it was necessary to work together as some farm facilities and equipment had to be shared. Also in the Reporoa area, settlement had been delayed because of unusual problems and a farming tradition had not developed. Solutions to their problems were actively sought by the respondents from all quarters and are gradually being incorporated into a developing farming tradition for the area.

Simon (1952) suggests that this (information seeking) activity imposed by the environmental situation upon a group will result in an increase in activity within the group, enhancing friendliness and interaction between the individuals of a group. As a tradition of farming practice and method establishes, the necessity for the environmentally imposed activity diminishes with a corresponding reduction in interaction between the individuals within a social group. Such a state has been referred to be Homans (1951) as a decline in the number of mutual sentiments or elements of social behaviour.

Halcombe with its established tradition of farming practice and method incorporating solutions to

many of the area's technical farming problems, does not have the same impetus for interaction among the respondents as appears to occur in the Reporoa area. With less interaction and exchange of ideas, a trend towards traditional or conservative values and ideas would be expected among the Halcombe respondents. Such a trend might be anticipated to occur with the passage of time in the Reporoa survey area too.

Although it has been suggested that a go ahead innovating farmer in a longer settled more conservative district may be ignored by others in the district, the contentions of hypothesis two tend to indicate this is not so in either the shorter or the longer settled of the two areas surveyed.

(c) Utilisation of sources of information.

The development of a farming tradition within an area may also be the basis for the difference between the areas surveyed in the degrees of contact they have with various forms of advisory media. Respondents in the Halcombe area if they recognise they have any problems would tend to try and solve them individually in terms of the methods embodied in the farming tradition of the area. They may not consider the formal sources of information applicable to what they probably consider an individual problem and therefore do not actively seek these sources. Also the significance of neighbouring farmers as information sources, may be overlooked, due to the low level of interaction in the Halcombe area, which results in a limited knowledge of neighbouring farmer's practices or problems.

Reporos respondents through their greater interpersonal interaction may recognise that their individual problem is shared by others. If a problem is not specific to the one farm, then more information sources may be considered relevant and greater use made of the formal information sources which initially provided the technical information that helped make settlement possible.

Recommendations.

These general conclusions presented above suggest four requirements which Farm Advisers, Extension workers and representatives of Commercial firms involved in the promotion of improvement or change in farming, should consider:

(1) Definition of the extent to which a farming tradition has developed within an area.

(2) Recognition and identification of area influentials.

(3) Stimulation and utilisation of the interaction between individuals within an area.

(4) Demonstration by the individual of his competence to give advice in the field to which he aspires.

(a) Farming tradition.

The extent of development of a farming tradition in an area is important. It is suggested in this study that it plays a major role in determining the degree of interaction among individuals within a farming area and also between the individuals and formal and informal

sources of information outside the area. Without this information the extension worker can not make the maximum use of the natural communication patterns which exist in an area, and may therefore be less effective.

Determination of the extent to which farming tradition has developed can only be obtained by discussion with farmers to see if they consider they have major problems common to the district, or only problems considered to be peculiar to their farm situation. The extent to which technical advice and information is sought also indicates how completely the farming tradition is developed in an area.

The length of time an area has been settled is not necessarily an indicator of the extent to which a farming tradition may have developed. Farming problems may not have been easily overcome in a particular area so that the development of a farming tradition is still occurring. Also there may have been an influx of new farmers into an area who do not have a background of experience with the farming tradition of the area and so are seeking to develop a new tradition based on their past experience and what they can learn of the local farming traditions in their new area.

(b) Area Influentials.

From the results it appears that certain farmers in each area could be termed influentials with regard to either one or a number of farming topics. Identification of these individuals by inquiring from farmers of whom, amongst their neighbours or acquaintances, they consider to be useful sources of farm information or successful

farmers would enhance the effectiveness of an Extension Worker's efforts. Hypothesis 9 assumes this contention, and Hypothesis 2 also assumed that individuals likely to be designated as area influentials, would be willing to act in an advisory capacity. The fact that farmers would make use of other farmers as sources of information in the two areas studied, confirmed Hypothesis 6. The evidence appears to indicate that in the two areas surveyed the use of the Department of Agriculture advisory services by an individual does not detract from the confidence other farmers may have in him as a source of farming information. (Hypothesis 8). Providing the individual identified as an influential is considered by his fellow farmers to be a successful and competent farmer, the author is of the opinion that the use of such a person by other Advisers or Extension personnel would be acccptable. As is discussed later, these people must however demonstrate a lack of bias and a willingness, if they are representatives of a commercial firm, to conceed that some other company's product may also do the job their company's product does.

(c) Interaction within an area.

As has been pointed out the extent of the interaction between area influentials and other farmers in an area, appears to be related to the extent to which a farming tradition has developed. If an area has a developing farming tradition an extension worker's message may permeate around a district fairly quickly once it has been accepted by area influentials. However,

in a district with little interaction, use of the influentials will not be sufficient. The extension workers will need to provoke interaction by demonstrating through mass and group methods, that problems considered by the individuals to be specific to their situation are in fact common to others within their area. This problem recognition and definition must be carried out by the extension worker initially, so that he is in a position to provoke the interaction between individuals which is being suggested.

Once interaction occurs it appears that information is sought from those considered best able to supply it. Such interactions appear to cut across socio-economic boundaries and even ignore family social contacts. (Compare sociograms of information seeking activity with those for Family Visiting, Appendix F.)

It is contended that with a high level of interaction, as was apparent in the Reporoa area, farmers become more active and involved in seeking information. Such a situation will result in greater feed back to the Extension worker and through this he may be able to gauge to some degree the effectiveness of his use of mass and group media methods of extension.

However, the extension worker must remember that, as Simon (1952) suggested, this state of interaction is dynamic and will be either declining or increasing, depending on the necessity for interaction. The need for interaction is imposed naturally by the environment or artifically by the extension worker organising meetings and discussion groups. Because of

this state of flux in the extent of interactions between individuals within an area the fact that after a time the interaction within an area, or group, may be declining, must be recognised. At such a time re-definition of the problems of the area or group may be necessary to revitalise it and stimulate interaction along a slightly different course, or between different individuals.

(d) Demonstration of competence.

As pointed out in the discussion of information sources for technical and financial problems on Page 124 and in the discussion of Tables 53 and 54 on Page 134, certain sources of information in the two survey areas appeared to be considered for information of a particular type. In particular, financial information was not considered to come from the professional farm advisory sources such as Farm Consultants, Improvement Club Advisers or Department of Agriculture Advisers. Therefore to become recognised as advisers in this field these workers must demonstrate an ability to give financial advice. Such a demonstration could be through the definition of financial problems common to a number of farmers and the demonstration of planned financial development with a co-operative and influential farmer. Intensive use of mass media in putting forward solutions to financial problems could also help in demonstrating competence.

Similarly representatives of commercial firms will be more readily accepted as sources of information if they can demonstrate their competence to give advice

in terms of the suggestions in Table 63. Basically this involves having adequate experimental information, preferably from local trials which have been verified by an independent authority.

While demonstrating competence to give advice in a particular field, it would appear that the respondents in both survey areas were concerned that the advice given should be relative to the local conditions. Therefore the use of local farms and farmers for demonstration purposes rather than the use of a regional demonstration farm or area could be an advantage. However, to use such an area was considered to be better than merely quoting experiments and results from other countries, without supporting experimental evidence from New Zealand.

Integration of Recommendations.

(a) Extension plan.

The integration and co-ordination of these four general recommendations should be achieved within a common plan for a whole area. Such plans are known as Extension Plans and involve a definition of district potentials and problems, assigning priorities to the achievement or solution of these and the formulation of a planned series of extension activities aimed at achieving objectives set for the area.

(b) Extension Techniques.

Generally the extension activities will be aimed at trying to bring about a change of practice or attitude which will be difficult to achieve if the Extension

Worker is not considered to be competent or there is a low level of interaction within the area. The review of literature has pointed out various factors considered to influence the acceptance and adoption of new ideas and practices and the results on the whole appear to support the various factors. However, in the two areas surveyed it does not appear that the respondents do, as the literature suggests, use different sources of information at various stages of the adoption process (See Page 127). Neither do the results confirm that New Zealand farmers in the areas surveyed, with a high urbanisation index as defined in this study, are more highly motivated or definitely make more use of formal information sources, than individuals with a lower urbanisation index.

It appears that the Extension Worker in New Zealand would be well advised to use an advisory media mix, motivating the farmer through his family aspirations by the demonstration of more profitable farming techniques both financially and in terms of time or labour involved, which would provide the means to achieve his family goals. The Extension worker should aim to encourage interaction among farmers and between them and himself. He should utilise co-operative influential farmers as unofficial assistants, to demonstrate new ideas and practices, act as sources of information to other farmers, and induce interaction especially among farmers in longer established areas, by creating dissatisfaction with present practices or productive levels through the demonstration of new or improved farming techniques.

Although this study considered only 60 individuals in two areas the author believes that the general conclusions could be applied to most other farming situations and localities in New Zealand.

B I B L I O G R A P H Y

Ashby, A.W. (1926) "Human Motives in Farming". Welsh Journal of Agriculture, 2, 5-12.

Ball, R. and McKenzie, S.A. (1970) "The Use of Nitrogenous Fertilisers", Joint paper presented at the Annual Meeting of Dairy Farmers, Palmerston North. Published in the Dairy Farming Annual 1970, Massey University, Palmerston North.

Ball, R. and Rose, E.G. (1970) "The Use of Nitrogen", joint paper presented at the Annual Sheepfarmers' Meeting, Palmerston North. Published in the Sheep Farming Annual 1970, Massey University, Palmerston North.

Beal, G.M. and Bohlen, J.M. (1957) "The Diffusion Process". Special Report Nos. 18. Agricultural Extension Service, Iowa State College, Ames.

Beal, G.M., Bohlen, J.M. and Raudabaugh, J.N. (1962) "Leadership and Dynamic Group Action". Iowa State University Press, Ames.

Beal, G.M., Rogers, E.M. and Bohlen, J.M. (1957) "Validity of Concepts of Stages in the Adoption Process". Rural Sociology, 22, 2 : 166-168.

Blum, M.L. and Naylor, J.C. (1968) "Motivation and Work", in "Industrial Psychology", p. 328-363. Harper and Row, New York.

Bohlen, J.M. et al. (1955) "How Farm People Accept New Ideas". Special Report Nos. 15. Agricultural Extension Service, Iowa State College, Ames.

Brandner, L. and Straus, M.A. (1959) "Congruence Versus Profitability in the Diffusion of Hybrid Sorghum". Rural Sociology, 24, 4 : 381-383.

Campbell, K.O. (1962) "Farm Decision Making and its Implications for Agricultural Extension." Paper 143, Australian Agricultural Extension Conference, C.S.I.R.O. Melbourne.

Campbell, R.R. (1966) "A Suggested Paradigm of the Individual Adoption Process." Rural Sociology, 31, 4 : 458-466.

Chaplin, J.P. (1968) "Dictionary of Psychology." Dell Publishing Cos., New York.

Chu, H.B. (1967) "A Survey of Dairy Production and Farm Management, Rotorua County 1967." Rotorua Agricultural Development Committee, Rotorua.

Clevenger, T., Lazier, G.A. and Clark, M.L. (1965) "Measurement of Corperate Images by the Semantic Differential." Journal of Marketing Research, 2, 1 : 80-82.

Copp, J.H. (1956) "Personal and Social Factors Associated with Adoption of Recommended Practices Among Kansas Cattlemen." Technical Bulletin Nos. 83. Agricultural Experimental Station, Kansas State College, Manhattan.

Emery, F.E. and Oeser, O.A. (1958) "Information Decision and Action." Melbourne University Press, Melbourne.

Festinger, L. and Katz, D. (1953) "Research Methods in the Behavioural Sciences." Holt Rinehart and Winston, Inc., New York.

Gallup, G. (1959) "Methods of Collecting Data", in "Evaluation in Extension", p. 45-48, ed. Byrn, D., Division of Extension Research and Training U.S.D.A., Washington.

Gellerman, S.W. (1968) "Management by Motivation." American Management Association Inc.

Gibson, T.E. (1969) "Anthelmintics." Veterinary Annual 1969, p. 258. John Wright and Sons, Bristol.

Griliches, Z. (1960a) "Hybrid Corn and the Economics of Innovation." Science, 132, 3422 : p. 275-280.

_____(1960b) "Congruence Versus Profitability - A False Dichotomy." Rural Sociology, 25, 3 : 354-356.

Gross, N. (1949) "The Differential Characteristics of Acceptors and Non-acceptors of an Approved Agricultural Technological Practice." Rural Sociology, 14, 2 : 148-156.

Gross, N. and Taves, M.J. (1952) "Characteristics Associated with Acceptance of Recommended Farm Practices." Rural Sociology, 17, 4 : 321-328.

Gross, N., Wilkening, E.A. et al. (1952) "Sociological Research on Diffusion and Adoption of New Farm Practices." Publication R.S.-2, Dept. of Rural Sociology, Kentucky Agricultural Extension Station, Lexington.

Hagerstrand, T. (1967) "Innovation Diffusion as a Spatial Process." University of Chicago Press, Chicago.

Haller, A.O. (1968) "On the Concept of Aspiration." Rural Sociology, 33, 4 : 484-487.

Hassinger, E. (1959) "Stages in the Adoption Process." Rural Sociology, 24, 1 : 52-57.

Havens, A.E. (1965) "Increasing the Effectiveness of Predicting Innovativeness." Rural Sociology, 30, 2 : 150-165.

Hay, D.G. and Ensminger, D. (1949) "Leader Follower Patterns in Selected Maine Towns." Rural Sociology, 14, 2 : 160-163.

Hill, L.J. (1967) "A Survey of Farmer's Level of Farming and Attitudes in Southern Southland." Extension Research Report Nos. 3, N.Z.D.A., Invercargill.

Hinkle, R.C. and Hinkle, G.J. (1954) "The Development of Modern Sociology." Random House, New York.

Hockey, P.R. (1962) "The Awareness, Use and Acceptance of the Extension Services by Suppliers to the Tokomaru Dairy Factory." Dissertation for Diploma of Agricultural Science, Massey University, Palmerston North.

Homans, G.C. (1951) "The Human Group." Routledge and Kegan Paul Ltd., London.

Hughes, A.H. (1967) "Report to the Thames District Agricultural Development Committee on the 1966 Lower Hauraki Plains Telephone Survey of Dairy Farmers." Massey University, Palmerston North.

Jones, G.E. (1964) "Leadership Among Farmers." Paper read at the Agricultural Education Assoc. Conference on Communication of Scientific and Technical Ideas in Farming, published by Dept. of Agricultural Economics, University of Nottingham.

_____(1967) "Adoption and Diffusion of Agricultural Practices." Review Article Nos. 6, in World Agricultural Economics and Rural Sociology Abstracts, 9, 3 : 1-31.

Katz, E. (1957) "The Two Step Flow of Communications, an Up to Date Report on a Hypothesis." Public Opinion Quarterly, 21, 61-78.

Katz, E., Levin, M.L. and Hamilton, H. (1963) "Traditions of Research on the Diffusion of Innovation." American Sociological Review, 28, 237-252.

Kendall, M.G. (1962) "Rank Correlation Methods." 3rd ed. Charles Griffin and Co. Ltd., London.

Keys, M. (1969) "An Application of Hagerstrand's Simulation Model to the Diffusion of Herring-Bone Cow Sheds in the Mid Waikato." Thesis presented for M.A. Geography, Canterbury University, Christchurch.

Kivlin, J.E. and Fliegel, F.C. (1967) "Differential Perceptions of Innovations and Rate of Adoption." Rural Sociology, 32, 1 : 78.

Lionberger, H.F. (1953) "Some Characteristics of Farm Operators Sought as Sources of Farm Information in a Missouri Community." Rural Sociology, 18, 4 : 327-338.

_____(1954) "The Relation of Informal Social Groups to the Diffusion of Farm Information in a N.E. Missouri Community." Rural Sociology, 19, 3 : 233-243.

_____(1959) "Community Prestige and the Choice of Sources of Farm Information." Public Opinion Quarterly, 23, 1 : 110-118.

_____(1960) "Adoption of New Ideas." Iowa State University Press, Ames.

Lionberger, H.F. and Coughenour, C.M. (1957) "Social Structure and Diffusion of Farm Information, Based on a Study of a Farm Community in N.E. Missouri." Research Bulletin Nos. 631., Agricultural Experimental Station, University of Missouri.

McArthur, A.T.G. (1964) Unpublished Lecture Notes for B.Agr.Sc. Candidates, Lincoln Agricultural College, Lincoln, New Zealand.

McMillion, M.B. (1960) "The Sources of Information and Factors which Influence Farmers in Adopting Recommended Practices in Two New Zealand Counties." Technical Publication Nos. 19, Lincoln Agricultural College, Lincoln.

Marsh, C.P. and Coleman, A.L. (1954a) "Farmers Practice-Adoption Rates in Relation to Adoption Rates of Leaders." Rural Sociology, 19, 2 : 180-181.

_____ (1954b) "The Relation of Kinship, Exchanging Work and Visiting to the Adoption of Recommended Farm Practices." Rural Sociology, 19, 3 : 291-293.

Marsh, C.P. and Coleman, A.L. (1954c) "The Relation of Neighbourhood of Residence to the Adoption of Recommended Farm Practices." Rural Sociology, 19, 4 : 385-389.

Mason, R.G. (1963) "The Use of Information Sources by Influentials in the Adoption Process." Public Opinion Quarterly, 27, fall : 455-466.

_____(1964) "The Use of Information Sources in the Process of Adoption." Rural Sociology, 29, 1 : 40-52.

Monroe, V.V. Mimeographed interviewers manual, U.S.D.A.

Munford, R.E. (1970) "Linked Statistical Programmes for the I.B.M. 1620 Monitor I System." Mimeograph Massey University, Palmerston North.

Murry, H.A. (1955) "Types of Human Needs", in "Studies in Motivation", p. 63-70, ed McClelland, D. Appleton, Century, Crofts, Inc., New York.

Neill, R.E. and Rogers, E.M. (1963) "Measuring Achievement Motivation Among Farmers." Department Series AE 346, Ohio Agricultural Experimental Station, Wooster.

Newcombe, T.M. (1964) "Motivation", in "A Dictionary of the Social Sciences", ed Gould, J., and Klob, W.L. Tavistock Publications Ltd., London.

Osgood, C.E. (1953) "Method and Theory in Experimental Psychology", p. 708-714. Oxford University Press, New York.

Osgood, C.E., Suci, G.J. and Tannenbaum, P.H. (1957) "The Measurement of Meaning." University of Illinois Press, Urbana.

Page, E.B. (1963) "Ordered Hypotheses for Multiple Treatments, A Significance Test for Linear Ranks." Journal of the American Statistical Association, 58, 301 : 216-230.

Payne, S.L. (1951) "The Art of Asking Questions." Princeton University Press, Princeton.

Presser, H.A. and Russell, H.M. (1965) "Acceptance of Research Results by Farmers." Review of Marketing and Agricultural Economics, 33, 3 : 147-165.

Rogers, E.M. (1958) "Categorising the Adopters of Agricultural Practices." Rural Sociology, 23, 4 : 345-354.

_____(1961) "Characteristics of Innovators and Other Adopter Categories." Research Bulletin Nos. 882, Ohio Agricultural Experimental Station, Wooster.

_____(1962) "Diffusion of Innovations." Free Press of Glencoe, New York.

Ryan, B. (1948) "A Study in Technological Diffusion." Rural Sociology, 13, 3 : 273-285.

Ryan, B. and Gross, N.C. (1943) "The Diffusion of Hybrid Seed Corn in Two Iowa Counties." Rural Sociology, 8, 1 : 15-24.

Sellitz, C., Jahoda, M., Deutsch, M. and Cook, S.W. (1960) "Research Methods in Social Relations." Holt, Rinehart and Winston, Toronto.

Sheppard, D. (1963) "Techniques of Enquiry in Decision Making." The Farm Economist, Oxford, 10, 5 : 226-228.

_____(1963b) "The Importance of 'Other Farmers'." Sociologia Ruralis, 3, 2 : 127-140.

_____(1965) "Some Notes on the Adoption of Farm Practices." Farm Economist, Oxford, 10, 11 : 454-457.

Siegel, S. (1965) "Non Parametric Statistics for the Behavioural Sciences." McGraw-Hill Book Co. Inc., Tosho. Kogakusha Co. Ltd., Tokyo.

Simon, H.A. (1952) "A Formal Theory of Interaction in Social Groups." American Sociological Review, 17, 202-211.

