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A Geographical Study of Some Factors That Affect the Location of Deer Farms in New Zealand

A thesis presented in partial fulfilment
of the requirements for
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Ian Darcy Mawson

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Darcy Mawson

ABSTRACT

This study of the rapidly-expanding industry of deer farming does not claim to be an economic treatise on the commercial viability of farming deer, nor does it claim to be a practical manual for prospective and established deer farmers. It is, however, a document designed and written to help the farmers of deer understand themselves, and their infant industry, a little more fully, and to help other interested persons gain an insight into the development of the exciting new enterprise of farming deer.

The underlying theme of the study is that the present distribution of deer farms throughout New Zealand, after some eight years of development within the industry, is explainable. Such explanations are expressed in terms of the past and present cultural attitudes within New Zealand to deer, the resultant legislation and official actions taken, the major modes of diffusion of both the underlying notion involved and the successful, practical methods that have evolved, the characteristics of the deer farming operation itself as well as of the people involved in it, and the relative productivity of the land employed for the farming of deer, particularly in view of man's changing knowledge of deer. Regional variations in the distribution of deer farms, and in other related phenomena, are examined, and possible explanations for these are sought.

Trends that have evolved within the industry up to the present time are examined, particularly in the light of more recently-gained scientific and empirical knowledge on both productivity and profitability. The future of the industry is then viewed with reference to these trends and to marketing outlets.

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INTRODUCTION

A common question asked of the writer in the course of this study has been, "What made you pick this topic?". The reasons for its choice are many and varied, but they can be generally summed up as:

1. The possession of a personal interest in deer.

2. The realisation that very little geographical research has been done in this field.

3. The hope that something of practical value would emerge.

4. The knowledge that most diffusion studies have been done after the innovation has been well-diffused; here was an opportunity to study an innovation and its diffusion while it was still in the early stages of development and diffusion.

5. The hope that the knowledge gained would be of value to the writer, even if to no one else, in his professional work as a practicing teacher.

Aims:

Many factors affect the location of man's economic activities. The major purpose of this study is to examine the spread and distribution patterns of deer farms in New Zealand to determine what factors have affected their location.

From the one broad hypothesis that was initially formulated, namely that the distribution of deer farms can be explained, several minor hypotheses were evolved for specific testing. The proof of these minor hypotheses would, in total, provide the proof of the major hypothesis. The main body of the text will not necessarily deal with the minor hypotheses in the order in which they are listed below, as the author will also be concerned with his second aim, that of producing an interesting and coherent account of the development of deer farming, the current economic viability of the practice of deer farming, and possible

future prospects of the deer farming industry.

Hypotheses:

1. That the distribution of deer farms in New Zealand can, over space and time, be explained.

2. That the recent development of the deer farming industry is based upon the cultural reappraisal of deer as a resource.

3. That the spatial distribution of deer farms is the product of public and official attitudes and policies that resulted from this resource reappraisal.

4. That the deer farming operation has characteristics that have been favourable to its adoption by farmers and that have caused the continuing expansion of the deer farming industry.

5. That deer farmers, as a group of individuals, tend to possess characteristics common to innovators.

6. That man's increasing knowledge of habitats suitable for deer has caused him to reappraise his selection of optimum locations for his deer farming units.

7. That the methods by which the basic notion of farming deer has diffused through the country has affected both the rate of adoption of the innovation and the spatial patterns of deer farms.

8. That the prime reason for individuals being attracted to the deer farming industry has been their great interest in deer.

9. That the nature of the groups of deer farmers who followed the initial innovative group, while still largely displaying an interest in deer for their own sakes, have been increasingly attracted by other factors, notably the apparent profitability of the units owned by the innovators.

Review of the Selected Literature:

It had originally been presumed that there would be little published material on deer and deer farming.

Although there may not be as much on farming deer as there is on other farming activities, there is, in view of the extreme youth of the deer farming industry, a fairly substantial amount of published information available.

For the historical aspects, Sharp's thesis "An Historical Geography of the Changing Attitudes to the Use and Abuse of Land by Deer" was found to be an extremely full account of the changing attitudes to, and reappraisals of, deer up to 1968, although the author at times had difficulty in remaining objective and emotionally uninvolved. It was an invaluable source of information.

Sutherland's thesis "The Wild Game Packing Industry in the South Island, New Zealand" was found to be helpful in parts. It did, however, provide a fairly comprehensive and succinct account of the development of, and the methods employed by, the game recovery industry.

The eight volumes of McKinnon and Caughlan provided an encyclopedic source of information on pre-1960 official reports and acts of legislation. This source, too, was invaluable.

For information on deer farming itself, two sources stand out for the amount of valuable information they contain. The many individual writers who have contributed to them will be acknowledged separately in the bibliography, and so will not be mentioned here. The first major source consists of both volumes of the "New Zealand Deer Farming Annual", 1976 and 1977-78, which have been published by the New Zealand Deer Farmers' Association. The second major source is the special volume of a journal dealing only with deer farming and associated matters, namely "New Zealand Agricultural Science", Volume 11, Number 4, 1977, which is the journal of the New Zealand Institute of Agricultural Science. The former volumes were largely written by deer farmers for deer farmers, while the latter presents much scientific and marketing research and opinions, but several writers have contributed to both.

Other sources, too, have been useful, but it is felt that the five mentioned above deserve special acknowledgement because of their special contributions to this thesis. The other sources will be acknowledged both in the text and in the bibliography.

Methods and Associated Problems:

After some initial reading, a questionnaire was drawn up. This questionnaire was then used for a pilot survey in the local Manawatu-Horowhenua region. Because of helpful suggestions from those interviewed in the pilot survey, several fairly minor alterations were made to the questionnaire. Multiple copies of it were then run off, and a copy was then mailed to every deer farmer as part of a nationwide survey.

How to define a 'deer farmer' posed a problem. Government statisticians tend to define a deer farmer as being a farmer whose income is at least half derived from deer, but it was soon realised that because the deer farming industry is still in its infancy, there would be very few such farmers about. This definition was inappropriate for the purpose of this study. It was decided to define a deer farmer, for this study, as being "any individual who was farming deer for profit, or at least with the full intention of eventually achieving a profit".

The Ministry of Agriculture and Fisheries had been approached for a list of deer farmers, and it was then discovered that they possessed the names of only those who had applied for a deer farming licence. The New Zealand Forest Service was subsequently approached, and it willingly provided the names of all those who had permits to hold deer in captivity. The Forest Service had noted those who intended to farm deer, those who wanted to keep deer as pets, and those who wanted to have deer for their own home consumption. The writer initially settled for the names and addresses of those in the first group, but in the course of his pilot survey, he discovered that some people who had been in the last two groups were now keeping deer

commercially, the major increase in profitability of producing deer and deer products having caused them to change their minds. The list of names was subsequently amended to include all those who, according to the files of the Forest Service, were in the last two groups. The definition of a deer farmer, however, was not changed.

The postal questionnaire was mailed to all the people whose names appeared on the amended list. Some three weeks after the mailing of the questionnaires, small reminder cards were sent off to the non-repliers.

As the responses came in, they were checked and it was found that a small number of them were from people who were, in fact, actually keeping deer as pets or for the purposes of home consumption. As these people did not fall within the definition of a deer farmer, their responses were destroyed and the names of the respondents concerned were deleted from the list.

It was then discovered that, although a further group of respondents had applied for the permit to hold deer in captivity with the intention of farming them, they had as yet not obtained any deer. This created a situation that was not covered by the definition, namely, at what stage an intending deer farmer could legitimately be called a deer farmer. Obviously the application for, and possession of, a permit to hold deer for the purpose of farming them was insufficient, as there is nothing to prevent an individual from obtaining such a permit and then changing his mind. In fact this particular instance was very rare, being discovered only in two cases. It was felt that if an individual had progressed as far as erecting the required fences for deer, then this, together with his avowed intention to farm deer, would suffice, the investment in fences more or less representing a commitment to subsequent investment in stock. The definition of a deer farmer was thus slightly altered to include, "any individual who was farming deer for profit, or who was setting up a unit with the full intention of farming them for profit and who had made a discernible,

evidential progress towards the attainment of that objective on his property".

Survey Returns:

Of the 383 postal questionnaires sent out, a total of 294 were returned (a further 4 arrived, but were too late for inclusion in the study). These 294 represented a very high return rate, 76 percent, but 36 of them could not unfortunately be used. The 36 unuseable returns consisted of the following:

8 from holders of pet deer

4 from home consumption units

4 from agents stating that the owners were abroad

2 from people who had sold their properties and who did not pass the questionnaire on to the new owners

3 from uncooperative people

5 were returned by the Post Office's "dead letter" office

A total of 10 were in the 'grey' area of having obtained a permit, but also of having done nothing else, and so were deleted by the definition used.

These returns that could not be used not only lowered the effective number of responses to 258, but some of them also reduced the total number of deer farmers. The 12 holders of deer for pets and home consumption, together with the 10 who had a permit only, represented a total of 22 deletions from the original list. Such deletions could not be done for the "dead letter" returns, or for those returns relating to properties where the original owners had sold and the new ones had not yet taken out permits, even though they may possibly have intended to continue farming deer on those properties.

The response rate thus became 258 out of 361, or 72 percent, and this is still a very high response rate for a postal survey. Furthermore, as it is not known how

many more owners there are of pet deer and home consumption units who did not respond as they considered that the questionnaire did not apply to them (although they had been asked to reply, stating that the questionnaire was not applicable to them), it is likely that the response rate for deer farmers is, in reality, even higher than the 72 percent estimated.

Not all respondents answered all questions. Those who had only recently set up their units and so had had no income from their deer could not, for example, indicate returns on the investment made. A few others omitted responses which they considered too personal, even though they had been assured of complete confidentiality. Thus the response rates for some questions are lower, perhaps in the order of 65 percent, but even so the findings based on them are held to be valid.

PART ONE

EVENTS LEADING UP TO THE FARMING OF DEER IN NEW ZEALAND

CHAPTER 1
DEER AS A RESOURCE: 1851-1890

The introduction of deer to New Zealand is undoubtedly due to cultural traits of the early pioneers. For varied reasons, they sought to enhance their new colony by introducing to it animal and bird life, among them deer, that were familiar to them. This chapter briefly examines the background of the colonists with respect to deer, a background that had inculcated in them favourable attitudes to deer and that directly led them to import and liberate deer in New Zealand. The subsequent rapid growth of the deer population is also examined.

Cultural Attitudes to Deer In Gt. Britain

Most of us are aware from tales of our childhood, for example "Robin Hood", that deer were regarded highly as a source of both sport and food in England during the Middle Ages. They were so highly regarded, in fact, that large areas of forest were set aside under feudal regimes specifically as the exclusive hunting rights of the king and the nobility. It was in the Middle Ages that -

> ... grants by successive kings placed considerable stretches of country under the control of individual magnates as private forests, generally called chases ... Magnates who controlled forest country could make grants of woodlands in very similar terms to those employed by the king ... The custom of making parks or enclosures from which the deer could not stray was common all over the country (Stenton, 102-3).

These ever-increasing practices were doubtless aimed to prevent the extermination of the wild deer in view of the fact that, as the human population was increasing,

the area of wooded land was decreasing accordingly, but they also served to deny legal hunting rights to all but a privileged few, although James I (1603-1625) gave landowners the right to shoot on their own land (Leopold, 10).

This pattern of fairly exclusive hunting rights persisted, with the deer providing sport and recreation for the nobility and landed gentry, together with venison for their tables. Although penalties were harsh, sometimes involving actual forfeiture of life although more latterly mostly involving fines and imprisonment, poaching by members of the lower social classes existed on a fairly extensive scale, their aim not being to participate in a sport so much as to provide much-needed meat.

By the time of the early planned settlement of New Zealand, the need for poaching by the lower social orders had been largely eliminated in England with the improved methods of animal and plant husbandry, the most important of the newer methods being the planting of winter fodder crops such as swedes and turnips. The hunting of deer was by then almost solely a sport for the privileged landowners and their friends, with the venison being but a welcome supplement to the table. The keeping of deer in private parks had become very popular. "Economic and social conditions favoured this hobby and many a well-to-do Victorian fortified his sense of social standing by possessing a deer park" (Whitehead, quoted in Logan and Harris, 7).

The Introduction of Deer to New Zealand

Researchers and writers are unanimously agreed that the introduction or diffusion of deer to New Zealand by the settlers was due to their desire to have with them in their new country what they considered to be the better aspects of British society and environment.

> The most powerful reason was founded in the desire of the newly arrived colonist to

> create as far as possible a replica of his native country without the restrictions of the many social and game laws of 'Home' (Sutherland, 48).

A few, who in England had been privileged to shoot deer, wanted to retain that privilege in their new land, while others who had not been so privileged in their homeland became more and more aware of the opportunity provided through the breeding of imported deer, an opportunity that would ensure, both for themselves and their sons future participation in this desirable'sport of the well-to-do'.

Wodzicki, however, believed that "a desire to improve the colonists' food supply" (177) was one of the initial, major factors for importing deer. In view of the fact that New Zealand has never had a wide range of animal game, and in view of the fact that the early colonists must have been busy building up the numbers in their own domestic flocks and herds, meat would have been both costly and relatively scarce, so this viewpoint of Wodzicki is credible. As it was undoubtedly a costly business importing and releasing deer, however, it was doubtful whether this was the major motive, for those who could afford the costs of importing deer could certainly afford meat from domestic origins. That their motives were philanthropic, based on providing a future continuing meat supply for their less financially, well-endowed fellow settlers, is also highly debatable. Their motives were thus almost certainly to have been of self-indulgence, providing sport for themselves and their friends, the odd haunch of venison being a welcome but purely secondary consideration.

The earliest recorded liberations of deer in New Zealand were made privately in Nelson and Wairarapa in 1851 and 1862 respectively (Wodzicki, 177), and Sharp (2) suggests the strong possibility of unrecorded liberations made by private individuals in Canterbury, and perhaps

elsewhere as well. The liberated deer came from the deer parks of England and Scotland, being "... gifts from the 'Old Country' park owners to their kinsmen or friends in the new colony" (Logan and Harris, 7). For example, "The first liberation of the species, in 1851, was that of a solitary stag, a gift from Lord Petrie of Thorndon Hall, Essex" (Harris, 1967, 3), an accompanying hind having died during the voyage out.

It was not long after the forming of the first acclimatisation society in London in the 1860's that such societies were formed in the provincial centres of New Zealand. These societies rapidly took over from private individuals the task of importing and releasing deer, together with other animals and birds. The different provincial acclimatisation societies together, in fact, released most of the deer liberated in New Zealand. The Otago Acclimatisation Society led the way, making two liberations of Scottish deer in 1871 in Bushey Park (Wodzicki, 177; Logan and Harris, inside back cover). The societies continued to import deer from England and Scotland, but soon turned to long-established deer parks in Australia for stock, although they shortly started breeding their own stock for liberation. They also sometimes caught their own wild deer to take and release elsewhere.

Most of the earlier liberations were in the South Island, probably since the open, tussocky plains of internal Canterbury and Otago, further enhanced with the major gold finds in the latter area, readily opened up large portions of it for earlier settlement than was the case with the North Island. Thus while the settlers in the south were prospering and developing their areas, those of the north were struggling to clear heavily forested land, while simultaneously having to cope with the Maori land wars.

The motives of the acclimatisation societies were in many cases identical with those of the individuals who privately released deer, although most such individuals eventually became members of the societies. The societies were largely formed by sportsmen for sportsmen, and opened the way for less affluent citizens to participate in the work of introducing the deer, anticipating future hunting forays that might otherwise be denied them, as had been the case in Great Britain. After all, at that early stage, they were not to know that the deer would increase so markedly in numbers!

Such societies did have other motives, however. By introducing birds and animals, not all of which were for game, the societies were seeking to make their new settlement environment more like their old land. They were "fired with a more aesthetic view that what they were doing was believed to be adding something to the attractions of the country" (Sharp, 3).

As the first herds of deer were established and grew in numbers, the government realised that the possession of a good herd of deer for sporting purposes was a further very positive allurement for future possible colonists as well as providing a healthy sport for present colonists, and acted accordingly. In 1861 the Government passed its first legislation pertaining to wildlife, the Protection of Certain Animals and Birds Act. It was designed to provide a measure of protection for introduced game animal and bird species in New Zealand, in order that the species concerned would become well-established. Further legislation was enacted in due course, and -

> In the last forty years of the century, no fewer than fifteen acts and amendments were passed by Parliament in an effort to achieve a desirable and applicable law. All of these maintained protection of deer as a necessity (Sharp, 11-12).