Smith, H.T.E. (1964) "Some Notes on the Adoption of Farm Practices, (I) Intensity of Information." Farm Economist Oxford, 10, 8 : 345-351.

Tully, J. (1966a) "Changing Practices, A Case Study." Journal of Cooperative Extension, Fall 1966, 143-152.

_____(1966b) "Towards a Sociological Theory of Extension." Human Relations, 19, 4 : 391-403.

Tully, J., Wilkening, E.A. and Presser, H.A. (1964) "Factors in Decision-Making in Farm Problems." Human Relations, 17, 4 : 295-320.

University of Michigan Survey Research Centre. (1946) "Manual for Interviewers on Sample Surveys for the U.S.D.A." Mimeograph Bureau of Agricultural Economics, U.S.D.A. Washington.

Whatman, N.H. (1961) "Landforms and Surface Geography of the Manawatu" in "Introducing The Manawatu", ed Anderson, A.G. and Saunders, B.G.R. New Zealand Geographical Society, Palmerston North.

Wilkening, E.A. (1950) "Sources of Information for Improved Farm Practices." Rural Sociology, 15, 1 : 19-30.

_____(1952) "Informal Leaders and Innovators in Farm Practices." Rural Sociology, 17, 3 : 272-275.

_____(1953) "Adoption of Improved Farm Practices as Related to Family Factors." Research Bulletin Nos. 183, Wisconsin Agricultural Experimental Station, University of Wisconsin.

_____(1954) "Techniques of Assessing Farm Family Values." Rural Sociology, 19, 1 : 39-49.

_____(1958) "An Introductory Note on the Social Aspects of Practice Adoption." Rural Sociology, 23, 2 : 97-102.

Wilkening, E.A., Tully, J. and Presser, H. (1962) "Communication and Other Factors Affecting the Acceptance of Farm Practices Among Dairy Farmers in Northern Victoria." Rural Sociology, 27, 2 : 116-197.

Wilson, M.C. and Gallup, G. (1955) "Extension Teaching Methods." Extension Circular Nos. 495, U.S.D.A. Washington.

Young, J.N. and Coleman, A.L. (1959) "Neighbourhood Norms and the Adoption of Farm Practices." Rural Sociology, 24, 4 : 372-380.

Young, J.N. and Marsh, C.P. (1956) "The Adoption of Recommended Farm Practices and Sources of Farm Information." Progress Report Nos. 40, Agricultural Experimental Station, University of Kentucky, Lexington.

APPENDIX A

H Y P O T H E S E S

The following nine hypotheses discussed in Chapter IV formed the basis of this study and therefore influenced the type of information sought from each respondent.

The hypotheses were that:

(1) Farmers being settled under similar conditions, at the same time in the same area would tend to consult each other about their problems.

(2) A farmer considered by other farmers to be a successful farmer sees part of his role as assisting those who come to him for advice especially if they are new to the district.

(3) Local public image does not concern a farmer who is prepared to change radically his farming practices or enterprises ahead of those in a district.

(4) A relatively urbanised* farmer will make more use of formal and informal sources of

*Urbanisation is defined here as - An index of the farmers' membership and/or leadership in organisations, formal education and past non-rural experiences.

information than a relatively unurbanised farmer.

(5) Family and personal aspirations are higher for relatively urbanised farmers than relatively unurbanised farmers.

(6) A farmer who perceives himself to be facing a farming problem (financial or technical) will seek advice from farmer neighbours whom he believes to be more successful and likely to be sympathetic.

(7) Greater confidence is placed in a neighbour as a source of information if his property is used for trial or demonstration purposes by:

Department of Agriculture.
Commercial firm.
Farmer himself or others,

than if it is not so used.

(8) Confidence in a neighbour as a source of information is enhanced if it is known he makes use of advisory services.

(9) Intensive work by an adviser with a co-operative influential will result in a more rapid general acceptance of a new practice than any other method of extension.

APPENDIX B

Q U E S T I O N N A I R E

Discussion of the questionnaire of 162 questions used in this study appears on page 33 of the text. To save space the questionnaire presented in this appendix does not include the spacing allowed between questions to note answers and record comments that were provided in the original. Also the Osgood Sematic Differential scale included on the last page was actually printed on a separate page in the original.

Asterisks beside some questions indicate those which were not coded in the final analysis because they were not considered to be applicable to the respondents, showed no variation (e.g. all government leasehold properties had similar terms and conditions) between respondents, or were not sufficiently well answered to be of use.

NAME: ..... CODE NOS: .....

ADDRESS: ..... PHONE NOS: .....

DISTRICT: .....

CONFIDENTIAL

1. Average Altitude of farm?

2. Annual average rainfall?

3. Total surveyed area of this home farm unit?

4. What area of this is freehold,

leasehold?

5. Total area in grass, crop and lucerne?

6. Total area in farm woodlots?

7. Total area which could not be worked with a wheel tractor?

8. Total area as yet unproductive?

*9. Is this unproductive land chiefly freehold (1) leasehold (2) NA (0)?

10. Total area you consider will never be capable of carrying stock?

11. How many paddocks have you?

12. Do you think this is the ideal Nos. - if not how many should you have? Why?

13. Do you have any form of race system?
No (1) Yes (2)

14. Who do you know of who has a race system around here?

Names

15. What do/would you think to be the advantages of a race system?

16. What do/would you think to be the disadvantages of a race system?

17. If you wanted more information about race systems who if anyone would you talk to about it? Why?

18. How would you describe the form of ownership?
Owner operator (1) Private Cos (2) Estate (3) Trust (4) Partnership other than with wife (5) Gvt. Block (6) Combination (7) Other (8)

19. How would you describe your position on the farm?
Owner operator (1) partner (2) manager (3) other (4)

20. What year did you take over?

21. How did you come by the farm originally?
Through; N.A. (0) private purchase (1) private lease (2) inheritance (3) serviceman settler lease (4) purchase (5) civilian settler lease (6) purchase (7) other (8)

22. If any of farm is leasehold what is the type of lease? N.A. (0) family (1) private individual (2) estate (3) trust (4) private maori (5) Maori Affairs (6) L. & S. (7) Other (8)

*23. Does lease allow for compensation for improvements?
No (1) Yes (2) N.A. (0)

*24. Total term of lease?

*25. How many years left?

*26. Can the lease be freeholded? No (1) Yes (2) N.A. (0)

27. If yes: have you done so - in which year?

28. From whom is first mortgage

second mortgage

seasonal finance taken?

N.A. (0) None (1) Trading Bank (13) Savings Bank (2) Dairy Cos. (3) Stock Firm (4) Insurance Cos. (5) Relative (6) Other person (7) Trust (8) S.A.C. (9) Marginal Lands (10) Other (11)

29. Have you ever applied to any of these for a development loan? No (0) Which one?

30. If no do you recall the reason which prompted you not to apply for a development loan at some time in the past?

31. If yes why do you think the application was granted or declined?

Did presentation have anything to do with this?

32. Coming back to your farming programme, what total area of crops did you have last season?

Area of
(1) Barley
(2) Swedes
(3) Chou
(4) Green feed
(5)
(6)
(7) Lucerne

33. If barley was grown, what was the specific reason which caused you to grow it? Income (1) Defray costs of regrassing (2) Other (3) Don't know (9) N.A. (0)

34. Is the fodder crop chiefly for fodder (1) pasture renewal (2) Both (3) N.A. (0)?

35. How do you use the fodder crop? N.A. (0) mix sheep and cattle over whole area free access (1)
mix sheep and cattle over whole area on permanently (2)
Cattle on first over whole area permanently follow by sheep (3)
Sheep on first over whole area permanently follow by cattle (4)
Sheep in front of wire whole area, cattle restricted behind wire (5)
Restricted on-off system - small breaks for sheep, cattle cleaning up behind sheep (6)

Intensive use numerous groups between wires (7)
Other (8)

36. Do you know of anyone practicing an intensive use system? Who?

37. Do you think such an intensive use system would have a place in your system of management?
No (1) Yes (2) D.K. (3) Why?

38. Have you tried any chemical methods of pasture renewal? What?

39. What are your ideas about it?

40. Do you know of anyone around about who has done it?

Who?

41. Do you know of any trials of chemical methods of pastures renewal carried out around about here?

Where?

42. Have you discussed it with any of your neighbours?

Who?

43. What would induce you to try it?

44. If you wanted further information who if anyone would you talk to about chemical methods of pasture renewal?

45. While <u>still obtaining information</u> and making up your mind, whether to try a new practice or not, would you rank 3 of these in the order in which you would place most trust in their evaluation of a new practice.

Cos. Salesman (1) Cos. Tech. Rep (2) Ag. Dept. Adviser (3) Private or Club Adviser (4) Farmer whose farm used for trial; by Ag. Dept. (5) by Commercial Firm (6) Farmer who has tried independently (7) Farmer known to make use of Ag. Dept. advisory services (8) Farmer known to make use of private or club adviser (9) Someone else (or nobody else) (0)

Why them?

46. Having made a decision to try some new farm practice, would you rank 3 of these in the order in which you would place most trust in their advice when attempting to put it into practice or overcoming any problems which may arise.

    Why them?

47. What was the total tonnage of fertiliser used on pasture this last season?

48. Total area of pasture to which this was applied?

49. Apart from phosphate do you include any other elements regularly in your fertiliser mixture?

    e.g. K
    Mg
    Mo
    S
    B
    Co
    Cu
    N

50. Do you know of any problems or interactions which could arise through using any of these elements?

51. What are your ideas on the use of nitrogen as a fertiliser for pasture on your farm?

52. What did/would induce you to try some nitrogen on your farm?

53. To whom would you go for more information about nitrogen fertiliser?

54. Do you use soil testing to help determine fertiliser requirements? No (1) Yes (2)

    Why?

55. Do you, or have you made silage on this property? No (1) Do (2) Have done (3)

56. What sort of silage would you/do/have you made made? Pit (1) Clamp (2) Wedge (3) Vacuum (4) Combination other

*57. If you have tried making vacuum silage but no longer do now - Why?

*58. What would induce you to try making vacuum silage?

59. If you wanted more information about vacuum silage from whom would you get it?

60. Do you know of anybody about here who has made vacuum silage? Who?

61. Have you discussed it with them? Why?

62. Stock carried at balance date?

Dairy cows

Dairy calves excluding dairy beef

Total if any dairy beef animals

Dairy Grazers

Beef cattle excluding dairy beef

Predominant cattle breed N.A. (0) A.A. (1) A.A.X. (2) B. Galloway (3) Galloway (4) Hfd (5) Hfd X (6) Other (7)

Stud cows

Stud 2 yr bulls

Stud yearling bulls

Run breeding cows including Hfrs R.W.B.

Dries

Calves mixed sex

Weaners 18 months M.S.

M.S. 18 mths - 3 yrs

Steers over 3 yrs

Others

Sheep Predominant sheep breed studs

flock

N.A. (0) Romney (1) Perendale (2) Border L (3) Other (4)

Stud ewes

Stud ewe hgts

ram hgts

Flock ewes

Flock rams Romney

P'dale

Border L

Southdown

Suffok

Other

Flock ewe hgts

wether hgts

63. What prompted you to go in for stud breeding here?

64. Stock policies sheep

Breed and stores (1) fat lamb breeding reps (2) fat lamb buying reps hoggets (3) .....as 2ths (4) buying as aged (5) as M.A. (6) Stud (7) combination 1 & 7 (8) 2 & 7 (9) Other (10)

65. What factors do you select for when culling or buying ewes? Body conformation (1) wool + conformation (2) wool + constitution (3) conformation wool + constitution (4) constitution (5) other (6).

66. Why do you select for these characters?
To obtain better sheep (1) Even line in flock (2) better lambing %age (3) better wool wt (4) both 3 & 4 (5) meaty carcase (6) 3 + 6 (7) 4 + 6 (8) 5 + 6 (9) Other (10)

67. When picking your rams what production records if any do you obtain from the breeder to help you in your selection?

None don't ask (1) none, not available (2) birth rank of ram (3) wool weight (4) weaning body wt (5) birth rank of parents (6) other (7)

68. Do you think such records of the rams from which you pick your replacements are a good guide to the rams ability to produce better offspring?

No (1) Don't know (2) Yes (3)

Why?

69. What is your average lambing percentage?

70. Do you mate any of your ewe hoggets if yes how many? No (000) N.A. (999)

Why?

71. If yes, for how many years have you been doing this.

72. Do you know anyone around about there mating their ewe hoggets? Who?

73. Have you discussed their results with any of them.

Who? Why?

74. Would you go to these people or someone else to find out more about mating ewe hoggets - if someone else who, why?

75. Before lambing do you sort the flock into groups according to relative expected lambing time? How do you do this? No (1) On basis of sire sign (2) Checking over shearing board (3) Other (4) N.A. (0).

76. Normal grazing for ewes over most of year is - set stocked (1) Rotated regularly 1-2 weeks (2) 2-3 weeks (3) Other (4)?

77. Have any of the following caused you concern? sleepy sickness (1) Bearing troubles (2) Milk Fever (3) External parasites (4) Internal parasites (5) Facial eczema (6) Salmonella (7) Blackleg + tetany (8) Foot rot (9) Flystrike (10) Trace element def. (11) Infert. (12) Pulpy kidney (13) Other (14)

78. Which do you consider to be the 3 sheep health problems which cost you most in terms of loss of production and/or deaths on your property?

79. What are your methods of control of

External Parasites

Internal Parasites

Facial Eczema

Salmonella

*"Hogget ill thrift"

Pulpy kidney

*Scouring lambs and hoggets

Why do you use that particular remedy?

80. Can you recall if the firms advertising influenced you in any way? How?

81. Has there been any type of advertising which has influenced you against a particular animal health product? What and which product?

82. The chemical companies making sheep drenches have been advocating a series of doses for young sheep do you think their drenching plan is a fair enough management plan or is it simply a sales gimmick?

Why?

83. Does the name of the Cos. advocating this effect your attitude?

84. Having dealt with sheep could we swing to your cattle policy?

Breeding reps - selling weaners (1)
" 18 months fat (2)
" " forward (3)
Over 2 yrs (4)

Buy breeding cow reps. sell weaners (5)
18 months fat (6)
" forward (7)
over 2 yrs (8)

Buy weaners fatten to 18 mths (9)
30 mths (10)
combination sell when fat (11)

Buy 12-18 months fatten (12)

Stud (13)

Other (14)

85. When picking a bull would you expect to derive any benefit from selection on growth rate characteristics?

What, or why?

86. Would, or do you mate yearling Hfrs? No (1) Yes (2)

Why?

87. From whom would you seek more information about mating yearling heifers?

88. Who around about here is, or would be likely to consider mating yearling heifers?

*89. What chances of success do you think he would have? Why?

90. Have you tried autumn calving?
N.A. (0) No (1) Yes and continuing (2) Yes but given it up (3) Other (4) Why?

91. Have any nearby neighbours tried autumn calving?

Who?

*92. Do you recall who you heard of <u>first</u> trying autumn calving around about here?

93. What is the average calving date for your herd?

94. Have any of the following diseases caused you concern?
Contagious abortion (1) T.B. (2) Grass Staggers (3) Milk fever (4) Bloat (5) Trace element def. (6) External parasites (7) Internal parasites (8) Scours in calves (9) Leptospirosis (10) Wooden tongue (11) Other (12)

95. What do you consider to be the 3 cattle health problems which cost you most in terms of loss of production and/or deaths on your property?

96. What are your methods of control of

Grass staggers

External parasites

Internal parasites

*Calf scours

Why do you use that particular remedy?

97. Can you recall if firms advertising influenced you in any way. How?

98. Do you think drenching young cattle with some form of worm drench is: Unnecessary (1) Occasionally necessary (2) Always necessary at least once (3) Necessary at frequent intervals (4). Why?

99. Could you define what you think a commercial firm's, for example, a stock remedies manufacturers reputation is based on?

100. When considering buying a product of which there are several very similar alternatives would the individual manufacturing Cos. reputations influence your decision?

101. What does?

102. If you were employed as an advertising consultant by a chemical company making stock drenches for example what type of promotional activity or advertising would you suggest the company used to influence farmers to buy their product?

103. Concerning the general management of the property what sort of records do you keep?

None (1) Stock tallies (2) Diary (3) Simple accounts (4) Detailed cash book (5) Other (6)

104. How do you use these records?

105. Do you actually put down on paper a proposed budget and plan of operations for the next, and subsequent years?

106. If yes do you compare it with how you are actually progressing during the season?

107. What do you see as posing the biggest problem facing you on this farm in the coming year?

108. Why do you consider this is/will be a problem?

Farmer personally

109. Where were you brought up? District,

on a farm (1) in town (2)?

110. What did your father do for a living?

111. Other than farming, what have you worked at mainly?

112. Which age group are you in? <35 (1) 35-55 (2) 55-70 (3) >70 (4)

113. How much education did you have?

Virtually none (1) Up to certif. of prof (2) some secondary (3) attempt S.C. (4) Attempt U.E. (5) University degree course (6) completed degree (7)

114. Have you had any war service? No (0) Yes yrs

115. What is your marital status? Married (1) separated (2) widowed (3) widower (4) single (5) other (6)

116. What was your wife's occupation?

117. How many children have you?

118. Which children are still at home, or at school and dependent on you?

Age Sex

119. Which are at home working for you?

120. How much schooling would you like your children to have? Stay till min. leaving age (1) at least attempt S.C. (2) Pass S.C. (3) Attempt U.E. (4) Pass U.E. (5) Other (6)

121. What hopes do you have for your children's vocational future?

122. Do you see the future of the farm conflicting with this in any way?

123. Do you have any particular personal hopes or ambitions?

124. What farm work does your wife help with?

125. Do your wife and family suggest improvements that may help you make more money on the farm?

126. Do you ask members of your family their opinions on new farming practices before using them?
No (1) Yes (2)

127. Is there any particular aspect of your farming of which you are particularly proud? What?

128. Do neighbours or visitors drop in on you to discuss farming or seek advice? No (1) Yes occasionally (2) Frequently (3)

129. Do you like discussing farming with these people who may be only trying to pick your brains?

130. If yes: do you actively foster your willingness to discuss and perhaps help other farmers by inviting them to your farm, or suggesting you visit them to see their problem? N.A. (0) No (1) Yes (2)

131. If you had a particular technical farming problem is there any particular farmer around about here from whom you would seek advice? Who?

132. Why him?

133. If you had a particular financial farming problem is there any particular farmer around about here from whom you would seek advice?

134. Do you think it is good for you, or the district to have a farmer nearby who is willing to try out new ideas and practices possibly before anyone else has heard of them? Why?

135. Do you or would you discuss farming and new practices and ideas with such a person?

If already do - who, why?

136. Can you recall any farm practice/s which you adopted that was subsequently adopted by your neighbours? No (1) If Yes who, what?

137. Are you concerned about your general public image strictly as a farmer, with other farmers around here or aren't you particularly concerned about what they may think of you as a farmer and your farming ability?

138. Now, as a person, are you concerned about your general public image with other families around here or aren't you particularly concerned about what they may think of you and your family as people?

139. As a matter of interest, why are you farming anyway?

140. Would you define what your main objective is in farming? Full and satisfactory life (1) reasonable level of income and leisure to enjoy it (2) minimum of doubt and uncertainty (3) Other (4)

141. Would you place in order which of these means most to you, if only one could be achieved at a time? Providing my children with a good education (1). Owning my farm free of debt (2). Having my farm tidy, productive and well equipped (3). Having more modern conveniences in my home (4). Providing myself and my family with an opportunity for travel and recreation (5).

142. Suppose you wished to send your daughter or son to a business college, university, trade school, farm institute or something like that, and at the same time you needed to spend money on the farm or farm home. Which would you do first? Spend on farm (1) Send child to college (2) D.K. (3)

143. Suppose you don't have all the field machinery you need but have enough to get along with and at the same time the family would like some new furniture in the house, what would you do?

Buy machinery first (1) Buy furniture (2) D.K. (3)

144. Suppose you wanted to paint the woolshed and out-buildings and the family wanted a trip or vacation. Would you paint the building (1) take the family on a holiday (2) D.K. (3)?

145. Suppose you have a son who is over 15 years of age and has the ability, but who hasn't finished secondary school. He would like to finish secondary school and is interested in farming. You need him to help you on the farm. Would you

(1) encourage him to stay at home and help on farm,
(2) encourage him to finish secondary school,
(3) don't know?

146. Suppose you have a son who wishes to take a short course in farming, yet this will mean harder work for you. Would you

Not encourage him to take the short course,
Encourage him to take the short course,
Don't know?

147. Suppose you have a child who wants to take time off during the harvesting period, to attend a function e.g. sports meeting or camp on which his heart is set, would you

Not encourage him to go,
Encourage him to go,
Don't know?

148. Can you recall any new farming practice which you approved of on grounds of sound farm management and economics but didn't actually put into practice because it may have conflicted with or placed in jeopardy some family value?

149. Has it ever been hard for you to make a decision because of this conflict? What and why?

150. When you first took over this farm were your plans for development of the farm limited in any way by your health? No (1) Yes (2)

151. Are the present productive levels or stock policies being influenced by your present health?

152. In say 5 years time do you foresee health, baring accidents affecting production?

153. Are you an active member of any ag. organisations?

154. Are you an active member of any non ag. organisations?

155. What offices do you, or have you held in ag. organisations?

156. What offices do you, or have you held in non ag. organisations?

157. Do you have any form of work exchange arrangement with any other farmers about here? Who?

158. With whom do you exchange visits on a family basis around here?

159. Contact with advisory media

Type	Frequently	Sometimes	Occasionally	Never	Don't own or get
Radio					
T.V.					
Newspaper					
"J. of AG"					
"Farmer"					
"Straight Furrow"					
National Conf.					
Local Conf.					
Field Days					
Accountant					
Private or Club Adviser					
Ag. Dept Adviser					
Sheep & Wool Inst.					
Livestock Inst.					
Commercial Firms					
Reps					
Other					

160. Finally on the sheet of paper I am going to give you there is a list of adjectives. Now I want you to look along each line and check the column which shows how strongly you associate the various adjectives with a number of companies and government bodies I am going to read out.

Of course if you don't associate the particular organisation with one of the adjectives then check the no association column.

Is that O.K. - now the essential thing is speed, I want the first impression so don't stop to think about other meanings the adjectives may have, if you do it will throw the results out of line.

As a dummy run, how do you associate the words with N.Z. Railways Dept.

161. Thank you, I have a great deal of information here but if I should want to know anything further can I visit you again?

162. The Farm Management Dept. at Massey would like to know if they could add your name to their list of farmers prepared to answer questionnaires on farm management and so on if such an occasion should arise in the future?

	Strong Assoc	Assoc	No Assoc	Assoc	Strong Assoc	
Up to date						Out of date
Deceptive						Honest
Friendly						Unfriendly
Red tape						Freedom
Understaffed						Overstaffed
Slow						Quick
Imaginative						Unimaginative
Co-operative						Unco-operative
Painstaking						Careless
Theoretical						Practical
Unreliable						Reliable
Inefficient						Efficient

APPENDIX C

S U P P L E M E N T A R Y B I B L I O G R A P H Y

The bibliography in this appendix includes all the references referred to before preparing the questionnaire and undertaking any interviews. Section 2 of the review of literature briefly summarises the main points from this literature. The titles of some references included in the main text are also included in this bibliography, but marked with an asterisk.

Benson, P.H. (1964) "Eliminating Consumer Biases in Survey Data by Balanced Tabulation". Journal of Marketing Research, 1, 4 : 66-71

Bradburn, N.M. and Mason, W.M. (1964). "The Effect of Question Order on Responses". Journal of Marketing Research, 1, 4 : 57-61

Byrn, D. (ed. 1959). Evaluation in Extension, Division of Extension Research and Training, U.S.D.A. Washington.

Candler, W.V. (1965). "The Role of Farm Management Surveys", Discussion Paper 39, Dept. of Agricultural Economics and Farm Management, Massey University, Palmerston North.

Candler, W.V. and Sargent, D. (1965). "Dairy Farm Management and Economics Research Needs", Discussion Paper 37, Dept. of Agricultural Economics and Farm Management, Massey University, Palmerston North.

Cartwright, R.W. (1967). "The Potential for Increased Production on Sheep Farms in Wairoa County", Unpublished M. Agr. Sc. Thesis, Massey University, Palmerston North.

*Clevenger, T., Lazier, G.A., and Clark, M.L. (1965). "Measurement of Corporate Images by the Semantic Differential". Journal of Marketing Research, 2, 1 : 80-82.

Cooper, S.L. (1964). "Random Sampling by Telephone - an Improved Method." Journal of Marketing Research, 1, 4 : 45-48.

Coughenour, C.M. (1965). "The Problem of Reliability of Adoption Data in Survey Research", Rural Sociology, 30, 2 : 184-203.

Deming, W.E. (1944). "On Errors in Surveys". American Sociological Review, 9 : 359-369.

Dohrenwend, B.S. (1965). "Some Effects of Open and Closed Questions on Respondent's Answers", Human Organisation, 24 : 175-184.

Fessenden, J.G. (1959). "Interviewing" in Evaluation in Extension, p. 49-56, ed. Byrn, D. Division of Extension Research and Training, U.S.D.A. Washington.

*Festinger, L. and Katz, D. (ed. 1953). "Research Methods in the Behavioural Sciences", Holt, Rinehart and Winston, Inc., New York.

*Gallup, G. (1959). "Methods of Collecting Data", in Evaluation in Extension", p. 45-48, ed. Byrn, D. Division of Extension Research and Training, U.S.D.A. Washington.

----------"Devices for Collecting Data" in Evaluation in Extension, p. 57-63, ed. Byrn, D. Division of Extension Research and Training, U.S.D.A., Washington.

----------"Construction of an Evaluation Device" in Evaluation in Extension, p. 64-69, ed. Byrn, D. Division of Extension Research and Training, U.S.D.A. Washington.

Garrett, A. (1958). "Interviewing its Principles and Methods", Family Service Assn. of America, New York.

Green, J.W. (1951). "Interviewer Training for Studies using Intensive Interview Techniques", Rural Sociology, 16, 1 : 69 - 71.

Guttman, L. (1950). "Basis for Scalogram Analysis" in Measurement and Prediction, ed. Stouffer, S.A. et al, Princeton University, Press, Princeton.

Heron, A. (1956) "The Effects of Real Life Motivation on Questionnaire Response", Journal of Applied Psychology, 40, 65-135.

Hunt, G.A.P. (1963) "Interviewing", Extension Bulletin Nos. 5 Extension Coordinating and Training Section, Queensland Department of Agriculture and Stock, Brisbane.

Kahn, R.L., and Cannell, C.F. (1957). "The Dynamics of Interviewing", John Wiley and Sons, Inc., New York.

*McArthur, A.T.G. (1964). Unpublished lecture notes for Lincoln College B. Agr. Sc. candidates.

Maynes, E.S. (1965). "The Anatomy of Response Errors : Consumer Saving", Journal of Marketing Research, 2, 4 : 378 - 387.

*Monroe, V.V. Mimeographed interviewers manual, U.S.D.A.

O'Donnell, B.G. (1969) "The Mail Survey in Agricultural Economic Research. A New Zealand Example", Occasional Paper, Nos. 1 Dept. of Agricultural Economics and Farm Management, Massey University, Palmerston North.

*Osgood, C.E. (1953) "Method and Theory in Experimental Psychology" p. 708-714, Oxford University Press, New York.

*Osgood, C.E. Suci, G.J. and Tannenbaum, P.H. (1957). "The Measurement of Meaning", University of Illinois Press, Urbana.

*Payne, S.L. (1951) "The Art of Asking Questions", Princeton University Press, Princeton.

Payne, S.L. (1965). "Are Open-ended Questions worth the Effort", Journal of Marketing Research, 2, 4 : 417-418.

Rogers, C.R. (1942) "Counselling and Psychotherapy", Houghton Mifflin Cos., Cambridge, Massachusetts.

Schapper, H.P. (1957) "Uses and Limitations of Farm Surveys", Review of Marketing and Agricultural Economics, 25, 1 & 2 : 51-66.

*Sellitz, C., Jahoda, M., Deutach, M., and Cook, S.W. (1960). "Research Methods in Social Relations", Holt, Rinehart and Winston, Toronto.

Sledge, G.W. (1956) "Standards and Forms for Research Studies", Mimeograph, Department of Agriculture and Extension Education, University of Wisconsin.

Straus, M.S. (1956) "Personality Testing the Farm Population", Rural Sociology, 21, 3 & 4 : 293-294.

Sudman, S. (1966) "New Uses of Telephone Methods in Survey Research", Journal of Marketing Research, 3, 163-167.

----------(1967) "Reducing the Cost of Surveys", Aldine Publishing Cos. Chicago.

*University of Michigan Survey Research Centre (1946). "Manual for Interviewers on Sample Surveys for the U.S.D.A.", mimeograph. Bureau of Agricultural Economics, U.S.D.A. Washington.

Ward, A.B. (1967) "The Use of the Telephone as a Survey Method - Some Preliminary Results" Discussion Paper 45, Dept. of Agricultural Economics and Farm Management, Massey University, Palmerston North.

Wesney, D. (1964) "A Study of the Financial Returns to Process Pea Growers in Hawke's Bay". Unpublished M. Agr. Sc. Thesis, Massey University, Palmerston North.

Whyte, W.F. (1955) "Money and Motivation", Harper and Row Publishers, New York.

Yang, W.Y. (1958) "Methods of Farm Management Investigations", F.A.O. Agricultural Development Paper, No. 64, F.A.O., Rome.

APPENDIX D

GOVERNMENT LAND SETTLEMENT SCHEMES

The assistance of Mr J.E. Holmwood, District Appraiser, S.A.C., Rotorua and Mr T.B. Pledger, Chief Administrator of the Development and Settlement Section of the Lands and Survey Department, Rotorua in providing the following information relevant to the settlement of the Reporoa survey area is greatfully acknowledged.

Prior to 1962 when civilian land settlement policies were introduced the State Advances Corporation undertook the guidance and financial control of new settlers. The Lands and Survey Department's Land Development Section developed blocks of new farmland and after it was improved sufficiently to be settled as individual farm units the properties were ballotted off to ex-servicemen according to priorities based on length and time of service and grading as a farmer. This grading was based on previous farm experience. To participate in a ballot for a farm the applicants had to make a statutory declaration concerning their cash resources and assets. However, although this information was confidential, each applicant would have an idea of the relative wealth and financial situation of all

other applicants.

Applicants successful in a ballot were required to make an initial deposit, which amounted to about 10 percent of the total charge set by the Land Settlement Board. They would then be given possession of a property with a limited amount of subdivision, a dwelling, and for sheep farms about 800-900 ewes with supporting cattle. The State Advances Corporation would take various securities over land stock and chattels and supply capital for further development and money on current account for general expenses. Where high levels of indebtedness were involved strict budgetary control was exercised over the initial few years until the income of the property was sufficient to support all charges and provide sufficient surplus to give some working capital. This was usually achieved after immediate development was completed (e.g. extra fencing, erection of yards and woolshed) and the outstanding indebtedness had been reduced to normal limits (i.e.) approximately two-thirds of the total value.

Once this stage had been reached all outstanding debt to the State Advances Corporation was converted to a thirty year table mortgage with the Corporation holding first mortgage on the land as security, together with a bill of sale over stock and plant if necessary.

As mentioned a change of policy occurred in 1962 with the introduction of civilian settler schemes. However, this change had little effect on the general policy outlined above regarding the allocation of farms. The main effect of this change was that the Commissioner of Crown Lands Office in each land district assumed the responsibility

for finance and guidance of the new settlers over their first few years instead of the State Advances Corporation. Through the Commissioner's Office, extra capital for development was made available as necessary, with the Lands and Survey Department holding all securities. However, because the Lands and Survey Department has no organisation for handling seasonal finance this was provided by a Stock Firm. As with S.A.C. policy strict budgetary control was exercised by field staff of the Commissioner of Crown Lands Office and the first income surpluses were used to decrease stock mortgages. The farm unit was consolidated and developed further, until the income could meet charges and provide some working capital. Once this was achieved the securities and liabilities which were on current account to the Lands and Survey Department were transferred to the S.A.C. which converted the liabilities to fixed mortgage and/or loan commitments. Normally this transfer was not possible earlier than six years after settlement.

Regardless of which settlement policy was applicable the individual had three alternative forms of tenure under which he could take up a farm. These were freehold title, deferred payment licence and renewable leasehold title.

If the settler could pay the full purchase price covering land, improvements, stock and plant in cash to the Lands and Survey Department a freehold title could be issued. This does not necessarily mean, however, that the land had not been mortgaged to some other institution such as the S.A.C. to provide this initial cash requirement.

A method of time payment for the land in which the purchase price was repayable over a term of up to thirty years by equal half-yearly instalments of principal and

interest was known as a deferred payments tenure. When the full amount had been repaid a freehold title could be issued. This form of tenure has been classed as a freehold tenure in this study because the initial deposit conditions are similar for both a freehold or a deferred payments tenure.

Settlers taking up properties under these forms of tenure had to make an initial cash deposit of $15,000-$20,000 which was approximately 35 percent of the total land value (unimproved value plus improvements) before possession was given. Since loans requiring the payment of interest were not acceptable for the cash deposit many new settlers have chosen the third form of tenure, the renewable lease. The deposit required for a property taken up as a leasehold section amounts to about 20 percent of the total land value. By this method a settler with limited resources could conserve his capital and use it for further capital development. The initial charges against the property were also reduced as rent was paid on the unimproved value only (currently at the rate of 5½ percent).

The lease is for a 33 year term and may be renewed perpetually for similar terms. A leasehold tenure may be converted to a deferred payment or freehold tenure at any time at a price fixed by a current valuation. Obviously as settlement progresses and amenities are added land valuations will increase, therefore if a settler wishes to obtain a deferred payment or freehold title it is cheaper in the long run if he does so as soon as possible after settlement. Conversely it is unlikely that the fixed charges incurred by taking up a deferred payment title will be less than the 5½ percent rental charge on leasehold tenure. Therefore a

settler should consider very carefully the relative financial merits of converting a leasehold title to a deferred payment or freehold title as the extra money involved in making the change could possibly be invested in some more profitable avenue (e.g. further farm development, or off farm investment).

APPENDIX E

STOCK UNIT CONVERSION RATIOS

This appendix lists the ratios derived from the N.Z.D.A. Stock Unit Tables prepared by the Economics Section of the Farm Advisory Division which were used to calculate the ewe equivalents and carrying capacities of respondents' farms.

Class of Stock	Ewe Equivalents.
Dairy Cattle:	
Cows	8.5
Calves	2.5
Dairy beef	3.0
Dairy grazers	4.5
Beef Cattle:	
Stud cows	7.0
Stud 2 yr. bulls	5.5
Stud 1 yr. bulls	5.0
Run cows	6.0
Calves	2.5
M.S. weaners - 18 mnths.	4.0
Steers 18 mnths - 3 yrs.	5.0

Class of Stock	Ewe Equivalents.
Steers over 3 yrs	5.5
Others	5.0
Sheep:	
Stud ewes	1.1
Stud hoggets	0.7
Stud ram hoggets	0.9
Flock ewes	1.0
Rams	0.8
Ewe hoggets	0.65
Wether hoggets	0.65

APPENDIX F

S O C I O G R A M S

The sociograms discussed in Chapter IV are presented in pairs, one for each survey area depicting the inter-communication patterns on a particular topic for that area.

All the sociograms for one area have the same basic format. That is each segment in the circle representing a particular respondent holds the same position throughout the series presented. The positions around the circle were determined chiefly from the roading pattern within each area. Therefore near neighbours are in close juxtaposition in the sociograms while individuals separated by the greatest distance in each survey area are in general the furtherest apart in the sociograms too.

Letters identifying respondents in the circle correspond to the same code letters used in identifying respondents in Tables 53 and 54.

The arrows across each circle indicate both with and in what direction any contact does or may take place. Those arrows terminating in the middle of the circle indicate respondents who claimed they would discuss the topic with neighbours generally. Arrows drawn outside the circle on the

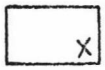
sociograms concerned with chemical methods of pasture establishment or renewal, indicate discussion with some outside contact defined by the code number at the arrow point. The figures written close to the circle on these two sociograms indicate the predicted sources of further information about "chemical ploughing".

On all the other sociograms the external figures indicate contacts made or predicted to be made, whichever is relevant according to the sociogram's title.

The following code is common to all the sociograms.

Code Number	Meaning
1.	Would rely on own experience.
2.	Discuss with neighbours generally.
3.	Discuss with unnamed "men with experience".
4.	Discuss with named farmer outside survey area.
5.	Discuss with scientist, D.S.I.R. University, etc.
6.	Discuss with Agriculture Department Advisor.
7.	Discuss with Private or Club Advisor.
8.	Discuss with a Cos. technical representative.
9.	Discuss with specific produce Cos.
10.	Discuss with stock and station firms.
11.	Discuss with contractor.
12.	Discuss with stud breeder.
13.	Obtain information from magazines.

Indicates individuals within the survey area who were not actually interviewed.

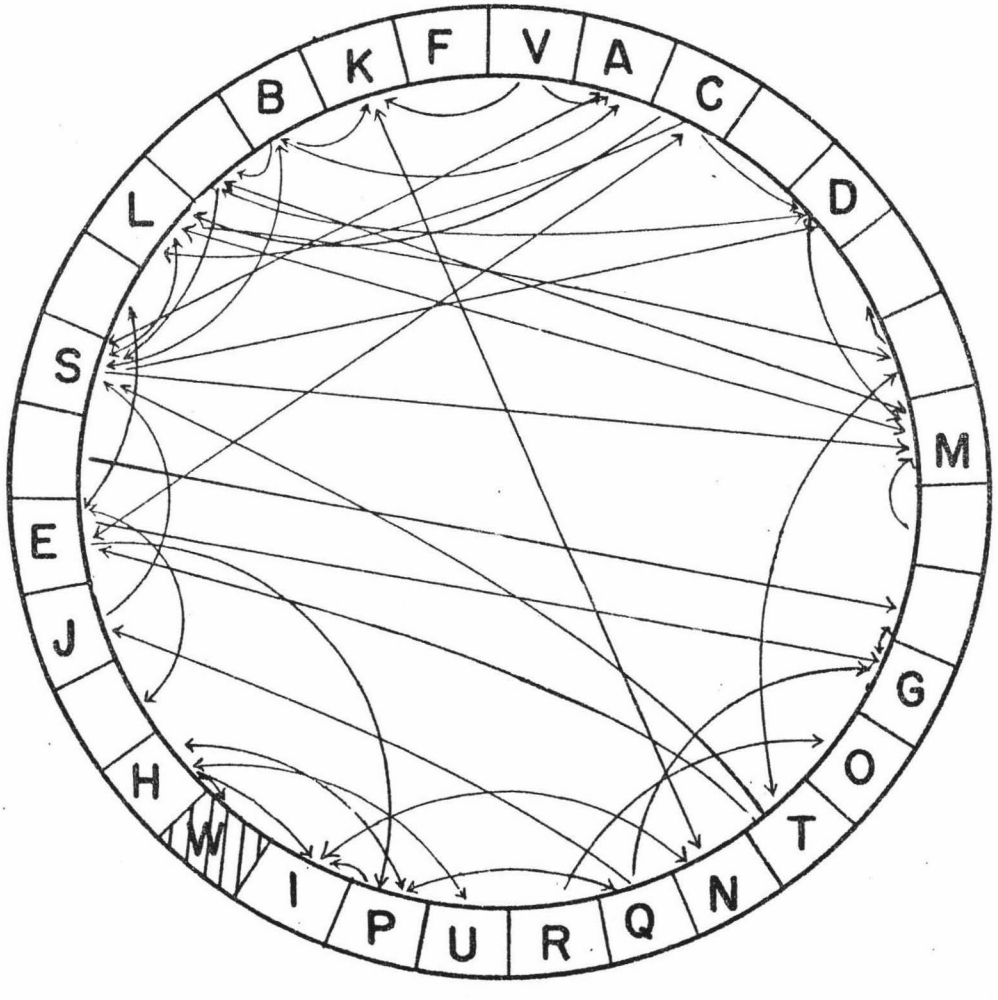


Indicates respondents who possess, have tried or have had trials on their properties of the item or practice being considered.