Relatively few deer had been introduced by the time

this first legislation was passed, and doubtless the government was hoping it would act as a further inducement to both individuals and groups to import and release deer. Knowing that the government not only condoned the practice of introducing game into New Zealand, but was actively promoting it by passing laws designed to protect them, such people must have felt encouraged to continue, but strangely enough the numbers of liberations declined until near the turn of the century.

It is thus readily apparent that deer were initially highly regarded as sporting animals, so highly in fact that individuals were going to much trouble and expense in introducing and liberating them while the government of the day felt justified in imposing official restrictions on the shooting of them. Harker stated, "Practically all of the population of New Zealand were enthusiastic about the liberation of game animals at the time" (Harker, n.p.), and certainly it would appear that at the time there were few adverse comments. Land was plentiful, but even so the liberators were taking some care to select land for their releases of deer that was "regarded as valueless for agriculture and at the same time ideally suited as the home of deer" (Sharp, 6).

Rapid Growth of the Deer Population

Once liberated, the deer adapted to their new conditions quickly. The adaptability of deer, especially red deer, has been commented upon in many contexts by numerous writers and certainly, without it, the deer would be much more difficult to farm under the intensive conditions that prevail today. It is, however, an historic fact that the deer settled easily and quickly in their new country. The reasons given for this are varied, but are in general agreed upon by all workers in the field.

It has already been pointed out that the private individuals who released deer, men who almost certainly knew and understood the basic needs of deer, having hunted and managed them in Great Britain and Europe, took

some pains to select land that they considered not only unsuitable for agriculture, but highly desirable for deer. It is not surprising that the deer survived remarkably well in these situations and locations especially selected for them by 'experts'.

Furthermore, the native bush in which they were released was relatively untouched by man and beast. New Zealand native forests were characterised by being largely evergreen in nature, and by having a fairly dense lower layer of shrubs, ferns, small trees, and the like. There was thus, in comparison with the British forests which were both more open and noticeably deciduous in nature, a markedly more abundant, all-year-round supply of forage. The New Zealand winters tended to be milder than in Britain, particularly those of Scotland, so the wintering conditions for the newly-released deer were far superior to any they had known before. Of course they adapted well in their new setting.

Such ideal conditions for deer must naturally have kept them in very good condition. Calving percentages would, therefore, have tended to be higher than in their native Britain. What is more, several investigators in the field have discovered that in New Zealand, hinds tended to calve at an earlier age. Thomson, for example, quotes Hardcastle in "The Deer of New Zealand", a N.Z. Tourist Dept. publication dated about 1905, as stating:

> Deer increase more rapidly in New Zealand than in the northern hemisphere. Whether there is a larger percentage of calves born, I cannot say; there probably is, considering the conditions here. But the large increase is mainly due to the hinds calving a year earlier. In Europe, hinds do not calve until they are three years old; here they calve at two years (Thomson, 44-45).

This earlier age of calving must, by itself, have accounted for a far higher rate of reproduction. The calves, too,

Table 1: Hypothetical Rates of Reproduction of Deer in New Zealand and Europe

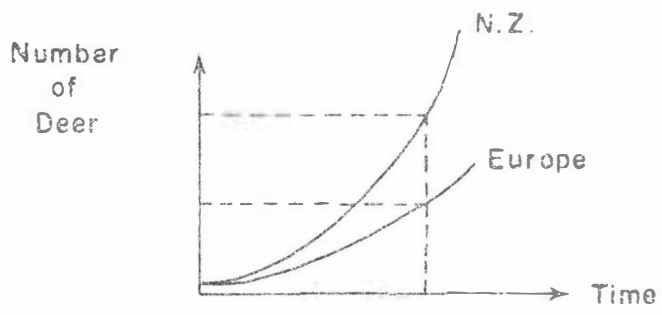
Year	In New Zealand	Total	In Europe	Total
1	1 1yh	1	1 1yh	1
2	1 2yh + f	2	1 2yh	1
3	1 3yh + 1 1yh + f	3	1 3yh + f	2
4	1 4yh + 1 2yh + 1 1yh + 2f	5	1 4yh + 1 1yh + f	3
5	1 5yh + 1 3yh + 1 2yh + 2 1yh + 3f	8	1 5yh + 1 2yh + 1 1yh + f	4
6	1 6yh + 1 4yh + 1 3yh + 2 2yh + 3 1yh + 5f	13	1 6yh + 1 3yh + 1 2yh + 1 1yh + 2f	6
7	1 7yh + 1 5yh + 1 4yh + 2 3yh + 3 2yh + 5 1yh + 8f	21	1 7yh + 1 4yh + 1 3yh + 1 2yh + 2 1yh + 3f	9
8	1 8yh + 1 6yh + 1 5yh + 2 4yh + 3 3yh + 5 2yh + 8 1yh + 13f	34	1 8yh + 1 5yh + 1 4yh + 1 3yh + 2 2yh + 3 1yh + 4f	13
9	1 9yh + 1 7yh + 1 6yh + 2 5yh + 3 4yh + 5 3yh + 8 2yh + 13 1yh + 21f	55	1 9yh + 1 6yh + 1 5yh + 1 4yh + 2 3yh + 3 2yh + 4 1yh + 6f	19

Abbreviations: yh - year old hind

f - fawn

would in turn bear young a year earlier than their European counterpart. To illustrate the difference this would have, let us examine the purely hypothetical case of a one-year-old hind in both New Zealand and Europe, and let us assume that all descendants will be female which calve in turn at the earliest age thereafter. It must also be assumed that no deer die due to hardship or hunting. From the one original hind in each case, the numbers of deer will respectively increase as is shown in Table 1.

If the numbers of deer are plotted against their respective year numbers, the result, as seen below, is obviously that of an exponential function. This demonstrates quite clearly, by drawing an horizontal line intersecting the two exponential curves, that New Zealand will attain a given number of deer, from the one matriarch, long before Britain. A vertical line intersecting the two curves will demonstrate that for any year subsequent to the first, New Zealand will have more deer descended from the one matriarch than Great Britain, and that the difference between the two is ever increasing until limits, imposed by availability of land and hence feed for the deer are met.



As the deer herds increased in population, there was ample wilderness into which they could spread. In fact the short hunting seasons when hunting pressures were exerted must, while decreasing the herd numbers slightly, have served quite well the function of scattering the deer greatly by frightening some into places that were more distant and hence less accessible to man. The virgin forest in such new areas would have lent itself to the further prolific breeding of deer.

New Zealand, then, provided an environment which was very much to the liking of the deer. Conditions were so favourable that the small herds enjoyed a far more prolific growth than could have been anticipated at the time. The herds tended to spread into new territory, perhaps partly due to the rapidly increasing pressure on feeding grounds, but also due to the occasional shooting forays of hunters.

CHAPTER 2
CULTURE IN CONFLICT: 1891-1930

In the period 1891-1930, opinions as to the role and worth of deer in New Zealand diverged greatly. While many people continued to regard deer as a highly-prized asset, a resource to be guarded, nurtured and encouraged to spread, others developed alternative attitudes. As depicted in the model, there arose two major polarities of thought that were diametrically opposed; the one group continued to see deer as a valued resource while the other tended to view deer as a gift from Pandora's box, a gift that was in reality of a negative value in that it was destroying what few resources the country had. Between the two extreme poles of thought were other, varied but more moderate mixtures of the two extremes.

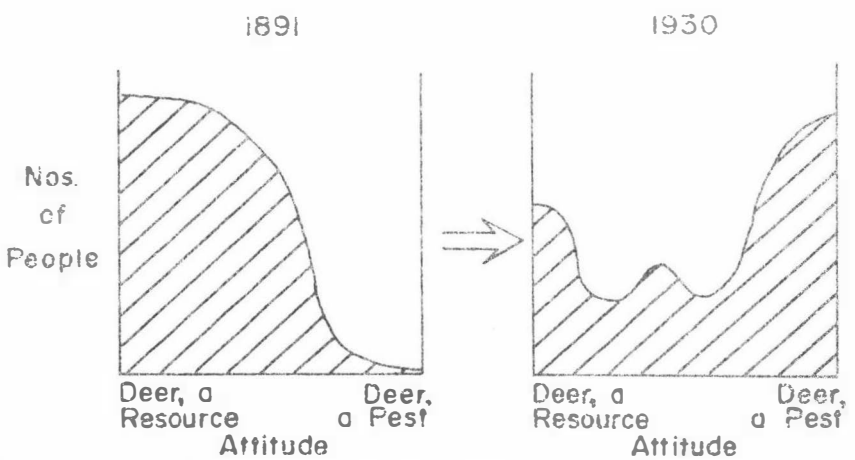


Figure 1 : Model of a Unified N.Z. Society Becoming Divided Over Deer

The purpose of this chapter is to examine the varied attitudes and viewpoints of the people, the organisations which participated in the conflict, and the actions of the various government departments, thereby tracing the divergence of attitudes to deer with respect to time. Reasons for changes in opinion will also be examined.

The First Warnings

Even before the period under consideration, some isolated and unheeded warnings had been given by individuals about the impact of the introduction of deer on the New Zealand bush. A comment of 1872 reads "... the silly mania for acclimatisation so warmly fostered by so many well-meaning though ill-advised persons, and nowhere more so than in New Zealand ... the importations will inevitably become the greatest of nuisances" (Sharp, 24). This was truly a prophetic statement, but one that was ignored at the time as it was based on little factual or scientific data. Seventeen years later, Mr R. Monk urged the House of Representatives to introduce a bill "... to conserve the magnificient forests, which were so essential to the fertility of our soil and to the beauty of our country, and to climatic influences ... the peoples of the future would suffer a very great wrong at our hands" (N.Z. Parliamentary Debates, Vol.65, quoted by Sharp, 24). This warning, too, was largely unheeded, but it did indicate an awareness that a problem existed. An increasing number of people were also doubtless beginning to think along similar lines.

Then, in 1892, a strong attack was made against the liberations of deer in New Zealand by the Rev. P. Walsh in a paper he read before the Auckland Institute. Walsh, too, desired protection for New Zealand forests. He stated, "People enjoying the sport (deer stalking) would only form but a fraction of our population ...", and pointed out that for the sake of this small group, deer were likely to destroy the forest which was the birthright of the whole country. He also pointed out that European deer parks had evolved subject to the presence of ruminants of various kinds in contrast to the New Zealand forests which had evolved undisturbed by ruminants. Thus directly opposed to the introduction of deer, yet realistic about the attitudes of others, he contented himself with suggesting a strict policy of clearly-defined reserves for deer. It is likely that Walsh did more with his paper to awake the majority of the New

Zealand population to the dangers of uncontrolled deer herds than did any other single person of the time, but the effect that he had on official policy was negligible.

The first concern expressed by a government department was made in 1901 when the Annual Report of the Agriculture Dept. stated:

> Now, while it is undoubtedly desirable to make the colony as attractive as possible to tourists and sportsmen, the necessities of the settler must not be lost sight of. Many of the importations of the past have proved to be very 'undesirable immigrants' (McKinnon and Coughlan, I, 1).

Four years later, in 1905, while reiterating that no game could be released without the written consent of the Minister of Agriculture, the Department's Annual Report added that "... there does not seem sufficient machinery to enforce this ..." (McKinnon and Coughlan, I, 2).

Deer Still Very Favourably Viewed

Walsh failed, in the short term, because of the overriding cultural bias ingrained in the attitudes of most of the population. People still tended to view deer-stalking as a fine, manly sport, and were largely not aware of any incipient deer problem. This is evidenced by the continuing liberations being made, without any public protest of note, together with the official 'stamp of approval' inherent in "The Protection of Certain Animals and Birds Act" 1861. Furthermore, the acclimatisation societies "... went to considerable trouble and expense to protect introduced animals from all hazards, both natural and man-made, and it was with great pleasure that they noted in their annual reports that deer were increasing fast and spreading over new country" (Sharp, 19).

Despite the protection offered by legislation and by the efforts of the acclimatisation societies, poaching did occur. Seddon stated that it was the right of every

man to "shoot game for his own food" (New Zealand Parliamentary Debates, 1889, LXV, 447), and there is little doubt that in saying this he was echoing the sentiments of the 'ordinary' people who were not interested in deer purely for the sport, or who were interested in it as a sport but considered the fee of £1 for a shooting licence to be prohibitive, thereby making the sport one for the select few as in Europe. Both the fact that poaching was being practised and that such a sentiment should be expressed in Parliament indicated that deer were becoming a culturally-recognised source of meat for the common dining table.

Furthermore, there was a small and clandestine, but nevertheless flourishing, industry going on in the sale of deer heads. "There was a ready market, both locally and for export, as a stag's head above the fireplace was very fashionable and popular" (Sharp, 21). Thus even in these early days, a monetary tag was being placed unofficially on the deer other than in the form of shooting licences. The greater the number of points, and the more perfectly formed the spread of antlers, the higher the price. Even before the head was sold, probably, a taxidermist would have been employed to preserve and mount the head. This meant that people other than those represented by the acclimatisation societies, the tourist sector, and the settler hunting for his own meat, namely the illegal head shooters, the taxidermist, the traders in heads, and the purchasers would have had positive attitudes to the continuing growth and expansion of the deer herds.

The official government attitude was definitely in favour of further protection and more liberations of deer. Because of the near-perfect environment, deer had been not only multiplying greatly in numbers, but had also grown well individually in physique. The stags were producing mighty and well-formed heads of antlers, and it was this fact that had caused the illegal industry mentioned above to arise. The occasional visitor to

the country, who had participated in a legal hunt, enthused about the quality of the trophies claimed. The fame of New Zealand deer-stalking spread, and visitors now began arriving expressly to hunt deer, as witnessed by the 1902 Annual Report of the Tourist and Health Resorts Department (hereafter referred to as Tourist Department), which stated:

> Deerstalking in New Zealand is attracting attention in other lands by the fine quality of the trophies obtainable, and during the last season - March and April - visitors came from Australia, Canada, India and Great Britain purposely to stalk red deer (McKinnon and Coughlan, I, 3).

In view of this, the Tourist Department had adopted a positive attitude to deer in New Zealand. The report went on to successfully urge that, in view of the deer destruction in Wairarapa, a deer forest be established there. The Department would protect the deer in this forest from illegal slaughter, permission to shoot there being granted only by the government.

The 1903 Annual Report of the Tourist Department eulogised even more the prospect of stocking the country with game to attract the foreign sportsman, and hence to gain for New Zealand urgently needed foreign funds. Among other comments, it stated:

> Many travellers are struck with the fact that better shooting is to be had in the red deer districts of the colony than in older lands, and that the pursuit of the sport is much less expensive here. The aim of the Department must be to make New Zealand one of the foremost of the shooting countries of the world. This colony has all of the natural attributes necessary to that end. Several kinds of suitable big game are

> required, and I am convinced that any money spent in the direction of importation and acclimatisation of such will be well-spent and would be recouped time and again in the future.
>
> Poaching is carried on in many districts in a systematic and wholesale manner, and I would suggest that the Government should consider the question of giving the acclimatisation societies more assistance in the protection of game (McKinnon and Coughlan, I, 4).

In its 1905 Annual Report, the Tourist Department continued in much the same vein, pointing out that "There are still many parts of the country unfit for settlement, which, as deer forests, would become valuable assets to the colony" (McKinnon and Coughlan, I, 6).

With such enthusiasm from one of its own departments, it was not surprising that the government of the day succumbed to the pressures being exerted upon it. It gave its Tourist Department, in 1902, the authority to both import and liberate deer. Thereafter, all liberations were made with not only the knowledge of the Minister of the Department of Agriculture, as required by the Animals Protection Amendment Act of 1895, but also with the complicity of the Tourist Department. In fact the Tourist Department initiated and carried out many of the later liberations by itself.

Early Complaints and Responses

"From 1899 onwards, the acclimatisation societies ... reported a growing number of complaints received from settlers on damage caused by deer" (Sharp, 25). The extremely rapid rate of reproduction, due to the favourable environment, must by now have been causing some considerable pressure on the forage available in certain areas. The Wellington Acclimatisation Society, for example, acknowledged this, suggesting that "... the deer were

becoming too hungry and were moving towards the gardens and fields of the farmers in search of an easy food supply" (Sharp, 26).