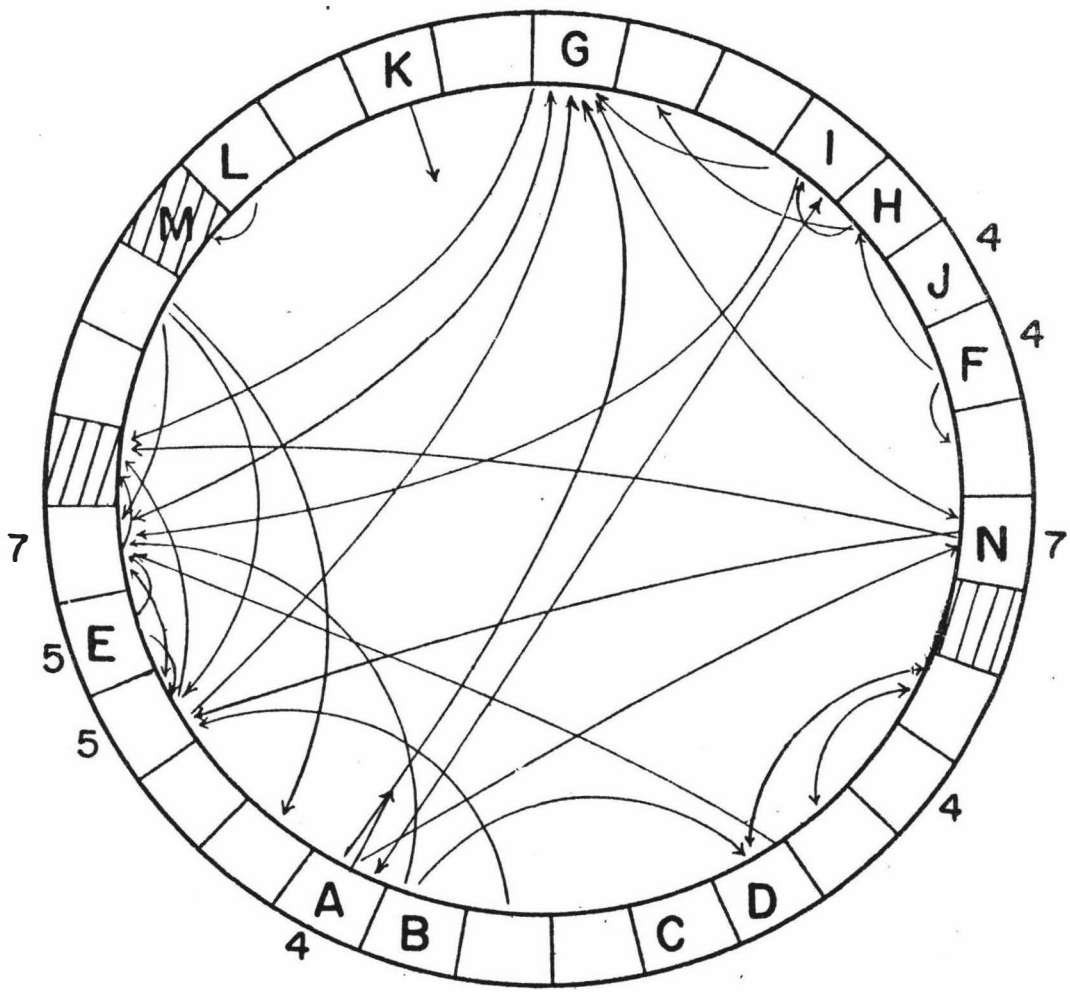
Segments without arrows or code numbers beside them indicate respondents who had not made any contact or discussed the particular topic with anyone else or indicated they would not seek information on the particular topic from any source.

The topics for each pair of sociograms are as follows:

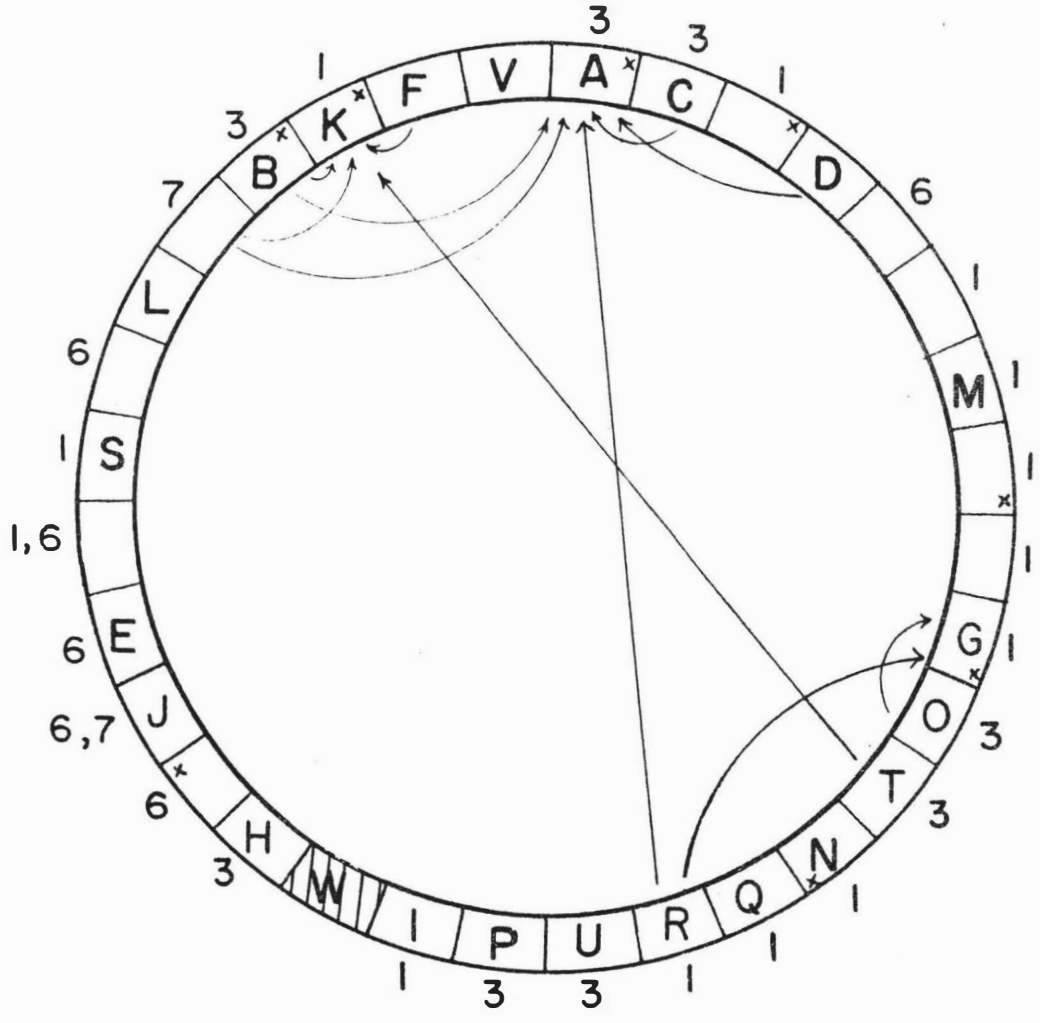
Reporoa Survey Area
Pattern of Family Visiting.



Halcombe Survey Area
Pattern of Family Visiting

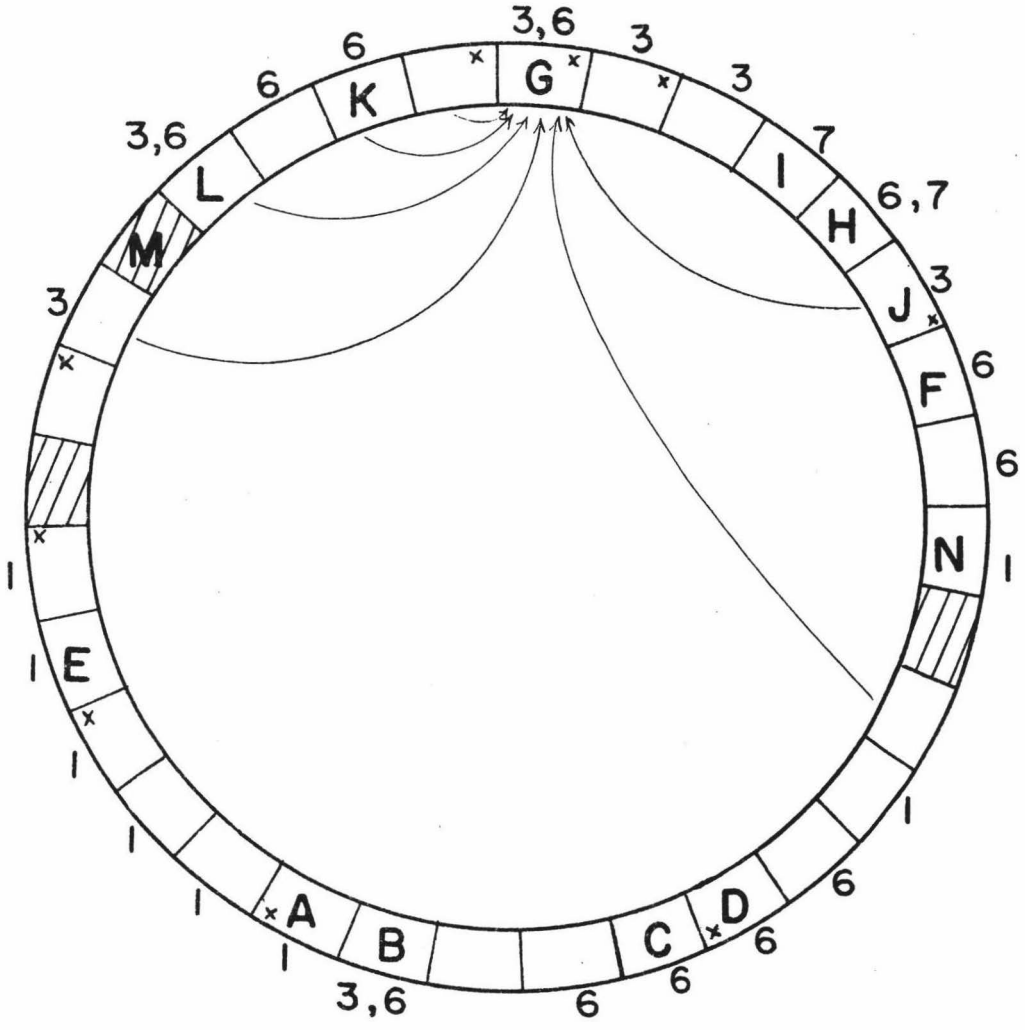


Reporoa Survey Area
Predicted sources of Information on Farm Race Systems



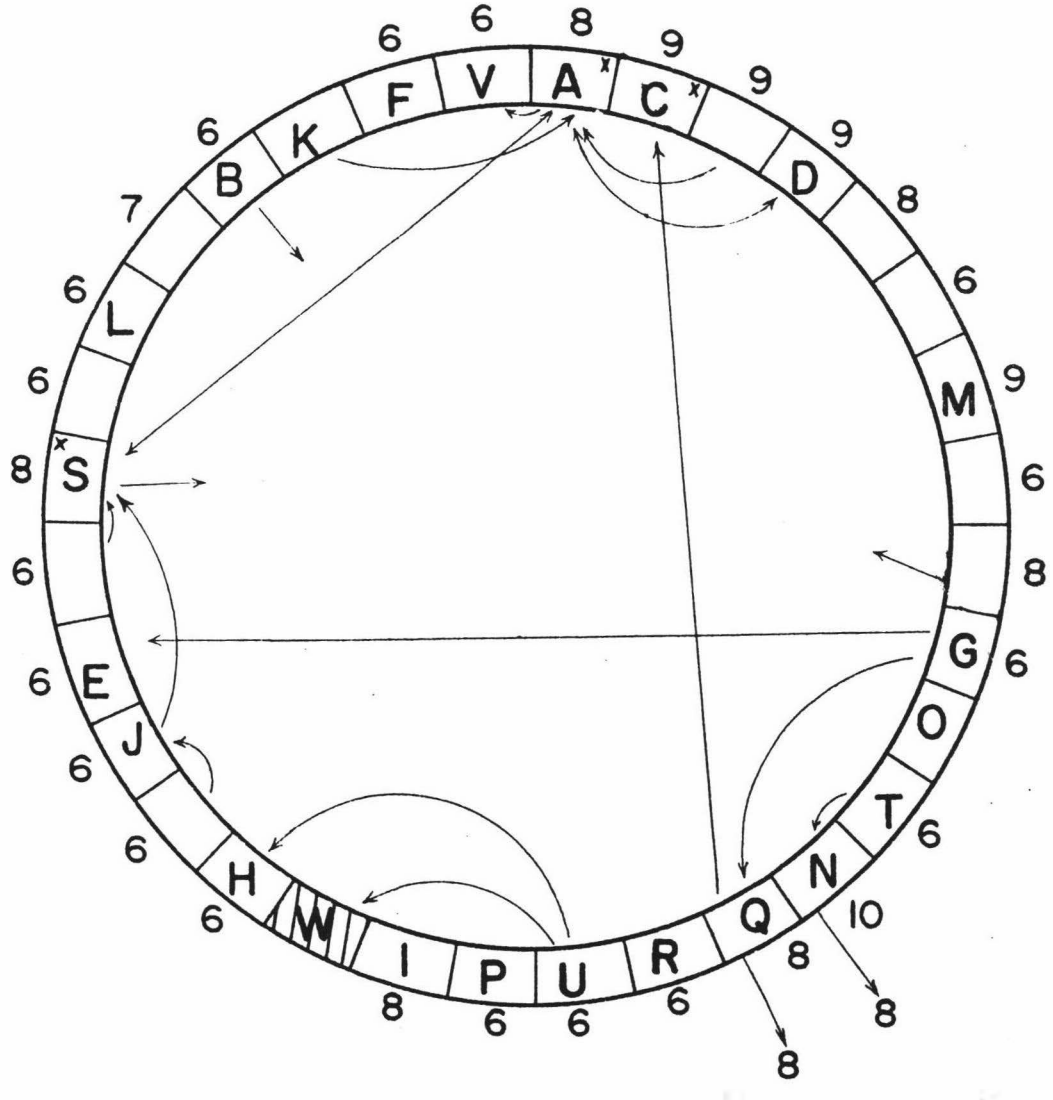
Halcombe Survey Area

Predicted Sources of Information on Farm Race Systems



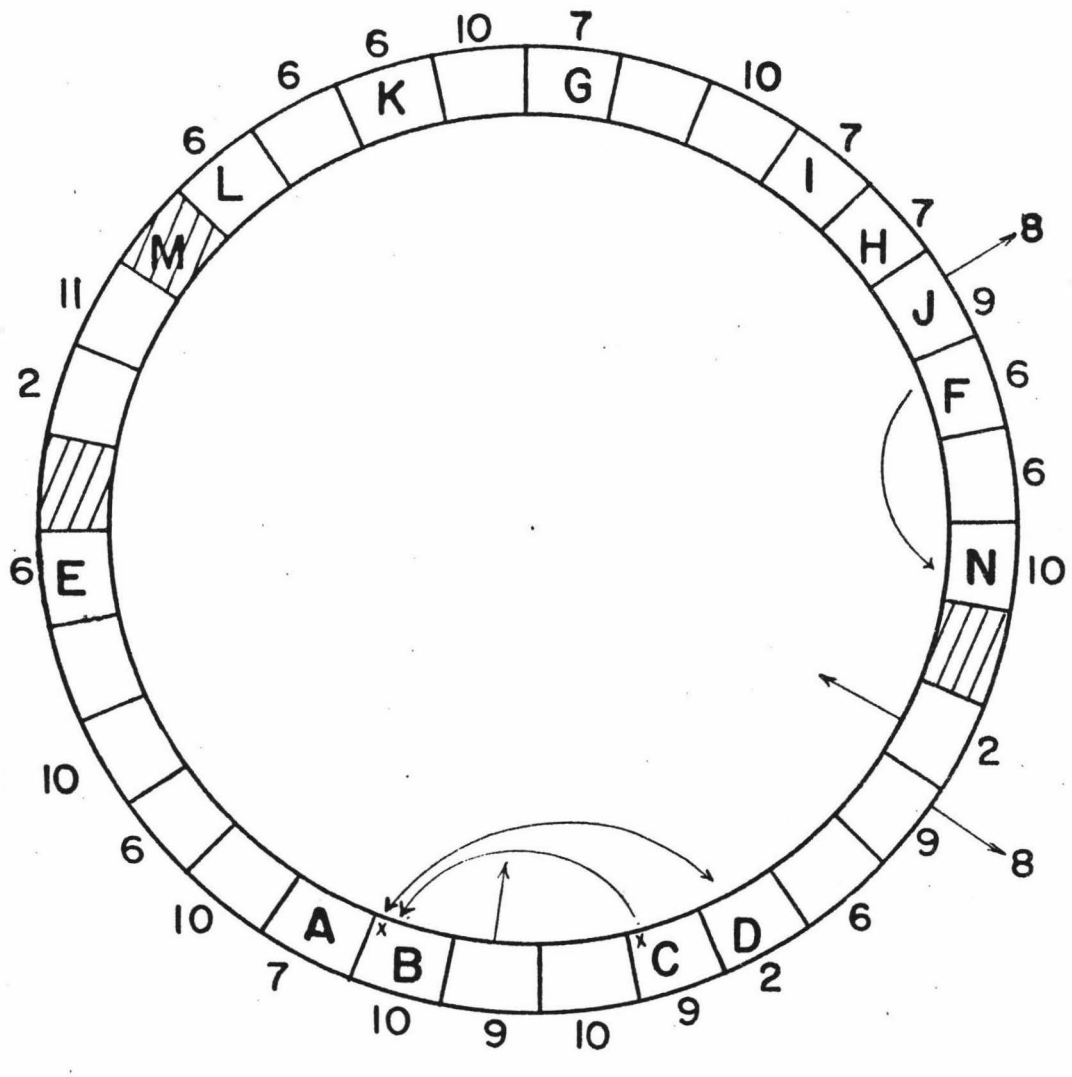
Reporoa Survey Area

Pattern of Interpersonal Discussion on Chemical Methods of Pasture Establishment or Renewal.



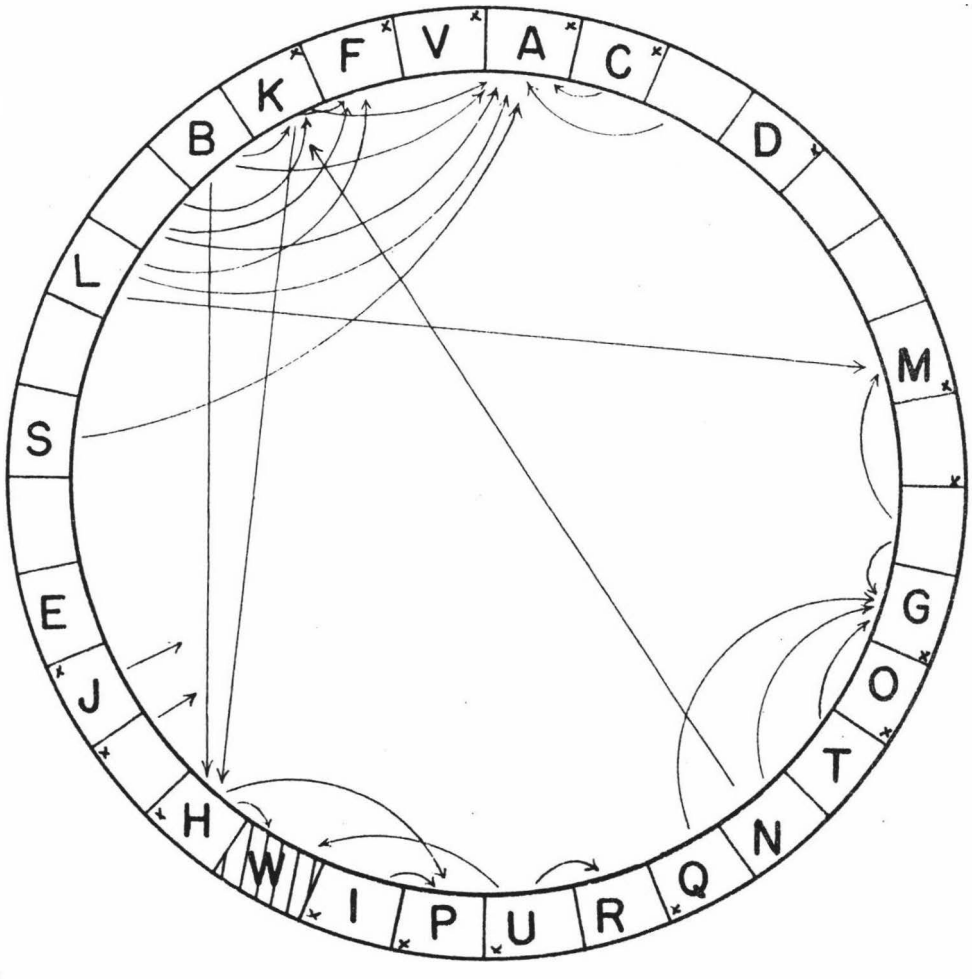
Halcombe Survey Area

Pattern of Interpersonal Discussion on Chemical Methods of Pasture Establishment or Renewal.