Some government departments, too, began complaining. The 1909 Annual Report of the Lands and Survey Department, for instance, stated that a permit had to be obtained to destroy a stag in its Dusky Hills Plantation, Otago, after a number of nut trees had been barked by it. In 1912, the same Department remarked of the same plantation: "So persistent have been the attacks upon our young ash and oak by the red deer that it has been necessary to devote a fair amount of time in stalking the destructive animals..." (McKinnon and Coughlan, II, 9). These statements demonstrate how rapidly the problem was growing as far as one establishment was concerned, and of course the problem was being compounded by occurring in many areas.

The numbers of complaints from both individuals and official bodies grew, but little if any official action was taken. The Tourist Department continued, with the help of the acclimatisation societies, to liberate deer in new areas of country, and legal protection on all herds was still in force.

By this time, deer-stalkers had begun to notice a decline in the standard of heads being claimed as trophies. Further consternation arose when it was discovered that malformed heads were occurring with increased frequency. These two facts upset both the acclimatisation societies and the Tourist Department, the former because of their own desires in having members shoot good quality heads as trophies, and the latter because it saw a major loss in revenue, particularly from foreign sources, being caused by shooters not being attracted by inferior trophies.

"The popular cause of the deterioration was in breeding" (Sharp, 30). Those concerned generally tended to believe that insufficient deer had been originally obtained from overseas, and that the subsequent inbreeding was causing the poorer quality of the heads. The

corrective measures taken were thus two-fold: destruction of the malformed stags and elderly hinds, not to ease population pressures but to preserve the vigour of the herds; and further liberations from new importations.

The Otago Acclimatisation Society had been the first to recognise the problem of malformed and weedy deer, and it responded by offering a bounty of two shillings and sixpence per head for such deer. Authorisations were soon sought by the various societies for the elimination by shooting of all malforms, and this was duly granted by legislation - the Animals Protection Act of 1907. The Otago Acclimatisation Society continued to lead the way, and "In 1908, it employed three men for a period on the basic of twenty shillings per week and ten shillings a head for each stag ..." (Harker, n.p.). This, and other like-minded programmes, cost substantial sums, and the Otago Acclimatisation Society frequently had to use reserve funds not obtained from the sale of deer-shooting licences. It successfully sought financial aid from the government for its culling operations.

Finally, in 1913, the government appointed a Royal Commission to investigate and report on forestry in New Zealand. The report demonstrated quite clearly the desire of the acclimatisation societies to prevent deer becoming too numerous. They desired the herds to be kept to manageable sizes that the quality of the heads could be maintained, and so did not find it difficult to agree with other witnesses that deer in large numbers would cause serious damage to forests, crops and grazing lands.

Despite the fact that all interested parties had acknowledged the danger of permitting deer to reproduce greatly, and despite the high repute of many of the witnesses who, independent of any faction, warned that deer damage to forests could lead to serious down-stream flooding and to forest fires, the report contented itself with advising what Walsh had already advised some twenty years earlier. It stated: "We therefore advise that

measures be taken to restrict deer to limited areas, sufficient for sport, which may be proclaimed deer parks, where they can do the smallest possible damage" (Sharp, 38).

Other than draw increasing public attention to the dangers of large numbers of deer, the Royal Commission achieved little, for the government chose to ignore its recommendation. The Tourist Department, together with the acclimatisation societies, continued releasing deer, particularly in the North Island, although "... vocal opposition especially from runholders increased" (Sutherland, 52). The extraordinary situation then arose when the government, continuing to support and actively assist with deer liberations, found itself issuing permits to landholders to shoot deer on their properties year-round in individual bids to prevent or limit damage!

Complaints from land holders increased. The Department of Internal Affairs was moved to ask its Conservator of Fish and Game for a report on damage done to farmlands by fallow deer in the Rongahere District of Otago. The Department's Annual Report of 1916 stated, as a result of this investigation, that "... in many cases settlers are working under very severe handicap owing to the depredations of the deer, and the question of how best to deal with the matter is receiving urgent attention" (McKinnon and Coughlan, III, 1).

The same Annual Report indicated that the Department had asked the same conservator to check on the conditions of the Otago and Waitaki herds.

> His report confirms the need for dealing with the deterioration in a comprehensive manner ... in the meantime the Otago and Waitaki Societies have been authorised to proceed with culling operations. A special shooting season was declared to enable the Hawke's Bay Society to carry out culling operations (McKinnon and Coughlan, III, 1).

These statements confirm that the government was aware of the growing deer problem, but it is also apparent that the government was not yet prepared to meet the problem on a national scale. Rather, it set out to deal with the problem in a localised, piece-meal and ad hoc manner, and was prepared to act only through the agencies of the acclimatisation societies concerned.

To give them credit, the various acclimatisation societies had been working very hard to show that they could control the situation. Their efforts, however, were directed more at culling out the weak and the malformed deer, that the standards of trophies would remain high, rather than in specifically maintaining a control over total deer population, and so the problem continued to worsen. What is more, the costs of the culling operations continued to rise, and despite the government's financial assistance, the societies were struggling to provide the necessary finance. It was not long before the Otago Acclimatisation Society, "... in an attempt to turn culling operations into a profitable industry" investigated a scheme to "can venison" (Harker), but the scheme fell through because of the difficulties imposed by the terrain. During the First World War, acclimatisation societies suggested pickling or freezing venison for the "Belgian or other deserving causes" (McKinnon and Coughan, VI, 24), but this scheme too was not carried out. The 1919 Annual Report of the Department of Internal Affairs, however states that an acclimatisation society did sell a little venison on the local market in aid of patriotic funds (McKinnon and Coughlan, III, 2).

The attitudes of the Department of Internal Affairs were slowly being forced to change by complaints from the public and by reports from its own officers. By 1917, "protection was removed from fallow deer in the Rongahere District", and by 1920, "special seasons for culling purposes were declared in Otago, Waitaki and Wellington Districts" (Annual Reports, 1917 and 1920, Dept. Internal Affairs, McKinnon and Coughlan, III, 193). The Department

also made the statement that "... deer culling will have ere long to be dealt with in a comprehensive manner" (loc.cit.). This sentiment was echoed in three successive annual reports, and this would surely indicate that the Department was aware that stronger measures were needed, but was perhaps a little undecided as to what these measures should be.

In the meantime, the State Forest Service had been formed, in 1919, as an autonomous government department by separating the Forestry Branch from its parent body, the Lands and Survey Department. The Service immediately demonstrated its stand on the deer question by stating in its first annual report, dated 1920, that "Particularly it is of value here in New Zealand to have charge of such imported animals as deer; unrestricted multiplication of these animals may lead to serious forest damage..." (McKinnon and Coughlan, II, 13).

The 1922 Annual Report of the State Forest Service said of deer:

> This animal is rapidly becoming an unmitigated nuisance throughout the Rotorua, Wairarapa, central Wellington, Nelson, Otago, Southland and Westland regions, and its rapid increase is causing considerable alarm and concern in many parts of the country .... The annual national loss from this source is estimated at £100,000 ... It is satisfactory to note that a conference has been called by certain acclimatisation societies to consider this question ... (McKinnon and Coughlan, II, 14).

This estimated loss of £100,000 would today be considered minimal, but in the early post-World War I era, before inflation had eroded the value of the pound, such a sum must have seemed enormous to this small country which had accrued a large national debt in its war effort.

No wonder the concern, particularly in view of the fact that this estimate would grow annually unless something was done to contain and control it. The surprising aspect, and this must be to their everlasting credit, is that the initiative was taken by the acclimatisation societies and not by the government in calling for a conference. The societies were evidently prepared to admit that the problem was beyond the scope of their resources.

The Conflict Grows

In 1922, the Perham Report, entitled "Deer in New Zealand: A Report on the Damage Done by Deer in the Forests and Plantations of New Zealand", was presented to Parliament. Although it was not part of his briefing, Perham gave considerable attention and thought to the effect of deer on farmlands as well as on forests and plantations. The report "indicated dramatically by use of photography that the situation had passed beyond toleration of deer in such numbers" (Sutherland, 53).

The report, parts of which were quoted in the 1923 Annual Report of the State Forest Service, also gave particularly serious examples of losses due to deer depredations. For example:

> In one case 23,000 acres was rendered useless for stock and the owner gave up his lease, while in another instance the carrying capacity of a run was reduced from 10,000 sheep and 100 cattle to 6,500 sheep ... At an estimation of 300,000 head the deer have displaced approximately 450,000 sheep involving a monetary loss of some £180,000 per annum (McKinnon and Coughlan, II, 15).

The seriousness of this figure can only be judged in the light of New Zealand's heavy dependence on her wool and meat cheques.

Sharp (49-54) adopted the attitude that the credit for the abrupt reversal in attitude by Parliament, and indeed by the entire nation, must go to the Perham Report. He stated: "In 1922 it appears as if the country as a whole suddenly became aware of the deer problem for the first time", and later on added, "it appears that the dangers of the situation had only just been brought to the attention of (Parliamentary) members. For this the Perham Report can undoubtedly be given the credit". This may be partly true, but one must not forget the antecedent efforts of individuals, government departments and a previous Royal Commission in both publicising the dangers and in suggesting remedies. The Perham Report would perhaps be better viewed as the crest of a slowly-awakening wave of realisation in society, a crest which could not have been but for the preceding efforts which supported it.

The Perham Report certainly employed more graphic methods and presented starker realities through its use of photographs, but the problem itself was then more acute than ever before. Perhaps the report was so successful because society itself was then, at long last, prepared to face reality, to admit that the deer was not such a beneficial gift as a creature from Pandora's box itself.

Again, in his conclusions and proposals, Perham was forthright and, as it must have appeared to some at the time, brutal. He concluded that deer were not only detrimental to the national interest through hastening the processes of erosion, but that they were displacing 450,000 sheep on land that would otherwise be used by pastoralists more intensively than they were then using it. He saw the nation as a whole paying a high price for the sport of a very small minority. He suggested that control operations should involve confining deer to well-defined wastelands, all deer found outside these areas being shot or poisoned.

Perhaps it was the measures suggested that forced people to take note of the issue. The report, like its predecessors, advocated deer parks for the hunting fratern-

ity, but it is obvious that its author himself preferred complete extermination. Such drastic solutions must imply a grave problem indeed!

Reaction to the report, however, was not unanimous. The then Commissioner of State Forests, the Hon. Sir R.H. Rhodes, "... accepted that deer did provide excellent sport and that they were responsible for bringing to the country large numbers of tourists and sportsmen" (Sharp, 53). He certainly did not accept total eradication of deer as the ideal solution. It is equally certain that the acclimatisation societies, while prepared to accept control measures which they had in many cases initiated themselves, did not desire to see their work undone by an official extermination policy. They intimated this at the conference called by the government in 1923 to discuss the possibility of removing protection from deer. Even the Department of Agriculture stated at the conference that it did not advocate a policy of extermination.

> The unanimous decision of the conference was that it be left to each Acclimatisation Society in consultation with the Department of Internal Affairs and the Agriculture and Forestry Departments to define such areas wherein it is desirable that protection should be removed (Sharp, 62).

Subsequently, in November of 1923, protection of deer in parts of Marlborough, Nelson, North Canterbury, Westland, Waitaki, Otago and Southland was removed. Subject to the permission of the landholder, any unlicensed hunter could legally shoot deer in these areas at any time of the year. Furthermore, the government allocated £1,000 to be spent in the form of two shilling tail bonuses, and it also arranged for cheap ammunition to be made available for stalkers.

Each acclimatisation society concerned, although "... it did not like the removal of protection from deer in certain parts of its district as this meant a loss in

revenue ..." (Harker) through fewer sales of licences, tended to cooperate fully and well with this decision, in which it had had its say too, as it was coming to recognise increasingly fully that the magnitude of the task of control was now beyond its resources. Full participation, the societies hoped, would allow them to "retain a measure of control so that when the most immediate problems were solved they could regain their old positions" (Sharp, 65), and control both the herds and the sport of hunting.

Some acclimatisation societies, such as that of Otago, saw their management efforts of several years being destroyed, since cullers "... often shot good heads. In addition, as they made their living from skins and heads, they were unwilling to shoot malformed deer which had poor skins and heads" (Harker,n.p.). Protests to the government, however, elicited such unsympathetic responses as "there was no restriction on the number of stags that could be killed" (Harker, n.p.). This must further illustrate the changing attitude of the government which had always previously been sympathetic to the cause of the acclimatisation societies in so far as deer were concerned.

At about this same time, a vocal and active group in total opposition to deer became organised. It was the Royal Forest and Bird Protection Society. In its efforts to look after and protect the forests and birds of New Zealand, this society clearly identified the deer as its number one enemy.

Thus, as well as the divergent opinions of government departments - the Tourist Department versus the triad of Internal Affairs and Agriculture Departments and the State Forest Service - there was also complete divergence between two non-government organisations - the combined acclimatisation societies versus the Royal Forest and Bird Protection Society. Both official and public bodies were now expressing extremely polarised opinions on the deer question.

Many of the attacks made by the Forest and Bird Society were emotive and tended to lack a detached, scientific argument. For example, a contributor named Myers wrote, "... we recognise that the annals of 'acclimatisation' are a record of national disaster brought on us and our posterity by wilful ignorance" (Birds, 1924, Bull.6, 2). How bad must something be to be labelled a 'national disaster'? Deer were certainly a problem, and an expensive problem at that, but were they a 'national disaster'? The term 'wilful ignorance' is a highly emotive one too, and it would be difficult to prove it applied to the acclimatisation societies and others involved with liberating deer. As Harker stated in 1973,

> A good many gentlemen behind the schemes were well-educated, conversant with wild-life environment and, without doubt, giving thought to future generations. It is easy to criticise when mistakes were not apparent until a quarter of a century later.

The then leader of the movement, Captain E.V. Sanderson, attempted to be more factual at times. In 1924, while urging more efficient means of controlling the deer population, he borrowed ideas from Walsh and Perham to prove his point, and summed up by stating, "Thus the agriculturalist and all are vitally affected by wildlife control, seriously in the immediate future, and vitally at no very far distant date" (Birds, 1924, Bull.6, 7). Sanderson spearheaded the attack for this society for many years thereafter, and certainly his efforts must have helped sway large portions of public and official opinion, particularly with his emotive outbursts based on a semblance of truth such as:

> Nay, even the very department which connives in the preservation of animals for sporting purposes in our forests spends large sums of money annually in an endeavour to attract tourists to see the forest scenery which, by the time visitors reach our shores in sufficient

> numbers to reimburse us the money spent, will have disappeared or at least be further greatly marred.
>
> Let us look the matter square in the face. On the one hand we have the Department of Internal Affairs heading the attempt to foster animals suitable for sport and at the same time the Forest Service is doing what little it can, but very ineffectually owing to lack of funds, to mitigate the menace. The revenue in part, however, from our forests, which could be devoted to lessening the evil these trespassing animals do is taken from the Forest Service by the Department of Internal Affairs and handed in part to Acclimatisation Societies, which by the way already filch revenue from State Forests by way of issuing opossum trappers licences to work in them and which also receive revenue from deer and foster them while the salaries to pay the officers in each Department thus working at cross purposes all come out of the public purse (Birds, 1929, No.17, 11).

The Department of Internal Affairs and the State Forest Service were nominally in agreement on the deer question, and were not opposed as suggested by Sanderson. It is true to say, however, that since its development into an independent government body, the State Forest Service had decided to do its best to eliminate deer as a problem. In outlining its policy and programme of action for the period 1925-35, the Service urged that the policy of piecemeal control of wildlife by the many bodies concerned, with the consequent loss of coordination, be replaced by one entirely in the hands of the Forest Service by 1930. Its 1925 Annual Report asked that "... protection on all species of deer be removed for a period of five years, and that the payment of bounty be continued on all deer

destroyed during that period" (McKinnon and Coughlan, II, 18). Although this was not then granted, the Forest Service pressed on with deer eradication programmes in its own forests. In 1927 it established small poisonous salt licks in badly infested areas to attract and more easily destroy deer. In 1928 it gave aid to a private firm in its endeavour to develop an overseas market for the export of deer carcasses, and it definitely located markets for deer hides and antlers. In 1929 it stated that deer destruction was being carried out systematically by parties under Forest officers in all infested areas (Annual Reports, 1927-29, McKinnon and Coughlan, II, 20-26).

The shooting of deer to obtain venison for foreign markets was not a new idea, having been investigated during World War I. This attempt, however, by a Mr R. Philp, went further. Sharp (91) states that Philp was reported to have obtained firm orders from the United States of America for 1,000 carcasses per month, and to fulfil these orders, Philp desired shooting parties, under contract to him, to shoot in each district. Various freezing works had agreed to process the carcasses, which were then to be stockpiled at a central base for export. It appeared likely that a profitable venture was getting off the ground, but then troubles started. The shooting by Philp's parties would interfere with the culling programmes of the acclimatisation societies, although this was probably more excuse than fact as sportsmen must have viewed the scheme with some abhorrence, so the societies gave him little assistance.

The real problem, though, lay in the lack of an adequate technology. The transporting of carcasses, by packhorse, from the bush and hillsides to the nearest railhead was time-consuming. The carcasses would have been at a high risk of deterioration by becoming flyblown and otherwise tainted. A further trip on the train to the freezing-works would certainly not have added to the wholesomeness of the meat, while,at the same time, such handling would be adding considerably to the final cost

of the product. Add to this the processing costs, and then the further handling and freight costs involved in railing the processed carcasses to the collecting depot. The handling and transport costs, together with losses incurred through meat becoming tainted, meant that the final product would have been extremely expensive, perhaps prohibitively so.

It was, however, a brave effort, and its failure was a blow to the Forest Service, which had seen this as a possible way of controlling, at minimum costs, the deer menace. The Forest Service, though, had foreseen the technological difficulties involved, and had pursued alternative avenues. It located good markets for hides. In 1930, its Annual Report stated that, "Increasing success has attended the commercial exploitation of fallow and red hides" (McKinnon and Coughlan, II, 29). Unfortunately, the 1931 Annual Report pointed out that, due to the major recession, the prospects of a payable overseas trade in skins and hides had diminished, but that local tanneries were accepting small, regular consignments. It also added that the High Commissioner in London was continuing to investigate the commercial exploitation of pig and deer hides (McKinnon and Coughlan, II, 31).

The Period Reviewed

Initially, except for a very few critics, New Zealand society appeared very favourably inclined towards deer, which were positively viewed as providing good sport, trophy heads for sale and meat for settlers. As the deer mostly occupied land not desired by settlers, it was felt by those who did not shoot deer for any reason that they were harmless, and therefore not a bad species to have introduced to the country.

As time passed, the attitudes and ideas of the few critics spread, and not without good cause. Rural settlers had begun complaining in increasing numbers about the effects trespassing deer were having on their crops and pastures. The Lands & Survey Department, too, found deer

were increasingly of a nuisance value by invading its plantations and ring barking the trees.

Nevertheless, this opinion that deer could be a danger to the economy remained a minority one for some time. Seeing only the very satisfactory and short-term results of increasing incomes through overseas hunters bringing foreign funds into the country, and the odd wealthy immigrant stating quite unequivocally that he was attracted to settle in New Zealand rather than another colony because of the deer-stalking available here, the Tourist Department continued to liberate deer. Indeed, both Wodzicki (177) and Harker (n.p.) agree that the government of the day can be held directly responsible for some of the most regrettable liberations.

Attitudes, both public and official, continued to harden. The acclimatisation societies responded by 'thinning' their herds by culling out the weak and malformed beasts. Few realised that the inferior heads becoming increasingly common were due to overpopulation and not to inbreeding. Without this bias, it is very likely that control efforts would, for a while, have contained the problem.

Two Royal Commissions on the deer question, particularly the second one under the chairmanship of Perham, served further to awaken the general populace to the dangers of deer. Public animosity to deer hardened still further. Control efforts were stepped up, protection being lifted in several areas, and a two shilling bounty was paid on deer tails.

The young and energetic State Forest Service applied for permits to shoot deer in State Forests, and then mounted its own eradication programme in these areas. It also led the increasingly vocal attack on deer, and was soon joined by the newly-formed Royal Forest and Bird Protection Society. In its efforts to keep control costs down, the Forest Service did much to establish the feasibility of commercial exploitation of deer for hides, its attempts

at fostering venison recovery through private enterprise having predictably failed.

CHAPTER 3
THE DEER AS A PEST: 1930-1955

The majority of both the general public and officialdom saw the ever-expanding deer herds as a direct threat to the ecological basis of New Zealand's forests and grasslands, and hence to the economy of the nation. All protection was lifted, and extermination programmes were initiated. Despite intensive efforts, these programmes failed to achieve their targets of extermination, and in fact were barely, if at all, preventing further growth in total deer population.

New Zealand society waged a relentless, though not all-out, war against deer. Just as in a war between opposing human forces, either side is likely to utilise loot to finance further campaigns against the army from which it was captured, so too did the government departments concerned acknowledge a resource from deer and more or less utilised it against the remaining deer. Deer skins and hides were sold in large numbers to help finance the 'war' against deer. Private shooters, too, were encouraged to participate in shooting deer that they could make a living from selling the skins, and thereby assist official efforts.

Removal of Protection

Although protection on deer had previously been removed in certain parts of the country, by the end of 1930 it had been lifted from all deer in the country with the exceptions of moose and wapiti. Opinion, both public and departmental, had been building up to this for some time, but the final official decision hinged directly upon the results of a conference held earlier that year in Christ-

church. The conference was well attended by government departments, farming interests, various acclimatisation societies, the Forest and Bird Protection Society, and others interested. Despite the wide divergence of opinion represented, the conclusions that there was a menace from deer, and that strong measures were needed to contain and control the problem, were unanimous (Sharp, 117).

Within months, the government acted. It removed all forms of protection and authorised the Department of Internal Affairs to initiate and conduct suitable control operations. In view of the fact that the Forest Service had already been conducting such operations, and that it had previously urged for such national control efforts under its own guidance, it was surprising that the task was not given to it rather than to the Department of Internal Affairs.

The 1931 Annual Report of the Department of Internal Affairs stated, "The Department was provided with financial provision to organise special parties to undertake deer-destruction" (McKinnon and Coughlan, III, 7), and official parties of paid shooters, known as deer cullers (although titles such as deer controllers or deer exterminators would have been more applicable) were organised by Captain G.F. Yerex of the Wildlife Branch of the Department. Sharp (127) stated that in the first four months of operation by these parties, each deer was killed at a cost of 6s.4½d. As 3,807 deer were destroyed, this yielded a total cost of over £1,200 for the four month period. This cost was likely to increase as deer became scarcer, due to the expected success of the campaign, and as they became more difficult to kill as the surviving deer retreated to more difficult areas. This, in a period of general economic recession, persuaded the Department to continue the efforts of the Forest Service in locating and servicing markets for deer hides.

Although many people at the time argued that it was a waste of skilled shooters' time to skin animals, par-

ticularly in view of the magnitude of the problem, the Department's 1931 Annual Report continued on to state:

> The extent to which deer destruction can be continued is largely governed by the question of cost ... a reliable market for deerskins will greatly help in the future control of the herds by inducing persons to undertake deer-killing as a commercial venture, besides establishing industries or export trade of considerable value to this country. This desirable result cannot be achieved without an adequate supply of skins with which to create and foster such a market and keep it supplied until private enterprise supplies the demand (McKinnon and Coughlan, III, 8).

This statement would indicate that the Department was aware that the problem of controlling the deer population would involve a long period of time, together with substantial expenditure of public money. If definite long-term markets, that offered fair prices for hides, could be established, then the Department was hopeful that private enterprise would assist tremendously, at little or no cost to the tax-payer, in shooting and thus controlling deer numbers.

The policy behind official extermination efforts was to move in on "large concentrations" of deer in the high basins and open tops (McKinnon and Coughlan, III, 8), as it was felt that shooting in the valleys and grazing areas of back country runs was merely to deal with the natural increase only. Commercial parties of private individuals were left to operate in the more accessible areas. The official parties, after dealing with one such area, would move on to another, and areas already dealt with soon became reinfested with deer. Although impressive kill tallies were counted, this was hardly an effective method. Sharp, too, considered it was not "scientific". He stated

that "The reaction against deer was so violent that reason was inhibited. The attacks on the animals were emotional almost to the extent of hysteria" (Sharp, 137). Certainly, the statements of "One of Them", a supposed deer culler, would tend to endorse this point-of-view when he wrote of deer cullers:

> They have the feeling that they are crusaders, performing a national service ... Few men would be likely to suffer willingly, even eagerly, as deer hunters do, the hardships season after season when they might obtain other work, unless they were crusaders, keen to save their native lands from deadly enemies (Forest and Bird, 1935, No.38, 9).

So the senseless slaughter, senseless in that it was not achieving the control it was meant to achieve, continued. The slaughter, however, was useful from two points of view. Firstly, the intensive grazing pressure of deer on certain areas was eased, even if only temporarily, and this must have favourably affected the ecology of those areas. Secondly, it served the purpose of providing large numbers of skins which were, as planned by the Department, successfully used to attract and interest an overseas market. Later, a smaller, local market was found too.

The Marketing of Deer Hides

In 1932, the Department stated that "markets have been found at a price which should make deer destruction attractive and remunerative as an avenue of employment" (McKinnon and Coughlan, III, 11). It then proceeded to abolish the tail bonus and instead inaugurated a payment for skins received.

That a market for deer hides could be established at all, in view of the prevailing world economic situation which had hindered earlier Forest Service efforts, was quite remarkable. Sharp (130) rightly ascribed this to the fact that the fineness of the leather was useful for

articles such as gloves, handbags and golf jackets, all of which had a ready market overseas. New Zealand manufacturers too, as the Forest Service had earlier discovered, were willing to turn to the new source of high-grade leather. The Department's Annual Report of 1933 stated:

> In addition to disposal of skins for overseas orders, large numbers have been sold for use in New Zealand. One Dominion firm is going in extensively for the manufacturing of deer-skin leather and articles made from the leather, and is purchasing supplies of skins from the Department. A new industry is thus in a fair way of being established in the Dominion; a commodity previously largely wasted is being turned to commercial account, and new avenues of employment have been found for many men (McKinnon and Coughlan, III, 12).

"One of Them", the supposedly official culler, in an article entitled "The War on Deer" (Forest and Bird, 1935, No.38, 8-13) wrote of New Zealand deerskins: "Soft and pliable as babies' shawls are the skins cured in New Zealand. Strong men cannot break deerskin bootlaces or thongs" (10).

An examination of Table 2 demonstrates quite clearly that the extermination effort, as measured by the number of deer killed by the Department, grew more or less steadily until World War II intervened. The Department considered itself justifiably proud of its success, and in 1937, it stated in its Annual Report:

> During this season on one station (St.James) a total of 3670 deer were killed, and the benefit to the sheep pastures is already indicated by the fact that the owner has been able to increase his sheep by about one thousand head, and it is considered that the in-

Table 2 Extermination and Export of Hides

Year	Deer Killed By Dept.	No. of Skins Recovered	No. of Skins Exported
1931	6,988	6,246	4,942
1932	6,357	1,746	11,768
1933	8,900	3,037	1,734
1934	8,207	3,221	3,920
1935	19,145	10,182	11,296
1936	26,424	11,744	15,891
1937	22,248	10,007	20,429
1938	30,372	12,230	22,512
1939	40,946	15,282	28,361
Pre-War Total	171,587	73,695	120,853
1940	31,354	12,160	38,477
1941	19,736	9,062	45,382
1942	11,656	5,432	53,190
1943	19,539	8,749	51,300
1944	12,371	6,323	100,935
1945	8,539	3,866	95,788
1946	13,519	7,058	97,057
War Years Total	116,714	52,650	482,129
Overall Total	288,301	126,345	602,982

Source: Wodzicki, 190

> creased feed available would permit of a further large addition to the flock (McKinnon and Coughlan, III, 28).

The same report, incidentally, contained the information that there was a very keen demand for deerskins, so much so in fact that the Department had difficulty in filling the orders received.

The war years affected the programme greatly in two ways. Firstly, trained and experienced departmental manpower, engaged in the control operations, were drafted into or volunteered for the armed services, leaving the Department short-staffed. Its 1942 Annual Report stated, in fact, that approximately 90 percent of its shooters[1] and six field officers had gone into the fighting services! (McKinnon and Coughlan, III, 42). But its 1943 Annual Report, however, stated that thirty men were released from military camps for deer-destruction work, and that "The Army Bush and Mountain Warfare Parties in the course of training have accounted for numbers of deer in areas covered by training operations"(McKinnon and Coughlan, III, 42). Despite this cooperation of the military, the effect of the war was that tallies of deer killed by official parties dropped drastically.

It is apparent, from a perusal of Table 2, that the number of hides exported in any one year never tallied with the number of skins recovered by the official parties. Changes in the number of hides exported in any one year correlates very highly with changes in the average price per hide on the open market, as will be discussed later, and this obviously resulted through two reactions to market prices; when prices were low, some hides were kept in reserve and were not placed on the market until prices

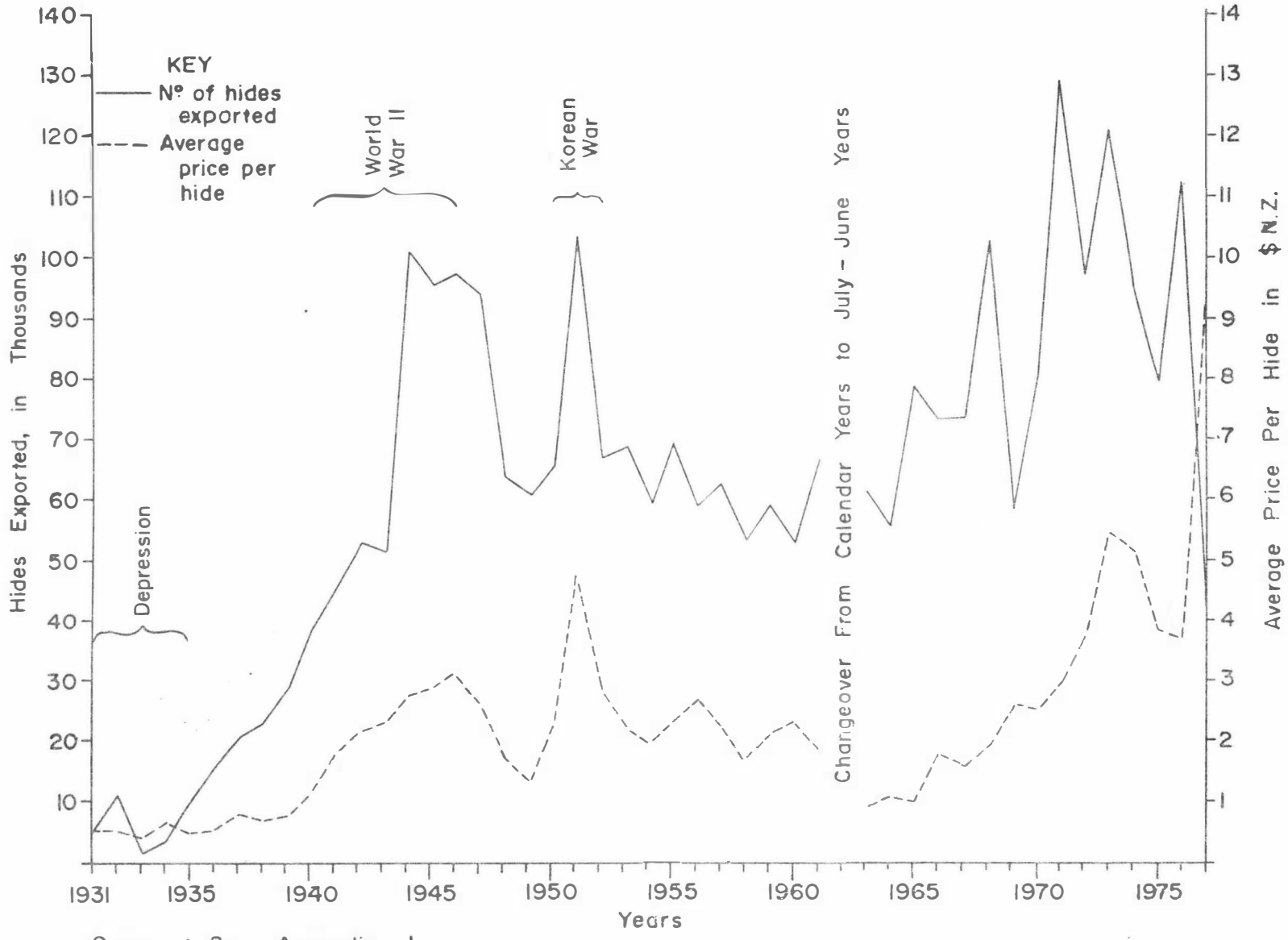
[1] The term 'culler' though often used, is really erroneous as its employees engaged in this work were out to exterminate the herds, and not just cull the old and weak deer out.

rose again, and high prices encouraged more shooting for hides from the private sector than did low prices. The Allied war effort demanded all the leather it could get for the production of war equipment. Prices were thus very high, increasing from $1 to $3 per hide during the war years (Fig.2), and the private sector responded accordingly. During the pre-war years, the government sector had provided 61 percent of the skins exported, but during the war years it provided only 11 percent, and this despite the fact that the government parties were successfully endeavouring to recover a higher proportion of skins from their kills - 45.1 percent as against 49.9 percent.