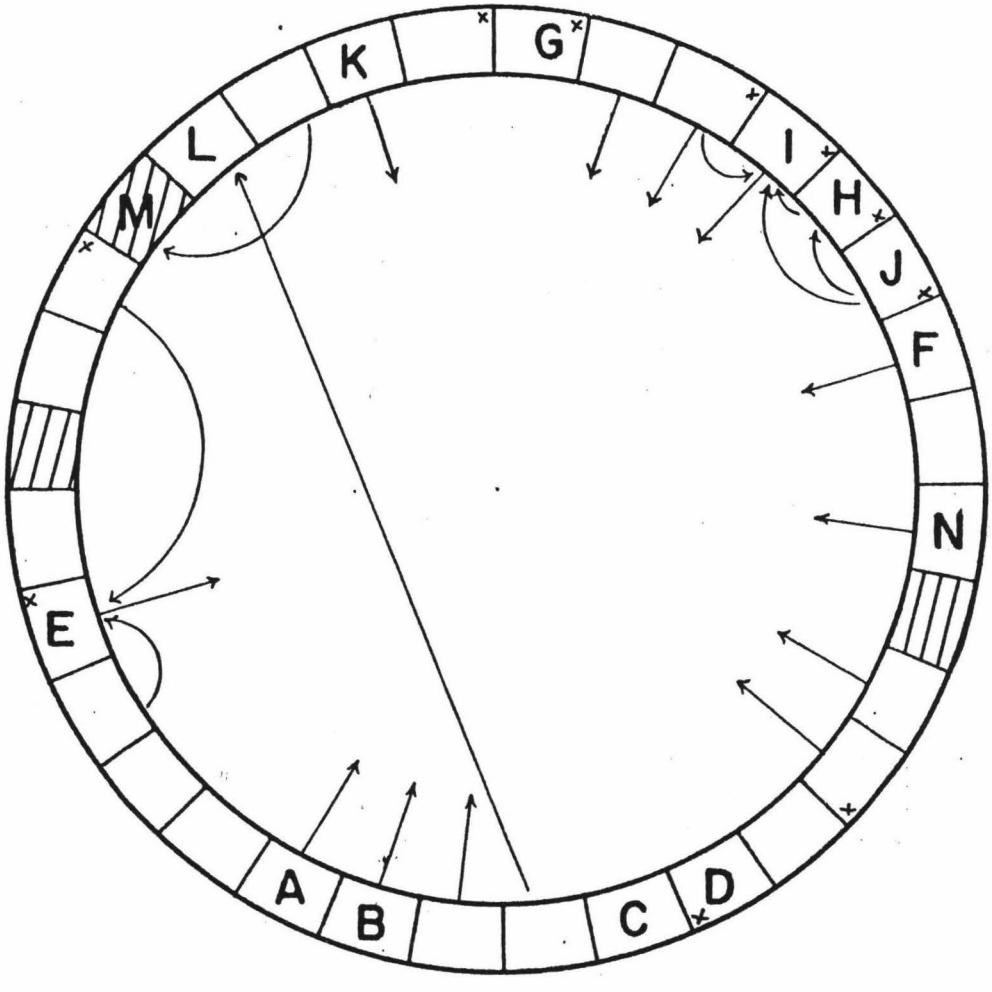


Reporoa Survey Area

Pattern of Interpersonal Discussion on Mating Ewe Hoggets

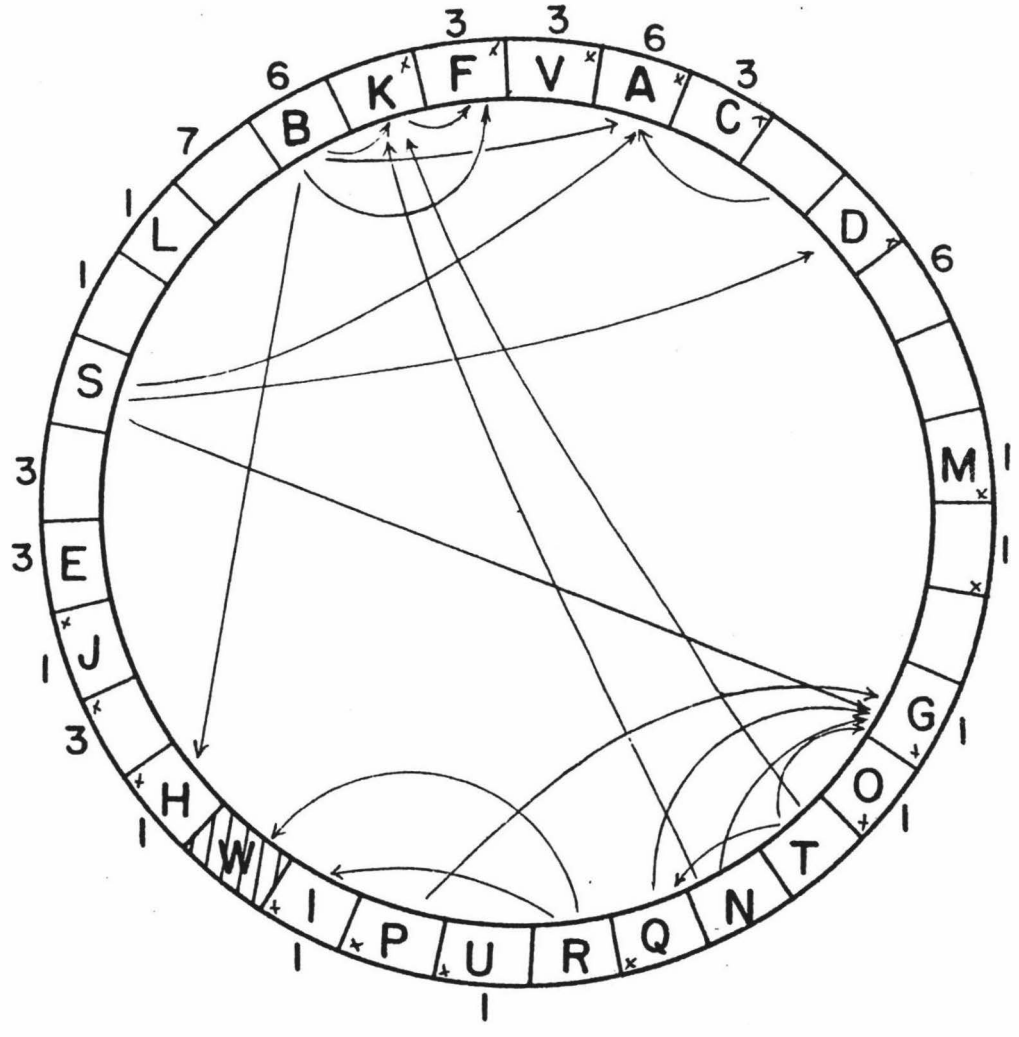


Halcombe Survey Area
Pattern of Interpersonal Discussion on Mating Ewe Hoggets



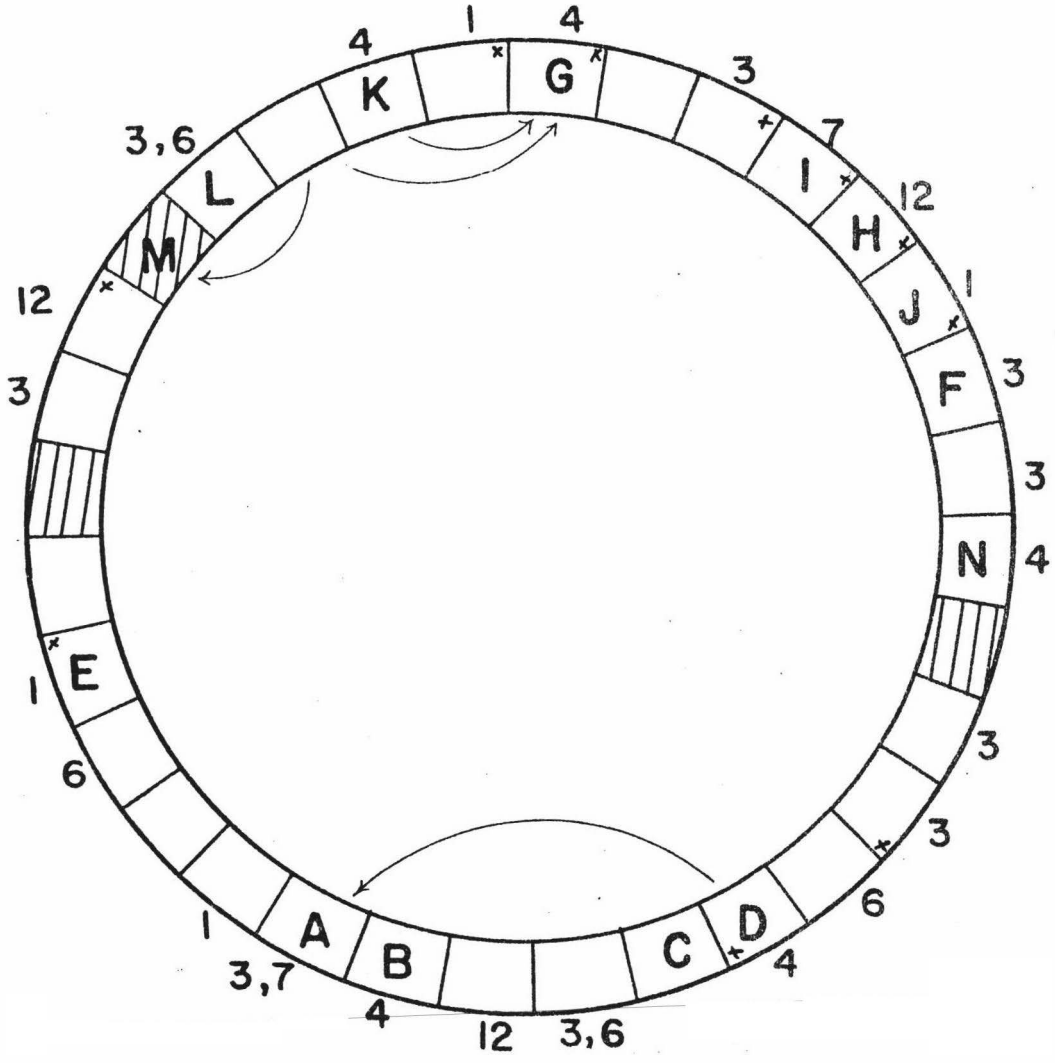
Reporoa Survey Area

Predicted Sources of Futher Information on Mating Ewe Hoggets



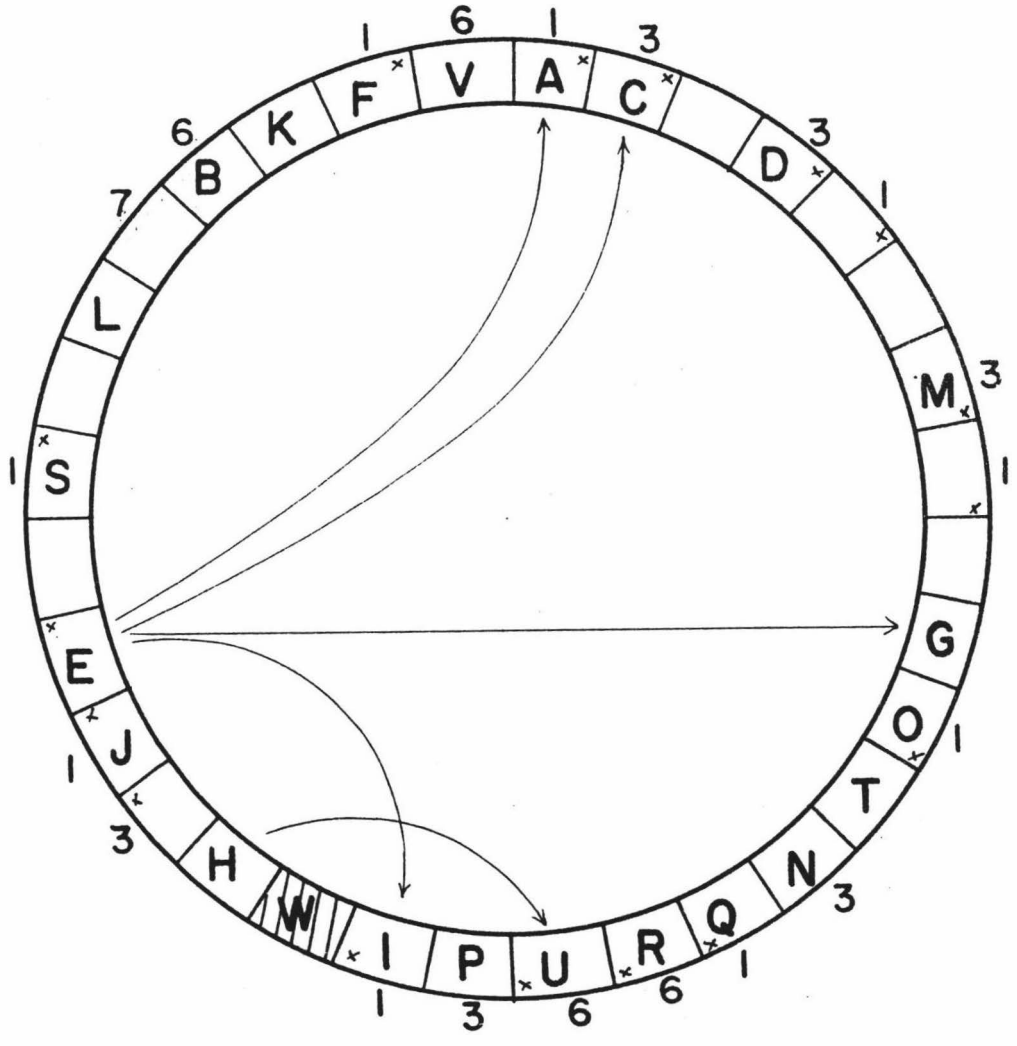
Halcombe Survey Area

Predicted Sources of Further Information on Mating Ewe Hoggets

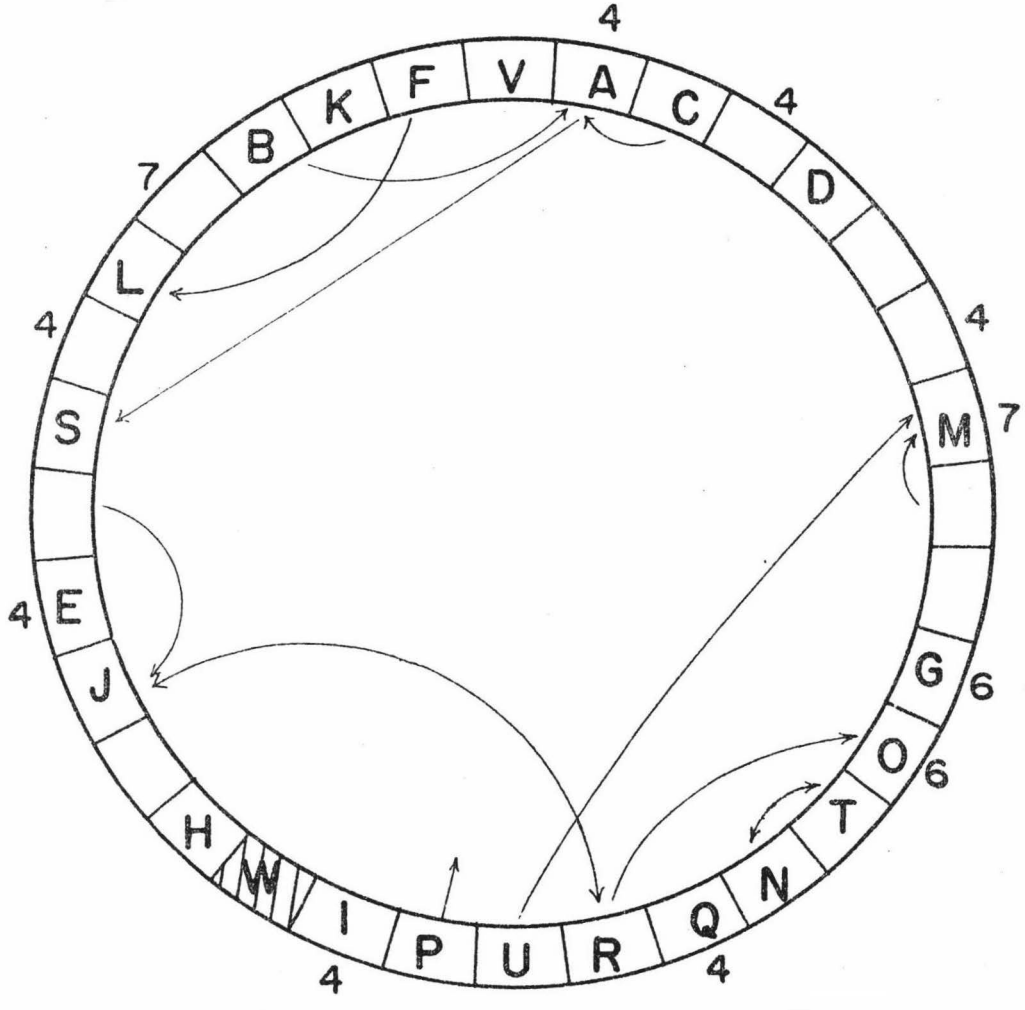


Reporoa Survey Area

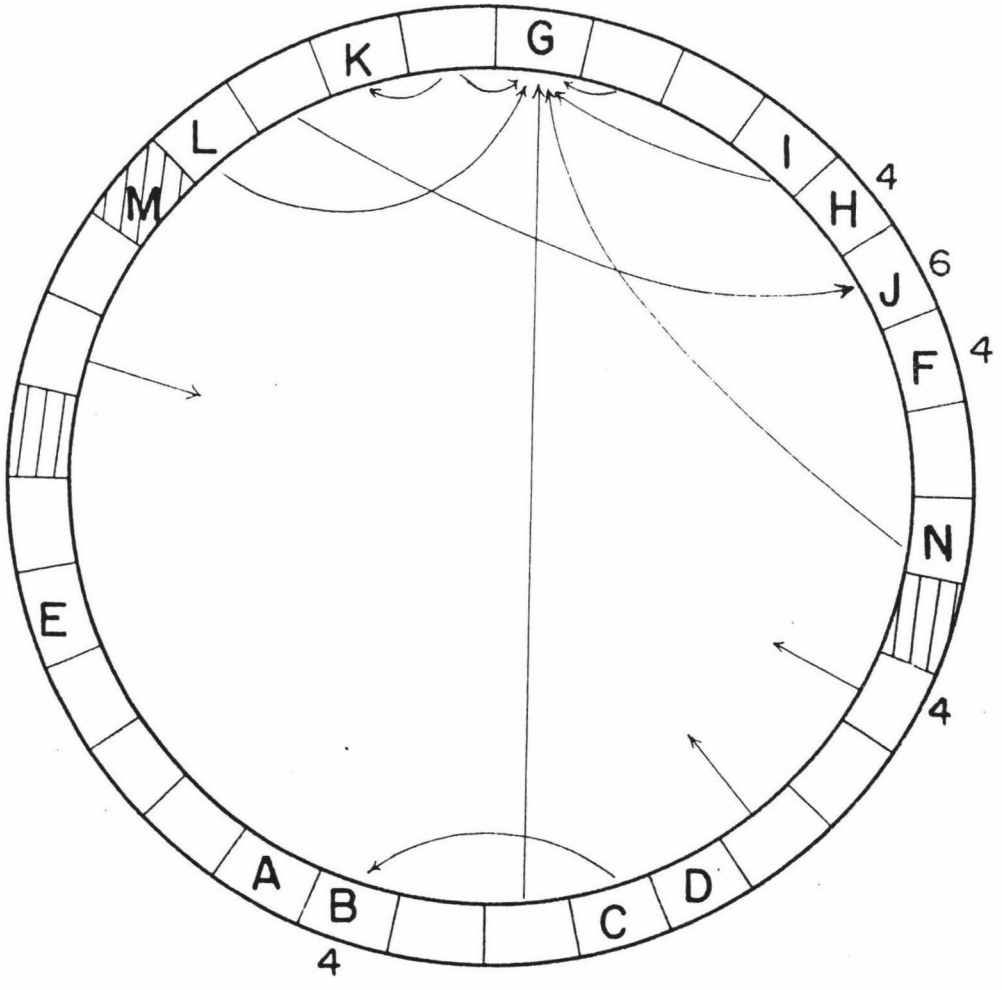
Predicted Sources of Further Information on Mating Yearling Heifers



Reporoa Survey Area
Predicted sources of Advice on Technical Farming Problems

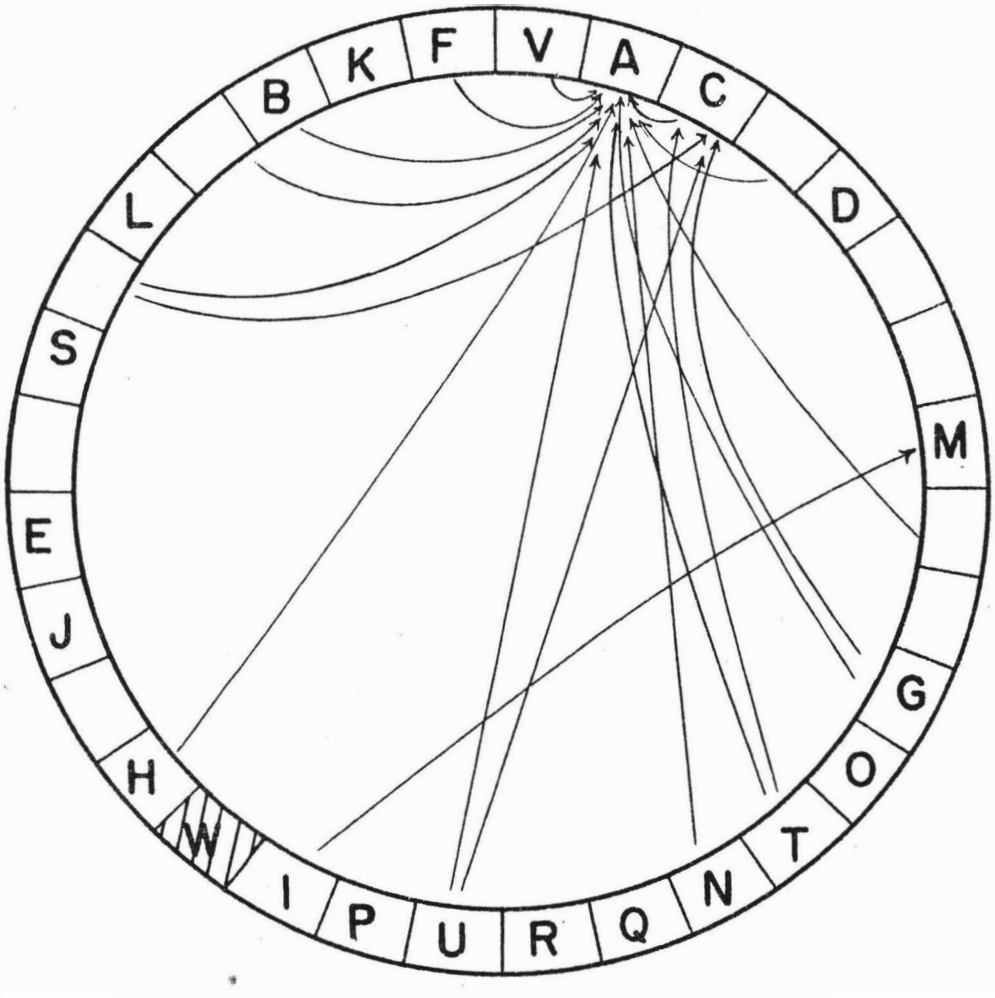


Halcombe Survey Area
Predicted Sources of Advice on Technical Farming Problems.

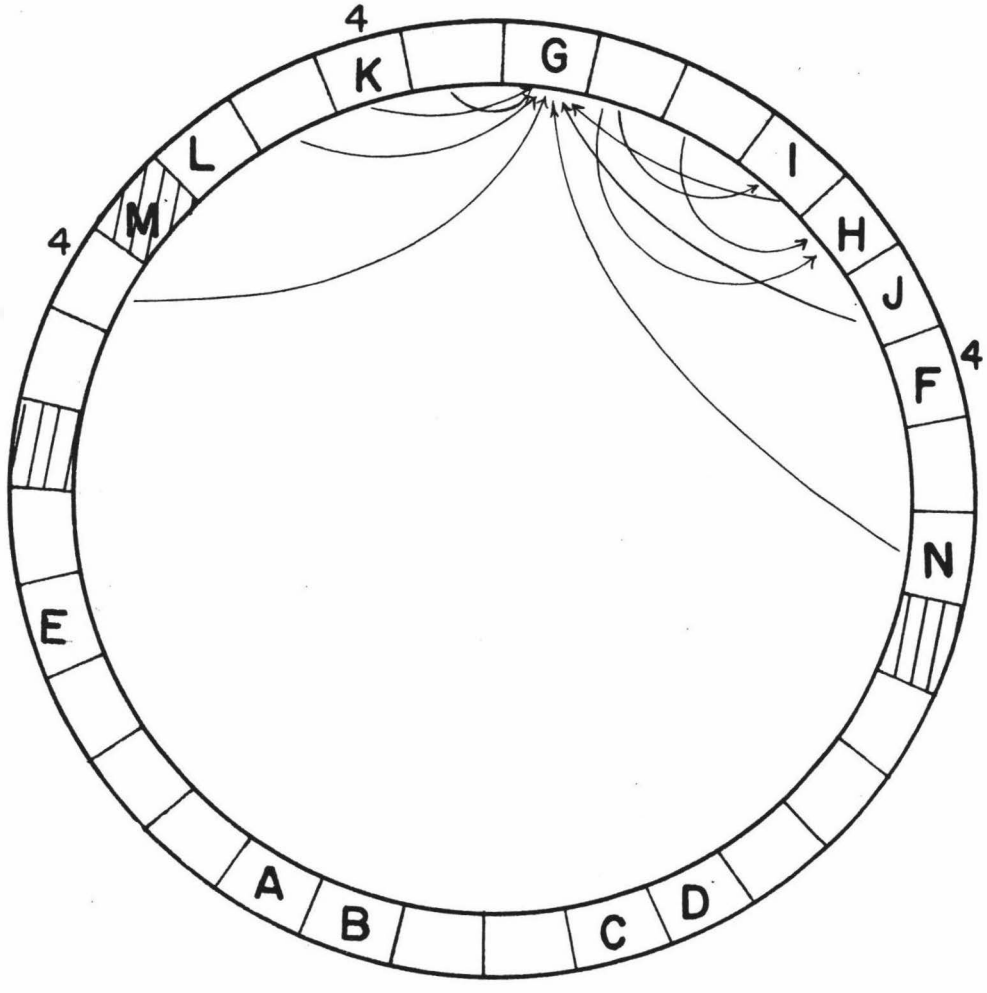


Reporoa Survey Area

Individuals Naming others as Innovators



Halcombe Survey Area
Individuals Naming Others as Innovators



APPENDIX G

C A L C U L A T I O N O F K E N D A L L ' S W

The use of Kendall's Coefficient of Concordance W and the formula for its calculation was discussed on Page 60. This appendix lists the k x N arrays of rankings the k respondents in each survey area gave when asked to rank the following (N = 10) entities:-

1. Cos. Salesman.
2. Cos. Technical Representative.
3. Ag. Dept. Adviser.
4. Private or Club Adviser.
5. Farmer whose farm used for trial by Ag. Dept.
6. Farmer whose farm used for trial by Commercial Firm.
7. Farmer who has tried practice independently..
8. Farmer known to make use of Ag. Dept. Advisory Services.
9. Farmer known to make use of Private or Club Advisers.
10. Somebody else.

Four arrays are presented, one for each survey area arranged in pairs to correspond with the two questions asked. (Numbers 45 and 46).

The order of the various sums of ranks, R_j, in the bottom row of each array can be used to give a "true" ranking of the various entities providing the calculated value of W is significant.

Reporoa Survey Area (k = 31)

k x N array of Rankings for Question 45

Farmer Code Nos.	Entities to be Ranked (N = 10)									
	1	2	3	4	5	6	7	8	9	0
1	7.0	7.0	3.0	7.0	2.0	7.0	1.0	7.0	7.0	7.0
2	7.0	7.0	3.0	7.0	7.0	2.0	1.0	7.0	7.0	7.0
3	7.0	7.0	1.0	7.0	7.0	7.0	2.0	3.0	7.0	7.0
4	7.0	7.0	2.0	7.0	1.0	7.0	3.0	7.0	7.0	7.0
5	7.0	7.0	2.0	1.0	3.0	7.0	7.0	7.0	7.0	7.0
6	7.0	7.0	2.0	1.0	3.0	7.0	7.0	7.0	7.0	7.0
7	7.0	7.0	1.0	7.0	7.0	7.0	7.0	2.0	3.0	7.0
8	7.0	7.0	1.0	7.0	7.0	7.0	7.0	2.0	3.0	7.0
9	3.0	2.0	1.0	7.0	7.0	7.0	7.0	7.0	7.0	7.0
10	7.0	7.0	1.0	7.0	7.0	3.0	2.0	7.0	7.0	7.0
11	7.0	3.0	1.0	7.0	7.0	7.0	2.0	7.0	7.0	7.0
12	7.0	3.0	2.0	7.0	7.0	7.0	1.0	7.0	7.0	7.0
13	7.0	1.0	3.0	7.0	7.0	7.0	2.0	7.0	7.0	7.0
14	7.0	7.0	2.0	3.0	1.0	7.0	7.0	7.0	7.0	7.0
15	7.0	7.0	1.0	7.0	7.0	7.0	7.0	2.0	3.0	7.0
16	7.0	7.0	1.0	7.0	3.0	7.0	2.0	7.0	7.0	7.0
17	7.0	7.0	2.0	7.0	1.0	7.0	7.0	3.0	7.0	7.0
18	7.0	7.0	3.0	7.0	2.0	7.0	1.0	7.0	7.0	7.0
19	7.0	7.0	1.0	7.0	2.0	7.0	7.0	3.0	7.0	7.0
20	7.0	3.0	2.0	1.0	7.0	7.0	7.0	7.0	7.0	7.0
21	7.0	3.0	7.0	7.0	2.0	7.0	1.0	7.0	7.0	7.0
22	7.0	7.0	1.0	7.0	2.0	7.0	3.0	7.0	7.0	7.0
23	7.0	7.0	1.0	7.0	3.0	7.0	2.0	7.0	7.0	7.0
24	7.0	7.0	7.0	7.0	7.0	7.0	1.0	7.0	7.0	7.0
25	7.0	7.0	3.0	7.0	2.0	7.0	1.0	7.0	7.0	7.0
26	7.0	7.0	2.0	7.0	7.0	7.0	1.0	3.0	7.0	7.0
27	7.0	7.0	1.0	7.0	2.0	7.0	7.0	3.0	7.0	7.0
28	7.0	7.0	2.0	7.0	7.0	7.0	1.0	3.0	7.0	7.0
29	7.0	3.0	7.0	7.0	7.0	7.0	2.0	1.0	7.0	7.0
30	7.0	3.0	1.0	7.0	2.0	7.0	7.0	7.0	7.0	7.0
31	7.0	7.0	2.0	1.0	7.0	7.0	7.0	7.0	7.0	7.0
R_j	213	182	69	189	143	208	120	172	205	217

W = 0.1090 which is significant as

X^2 = 30.411 with D.F. = 9

and probability $p \ll .001$

Halcombe Survey Area (k = 29)

k x N array of Rankings for Question 45

Farmer Code Nos.	Entities to be Ranked (N = 10)									
	1	2	3	4	5	6	7	8	9	0
1	7.0	7.0	1.0	7.0	3.0	7.0	7.0	2.0	7.0	7.0
2	7.0	7.0	7.0	7.0	3.0	7.0	1.0	7.0	2.0	7.0
3	7.0	1.0	2.0	7.0	3.0	7.0	7.0	7.0	7.0	7.0
4	7.0	3.0	1.0	7.0	2.0	7.0	7.0	7.0	7.0	7.0
5	7.0	7.0	3.0	7.0	1.0	7.0	2.0	7.0	7.0	7.0
6	7.0	2.0	3.0	7.0	7.0	7.0	1.0	7.0	7.0	7.0
7	7.0	7.0	2.0	1.0	7.0	7.0	3.0	7.0	7.0	7.0
8	7.0	7.0	7.0	7.0	3.0	2.0	1.0	7.0	7.0	7.0
9	7.0	1.0	2.0	7.0	3.0	7.0	7.0	7.0	7.0	7.0
10	7.0	7.0	7.0	7.0	3.0	7.0	1.0	2.0	7.0	7.0
11	1.0	2.0	3.0	7.0	7.0	7.0	7.0	7.0	7.0	7.0
12	7.0	1.0	7.0	7.0	7.0	3.0	2.0	7.0	7.0	7.0
13	7.0	7.0	2.0	7.0	7.0	7.0	1.0	3.0	7.0	7.0
14	7.0	7.0	1.0	7.0	2.0	7.0	3.0	7.0	7.0	7.0
15	7.0	7.0	2.0	7.0	7.0	7.0	3.0	1.0	7.0	7.0
16	7.0	7.0	7.0	7.0	3.0	7.0	2.0	1.0	7.0	7.0
17	7.0	2.0	3.0	7.0	1.0	7.0	7.0	7.0	7.0	7.0
18	7.0	3.0	2.0	1.0	7.0	7.0	7.0	7.0	7.0	7.0
19	7.0	7.0	2.0	1.0	7.0	7.0	3.0	7.0	7.0	7.0
20	7.0	3.0	7.0	7.0	7.0	2.0	1.0	7.0	7.0	7.0
21	7.0	7.0	2.0	1.0	3.0	7.0	7.0	7.0	7.0	7.0
22	7.0	7.0	1.0	7.0	2.0	7.0	3.0	7.0	7.0	7.0
23	7.0	7.0	3.0	7.0	1.0	2.0	7.0	7.0	7.0	7.0
24	7.0	3.0	1.0	7.0	7.0	7.0	7.0	2.0	7.0	7.0
25	7.0	7.0	1.0	7.0	7.0	7.0	2.0	3.0	7.0	7.0
26	7.0	7.0	7.0	7.0	1.0	3.0	7.0	2.0	7.0	7.0
27	7.0	3.0	7.0	7.0	2.0	7.0	1.0	7.0	7.0	7.0
28	7.0	7.0	7.0	7.0	1.0	3.0	7.0	2.0	7.0	7.0
29	7.0	3.0	7.0	7.0	7.0	7.0	1.0	2.0	7.0	7.0
R_j	197	146	107	179	121	176	115	153	198	203

W = 0.1045 which is significant as

X^2 = 27.275 with D.F. = 9

and probability p ≒ 0.01

Reporoa Survey Area (k = 31)

k x N array of Rankings for Question 46

Farmer Code Nos.	Entities to be Ranked (N = 10)									
	1	2	3	4	5	6	7	8	9	0
1	7.0	7.0	1.0	7.0	3.0	7.0	2.0	7.0	7.0	7.0
2	7.0	7.0	1.0	7.0	7.0	3.0	2.0	7.0	7.0	7.0
3	7.0	7.0	1.0	7.0	7.0	7.0	2.0	3.0	7.0	7.0
4	7.0	7.0	1.0	7.0	3.0	7.0	2.0	7.0	7.0	7.0
5	7.0	7.0	2.0	1.0	3.0	7.0	7.0	7.0	7.0	7.0
6	7.0	7.0	2.0	1.0	3.0	7.0	7.0	7.0	7.0	7.0
7	7.0	7.0	1.0	7.0	7.0	7.0	7.0	2.0	3.0	7.0
8	7.0	7.0	1.0	7.0	7.0	7.0	7.0	2.0	3.0	7.0
9	3.0	2.0	1.0	7.0	7.0	7.0	7.0	7.0	7.0	7.0
10	7.0	2.0	1.0	7.0	7.0	7.0	7.0	7.0	7.0	7.0
11	7.0	3.0	2.0	7.0	7.0	7.0	1.0	7.0	7.0	7.0
12	7.0	3.0	1.0	7.0	7.0	7.0	2.0	7.0	7.0	7.0
13	7.0	1.0	3.0	7.0	7.0	7.0	2.0	7.0	7.0	7.0
14	7.0	7.0	1.0	2.0	7.0	7.0	7.0	7.0	7.0	7.0
15	7.0	7.0	2.0	7.0	7.0	3.0	7.0	1.0	7.0	7.0
16	7.0	7.0	1.0	7.0	2.0	7.0	3.0	7.0	7.0	7.0
17	7.0	7.0	1.0	7.0	7.0	7.0	3.0	2.0	7.0	7.0
18	7.0	7.0	3.0	7.0	2.0	7.0	1.0	7.0	7.0	7.0
19	7.0	7.0	1.0	7.0	3.0	7.0	7.0	2.0	7.0	7.0
20	7.0	3.0	2.0	1.0	7.0	7.0	7.0	7.0	7.0	7.0
21	7.0	1.0	7.0	7.0	2.0	7.0	3.0	7.0	7.0	7.0
22	7.0	7.0	1.0	7.0	2.0	7.0	3.0	7.0	7.0	7.0
23	7.0	7.0	3.0	7.0	2.0	7.0	1.0	7.0	7.0	7.0
24	7.0	7.0	7.0	7.0	7.0	7.0	1.0	7.0	7.0	7.0
25	7.0	7.0	1.0	7.0	3.0	7.0	2.0	7.0	7.0	7.0
26	7.0	7.0	2.0	7.0	7.0	7.0	1.0	3.0	7.0	7.0
27	7.0	7.0	1.0	7.0	2.0	7.0	7.0	3.0	7.0	7.0
28	7.0	7.0	3.0	7.0	7.0	7.0	1.0	2.0	7.0	7.0
29	7.0	7.0	3.0	7.0	2.0	7.0	1.0	7.0	7.0	7.0
30	7.0	1.0	3.0	7.0	2.0	7.0	7.0	7.0	7.0	7.0
31	7.0	7.0	2.0	1.0	7.0	7.0	7.0	7.0	7.0	7.0
R_j	213	177	62	188	153	209	124	174	209	217

W = 0.1128 which is significant as

X^2 = 31.471 with D.F. = 9

and probability $p \ll .001$

Halcombe Survey Area (k = 29)

k x N array of Rankings for Question 46

Farmer Code Nos.	Entities to be Ranked (N = 10)									
	1	2	3	4	5	6	7	8	9	0
1	7.0	7.0	1.0	7.0	3.0	7.0	7.0	2.0	7.0	7.0
2	7.0	7.0	7.0	7.0	3.0	7.0	1.0	7.0	2.0	7.0
3	7.0	1.0	2.0	7.0	3.0	7.0	7.0	7.0	7.0	7.0
4	7.0	3.0	1.0	7.0	2.0	7.0	7.0	7.0	7.0	7.0
5	7.0	7.0	3.0	7.0	1.0	7.0	2.0	7.0	7.0	7.0
6	7.0	1.0	2.0	7.0	7.0	7.0	3.0	7.0	7.0	7.0
7	7.0	7.0	2.0	1.0	7.0	7.0	3.0	7.0	7.0	7.0
8	7.0	7.0	7.0	7.0	3.0	2.0	1.0	7.0	7.0	7.0
9	7.0	7.0	7.0	7.0	1.0	7.0	3.0	7.0	2.0	7.0
10	7.0	7.0	7.0	7.0	3.0	7.0	1.0	2.0	7.0	7.0
11	1.0	2.0	3.0	7.0	7.0	7.0	7.0	7.0	7.0	7.0
12	7.0	1.0	7.0	7.0	7.0	3.0	2.0	7.0	7.0	7.0
13	7.0	7.0	2.0	7.0	7.0	7.0	1.0	3.0	7.0	7.0
14	7.0	7.0	1.0	7.0	2.0	7.0	3.0	7.0	7.0	7.0
15	7.0	7.0	2.0	7.0	7.0	7.0	3.0	1.0	7.0	7.0
16	7.0	7.0	3.0	7.0	7.0	7.0	2.0	1.0	7.0	7.0
17	7.0	1.0	3.0	7.0	2.0	7.0	7.0	7.0	7.0	7.0
18	7.0	7.0	2.0	1.0	3.0	7.0	7.0	7.0	7.0	7.0
19	7.0	7.0	3.0	1.0	7.0	7.0	2.0	7.0	7.0	7.0
20	7.0	1.0	7.0	7.0	3.0	7.0	2.0	7.0	7.0	7.0
21	7.0	7.0	2.0	1.0	3.0	7.0	7.0	7.0	7.0	7.0
22	7.0	7.0	3.0	7.0	7.0	7.0	2.0	1.0	7.0	7.0
23	7.0	2.0	1.0	7.0	7.0	7.0	3.0	7.0	7.0	7.0
24	7.0	2.0	1.0	7.0	7.0	7.0	7.0	3.0	7.0	7.0
25	7.0	7.0	1.0	7.0	7.0	7.0	2.0	3.0	7.0	7.0
26	7.0	7.0	1.0	7.0	2.0	7.0	3.0	7.0	7.0	7.0
27	7.0	1.0	7.0	7.0	2.0	7.0	3.0	7.0	7.0	7.0
28	7.0	7.0	7.0	7.0	1.0	3.0	7.0	2.0	7.0	7.0
29	7.0	3.0	7.0	7.0	7.0	7.0	1.0	2.0	7.0	7.0
R_j	197	144	102	179	128	190	106	153	193	203

W = 0.1051 which is significant as

$X^2 = 27.431$ with D.F. = 9

and probability $p \doteq .01$

APPENDIX H

CALCULATION OF PAGE'S L STATISTIC

The use of Page's L Statistic and the formula for its calculation was discussed on Page 62. This appendix lists the k x N arrays of rankings the respondents in each survey gave when asked to rank the following (N = 5) entities:-

1. Providing children with good education.
2. Owning farm free of debt.
3. Having my farm tidy, productive and well equipped.
4. Having more modern conveniences in my home.
5. Providing myself and family with an opportunity for travel and recreation.