Figure 2 depicts very clearly the high correlation between the numbers of hides exported and the prices being paid for them. The Spearman Rank Correlation Coefficient applied to the data of this period, i.e. up to and including 1952, gives the extremely high positive correlation between skins sold and prices paid of 0.9575. By squaring this figure and reading it as a percentage, the information that over 90 percent of the hides exported during the period can be explained in terms of money received is obtained. Although the post-1952 data has not been so treated, the graph would indicate that similarly high figures would result if it was done although 1975 and 1976 would appear not to follow suit. The three major possible reasons for this have already been discussed, namely that demand forced prices up, and this in turn caused hides held in reserve to be released as well as encouraging further effort from the private sector due to the higher internal prices subsequently offered.

Right from the start, when the policy of encouraging shooting for skins by the private sector had been inaugurated, the Department realised, through its own skin-recovery efforts, that the skins presented for marketing would have to be of a uniformly high quality. This meant that sound, standard procedures in both skinning the animals and in initially preparing the hides would have to be met. The Department's Annual Report of 1933 stated that it had been

Figure 2 Numbers of Hides Exported and Average Prices Received



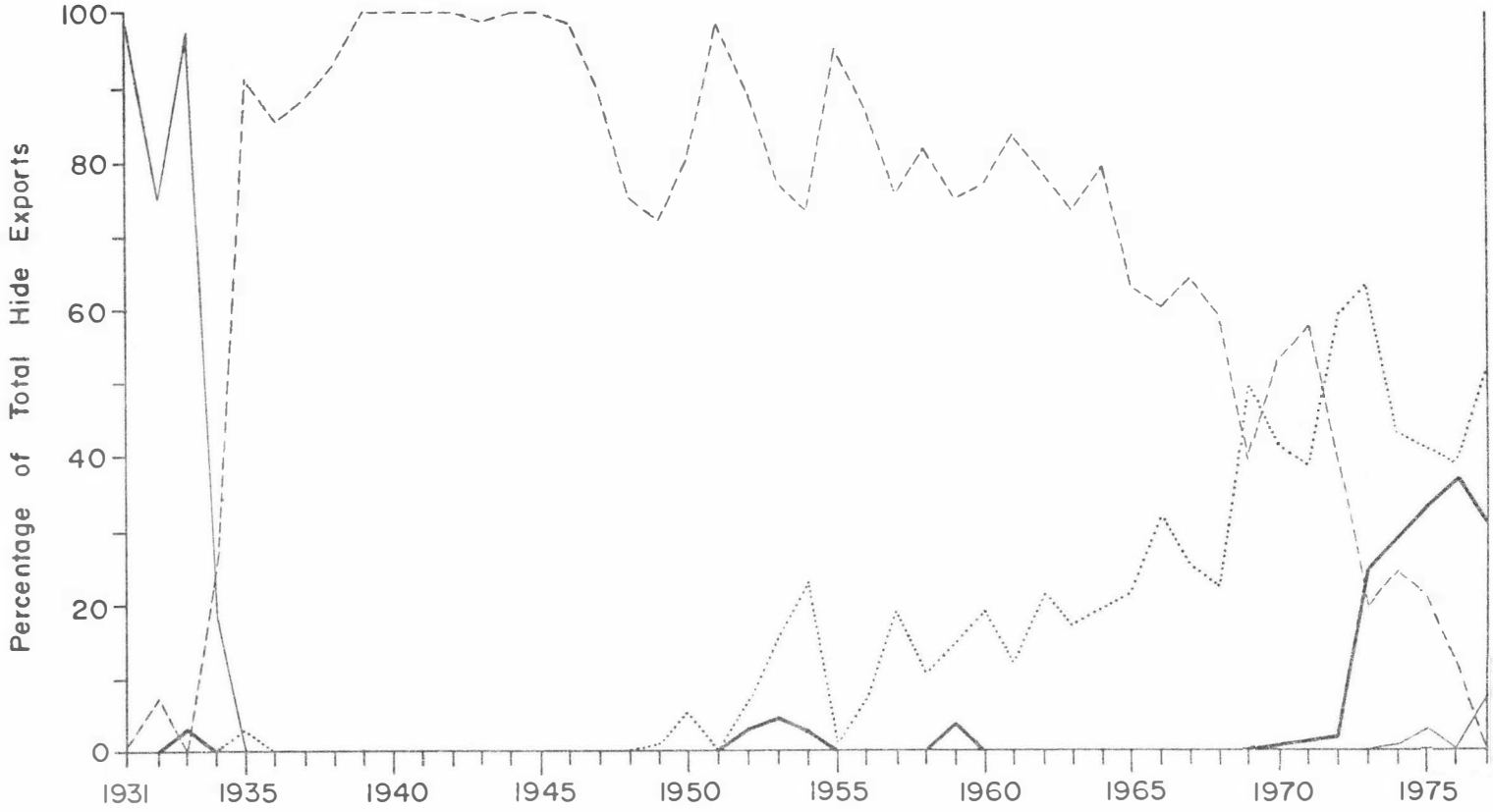
Source : See Appendix I

possible to educate hunters to treat and care for skins (McKinnon and Coughlan, III, 12). By providing instruction leaflets and the incentives to follow them, Departmental officers and agents refusing to accept skins that had received sub-standard treatment, the Department ensured that overseas purchasers would continue to have confidence in the standard of the product.

With the cessation of war, demand and hence prices fell to almost pre-war levels, but soon afterwards rose again (Figure 2). This rise was almost certainly caused by the Korean conflict in the early 1950's. Thereafter, prices more or less stabilised at an average market price of $2.00 per skin until the early 1960's when a minor recession caused prices to slump, although this had little noticeable effect on demand. In the late 1960's, and particularly in the early 1970's, both demand and prices rose to unprecedented heights. This may be partly attributed to the increasing affluence of the world markets, but must certainly have been partly caused by the increasing competition for deer hides by the West Germans, the American purchaser previously enjoying, from 1935 onwards, what amounted to a price-setting monopoly (Fig.3). Furthermore, suede jackets, coats and boots were fashionably popular at that time, and this must have affected the level of demand as deerskins were "sought as raw material for the production of top quality suede clothing leather" (Milnes and Peters, 199).

In the early stages, Australia and then the United Kingdom, both countries that had traditional ties with New Zealand, provided the major markets for deer hides. A small sample purchase in 1932, however, led to the United States becoming the dominant purchaser, with the previous countries thereafter buying spasmodically in small but significant amounts. As already mentioned, the huge near-monopoly of the United States may have permitted the Americans to set their own price, and there was little New Zealand could do about it. In the late 1950's and in the 1960's, however, West German buyers increasingly

Figure 3: Percentage of Total Receipts, by Major Countries of Destination, for Deer Hides : 1931 - 1977



—— Australia (omitted from 1936 to 1973 because percentages of one percent or less prevailed)

- - - - - U.S.A.

..... West Germany

—— Japan (amounts less than one percent omitted)

Source: "External Trade Exports" N.Z. Department Statistics

challenged the dominance of the Americans.[2] Ultimately, in 1972, the West Germans became the major purchaser of New Zealand deer hides, but it was about this time that a major market emerged in Japan. It is, without a doubt, the competition between these two buyers that has caused a major upswing in prices during the late 1960's and early 1970's, with the American market not purchasing any in 1977.

Extermination Efforts Continue

The post-war fall in prices affected the economic viability of private ventures in skin recovery operations. Many of the shooters who had been so employed now decided to join the Department of Internal Affairs as shooters, and with previous employees now returning from the war, government parties were soon well-staffed with experienced men. Annual kills by official efforts rose steadily to peak in 1949, and then rose steadily again to new heights, peaking at over 60,000 in 1956 (Sutherland, Fig.4). Government shooters had been supplying an ever-increasing portion of the skins marketed, and were now supplying almost all available.

The large groups of experienced shooters operating for the government, though, did not continue for long. Because the work was not well-paid, while being difficult, lonely and at times dangerous, a high turnover of staff began to occur. The Department responded by making two major innovations. In 1953, its Annual Report stated that, in addition to its normal groups of shooters, a cooperative contract hunting scheme was introduced whereby the men involved received no wages, but were paid £1 for each acceptable skin plus a bonus for each tail where a skin was not recovered. It stated that first-class, experienced men, largely ex-employees, were attracted by the scheme which was almost self-sufficient, receipts from the skins

[2] It is not insignificant that they were simultaneously doing the same with venison, but a discussion of this will be left for the next chapter.

so recovered almost equalling payments to the hunters (McKinnon and Coughlan, III, 68).

Its second innovation, reported in the 1954 Annual Report (McKinnon and Coughlan, III, 71), had previously been successfully experimented with, and was now being used more fully. It was the employment of air transport, utilising the technology and techniques that had been successfully developed in the war for dropping supplies and equipment to men in the field. Air transport encouraged men to stay on the job by removing much of the slog from their work, while at the same time permitting superior field facilities, such as huts, to be moved in. It also, incidentally, allowed the killing rate to be maintained and even improved upon by ensuring that the men working in the critical but more remote areas were able to spend a longer time in the field shooting.

In the meantime, a programme of hut-building and track-cutting, initially intended for ongoing operations but later extended as an aid for long-term control by both official and private hunters, was being carried out. The operational policy of concentrating upon the most seriously infected areas was being continued, as it was realised that resources, particularly that of manpower, were not sufficient to hold deer densities to satisfactory levels throughout all districts.

Although the Department of Internal Affairs was responsible for the elimination of the deer problem, the State Forest Service, which became the New Zealand Forest Service in 1950, continued to retain an interest in the problem. It had a more realistic attitude to the problem, stating as early as 1939 in its Annual Report that "it is manifestly impossible to expect that, after being acclimatized and left comparatively unmolested for many years, these forest pests can ever be completely exterminated ..." (McKinnon and Coughlan, II, 35). In 1950, it stated, "The objective, obviously, should be one of complete extermination but such a policy is unrealistic and impossible to achieve" (op.cit., 41). Finally, in 1956, it stated

quite bluntly what many of those concerned must have been thinking for some time, namely - "Animal populations are still high, and spreading, and despite vigorous and locally successful culling by Wildlife Division, seems increasing in many places" (McKinnon and Coughlan, II, 45). The Forest Service was obviously concerned, and was desirous of better, long-term results.

While this deer-destruction programme, as outlined, was being carried out, several events of note occurred. By concurring so readily with the decision to lift protection on deer, and with the decision to destroy them, the acclimatisation societies more or less indicated that they were either unwilling or unable to continue to represent the views of the deer-stalking fraternity. A group of deer-stalkers, under the leadership of Mr A.H. Hamilton of Invercargill, had formed themselves into a club that was to serve as the forerunner of the New Zealand Deerstalkers' Association Incorporated. This group was not opposed to the lifting of protection, but was opposed to the policy of extermination. They considered extermination to be undesirable, and that the methods employed in such a programme effectively meant that the finest and largest beasts, which presented better targets and larger skins for sale, were effectively being culled out, leaving only the weak and malformed to breed. In place of extermination, they argued for a massive shooting effort to lower total herd numbers, and these numbers were then to be controlled further by culling out the undesirable herd members. In other words, they sought management of the herds rather than extermination. The mood of the country, however, was such that no notice was taken of their pleas at the time (Sharp, 150-151).

The second occurrence of note was the passing of the Statutes Amendment Act in 1945. This, briefly, strengthened the hand of the Department of Internal Affairs by giving it the authority, upon the request of a Board or Council, to enter upon any privately-owned land and to kill any wild animals found thereon that were likely to

cause soil erosion and flooding through damaging trees, shrubs and grasses. Government attitudes, as witnessed by legislation, were still hardening against deer.

Thirdly, a more scientific approach to the problem was being made. One worker in particular, Thane Riney, investigated the problem at some depth. He pointed out that deer were not the only ruminants causing erosion, and that often the problem had been caused through the over-grazing of land by sheep. He was not imbued with the then generally prevailing attitude of enmity towards deer, and considered that controlled numbers of deer in certain areas would make sound, economic sense, whereas their extermination in other areas would make equally sound sense.

The Deerstalkers' Association naturally accepted Riney's work unreservedly, for it served to back up much of their argument, but the Department of Internal Affairs literally disowned him! The Forest Service later employed him, and although it had come to recognise that the task of exterminating deer was an impossible one, Riney may have been partly instrumental in softening its later attitude to deer.

Finally, in 1953, the last event of note occurred. Efforts to export venison were made again. One of these attempts was successful, but an examination of the start of this new industry will be left for the next chapter. It is sufficient to state here that the industry succeeded in getting off the ground in 1953, and that this success was achieved without the help, or even cooperation, of the Department of Internal Affairs. Despite the precedent set by the State Forest Service in actively working to help an earlier company establish, albeit unsuccessfully, a venison-export industry, and despite the very active participation of the Department of Internal Affairs itself in exporting deerskins, this latter department was now to be highly suspicious of the effects a venison trade would have on its eradication programme (Sharp, 165).

The concern felt by the Department, however, was not to remain its prerogative for long. Its 1956 Annual Report states, quite unemotionally, that "This Department's responsibility for the destruction of noxious animals was transferred to the New Zealand Forest Service as from 1st April, 1956".

The Period Reviewed

Due to both public and departmental pressures, the government in 1930 lifted all protection from deer, except in the case of moose and wapiti, and, through the Department of Internal Affairs, initiated a deer-destruction campaign. The results of this campaign were, over the succeeding years, basically fourfold: (a) it tended to contain the rate of annual increase of deer rather than provide a final solution; (b) it provided hides for export and for a flourishing New Zealand leather industry; (c) it instigated further interest in, and attempts at, exporting venison by the private sector, and (d) it indicated to many people that deer could not be eliminated from the remote bush and mountainous areas of New Zealand.

At the start of the campaign, the public fully supported the official efforts. The shooters employed were keen, and considered that they were performing a necessary function, but by 1956 the Department had had difficulty in retaining suitable staff. While this may indicate some change in public attitude, with the shooters perhaps not seeing their jobs as being so important now, it is more likely that poor staff retention reflected the fact that employment conditions were not commensurate with those obtainable elsewhere. Steps taken to correct the matter appear to have been effective.

The trade in deer hides grew. During the war years, deer hides were in great demand, and perhaps were then seen as a resource for the war effort, but otherwise the deer were not seen as a resource per se. Instead, the skins were being utilised only to finance in part the cost of destroying the deer menace.

Finally, in 1956, the Forest Service was given overall responsibility for the deer-eradication programme. The Forest Service had first asked for this in 1925, before deer protection had been removed, and now, thirty-one years later, their request had been granted.

CHAPTER 4

CULTURAL ATTITUDES SWING AGAIN: 1956-1978

> Although deer had been exploited by man in New Zealand, mostly by killing them to obtain financial gain through exporting the hides and antlers, the deer themselves were not generally regarded as a resource. This form of exploitation was seen to be a way of controlling and exterminating a pest with minimum cost to the nation.
>
> Now "'natural resources' are in fact cultural appraisals" (Sauer, 1952, 2). By the end of the 1960's, deer were recognised as a resource for both farming and tourist purposes. In this chapter, the change in attitude is examined with particular reference to events which had occurred and which led directly to this change. Further changes followed in the 1970's, changes that enhanced the value of deer as a recreational resource.

The Forest Service Assumes Control

The assumption of control by the Forest Service did not interrupt the deer-destruction work in any way, as evidenced by the fact that the 1957 kill exceeded that of 1956. This was achieved by having all personnel involved in the work, together with the available stores and equipment, transferred from the Department of Internal Affairs to the Forest Service. At the same time, the Forest Service did not change the mode of operations, but instead concentrated upon absorbing its new unit and improving its servicing to it.

That the Forest Service did plan to alter its'modus operandi', however, was shown by its Annual Report of 1957, which stated:

> Because it has gradually become apparent that extermination cannot be achieved, it has been necessary to direct operations

> to areas where they will be most effective, this direction to be based on the need for better forest management or improved land use. It is becoming more and more necessary to concentrate on such areas. This closing-in will lead to smaller kills in the future, but to better results as far as forests and adjacent open country is concerned. (McKinnon and Coughlan, II, 47).

Furthermore, the same report continued that hunters would have to be trained not just to move in and kill many deer before moving on, but to "patiently reduce or if possible exterminate an animal population ..." while its controlling field officers "must be skilled both in assessing the effects of animals on the vegetation and in assessing animal populations and the likely effects of killing" (McKinnon and Coughlan, II, 47).

Despite the Forest Service's frequent claims that extermination was unattainable, at least without employing a new method or without massive injections of finance and manpower for the more effective use of the old methods, several groups of people opposed the move to place the problem in Forestry's hands. The Deerstalkers' Association was particularly upset by the Forest Service's intention to exterminate if at all possible, although this had been for many years the official policy of central government. The Forest Service had also previously experimented with a method for poisoning deer, and fear must have been felt in some quarters that poisoning would again be tried.

True to their stated intentions, the Forest Service in 1959 opened its Hunter Training School at Golden Downs Forest in Nelson. At this school, young men were to be given suitable training that would equip them adequately for the task of deer-destruction by shooting. After four weeks of intensive training, both practical and theoretical aspects being included, the trainees graduated to spend two months under close supervision at a relatively handy

operational base before being placed elsewhere as part of a conservancy team. High standards were set, and the course was not easy. Of the 47 entrants admitted in the first few months after its opening, there were only 26 still on the job six months later. Many had been dismissed as unsuitable, and others had left voluntarily of their own accord (N.Z.F.S. Annual Report, A.J.H.R., C.3, 59-60).

The establishment and operation of this school demonstrated quite clearly that the Forest Service, as had the Department of Internal Affairs before it, viewed rifles in the hands of experienced hunters as its major weapon in the 'war' on deer. It had altered substantially, however, the actual deployment of the men involved in the shooting. Where its predecessor had been placing single hunters on large areas, the Forest Service now introduced 'group' hunting by decreasing the area to be covered by a hunter. Further hut-building and track-cutting to assist this scheme was also carried out. Areas designated as "high priority" ones were selected for field operations against the deer. The label "priority" was attached to an area not because of the high numbers of deer there, but because of the effect the deer present were having on farmland, plantation or protection forests (N.Z.F.S. Annual Report, 1961, A.J.H.R., II, 27).

It was thus apparent that the Forest Service, whose stated aim was identical to that of its predecessor in so far as the deer problem was concerned, tackled the problem with a different yardstick for measuring success. It wished to do this in terms of the resources saved and in terms of less damage by soil erosion, flooding and the like, rather than in terms of high killing rates. Largely because of this change in emphasis as to what indicated success, the Forest Service, as evidenced by Table 3 and by the above quotation from its Annual Report of 1957, was quite content to accept a general decline in its annual total number of kills from 1957 onwards. As this number was held to be meaningless as a measure of success, the Forest Service did not use it from 1963 onwards, although

this cessation of its use must also have been prompted by the increasing use of a new and potent weapon, namely 1080 poison. The use of poison effectively prohibited the attainment of accurate figures of deer killed.

Table 3 Deer Destroyed in Official Operations, 1956-62

Year	1956	1957	1958	1959	1960	1961	1962
Deer Killed	54,946	63,583	44,990	41,870	31,494	29,809	35,596

Source: Annual Reports, N.Z.F.S.

Poisoning of Deer

As had perhaps been feared by some elements of the public, the Forest Service resumed experiments with poison, and then proceeded to make widespread use of it. Its Annual Report, 1959, stated that "the use of poisons must be implemented or attempted" (A.J.H.R., C.3, 70). Proof of public unrest over the issue was revealed further on in the same report with the statement that "Ill-considered and often reckless comment, designed to arouse concern and alarm in respect of official noxious animal control operations, was current during the year. This was particularly aimed at the use of poison" (A.J.H.R., 1959, C.3, 70).

"The public uneasiness finally decided the Minister of Forests, the Hon.E.T. Tirikatene, to call a meeting of representatives of organisations and Government departments ..." (Poole, 18). At this meeting, known as the 1958 Conference, many aspects of the deer question were debated, but with respect to the poisoning issue, the Forest Service did not change its attitude.

The trials with poison that had aroused public concern involved sodium fluoroacetate, commonly known as 1080. This chemical was selected because of its eminent practicability. It was technically simple, killed humanely, and unconsumed bait soon lost its toxicity. The trials occurred in the Caples Valley at the head of Lake Wakatipu where

fallow deer were a problem. In the trials, some 110 deer were definitely counted as having been killed (A.J.H.R., C.3, 1959, 65).

Two years later, while discussing its group hunting technique, the Forest Service pointed out the high manpower, and hence cost, involved with the method. It then stated:

> It is reassuring then at this stage to be able to turn to an alternative control method, an alternative which offers a high degree of efficiency for the future. The method is that of poisoning which ... has now been adopted as a standard control aid to be applied whenever effective and economic (A.J.H.R., C.3, 1961, 29).

The aerial spreading of poisoned baits thereafter became a potent tool of the Forest Service in its fight against deer. The Forest Service occasionally had doubts, as witnessed by its Annual Report of 1962 which stated that "It is not so much whether deer will accept (poisoned) bait, but whether enough of them will accept it to justify the expense of the operation" (A.J.H.R., C.3, 33), and it continued further experiments. In 1963, it found that in South Island poisoning operations, better results were obtained where animals had been pre-fed with non-toxic baits.

Although small sections of the public had protested vehemently about the poisoning of deer, and although complaints in subsequent years from farmers regarding stock losses due to stock eating the poisoned baits, and from ornithologists regarding similar deaths to members of various bird species, continued to be made, the fact that the Forest Service was able to continue with its poisoning of deer was indicative of the overall current cultural attitude to deer. They were despoilers of our forests, they caused serious conservation, soil erosion and water control problems, and the like. Let them be killed. People should not have to risk their land and resources

for the pleasure of a minority group of deerstalkers.

The Private Hunter as an Aid to Control

The Forest Service recognised the private hunter as a valuable aide in deer control, if not in deer extermination. In 1957 it stated that "Private hunters helped considerably in the control of deer ... for over 58,000 deerskins were exported in 1956. These came from private hunting ..." (A.J.H.R., C.3, 46). Furthermore, in 1961, it looked into the crystal ball, as it were, and stated that, "looking many years ahead, experience is being gained in transforming a weekend sport into an efficient animal control operation" (A.J.H.R., C.3, 31-32), and it visualised its programme of hut building and track cutting encouraging this.

Although its policy was extermination, a policy which it freely acknowledged to be unrealistic in terms of practical achievement, rather than one of control for the sake of deerstalkers, the Forest Service saw no reason why it should not permit private shooting as an aid to deer control in certain areas where it was not itself working at the time, in other words in the areas of low priority. While it was busy in the priority areas, the private stalker was seen to be helpful in keeping deer numbers down in other areas, thus perhaps preventing them too from attaining priority status.

It was with this objective in mind that the Forest Service announced in 1959 that it had made provision for the supply of free ammunition in exchange for tokens from slain deer. Only eight years later, however, this practice was abolished, not because the Forest Service changed its attitude to the effectiveness of private stalkers, but because most such stalkers were now selling to the commercial game meat firms. What is more, many private stalkers were no longer using .303 rifles, and the Forest Service could not cheaply supply alternative ammunition (A.J.H.R., C.3, 1967, 28).

The Wild Game Industry Booms

In 1953, a Christchurch businessman, J.R. Maddren, attempted to export venison, but found it unprofitable. Almost simultaneously, a Greymouth man, H.A. Buchanan, began to successfully pack venison, through the firm of Baille-Neville and Company, from Greymouth to the U.S.A. Initially, hind quarters only were purchased by him for processing. His packing work was done at the Greymouth airfield to start with, but later he rented space in local factories. Business grew very quickly, almost to the extent of receiving more meat than he could process, despite the extra labour he had hired.

Freezer units or safes were installed at smaller outlying towns, with appointed agents buying carcasses on commission. Trucks periodically collected carcasses from these collecting depots and rushed them through to Greymouth.

This one successful venture led, before the end of the 1950's, to other venison-packing companies starting up. Many more started in the early 1960's. It was not long before these companies not only purchased carcasses from private hunters, but they employed their own hunters to ensure a large and year-round inflow of carcasses. Landrovers, jet boats and aircraft were soon in use for getting men and supplies in to remote areas and for getting carcasses out.

The greater the number of carcasses, the cheaper the processing costs per carcass and hence the greater the profits. Competition between game packing companies for meat shot by private individuals increased, and resulted in price wars in many areas. The various companies tried to outbid each other for carcasses from this source.

Because of the intense rivalry and competition, and perhaps because they knew even at this stage that the deer population could not for long sustain such a high level of activity, companies became very dependent on technology. They were prepared to innovate to get an advantage over their competitors. Helicopters were used in 1962-3 to

transport men and supplies in and to carry carcasses out (Sutherland, 72). The hunters involved, however, often found that they had amassed numerous carcasses for the helicopter to lift out when the weather would close in, thereby stranding the party with its stockpile of venison for sometimes days at a time. Tons of venison was thus wasted, but this type of operation did lead to an increase in the amount of venison processed.

In 1964, shooting from the helicopter itself evolved (Sutherland, 73). It was so successful that all other companies rushed to follow suit. This raised production still further, but bad crashes marred the work for some time. Bad weather, too, often meant no flying, and machines were often grounded for maintenance. The excellent results achieved between such interruptions, however, ensured the popularity of this method with the companies involved, and it is still used today.

Innovations continued to be made. The availability of deer on the open tops had decreased markedly due to the success of the helicopter operations. Other deer were becoming wary of helicopters and were retreating to the forested areas where helicopter operations were less successful. Sirens were then fitted to the helicopters. These were used to frighten deer from the bush towards open areas where they could be shot more easily.

The firm, Luggate Game Packers Ltd., obtained the right to operate in the Fiordland area. To solve the problems posed by this large area with limited accessibility, they purchased the two ships, Ranginui and Hotonui, which served as mobile bases for the helicopter shooting forays. When the freezers on the ships were filled, they sailed to Milford or Invercargill to unload (Sutherland, 81).

As deer became scarce and less easy to get at, the intense competition increased still further, particularly in South Westland. Accusations of foul play abounded. Just before a helicopter flew in to shoot over an area,

a rival company often contrived to fly over the area, frightening all the deer. Deer were becoming adjusted to the new form of hunting, and the slightest sound of a helicopter forced them to take refuge. Thus when the machine belonging to the company which had the permit to shoot in the area arrived, very limited results were achieved.

Sometimes, even worse tactics were employed. Petrol dumps were interfered with, and complaints of sabotage to helicopters were made. The competition was turning sour and bitter.

While this industry was developing and carrying out operations, other interested groups in the community were developing varied attitudes towards it. Private hunters developed an intensive dislike of the helicopter companies, seeing in them a threat to their own profitable weekend and evening shooting. After a fruitless hunt, the chagrin and dislike experienced by a foot hunter was intense when a helicopter flew overhead with a large haul of carcasses suspended below it. Threats of shooting down a helicopter were frequent, but whether any such attempts were actually made is beyond the author's knowledge.

Other hunters on foot complained that, in turn, they had been nearly shot by the occupants of helicopters. Cases were often cited of men on foot stalking deer in basins, getting in close for a certain kill, when over the hill, bullets flying wildly from it, came a helicopter. Such incidents, however, were accidental and were not contrived. The fact that no one has been killed or wounded in such a situation would indicate that many such stories had been exaggerated, or even invented, by disappointed individuals attempting to cause disrepute for the helicopter-hunting operators.

It will be recalled that the Department of Internal Affairs offered no assistance when the venison-recovery industry first started. It questioned the long-term effects of such an industry on the extermination campaign.

As H.B. Gordon, Professor of Botany at Victoria University, wrote in a letter to the 'Evening Post', "It is well-known that when people are allowed to make money out of a pest animal, this leads to 'farming the pest'" (Forest and Bird, No.129, 1958, 4). The Department of Internal Affairs had also feared that, if people made good profits out of deer, they would then have a vested interest in seeing to it that the deer were not killed off.

When it assumed responsibility for the deer problem, the Forest Service kept a close eye on the development and activities of the game recovery operators, but otherwise kept a low profile on the matter. In 1965, however, its Annual Report showed its attitude to be generally favourable by stating that "Commercial hunting has undoubtedly assisted in reducing the number of noxious animals in some areas, and total yearly killings in this way may perhaps be as high as 20,000 to 25,000 deer" (A.J.H.R., C.3, 1965, 28).

The following year, the Forest Service reported that commercial hunters did not wish to hunt deer to the point of exterminating them, but instead desired to 'cream' the herds for a sustained yield of meat, and so were desirous of obtaining exclusive hunting rights for particular areas. Forestry's response was predictable. It stated that "it is essential that commercial interests do not become entrenched to the stage where profitable harvests are taken in perpetuity" and "There is no place for exclusive shooting rights with our noxious animal problems"(A.J.H.R., C.3, 1966, 31). It also stated that the income from the venison, then half a million pounds, was insignificant compared with the other values threatened by these animals. The commercial value of these animals had not altered the Forest Service's attitude to them.

By 1970, the game meat industry was forced to stabilise. With deer less abundant now, smaller companies could not compete. They either closed up or were absorbed by the larger companies. This consolidation and retrenchment within the industry continued, but efforts were made to find alternatives. To keep their processing plants viable,

the companies needed a constant and dependable source of meat. The feral herds could no longer provide this, and pressure had been exerted on the government to permit the farming of deer.

The Markets for Venison

Table 4 shows that the United States of America provided the initial market for venison. Its share soon dropped as a European market was located, the United Kingdom and Belgium purchasing substantial amounts. Markets were located in Jamaica, Japan, West Germany and the Netherlands, and each of these countries assumed prominence as a major buyer of New Zealand venison. Since first evincing an interest in New Zealand venison in 1958, the portion of our venison sales to West Germany quickly rose to a position of dominance. Over the last nine years, West Germany took from 65 percent to 83.6 percent of our total annual export of venison.

These large sales to West Germany have been caused by several factors. Germans have traditionally been great consumers of game meat. While they will, and in fact do, eat the flesh of domesticated animals, their preference is for game meat, and they have been prepared to pay for this culinary treat.