Significant values for L would indicate that the hypothesised ranking (discussed on Page 95) agrees with the respondents ranking of the above family goals or values. Kendall's Coefficient of Concordance W was also calculated to justify (if W was significant) using the sums of ranks R_j to provide the observed rankings used in Table 20.

Reporoa Survey Area (k = 30)

k x N array of Rankings of Family Goals or Values

Farmer Code Nos.	Entities to be Ranked				
	1	2	3	4	5
1	1.0	3.0	2.0	4.5	4.5
2	1.0	4.5	2.0	4.5	3.0
3	2.0	3.0	1.0	4.5	4.5
4	1.0	4.5	2.0	4.5	3.0
5	1.0	2.0	4.5	4.5	3.0
6	2.0	4.5	1.0	3.0	4.5
7	3.0	1.0	2.0	4.5	4.5
8	2.0	1.0	3.0	4.5	4.5
9	1.0	4.5	2.0	4.5	3.0
10	4.5	1.0	2.0	4.5	3.0
11	1.0	4.5	2.0	4.5	3.0
12	1.0	4.5	2.0	4.5	3.0
13	1.0	4.5	2.0	4.5	3.0
14	1.0	4.5	2.0	3.0	4.5
15	1.0	2.0	3.0	4.5	4.5
16	1.0	3.0	2.0	4.5	4.5
17	2.0	1.0	3.0	4.5	4.5
18	2.0	3.0	1.0	4.5	4.5
19	1.0	3.0	4.5	4.5	2.0
20	3.0	2.0	1.0	4.5	4.5
21	4.5	3.0	1.0	4.5	2.0
22	2.0	3.0	1.0	4.5	4.5
23	2.0	4.5	1.0	4.5	3.0
24	2.0	3.0	1.0	4.5	4.5
25	3.0	1.0	2.0	4.5	4.5
26	2.0	1.0	4.5	4.5	3.0
27	1.0	4.5	3.0	4.5	2.0
28	1.0	3.0	2.0	4.5	4.5
29	1.0	4.5	2.0	3.0	4.5
30	1.0	3.0	2.0	4.5	4.5
R_j	53.0	94.5	65.5	135.0	117.0

$L = 1601.5$ which is significant as the probability that $L \geq 1436 = .001$

$W = 0.4051$ which is significant as $X^2 = 50.232$ with D. F. = 4 and

Malcombe Survey Area (k = 29)

k x N array of Rankings of Family Goals or Values

Farmer Code Nos.	Entities to be ranked				
	1	2	3	4	5
1	1.0	4.5	2.0	3.0	4.5
2	1.0	3.0	4.5	4.5	2.0
3	1.0	4.5	4.5	2.0	3.0
4	2.0	3.0	1.0	4.5	4.5
5	2.0	3.0	1.0	4.5	4.5
6	2.0	4.5	1.0	3.0	4.5
7	1.0	4.5	2.0	4.5	3.0
8	3.0	2.0	1.0	4.5	4.5
9	2.0	4.5	1.0	3.0	4.5
10	1.0	2.0	3.0	4.5	4.5
11	1.0	2.0	4.5	3.0	4.5
12	3.0	2.0	1.0	4.5	4.5
13	1.0	4.5	2.0	4.5	3.0
14	2.0	3.0	1.0	4.5	4.5
15	1.0	3.0	2.0	4.5	4.5
16	2.0	4.5	1.0	3.0	4.5
17	1.0	2.0	3.0	4.5	4.5
18	1.0	2.0	3.0	4.5	4.5
19	3.0	2.0	1.0	4.5	4.5
20	3.0	1.0	2.0	4.5	4.5
21	2.0	4.5	1.0	4.5	3.0
22	3.0	1.0	2.0	4.5	4.5
23	2.0	1.0	3.0	4.5	4.5
24	1.0	3.0	2.0	4.5	4.5
25	2.0	1.0	3.0	4.5	4.5
26	3.0	2.0	1.0	4.5	4.5
27	3.0	2.0	1.0	4.5	4.5
28	2.0	1.0	4.5	4.5	3.0
29	4.5	2.0	1.0	3.0	4.5
R_j	56.5	79.0	60.0	119.0	120.5

$L = 1491.5$ which is significant as the probability that $L \geq 1389 = .001$

$W = 0.4884$ which is significant as $X^2 = 56.654$ with D.F. = 4 and probability $p \ll .001$

APPENDIX I

O S G O O D A N A L Y S I S
C O M P U T E R P R O G R A M M E 1

This computer programme combined the raw data from all the respondents for each firm or organisation to which the Osgood Semantic Differential Scale was applied. It printed an intensity matrix of the results for each firm or organisation which indicated the number of respondents who considered a particular adjective in each pair of bipolar adjectives was either strongly, weakly or not associated with the firm under consideration. These intensity matrices are included in Appendix J.

Also the programme calculated a weighted score for each of the 12 bipolar pairs in each of the eight differential scales used. These weighted scores were punched onto cards and used as the input data for the Spearman Rank Correlation programme which was provided, discussed on Page 64.

Comments cards included in this programme outline the major computational steps, and reference to Appendix J will indicate the form of the resulting intensity matricies. Note however that the programme did not provide for the detailed headings to each intensity matrix which has been included in Appendix J.

```
C      OSGOOD ANALYSIS PROGRAM NOS.1
C
C      CALCULATES ACCUMULATED INTENSITY MATRIX FOR EACH FIRM FROM
C      THE RAW DATA (IE)-TOTALS NOS OF RESPONDENTS CHECKING A SPECIFIC
C      INTENSITY LEVEL FOR EACH BIPOLAR PAIR OF ADJECTIVES K FOR EACH
C      FIRM OR GOVERNMENT DEPARTMENT,KK.
C      RAW DATA CONSISTS OF FARM CODE NOS. INTENSITY CODE NOS. FOR THE
C      12 BIPOLAR ADJECTIVES FOR EACH FIRM,IC(I) AND A CARD CODE NOS. NBG
C
       DIMENSION IC(96),IT(480)
       DO 100 I=1,480
  100  IT(I)=0
    1  READ 21,IFN,(IC(I),I=1,36),NBG
       IF(IFN)92,92,191
  191  READ 21,IFN1,(IC(I),I=37,72),NBG
       READ 22,IFN2,(IC(I),I=73,96)
   21  FORMAT(I3,12I2,I3,11I2,I3,11I2,I3)
   22  FORMAT(I3,12I2,I3,11I2,I3)
C      CHECKS 3 CARDS READ ARE IN ORDER ACCORDING TO FARM CODE NOS. IFN.
   99  CK=IFN*2-IFN1-IFN2
       IF(CK)2,3,2
    2  PRINT 23
       PAUSE
       GO TO 1
   23  FORMAT(1HO,12H DATA  WRONG)
C      ALTERATION OF INTENSITY CODE FROM INCREASING VALUES  FOR
C      UNFAVOURABLE DESCRIPTORS  TO DECREASING  VALUES (IE) 5 DOWN TO 1
    3  K=2
       DO 10 I=1,8
       LG=0
    4  IF(IC(K)-2)5,6,7
    5  IC(K)=5
       GO TO 19
    6  IC(K)=4
       GO TO 19
    7  IF(IC(K)-4)8,9,11
    8  GO TO 19
    9  IC(K)=2
       GO TO 19
   11  IC(K)=1
C      TRANSPOSE ORDER OF CERTAIN BIPOLAR ADJECTIVES SO INTENSITY MATRIX
C      IS ONE SIDE FAVOURABLE. K INVOLVED ARE K=2,4,6,10,11,12
C      LG=INDEX OF NOS.OF ALTERATIONS OF K REQUIRED
   19  LG=LG+1
       GO TO (12,13,14,15,16,10),LG
   12  K=K+2
       GO TO 4
   13  K=K+2
       GO TO 4
   14  K=K+4
       GO TO 4
   15  K=K+1
       GO TO 4
   16  K=K+1
       GO TO 4
C      PREPARING FOR REPETITION OF REVERSING PROCESS WITH NEXT FIRMS DATA
   10  K=K+2
       KK=1
C      COUNTING NOS. OF RESPONDENTS WHO IN EACH FIRM ASSIGN THE SAME
C      INTENSITY POSSITION TO EACH BIPOLAR PAIR OF ADJECTIVES
```

```
      DO 20  I=1,96
      J=I*5+IC(I)-5
   20 IT(J)=IT(J)+1
      GO TO 1
   92 L =1
      N=2
      DO 80 I=1,470,60
      MN=0
      PRINT 63,KK
      PRINT 198
  198 FORMAT(1HO)
      K=1
C     CALCULATING WEIGHTED SCORE FROM +2 - -2 FOR EACH BIPOLAR PAIR OF
C     ADJECTIVES, AND SUMMING THIS (NN)
      DO 30 J=1,12
      NN=IT(L)*N+IT(L+1)*(N-1)+IT(L+2)*(N-2)+IT(L+3)*(N-3)+IT(L+4)*(N-4)
C     PRINTING INTENSITY MATRIX AND SUMMED WEIGHTED SCORE FOR EACH
C     BIPOLAR PAIR OF ADJECTIVES AND PUNCHING FIRM NOS,BIPOLAR CODE NOS.
C     INTENSITY MATRIX VALUES FOR EACH BIPOLAR DESCRIPTOR AND
C     THE SUM OF RESPONDENTS MARKING A GIVEN INTENSITY LEVEL AND THE
C     WEIGHTED SCORE FOR THAT BIPOLAR ADJECTIVE NN,   USED IN SPEARMAN
C     RANK CORRELATION PROGRAM
      PRINT 62,K,IT(L),IT(L+1),IT(L+2),IT(L+3),IT(L+4),NN
      PUNCH 65,KK,K,IT(L),IT(L+1),IT(L+2),IT(L+3),IT(L+4),NN
   65 FORMAT (8I9)
      L=L+5
C     CALCULATING TOTAL WEIGHTED SCORE FOR EACH FIRM MN.
      MN=MN+NN
   30 K=K+1
      PRINT 299,MN
   80 KK=KK+1
   63 FORMAT(1HO,9H  FIRM   ,I6)
  199 FORMAT(1H1)
   62 FORMAT(1HO,7I11)
  299 FORMAT(1HX,66X,I11)
      CALL EXIT
      END
```

APPENDIX J

OSGOOD SEMANTIC DIFFERENTIAL SCALE INTENSITY MATRICIES

The Osgood Semantic Differential Scale used in this study is included below. This scale differs from that included in the questionnaire in Appendix B as it has been altered to make it one side favourable.

Semantic Differential Scale

	Strong Assoc.	Assoc	No Assoc	Assoc	Strong Assoc	
Up to date			(1)			Out of date
Honest			(2)			Deceptive
Friendly			(3)			Unfriendly
Freedom*			(4)			Red Tape
Understaffed			(5)			Overstaffed
Quick*			(6)			Slow
Imaginative			(7)			Unimaginative
Co-operative			(8)			Unco-operative
Painstaking			(9)			Careless
Practical*			(10)			Theoretical
Reliable*			(11)			Unreliable
Efficient*			(12)			Inefficient
Scoring Scale	+2	+1	0	-1	-2	

Bracketed numbers are the code numbers for each pair of bipolar descriptors used in the following intensity matricies.

Those pairs of bipolar descriptors marked with an asterisk have had their positions on either side of the scale reversed so that all the "favourable" adjectives are on the left-hand side.

Each intensity matrix is presented in this one side favourable form, the conversion having been incorporated in the computer programme used in the Osgood analysis (Appendix I).

Conversion to this one side favourable form was done to enable a graphical presentation of the image of each firm or government department to be shown on the intensity matricies. Within each matrix a straight line has been drawn between the degree of association positions to which the largest number of respondents referred for each pair of bipolar adjectives. Where an equal number referred to two different degrees of association the stronger position has been taken.

Because the matrices are one side favourable this means that the more vertical and further to the left the straight lines joining the largest number of respondents for each bipolar pair are, the more favourable is the general consensus of opinion about each particular factor for the firm or government department being considered. As discussed on Page 64, an overall indication of the regard in which the various companies and government departments were held was all that was required in this study. However, this graphical presentation would allow for a more detailed comparison between each concern, of the factors involved in the concept of image.

The firm code numbers used for each intensity matrix are the same as those used in Table 61. Appendix I lists the computer programme which colated the intensity matricies and calculated the weighted scores. As described on Page 64 these weighted scores were used in the Spearman Rank Correlation programme the r_s values for which appear in Appendix K. From the correlation it was found that the bipolar pair number 5 (indicated by an asterisk) was not significantly correlated with any of the other bipolar descriptors, and therefore its weighted score was discarded and the corrected summed weighted score used in Table 61 calculated.

Each weighted score is obtained by multiplying the number of respondents checking each degree of association by the appropriate score scale (included at the top of each column in the intensity matricies) and adding all these scores together for each bipolar pair of adjectives.

Intensity Matricies Derived from Osgood Semantic Differential Scale

FIRM 1

Bipolar Code Nos.	Total Nos. of respondents marking each degree of association					Weighted Score
	+2	+1	0	-1	-2	
1	40	13	4	0	1	91
2	29	16	7	2	4	64
3	32	16	8	1	1	77
4	13	13	29	2	1	35
5	1	2	49	3	3	-5*
6	16	18	22	1	1	47
7	22	19	15	2	0	61
8	28	18	11	1	0	73
9	25	16	15	2	0	64
10	15	14	16	6	6	28
11	31	19	8	0	0	81
12	32	22	4	0	0	86
Summed weighted score						702
Corrected summed weighted score						707

FIRM 2

Bipolar Code Nos.	Total Nos. of respondents marking each degree of association					Weighted Score
	+2	+1	0	-1	-2	
1	34	10	15	1	1	69
2	17	15	22	2	2	43
3	23	14	21	0	0	60
4	11	10	36	1	0	31
5	0	1	57	0	0	1*
6	13	13	32	0	0	39
7	15	19	22	2	0	47
8	20	12	25	0	1	50
9	16	13	29	0	0	45
10	12	10	24	7	5	17
11	18	19	20	0	1	53
12	20	20	17	1	0	59
Summed weighted score						514
Corrected summed weighted score						513

FIRM 3

Bipolar Code Nos.	Total Nos. of respondents marking each degree of association					Weighted Score
	+2	+1	0	-1	-2	
1	11	10	35	0	2	28
2	6	10	35	3	4	11
3	10	6	40	1	1	23
4	2	7	47	1	1	8
5	3	0	51	3	1	1*
6	4	7	44	3	0	12
7	6	11	38	1	2	18
8	7	11	38	0	2	21
9	5	11	40	1	1	18
10	2	2	42	9	3	-9
11	7	5	41	2	3	11
12	6	7	40	2	3	11
Summed weighted score						153
Corrected summed weighted score						152

FIRM 4

Bipolar Code Nos.	Total Nos. of respondents marking each degree of association					Weighted Score
	+2	+1	0	-1	-2	
1	38	14	5	0	1	83
2	29	14	12	1	2	67
3	34	15	7	1	1	80
4	13	10	32	3	0	33
5	2	1	45	6	4	-9*
6	20	17	20	0	1	55
7	18	18	20	2	0	52
8	29	24	4	0	1	80
9	21	23	14	0	0	65
10	14	12	23	5	4	27
11	25	19	11	0	3	63
12	28	21	7	1	1	74
Summed weighted score						675
Corrected summed weighted score						684

FIRM 6

Bipolar Code Nos.	Total Nos. of respondents marking each degree of association					Weighted Score
	+2	+1	0	-1	-2	
1	18	13	22	3	1	44
2	17	16	25	0	0	50
3	21	17	20	0	0	59
4	6	11	38	3	1	18
5	2	2	48	4	2	-2*
6	10	10	36	2	0	28
7	8	17	30	1	2	28
8	21	11	26	0	0	53
9	15	12	31	0	0	42
10	10	10	31	4	3	20
11	23	14	21	0	0	60
12	20	14	24	0	0	54
Summed weighted score						454
Corrected summed weighted score						456

Although the image of the firms was assumed to be based chiefly on commercial contacts and the satisfactory nature of impersonal dealings the individual may have had with each firm or its products, some influence of personalities may have occurred. Firm numbers 1 and 2 appeared at the time of the survey to be more actively engaged in field promotion of their products than were the rest of the companies considered and may have influenced the results.

This influence of personalities and the personal contact respondents may have had with representatives of the various government departments prevents a full analysis of the Osgood Scales obtained for the departments considered. Detailed information concerning the circumstances under which contact occurred and the frequency of

contact would be required, as any image held by a respondent would be based predominantly on the satisfaction of his personal contacts with a particular department.

However, for interest the intensity matricies which were derived are presented. The corrected summed scores for these departments do show a marked difference and this was also noticed to a small degree between areas. This difference was considered to be due to the difference in degree of contact with the various departments that respondents in each area have had.

GOVERNMENT DEPARTMENT A

Bipolar Code Nos.	Total Nos. of respondents marking each degree of association					Weighted Score
	+2	+1	0	-1	-2	
1	17	23	10	4	4	45
2	20	17	15	2	4	47
3	16	19	16	4	3	41
4	2	3	16	15	22	-52
5	4	7	33	8	6	-5*
6	2	6	25	13	12	-27
7	8	12	22	9	7	5
8	16	21	12	6	3	41
9	10	16	24	3	5	23
10	8	15	25	9	1	20
11	13	23	16	3	3	40
12	10	22	10	10	6	20
Summed weighted score						198
Corrected summed weighted score						203

GOVERNMENT DEPARTMENT B

Bipolar Code Nos.	Total Nos. of respondents marking each degree of association +2	+1	0	-1	-2	Weighted Score
1	33	17	7	0	1	81
2	39	11	6	2	0	87
3	36	18	2	1	1	87
4	7	8	11	16	16	-26
5	10	12	23	5	8	11*
6	2	13	16	14	13	-23
7	18	16	16	6	2	42
8	30	23	3	0	2	79
9	25	13	19	0	1	61
10	9	10	17	13	9	-3
11	28	16	10	3	1	67
12	23	21	10	3	1	62
Summed weighted score						525
Corrected summed weighted score						514

GOVERNMENT DEPARTMENT C

Bipolar Code Nos.	Total Nos. of respondents marking each degree of association +2	+1	0	-1	-2	Weighted Score
1	21	14	11	8	4	40
2	23	12	14	5	4	45
3	20	15	19	3	1	50
4	0	5	8	13	32	-72
5	5	1	34	11	10	-20*
6	4	2	14	19	19	-47
7	7	11	21	11	8	-2
8	17	17	14	5	5	36
9	11	13	27	6	1	27
10	5	11	21	8	13	-13
11	17	10	19	1	2	48
12	13	22	17	2	4	38
Summed weighted score						130
Corrected summed weighted score						150

APPENDIX K

S P E A R M A N R A N K C O R R E L A T I O N

The Spearman Rank Correlation matrix of r_s values obtained from a comparison of the weighted scores of the bipolar descriptors for each company or government department is included below. For a discussion of the use of this correlation see Page 64.