When New Zealand first commenced supplying countries in Western Europe with venison, it faced competition, not only from local game meats, but also from imports from East European countries. West Germany was certainly purchasing the major portion of its requirement for wild venison from northern and eastern Europe, when in 1967 a large and widespread outbreak of foot and mouth disease occurred in Europe. The countries there cooperated with each other in their efforts to contain and then eliminate the disease. Stock movements across borders were stopped, and shipments of meat were not allowed to enter the region unless it could be proven that they originated from regions free of the disease. These controls were strictly enforced, and their major impact for Western Germany was that it then

Table 4: Market Percentages of Total Venison Exports for Some Principal Markets

	1953	1954	1955	1956	1957	1958	1959	1960	1961	1962	1963	1964	1965
USA	100	68.2	18.9	11.5	11.4		1.8	3.3	2.7	1.2	5.0	1.4	0.9
U.K.			42.0	60.7	3.3		0.1				0.3		neg
Belgium and Luxembourg			25.0	13.1	9.0	1.4	5.8	5.6					
Fiji			14.1	5.3		6.4	3.2	0.3	0.6	0.8			
Jamaica				0.3	12.6	34.7	39.1	29.5	12.0	6.1			
Trinidad and Tobago					0.7	10.7	12.7	9.1	9.4	2.0	0.05		
Japan					62.9	45.4	11.4	19.0	6.2	6.7			
Hong Kong						0.02	0.2	0.1	0.2	0.8	0.03	0.2	0.2
West Germany						1.3	15.0	27.2	48.0	46.4	72.3	46.7	55.1
Netherlands							6.7		0.1	7.6	22.0	49.4	40.1
Australia									0.08				
Switzerland									2.8	21.2	0.07	1.9	2.2
France										0.03		0.2	0.8
Sweden												0.03	
Total	100	68.2	100.0	90.9	99.9	99.9	96.2	94.1	82.0	92.8	99.8	99.8	99.3

Continued over Page

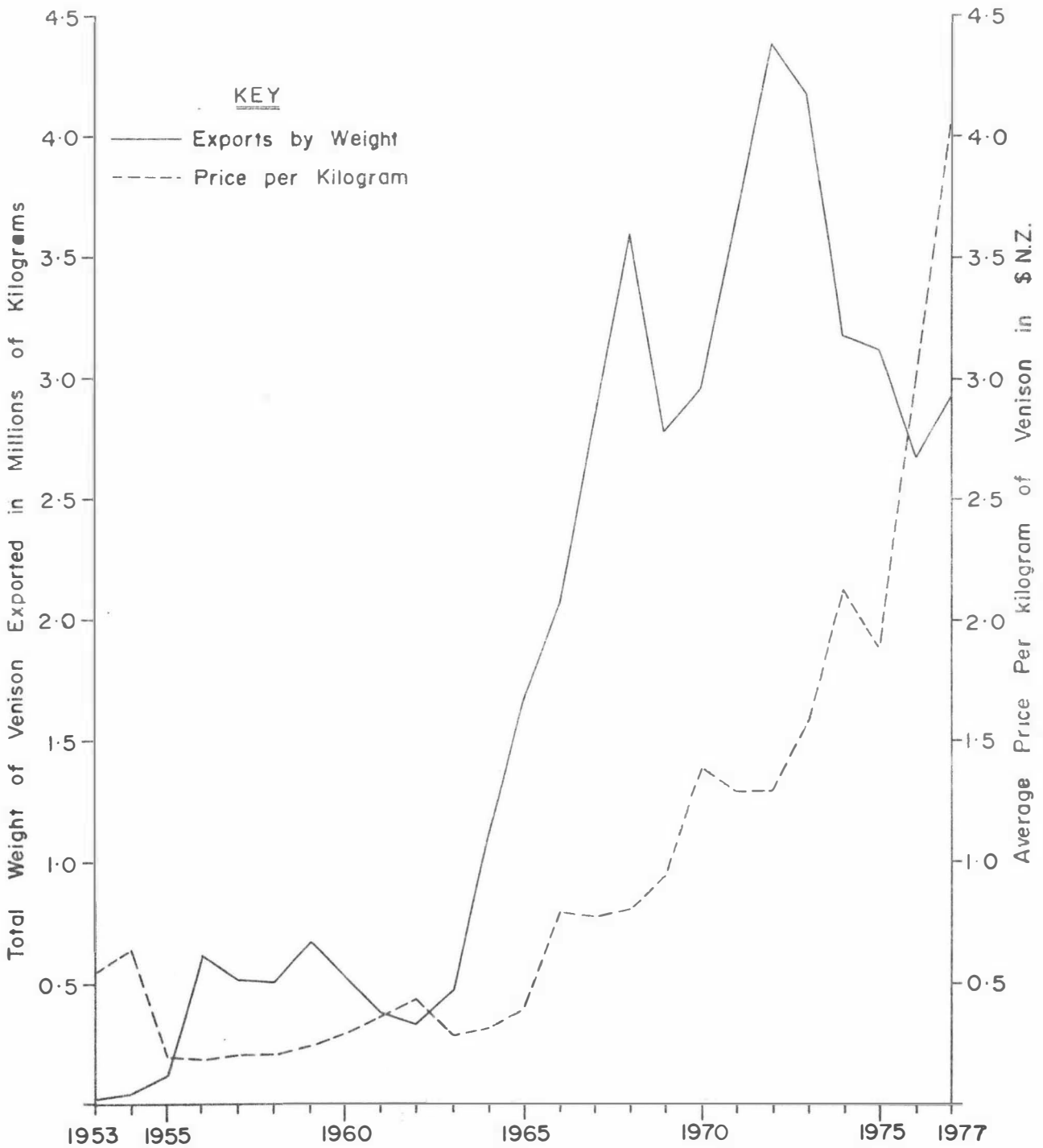
	1966	1967	1968	1969	1970	1971	1972	1973	1974	1975	1976	1977
USA	2.6	3.0	2.3	1.5	1.4	1.5	1.1	1.9	2.5	1.8	1.9	2.9
U.K.				neg	0.03							
Belgium and Luxembourg	0.04	0.2	0.7	0.8	1.5	2.2	1.9	1.0	1.1	0.2	0.4	0.1
Fiji								0.01	neg	0.01	0.03	0.07
Jamaica				neg	neg	0.01	0.01					
Trinidad and Tobago												
Japan				neg	neg	0.03	0.05	0.2	0.2	0.3	0.1	0.6
Hong Kong	0.01	0.1	0.1	0.3	0.1	0.4	0.02	0.3	0.4	0.3	1.2	1.9
West Germany	50.2	69.8	62.3	70.5	67.0	67.1	78.0	68.5	65.0	75.9	83.6	76.1
Netherlands	29.7	18.9	20.7	10.4	12.4	11.8	7.8	17.9	21.8	16.2	9.2	9.6
Australia			neg		0.2				0.01		0.3	0.3
Switzerland	0.3	1.8	1.8	2.7	6.0	4.0	1.9	2.4	3.0	1.3		0.8
France	2.4	1.3	3.1	3.0	0.7	3.0	1.0	0.8	0.5	0.1	0.9	1.1
Sweden	14.3	3.1	7.3	9.1	8.8	8.0	5.6	5.6	4.2	2.7	0.5	4.5
Total	99.6	98.1	88.3	98.3	98.1	98.0	97.4	98.3	98.7	98.8	98.1	98.0

Source: N.Z. Dept. of Statistics: External Trade Export:Commodity by Country and Country by Commodity

had no access to its sources of game venison in Eastern Europe, nor to its sources of reindeer meats in Northern Europe. New Zealand, free of foot and mouth disease, was the only alternative source, so West Germany purchased increasingly more from this source.

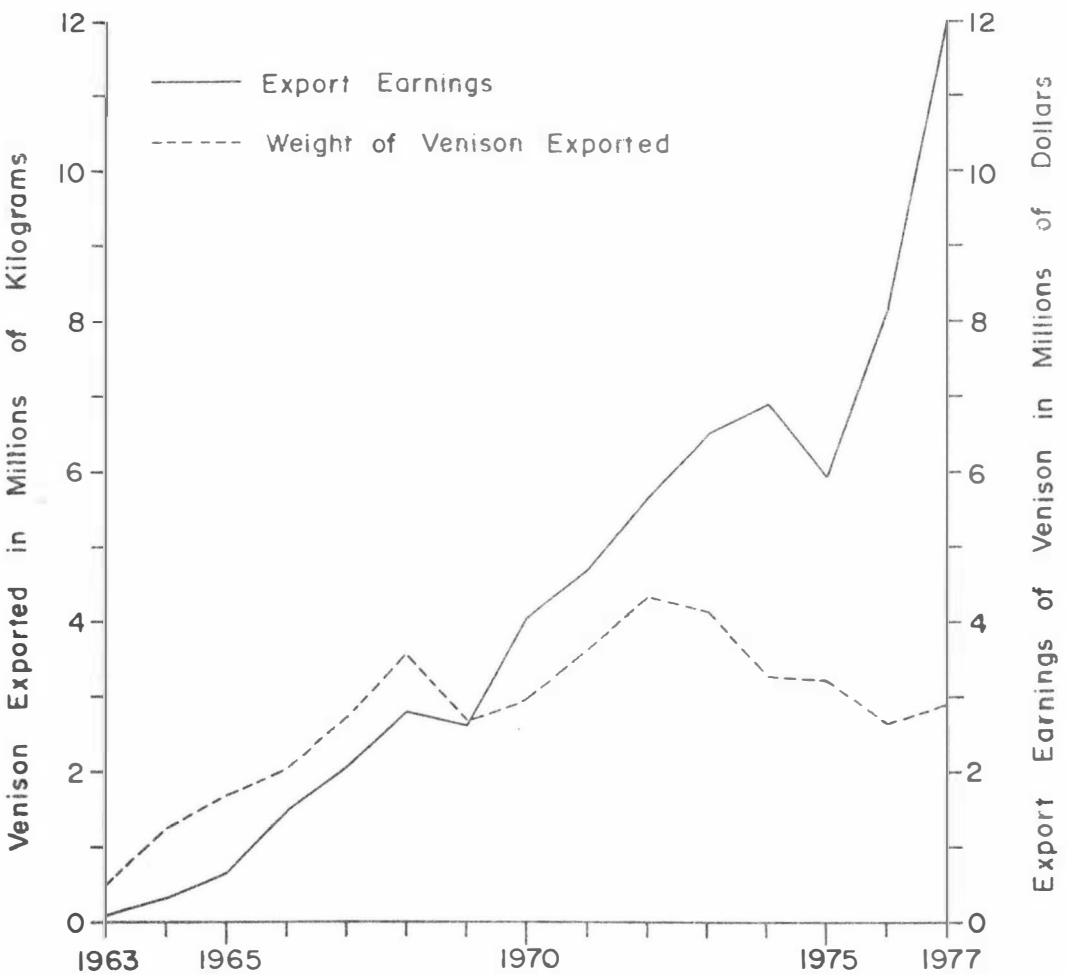
Prior to the European outbreak of foot and mouth disease, prices had not been particularly high for venison, as may be seen in Figure 4. Prices now rose as West Germany sought to dominate the market in its bid to make up for its lost imports from its other sources. By the time the outbreak was over, and European countries eased the restrictions placed on meat shipments, New Zealand exporters of game meat had effectively 'cornered' the market. Many previous suppliers from other countries had, in the meantime, either limited their production or had ceased it altogether. This, together with the fact that the West Germans were well satisfied with the New Zealand product, meant that West Germany continued its large purchases here, and so prices continued to remain high, even increasing further at times. As the total venison exports have tended to decrease since 1972, so there has tended to be a more than compensatory increase in price (Fig.4). The value of venison exports to New Zealand has increased quite dramatically since 1972, even though the volume of this trade has generally declined (Fig.5). The decline in the volume of trade is accounted for by the high hunting pressures exerted on the feral deer in previous years by the game recovery industry, and the increasing prices and hence income by the resultant greater competition among the purchasers. Furthermore, tremendous efforts had been made over the years to increase standards of hygiene in the packing plants, and some factories, such as Donaghys Industries Ltd. of Dunedin, Luggate Game Packers Ltd. of Luggate, and Prepared Foods Ltd. of Palmerston North, were now processing the venison rather than just packing it. This would add value to the product.

Figure 4 Exports of Venison by Weight and by Price



Source : See Appendix III

Fig. 5 Export of Venison From New Zealand by Weight and by Income Earned



Source : See Appendix III

After its initial importance as the major market for venison, the United States has always, except for 1958, accepted smaller quantities. This has occurred not because of changes in the American consumer taste, but because of legal restrictions placed by the majority of the states on the importation of meat that has not been slaughtered and processed under approved conditions. The meat that is imported must be accompanied by prescribed post- and ante-mortem certificates. The New York area, however, has continued to import select cuts of venison, and these mostly go to the restaurant and hotel trade.

Within Europe, West Germany is not the only significant market for venison, although it is the major one. The Netherlands, too, has been a major buyer, with Switzerland, France, Sweden, Belgium, Italy, Austria and Norway all purchasing venison from New Zealand over the years.

Markets have not only been located in Western Europe and North America. The Caribbean countries of Bermuda, Jamaica, Trinidad and Tobago, Puerto Rico and the Netherlands Antilles (or Curacao) have all at times purchased significant amounts of venison. Asian markets have been found in Japan, Taiwan, Hong Kong, Ceylon, Indonesia, Malaya (and later Malaysia), Thailand and Singapore. Japan in particular provided a major market in the late 1950's and early 1960's. The oceanic countries of Fiji, American Samoa, Hawaii, Society Islands, Nauru, French Polynesia, Guam, New Caledonia, Papua and the New Hebrides, as well as Australia, have provided over the years a smaller market. The Middle Eastern nations of Kuwait and Qatar have recently bought New Zealand venison too. In 1977, New Zealand had venison markets in 22 countries. Some are small, like New Caledonia which purchased 26 kilograms, and others like West Germany, which took 2,216,303 kilograms, are large. The markets are distributed around the world on all populated continents, but very little has gone to African, South American and Middle East countries. With the 1977 export price exceeding four dollars per kilogram, it is of little surprise that the third world countries are

poorly represented in the list of venison markets, but the increasing affluence of the Middle East may lead to more and greater sales in that area.

The Re-Emergence of Hunting for Tourists

Although hunting for tourists had once been a good money-earner for New Zealand, the practice had more or less died out due to the poorer quality of trophy heads and due to the prevailing cultural attitude. With the growing tourist business of the 1960's, however, the practice became widespread again, and hunting by tourists became a big business.

Some South Island high country stations found it very profitable to run a tourist lodge offering hunting and fishing. Erewhon and Mesopotamia were two such examples. In the strictest sense, these enterprises were not legal as the landholders were legally obliged to keep their land free from noxious animals, and with such a business venture they were not even likely to try to meet their obligation.

Other companies were formed to conduct safaris on unoccupied Crown lands. These companies used landrovers, jet boats and aircraft to get their clients to a locality which offered good shooting. It had been estimated, though, that "each animal shot by a tourist is worth between 300 dollars and 1000 dollars to the country" (Sutherland, 114), so the investment in lodges and modes of transportation was soundly based.

The safari companies and stations offering hunting to the tourist, like the game recovery industry, had vested interests in seeing that 'their' herds of deer[1] were not hunted to extinction, although many safari operators utilising unoccupied Crown lands were forced out of business because of the operations of commercial meat hunters. The stations concerned were not now prepared to admit ordinary, non-paying weekend deerstalkers on to their lands, a fact

[1] By law, deer belong to the government until legally shot or taken.

which rather annoyed the Deerstalkers' Association which saw the trend as being one which would end in all people having to pay to shoot a deer. They argued that this should not be, as the deer legally belonged to the government, and hence to the people of the country, until legally shot or taken. The government caucus committee of 1974, however, did not agree with this, and stated that "The Committee does not regard the Safari tourist hunting of some landholders as assigning exclusive hunting rights. In these cases the operators are selling a service, not the right to hunt animals" (Report to the Minister of Forests, 66-67).

Before this, though, the Forest Service had stated in 1958 that "much attention has been given to the encouragement of overseas tourist shooters in order to attract overseas funds. Certain organisations are advancing a policy which comes very close to harbouring noxious animals for the purpose of sport" (McKinnon and Coughlan, II, 52). The Forest Service, obviously, did not like the development of safari hunting, and reserved the right to move in on lands used for this purpose if the herds of deer there grew to what it considered to be undesirable numbers. With such deer being generally free to range wherever they liked, the Forest Service would have doubtless preferred to see these ventures closed down.

The government caucus committee of 1974 stated that it did not object to the principle of safari hunting as long as it was compatible with wise land use and as long as no special privileges were given for hunting on publically-owned lands. It recommended that safari hunting operators should be licensed and monitored to ensure that herd populations were kept in control. With respect to the dangers inherent in safari operations, the report stated that not all the country involved was prone to erosion as valley flats and low country were also used, but that it was difficult to keep the deer on such areas without them straying on to areas prone to erosion. It stated that this would have to be given some consideration (Report to the

Minister of Forests, pp.14, 46-48). The Land Amendment Act 1975 subsequently made provision for such commercial undertakings as safari hunting, but it specified that the required licences would be granted only if the Board considered such ventures could be properly undertaken on the land involved. These licences were also subject to conditions being met that would satisfy water and soil conservation requirements and erosion-prevention measures, and that followed town and country planning ordinances. As these conditions frequently meant that large areas had to be fenced in, many small safari operators were effectively forced out of business. The act, however, was successful in legitimising the safari hunting industry and in exerting control over it.

Attitudes to Feral Deer Change Significantly

The outstanding success of the commercial operators in reducing substantially the populations of deer in areas designated by the Forest Service as low priority, together with the continued operations in the areas of high priority by official shooters, meant that the Forest Service had, by the end of the 1960's, concluded that the deer problem was controlled, even if not eradicated. In 1970, its Annual Report stated:

> Most Forest Service control operations are now at a level designed to maintain the noxious animals concerned at low production levels in priority catchments. This maintenance level of control has been reached in practically all areas ... The level of control brings populations generally below those that sport or commercial hunters find attractive or profitable. Consequently the Forest Service has continually to maintain the pressure needed (A.J.H.R., C.3, 1970, 32).