Spearman Rank Correlation Matrix

Bi-polar Code Nos.	1	2	3	4	5	6	7	8	9	10	11
2	.738										
3	.833	.833									
4	.667	.262*	.476								
5	-.048*	-.036*	.145*	.048*							
6	.643	.286*	.500*	.976	.012*						
7	.857	.500*	.738	.929	.157*	.905					
8	.857	.905	.929	.571	.024*	.619*	.762				
9	.905	.762	.929	.690	-.108*	.714	.857	.929			
10	.755	.515*	.407*	.755	-.224*	.731	.719	.647	.623*		
11	.857	.833	.905	.595*	.036*	.548*	.786	.881	.905	.587*	
12	.929	.738	.905	.714	-.072*	.690	.881	.881	.976	.647	.952

Note: With N = 8 a one tailed test of probability p

that $r_s \geq 0.833$ is $p = 0.01$

and for $r_s \geq 0.643$ is $p = 0.05$

Asterisks in the matrix above indicate r_s values <u>not significant</u> at $p = 0.05$ or less.

APPENDIX L

M A N N - W H I T N E Y U T E S T
C O M P U T E R P R O G R A M M E

The Mann-Whitney U Test was discussed on Page 66. This programme utilises the individual respondents summed weighted scores derived from the Osgood Semantic Differential Scale by the programme in Appendix M. The in put data for the Mann-Whitney U Test was machine sorted into ascending order of summed weighted scores for each firm or government department.

All possible combinations of two firms or government departments were compared by the programme which calculated a combined ranking of the individual summed weighted scores and calculated the U and Z values according to the formula on Page 67.

The significance of Mann-Whitney U values was obtained from the Z values calculated and a matrix of Z values for each survey area is included in Appendix N.

If the Z values are significant then the assumption that the firms corrected weighted scores are different is justified.

Comments cards included in this programme outline the major computational steps in formulating the rankings and calculating the U and Z values.

```
C      MANN-WHITNEY U TEST
C
C      A NON PARAMETRIC EQUIVALENT OF THE T TEST
C      DATA SUPPLIED IN GROUPS OF VARIABLES IN RANK ORDER FROM LOWEST TO
C      HIGHEST. HEADER CARD,N=NOS OF OBSERVATIONS A(I) WITHIN EACH GROUP
C      N1=NOS OF GROUPS,LR DEFINES FIRST GROUP TO BE COMPARED WITH SECOND
C      GROUP DEFINED BY L.X IS POSITION IN COMBINED RANKING OF 2 GROUPS,K
C      IS RANK POSITION WITHIN FIRST GROUP C(I). KK IS SAME FOR SECOND
C      GROUP D(I)
C      PROGRAM RANKS GROUPS IN PAIRS ALLOWING FOR TIES AND CALCULATING
C      CORRECTION FACTOR FOR TIES ON BASIS OF (T**3-T)/12. PROGRAM T IS
C      SUMMATION OF CORRECTION FACTOR FOR ALL TIES.
C
*NO DIAGNOSTICS
      DIMENSION A(800),C(80),D(80),RA(80),SA(80)
    1 READ,N,N1
      M=N
      N2=N*N1
      O=N
      NN=N*2
      XN=NN
      DO 10 I=1,N2
   10 READ,FIN,FAN,A(I)
      NZ=N1-1
  787 DO 789 LR=1,NZ
      DO 20 IO=1,N
      LQ=(LR-1)*N+IO
   20 C(IO)=A(LQ)
      LZ=LR+1
      DO 788 L=LZ,N1
      DO 160 IP=1,N
      JK=(L-1)*N+IP
  160 D(IP)=A(JK)
      DO 900 I=1,80
      RA(I)=0.
  900 SA(I)=0.
      K=1
      KK=1
    2 X=1.
      T=0.
   99 DO 91 I=1,NN
C      TEST FOR TIED RANK BETWEEN GROUPS
      IF(C(K)-D(KK)) 7,15,4
    6 PRINT 121
      PAUSE
      GO TO 1
C      BECAUSE DATA READ IN RANKED ORDER WHICH IS WRONG
  121 FORMAT(1HO,10HDATA WRONG)
C      TEST FOR TIED RANK IN ONE GROUP
    7 IF((K+1)-N)501,501,11
  501 IF (C(K)-C(K+1))11,5,6
C      TEST FOR TIED RANK IN OTHER GROUP
    4 IF((KK+1)-N)502,502,13
  502 IF (D(KK)-D(KK+1))13,8,6
C      NO TIES WITHIN OR BETWEEN GROUPS-ASSIGN RANK
   11 RA(I)=X
      X=X+1.
      K=K+1
      GO TO 90
   13 SA(I)=X

      KK=KK+1
      X=X+1.
      GO TO 90
C      TIE WITHIN GROUP LR  -HOW MANY TIES
    5 XB=X
   14 DO 100 IX=1,N
      KJ=K+1
      IF(KJ-N)503,503,16
  503 IF(C(K)-C(KJ))16,17,6
   17 K=K+1
      XI=IX
      XB=XB+X+1.
      X=X+1.
  100 CONTINUE
C      HAVE FOUND NO TIE BETWEEN GROUPS BUT TIE WITHIN A GROUP NOW ASSIGN
C      RANK
```

```
   16 RB=IX
      II=I+IX-1
      DO 40 LX=I,II
   40 RA(LX)=XB/RB
      I=II
      T=T+(RB**3-RB)/12.
       K=KJ
      X=X+1.
      GO TO 90
C     TIE WITHIN GROUP L   -HOW MANY TIES
    8 XB=X
   41 DO 110 IY=1,N
      KJ=KK+1
      IF(KJ-N)504,504,18
  504 IF(D(KK)-D(KJ))18,19,6
   19 KK=KK+1
      YI=IY
      XB=XB+X+1.
      X=X+1.
  110 CONTINUE
C     FOUND NO TIE BETWEEN GROUPS BUT TIE WITHIN OTHER GROUP NOW ASSIGN
C     RANK
   18 RB=IY
      II=I+IY-1
      DO 50 LX=I,II
   50 SA(LX)=XB/RB
      I=II
      T=T+(RB**3-RB)/12.
      KK=KJ
      X=X+1.
      GO TO 90
C     TIE BETWEEN GROUPS  -ARE THERE TIES WITHIN GROUPS  -HOW MANY
   15 XB=X
      DO 120 IZ=1,N
      KJ=K+1
      IF(KJ-N)505,505,21
  505 IF(C(K)-C(KJ))21,22,6
   22 ZI=IZ
      XB=XB+X+1.
      K=K+1
      X=X+1.
  120 CONTINUE
   21 ZI=IZ
      DO 130 IW=1,N

      KR=KK+1
      IF(KR-N)506,506,23
  506 IF(D(KK)-D(KR))23,24,6
   24 WI=IW
      XB=XB+X+1.
      KK=KK+1
      X=X+1.
  130 CONTINUE
C     HAVE TIES BOTH WITHIN AND BETWEEN GROUPS.NOW CALCULATE MEAN RANK
C     AND ASSIGN
   23 WI=IW
      X=X+1.
      RB=ZI+WI
      XB=X+XB
      TFACT=XB/RB
      KG=I+IZ-1
      DO 140 IA=I,KG
      RA(IA)=TFACT
  140 CONTINUE
   25 KG=I+IW-1
      DO 150 IB=I,KG
      SA(IB)=TFACT
  150 CONTINUE
   26 T=T+(RB**3-RB)/12.
      K=KJ
      KK=KR
      I=I+IZ+IW-1
      X=X+1.
   90 IF (I-NN)507,627,627
  507 IF (K-N) 508,508,509
  509 I=I+1
      GO TO 4
  508 IF (KK-N) 91,91,510
  510 I=I+1
      GO TO 7
```

```
   91 CONTINUE
C
C      2 GROUPS BEEN ASSIGNED RANK POSITIONS IN ONE ARRAY. SUM RANK
C      POSITIONS FOR EACH GROUP INDIVIDUALLY AS RTOT AND STOT
  627 RTOT=0.
      STOT=0.
      DO 170 IV=1,N
      RTOT=RTOT+RA(IV)
  170 STOT=STOT+SA(IV)
      PRINT 102,LR,L
      PRINT 666
  102 FORMAT(1HO,21HCOMPARISON OF GROUP  ,I3,16H  AGAINST GROUP ,I3)
  666 FORMAT(1H ,43H-------------------------------------------)
      PRINT 103,LR
  103 FORMAT(1HO,27H    RANK VALUES FOR GROUP  ,I3)
      PRINT 101,(RA(I),I=1,NN)
      PRINT 103,L
      PRINT 101,(SA(I),I=1,NN)
  101 FORMAT(20F7.2)
      PRINT 104,LR,RTOT,L,STOT,T
  104 FORMAT(1HO,22H    SUM OF RANKS GRP  ,I3,2H =,1F7.2,20H  SUM OF RAN
     1KS GRP ,I3,2H =,F7.2,36H  SUM CORRECTION FACTOR FOR TIES T =,F7.2)
C
C      CALC OF MANN-WHITNEY Z VALUE WHEN N IS CONST BETWEEN GRPS AND OVER
C      20
C      TEST TO ENSURE USE SMALLEST U VALUE -USE LARGEST OF RTOT AND STOT
      IF(RTOT-STOT)321,321,322
  321 U=O*O+(O*(O+1.))/2.-STOT
      GO TO 323
  322 U=O*O+(O*(O+1.))/2.-RTOT
  323 Z=(U-(O*O)/2.)/(SQRTF(((O*O)/(XN*(XN-1.)))*((XN**3-XN)/12.-T)))
      SDEV=SQRTF(((O*O)/(XN*(XN-1.)))*((XN**3-XN)/12.-T))
      PRINT 105,Z,U,SDEV
  105 FORMAT(1HO,6H    Z=,F8.5,6H    U=,F10.3,9H    SDEV=,F8.3)
   53 K=1
      KK=1
      M=M+N
C     HAVE COMPLETED ONE COMPARISON NOW ORGANISING A SECOND GROUP TO BE
C     COMPARED
  788 CONTINUE
  789 CONTINUE
      GO TO 1
      END
```

APPENDIX M

OSGOOD ANALYSIS COMPUTER PROGRAMME 2

This computer programme is very similar to the Osgood Analysis Programme Nos. 1. It used the same raw data but calculated the corrected summed weighted score for each individual instead of accumulating all the individuals into a single intensity matrix for each company or government department considered.

From the Spearman Rank correlation (Appendix K) it was found that one bipolar pair of adjectives was not correlated with the other eleven and therefore this programme includes a section to delete the weighted score for this pair of descriptors.

As with programme Nos. 1 this programme also converts the data to a one side favourable form. The corrected summed weighted scores of each individual for each concern were punched onto separate cards and these formed the input data for the Mann-Whitney U test programme in Appendix L (as discussed on Page 68).

Comments cards included in this programme outline the major computational steps in preparing the data for the Mann-Whitney U Test.

```
C      OSGOOD ANALYSIS PROGRAM NOS.2
C
C      CALCULATES INDIVIDUAL RESPONDENTS SUMMED WEIGHTED SCORES FOR EACH
C      FIRM - WITH WEIGHTED SCORE FOR NON CORRELATING BIPOLAR DELETED
C      RAW DATA CONSISTS OF FARM CODE NOS. INTENSITY CODE NOS. FOR THE
C      12 BIPOLAR ADJECTIVES FOR EACH FIRM,IC(I) AND A CARD CODE NOS. NBG
C
       DIMENSION IC(96),ITO(60)
     1 READ 21,IFN,(IC(I),I=1,36),NBG
       IF(IFN)61,61,191
   191 READ 21,IFN1,(IC(I),I=37,72),NBG
       READ 22,IFN2,(IC(I),I=73,96)
       DO 80 I=1,60
    80 ITO(I)=0
    21 FORMAT(I3,12I2,I3,11I2,I3,11I2,I3)
    22 FORMAT(I3,12I2,I3,11I2,I3)
       IF(SENSE SWITCH 9)99,99
C      CHECKS 3 CARDS READ ARE IN ORDER ACCORDING TO FARM CODE NOS. IFN.
    99 CK=IFN*2-IFN1-IFN2
       IF(CK)2,3,2
     2 PRINT 23
       PAUSE
       GO TO 1
    23 FORMAT(1H0,12H DATA  WRONG)
     3 K=2
C      ALTERATION OF INTENSITY CODE FROM INCREASING VALUES  FOR
C      UNFAVOURABLE DESCRIPTORS  TO DECREASING  VALUES (IE) 5 DOWN TO 1
       DO 10 I=1,8
       LG=0
     4 IF(IC(K)-2)5,6,7
     5 IC(K)=5
       GO TO 19
     6 IC(K)=4
       GO TO 19
     7 IF(IC(K)-4)8,9,11
     8 GO TO 19
     9 IC(K)=2
       GO TO 19
    11 IC(K)=1
C      TRANSPOSE ORDER OF CERTAIN BIPOLAR ADJECTIVES SO INTENSITY MATRIX
C      IS ONE SIDE FAVOURABLE. K INVOLVED ARE K=2,4,6,10,11,12
C      LG=INDEX OF NOS.OF ALTERATIONS OF K REQUIRED
    19 LG=LG+1
       GO TO (12,13,14,15,16,10),LG
    12 K=K+2
       GO TO 4
    13 K=K+2
       GO TO 4
    14 K=K+4
       GO TO 4
    15 K=K+1
       GO TO 4
    16 K=K+1
       GO TO 4
    10 K=K+2
C      PREPARING FOR REPETITION OF REVERSING PROCESS WITH NEXT FIRMS DATA
       KK=1
       KG=12
C      CONVERTING INTENSITY CODE NOS. TO WEIGHTED SCORES FROM +2 - -2
       DO 140 I=1,96
```

```
      IF (IC(I)-2) 42,43,44
   42 IC(I)=2
      GO TO 140
   43 IC(I)=1
      GO TO 140
   44 IF (IC(I)-4) 45,46,47
   45 IC(I)=0
      GO TO 140
   46 IC(I)=-1
      GO TO 140
   47 IC(I)=-2
  140 CONTINUE
C     DELETING WEIGHTED SCORE FOR NON CORRELATING BIPOLAR ADJECTIVE K=5
      DO 150 MO=5,93,12
  150 IC(MO)=0
      MM=1
C     CALCULATING SUM OF WEIGHTED SCORES ITO(MM) OF EACH FIRM MM,FOR
C     EACH INDIVIDUAL RESPONDENT IFN.
      DO 160 J=1,93,12
      ITO(MM)=0
      JK=J+11
      DO 170 JJ=J,JK
  170 ITO(MM)=ITO(MM)+IC(JJ)
C     PRINTING FARM CODE NOS. FIRM CODE NOS. AND SUMMED WEIGHTED SCORE
C     SUMMED WEIGHTED SCORE OF PUNCH OUTPUT USED IN MANN-WHITNEY PROG.
      PRINT 111,IFN,MM,ITO(MM)
      PUNCH 119, IFN,MM,ITO(MM)
  160 MM=MM+1
      GO TO 1
C     REPEAT CALCULATIONS FOR NEXT INDIVIDUAL RESPONDENT
  111 FORMAT (1HO,7H FARM   ,I4,7H FIRM   ,I4,6H SCORE ,I4)
  119 FORMAT (I3,2X,I1,2X,I3)
   61 CALL EXIT
      END
```

APPENDIX N

Z VALUES FROM MANN-WHITNEY U TEST

As discussed on Page 67 the significance of Mann-Whitney U values is obtained by the calculation of Z values which are compared with a table of standard values. The computer programme in Appendix L calculated the appropriate Z values and this appendix lists the values obtained for each firm pair comparison, for each survey area.

The Z values obtained are all highly significant since the probability p that $Z \geq 4$ is $p = 0.0003$. Therefore it can be assumed that the distribution of scores of one firm or government department are different to any other with which it may be compared in this study.

Code numbers used for the various organisations considered are the same as those used in Appendix J. Alphabetical letters refer to government departments and numbers to the drench manufacturers referred to in Table 61.

Repcros Survey Area Matrix of Z Values

Firm Code	A	B	C	1	2	3	4
B	8.919						
C	9.057	8.679					
1	8.849	9.768	8.577				
2	9.518	9.852	9.468	9.477			
3	8.641	8.524	9.482	8.483	9.552		
4	8.538	9.344	8.692	8.685	9.247	8.627	
6	8.663	9.416	8.677	9.627	9.830	8.857	9.814

Halcombe Survey Area Matrix of Z Values

Firm Code	A	B	C	1	2	3	4
B	8.888						
C	9.426	9.496					
1	9.209	9.649	8.797				
2	9.049	9.219	9.057	8.651			
3	8.106	7.673	7.096	8.364	8.287		
4	9.291	9.574	9.169	9.661	9.702	8.675	
6	9.232	9.166	9.401	9.199	8.828	8.037	8.799

APPENDIX O

A N A L Y S I S O F V A R I A N C E

The use of the analysis of variance in this study was discussed on Page 62. Results from two analysies are presented. The first is an analysis of the variance between the Reporoa and Halcombe survey areas in the number of respondents who knew of individuals in their area carrying out a given practice.

The second analysis determines whether there is any significant variation between survey areas with regard to the number of individuals who have or are carrying out a given practice.

For a discussion of the results of the analysis see Page 138.

Between Survey Areas Analysis of the Variance in Knowledge of Individuals carrying out Practices.

	Farm Practice				
	Farm Race	Intensive Use of Crop	"Chem. plough"	Vacuum Silage	Mate Ewe Hgts
Stnd. Deviation	2.53	1.40	1.47	1.75	2.98
F Ratio	6.44	6.23	2.94	10.16	10.71

These F ratios are significant and indicate that there is a significant difference between the survey areas in the extent of knowledge respondents had of which individuals were carrying out the various practices considered.

Between Survey Areas Analysis of the Variance in the Number of Individuals Who Have or Are Carrying Out Practice

	Farm Practice				
	Farm Race	Intensive Use of crop	"Chem. Plough"	Vacuum Silage	Mate Ewe Hgts
Stnd. Deviation	1.49	0.80	0.81	0.53	1.57
F Ratio	1.00	0.92	0.003	0.00	2.53

These F ratios are not significant and indicate that there is no significant difference between the survey areas in the number of individuals carrying out a practice.

APPENDIX P

CONTINGENCY TABLES FOR FISHER'S EXACT PROBABILITY TEST

Fisher's Exact Probability test and the associated Chi-square test for two independent samples was discussed on Page 69. This appendix lists the contingency tables which were set up to test whether there was a significant relationship between the number of individuals who were carrying out a practice and the number of respondents who knew of the individuals who were carrying out a particular practice.

The appropriate probability value, whether calculated by Fisher's Test or Chi-square, is included with each contingency table.

Farm Race System

Area	Nos. of respondents who, Carry out practice	Know of practice
Reporoa	8	26
Halcombe	10	21

$X^2 = 0.258$

with p = 0.618

Intensive Use of Crop

Area	Nos. of respondents who, Carry out practice	Know of practice
Reporoa	3	6
Halcombe	1	0

Fisher's probability p = 0.311

"Chemical Ploughing"

Area	Nos. of respondents who: Carry out practice	Know of practice
Reporoa	2	8
Halcombe	2	2

Fisher's probability p = 0.400

Vacuum Silage

Area	Nos. of respondents who: Carry out practice	Know of practice
Reporoa	1	14
Halcombe	1	3

Fisher's probability p = 0.386

Mate Ewe Hoggets

Area	Nos. of respondents who: Carry out practice	Know of practice
Reporoa	17	26
Halcombe	10	12

X^2 = 0.369
with p = 0.842

All the probabilities calculated above are not significant and therefore as discussed on Page 139 there is no significant relationship between survey areas in the number carrying out a practice and the number who knew of it.

APPENDIX Q

FACTOR SCORE VALUES USED IN THE URBANISATION INDEX

The various factors considered in the formulation of the urbanisation index used in this study and the reasons for their selection have been discussed on Page 71. This appendix lists the score values assigned to each factor according to the degree to which (in the author's opinion) each factor would predispose an urban outlook or attitude:

Factor	Score
Brought up on a farm	0
Brought up in a town	3
Father's Occupation	
Farmer, or on land as a bushman, contractor or labourer	1
Wharehouseman, engineering trade or freezing works buyer/manager	2
Owned own business, e.g. shop, teacher, accountant or lawyer	3
Respondents Work Experience	
Forestry or farm labouring or agricultural contracting	0
Storeman driver or wool or stock buyer	1
Tradesman	2
Own business or Field Officer with Government Department	3

Factor	Score
Respondents Educational Attainment	
Virtually none	1
Up to Certificate of Proficiency	2
Some secondary	3
Attempted School Certificate	4
Attempted University Entrance	5
Attempted University Degree Course	6
Completed University Diploma	7
Completed University Degree	8
War Service	
0 - 1 years	0
2 - 4 years	1
5 years and over	2
Wife's Occupation	
Land girl or domestic	0
Shop assistant or telephonist	1
Office clerk	2
Nurse	3
Teacher	4