Clearly, the Forest Service was prepared to continue control operations on deer populations where it saw fit, a fact

borne out in the two succeeding years when it stated that difficulties had been experienced in recruiting experienced hunters.

It had, however, for many years been stating that complete extermination was impossible, and now that control of deer populations had basically been achieved, it was prepared to listen more sympathetically to the pleas of the Deerstalkers' Association on the question of game management. The fact that deer were being more favourably viewed by the general population because of the large national earnings from venison exports and tourist hunting, together with the fact that legislation in 1969 had been passed to permit the legal farming of deer, perhaps helped induce this more favourable change in attitude of the Forest Service to the arguments put forward by the Deerstalkers' Association.

The Deerstalkers' Association had been agitating without success for years to have the Forest Service apply a policy of game management rather than one of extermination. For example, the 1958 Conference, which resulted from the poisoning trials of the Forest Service, discussed many themes, one of which was the recreational values of hunting. The then Minister of Forests, the Hon. E.T. Tirikatene, stated that "Representations by the deerstalkers for the culling of certain deer herds in order to improve trophy values for New Zealanders and overseas shooters did not meet with any general approval" (Poole, 20).

J.T. Dillon, President of the New Zealand Deerstalkers' Association, wrote in 1965,

> In presenting our submissions to this select committee I would like to make it clear that the N.Z.D.S.A. policy is not to have herds of uncontrolled game animals throughout New Zealand. However, we honestly believe there are areas in New Zealand where herds of game animals could be controlled in compatibility

with the required regeneration (New Zealand Wild Life, No.11, 17-19).

Three years later, in 1968, S.N. Adams wrote that "New Zealand's attitude on deer is steadily changing .... The time is now ripe, where deer are concerned, to move out of the 'noxious animal' era into the game management era" (New Zealand Wild Life, 23, 18-23).

This time, because of the more favourable attitudes prevailing towards deer, an official body found in their favour. In 1974 the government caucus committee on noxious animals' control and related matters produced a report containing 40 recommendations. Those pertinent to this discussion are:

30. That for the areas mentioned below and for others which the New Zealand Forest Service may from time to time specify, control of noxious animals be through recreational hunting alone:
    (a) sambar deer in the Manawatu and Rotorua
    (b) white-tail deer at the head of Lake Wakatipu
    (c) fallow deer in the Kaipara, Wanganui and Blue Mountains regions
    (d) rusa deer in the Galatea region
    (e) red deer in north west Nelson
    (f) red deer in the Kaimanawa Ranges

31. That recreational hunting in these areas be a specific objective of land management.

32. That no action be taken to remove any species from the schedule of noxious animals in the Wildlife Act 1953.

33. That the Government reserve the right to reimpose commercial or official hunting should it be demonstrated that recreational hunting is inadequate in maintaining the necessary degree of control of

animals (Report to the Minister of Forests, 7).

Recommendations 30 and 31 depict the extent of the divergence from previous attitudes. Deer in certain areas were to be given official cognizance as game animals for recreational hunting alone. To all intents and purposes, the animals in these regions were no longer to be thought of as noxious, but it is clear from recommendations 32 and 33 that they were officially to remain in the noxious category. This, however, was merely as a safeguard so that the Forest Service could, if it felt the deer populations in those particular areas were growing beyond the desired limits, mount operations to correct the matter without having to wait for legislation to be passed that would give them the authority to do it. Certainly, the recommendations fall into line with the philosophy of the Forests Act 1949 which stated that "recreation is a legitimate and desirable objective, providing that the well-being of the forest is not adversely affected" (McKelvey, 177), but perhaps they imparted a further, particular direction to it which had been lacking before.

The subsequent Wild Animal Control Act 1977 made legal the provision that areas of land which were to be notified in the Gazette and on which wild animals were present "shall form or be part of a recreational hunting area where hunting as a means of recreation is to be used to control (though not exclusively) the numbers of wild animals" (Wild Animal Control Act 1977, 37). The Annual Report of the Forest Service in 1978 stated that fourteen recreation areas with a total area of 110,720 hectares had been gazetted. It is obvious that the Forest Service had anticipated the passing of this act, and had been working towards the establishment of these recreation areas for some time before the act itself was passed.

Although the act stated that recreational hunting was not to be the only control measure used, it was apparent that even if the recreational hunting did keep deer populations in check, the Forest Service would not seek to employ other methods in these areas. This is a clear indication

that deer in New Zealand are now officially recognised once more as having value as game or sporting animals, and that game management, as envisaged for so many years now by the Deerstalkers' Association, may soon be a reality.

The Effects of the Venison Trade

The 1960's saw the venison-exporting business boom from a small but flourishing industry to become a multi-million dollar income-earner. The companies involved, although they had doubtless realised when they first started up that it was to be a short-lived venture of high profits, now had considerable investments in not only the knowledge and technology for deer shooting, but also for the necessary processing. With deer becoming more difficult to shoot in sufficiently economic numbers, the companies involved looked for alternatives. The best, deer farming, was one which they hoped would not only make up for any shortfall in wild game, but which would provide them with a constant source of carcasses. Any business, to remain viable and to be able to plan ahead for future development, needs to be assured of the continuity of supplies of inputs, as a lack of these threatens economic viability by causing capital, in the form of plant and labour, to remain idle for periods of time. Pressure was thus brought to bear on official circles to permit the farming of deer.

This development was not unexpected, for the Department of Internal Affairs had foreseen the likelihood of it arising when it did not offer assistance to the infant industry. The Forest Service had already denied companies individual hunting rights for large tracts of bush and mountain, and had done its best to stop the practice of 'creaming' the herds. Deer were still noxious, and were still regarded as vermin to be exterminated whenever and wherever possible.

Prior to 1956, a few people had tentatively formed ideas on keeping and farming deer. Tabart (New Zealand Deer Farming Annual, 1976, 25-37) related the efforts of one such pioneer, T.R. (Rex) Giles who later became very

active in both the venison export field and deer farming. Two pieces of legislation in 1956, however, effectively curtailed all such attempts.

The Wildlife Amendment Act 1956 placed deer, along with other pests such as the goat, wallaby and opossum, in the sixth schedule, which was a new schedule specifically created for animals that were to be termed noxious and to which the Noxious Animals Act 1956 was to apply. The keeping of noxious animals in captivity was effectively forbidden by the clause which stated:

> No person shall, without the prior written authority of the Director ... capture or attempt to capture or have in his possession for the purpose of liberating or turning at large .... any animal of any species specified in the Sixth Schedule (McKinnon and Coughlan, VIII, 90).

Although a deer farmer obviously would not wish to turn at large, in the broadest sense of the word, any deer he had, the permission of the Director-General of Forests had still to be obtained. A man keeping some deer in a paddock would find it difficult to explain, and indeed prove, that he was not about to liberate them at some future date. That some people evinced a desire to do so, however, is indicated by the Noxious Animals Amendment Act 1962 which stated that "No person shall .... keep in captivity any deer .... except pursuant to a permit granted by the Director-General" (McKinnon and Coughlan, VIII, 95). This was a positive statement that brooked no argument, regardless of the intention behind the desire to keep deer.

In 1963 a select committee was formed to examine and report on all aspects of deer in New Zealand. The committee heard submissions from many official and public bodies, and it soon became apparent that again two diverse poles of thought were being presented as well as an intermediate range of ideas. The largest group, which desired a contin-

uation of the status quo, consisted of the Forest Service, Catchment Boards, National Parks Boards and the Royal Forest and Bird Protection Society. This group opposed any relaxation of legislation that would serve to enhance the value of deer to society (McGregor, 8).

Opposing this group was a smaller but very vocal group of people concerned with the commercial exploitation of deer. They argued that the game recovery industry had done much to contain the deer problem, and that it could only continue this work if carcasses were readily available from farming sources to help eke out the supply of carcasses from the dwindling feral herds. The Deerstalkers' Association, perhaps seeing any move resulting in an enhanced status for deer as a move in a desirable direction - that is towards game management rather than eradication - threw its support behind this group. They submitted that the commercial value of deer products was just being recognised, and that the Government would be foolish not to recognise it as a potentially valuable source of foreign funds (Henderson, 43). They saw much land that was otherwise economically useless as being put to good use by deer farmers without any erosion or other problems arising.

When it presented its findings in 1965, the committee's two major recommendations were that deer should remain on the noxious animals list and that deer farming should be permitted provided that certain strict provisions, designed to prevent the farmed deer from escaping and infesting or reinfesting the land, be adhered to. The first of these recommendations caused little surprise as no group had argued convincingly against it, but the second was quite controversial. If implemented, it would effectively reverse previous legislation.

It is quite certain that this latter recommendation was reached because of the growing value of the trade in venison and other deer products, and because an established industry would fail without an assured and regular supply of input. This failure would then place almost all the work

of deer control back in the hands of the Forest Service which would not, in all likelihood, be able to cope with it.

By recommending the legal farming of deer, the select committee was suggesting that deer were now a resource, a resource that should not be hunted to extinction, but rather should be managed as a replenishable one. This, however, was to be done only under strictly controlled conditions that were culturally feasible. It had been proven already by the game recovery industry that the strictly controlled levels desired in the feral herds could not be, or would not be, attained by society at that time, so domesticating the animals, if this was possible, was the only recourse.

In 1966, the recommendations, as made by the select committee, were approved in principle, but this did not legalise them. Heartened by this approval, a couple of companies engaged in the recovery of game meat, in particular Consolidated Traders Limited of Wellington - founded by the Rex Giles already mentioned -announced plans of establishing deer farms. They could, however, do little else but plan until the recommendations were passed by Parliament.

A bill designed to legalise the farming of deer in New Zealand was brought before Parliament on 6 October, 1967. It took note of the fears and attitudes of groups such as the Forest Service and the Royal Forest and Bird Protection Society, as expressed by the select committee. This bill, which became known as the Noxious Animals Amendment Act, was passed with a singular lack of opposition, a fact which surely served to indicate that the people of New Zealand were prepared to accept deer as a resource.

Eventually, on 23 April, 1969, the Noxious Animals in Captivity Regulations, which governed deer farming, were gazetted. It had taken a seemingly unconscionable period of time to get this far because of the fears of farmed deer escaping to establish or re-establish large feral herds. The Department of Lands and Survey, the Forest

Service, the Ministry of Works and the Department of Agriculture cooperated in drafting what they considered to be foolproof regulations.(These are given in Appendix IV, and will be referred to more fully later on). As long as the regulations were adhered to, deer farming was now a legitimate enterprise.

Because of the fears that escaped deer might lead to areas, that had been free of deer, becoming infested by them, the Noxious Animals in Captivity Regulations limited the farming of each species of deer to areas which were deemed to be within the feral range of its own species. With the successful farming of deer, and because of pressures exerted by the Deer Farmers' Association for reasons which shall be examined later, the Wild Animal Control Act 1977 partly rescinded this. This move, which further demonstrated the more liberal and easier attitude prevailing towards deer, permitted the farming of species of deer outside their own feral ranges as long as they still remained within the feral range of another species of deer (Wild Animal Control Act 1977, 16).

The Period Reviewed

The relatively short interval from 1956 to 1978 witnessed major changes in people's attitudes to deer, and these changes were reflected in changing policies and modifications to the country's laws. In 1956, all deer were regarded as noxious and were to be exterminated, although doubts as to the achievement of extermination had been expressed earlier. By 1978, deer held behind fences that met certain strict regulations were not held to be noxious and could be farmed. Furthermore, by 1978, deer were seen to have value, both in earning tourist dollars and in providing sport for the New Zealand citizen. This had not been so in 1956.

These radical changes were brought about by two major factors. Firstly, the export of venison at very high prices, which provided a growing national income of some substance, had created an industry which in turn had made

a substantial investment in plant, machinery and skilled labour. The industry was now thought to be rapidly approaching the point of becoming largely uneconomic in its operations due to the depletion of its major input, deer carcasses. Failure of the industry, it was thought, would lead to a substantial loss in income, to capital-intensive equipment lying idle, and to rapidly expanding herds of deer which the Forest Service could not, in all likelihood, cope with.

Secondly, the Forest Service considered the country to have the deer problem under control. With deer no longer seen to be a major menace to the nation, the Forest Service and the general public considered it safe to ease their attitudes. When they were seen to be a major threat to the country, attitudes against deer were stern and harsh. Once the threat was under control, attitudes could be more lenient.

In this short period of 22 years, deer had officially moved from a status of vermin to one where some of them, depending on their area of habitation, were viewed as a valued resource. This had evolved through man's attempts to gain control over the deer population, and in the process discovered that he could not only achieve this by employing modern technology such as helicopters, but that to him the deer were now a valued resource. Control over the sizes of deer populations had allowed man to reappraise his environment. He had now found a way in which deer could be a valued resource within it.

PART TWO

DEER AS A FARMED RESOURCE IN NEW ZEALAND

Plate 1: Farmed Deer Are a Reality

CHAPTER 5

THE GROWTH AND VIABILITY OF THE DEER FARMING INDUSTRY

Part One of this thesis was devoted to tracing the historical aspects of the development of attitudes to deer in New Zealand to provide a better understanding of the legislative controls that are exercised by government departments over the deer farming industry, and the reasons for them. With the farming of deer being viewed as a legitimate enterprise from 1969 onwards, this sector of the farming industry has enjoyed considerable growth. The purpose of this chapter is to examine aspects of the deer farming industry that illustrate its economic viability, and to view the directions it has taken during its growth process.

Domestication of Deer

When the farming of deer was first legalised in 1969, the practice of deer farming had not previously been undertaken by any community in the world, the only domesticated species of the deer family being the reindeer (Page, 105; Sauer, 1952, 90). There is no clear evidence of how reindeer first became domesticated, but apparently theories on the subject abound. Sauer, who considered that herd animals could not have been domesticated until man had settled down into the sedentary life of a seed farmer, saw the reindeer as a domesticate that was "a belated substitute added when pastoralism spread into the margins of the Arctic" (Sauer, 1952, 90). Several years later, Zeuner disagreed, and instead ascribed the domestication of reindeer to the use of live decoy reindeer. He considered that tame stags had ropes looped about their antlers and were then freed near a wild herd. A fight would soon develop between the tame stag and the wild one, the antlers of the wild stag would become entangled in the rope so that it could not disengage itself, and the hunter would then approach to kill the wild stag. Zeuner did, however, partly concede

to Sauer's theory by admitting the strong likelihood that the use of the reindeer as a riding and draught animal, and as a provider of milk, was not achieved until practices applied elsewhere to horses and cows had diffused to the area at a late date (Zeuner, 46 and 112). Heine-Geldern proferred a third theory. He saw the domestication of reindeer occurring as a result of the Siberian people adopting, from their southern neighbours who bred horses and cattle, the principle of domestication (International Encyclopedia of the Social Sciences, IV, 170). To him, the principle of domestication had diffused to Siberia, and the adopters then applied it to the reindeer.

Although both Page and Sauer, among others, considered reindeer to be the only domesticated deer, there is some evidence that domesticated deer of other species have been kept in Russia and China. It has been stated of these countries that "for centuries deer have been killed in the wild or farmed. It is unfortunate that little is known ... as their experience could be of great value" (Wallis and Faulks, 196). It is, however, doubtful whether these deer, most of which would probably be reindeer, were farmed in the true sense, or were herded by herdsmen who lived a nomadic life.

It cannot be disputed that, for hundreds of years, deer management had been carried on in the deer parks of Britain and Europe, but again this practice can scarcely be called deer farming. Enquiries into the feasibility of farming deer had certainly been going on in Scotland, notably at the Rowett Research Institute, before the farming of deer became acceptable in New Zealand, and it is undoubtedly from this source that several of our pioneer deer farmers received some of their initial ideas, if not their original inspiration. Scotland, however, was more noted for its game management than for its deer farming, which had not really progressed beyond the stage of research by 1969. Its substantial venison exports to Europe were derived largely from the culled animals of the park herds, or from other wild game.

It would thus appear that deer farming, as a culturally recognised activity and distinct from herding and game management, was definitely a "first" for New Zealand. It is difficult to determine whether the original idea evolved independently in both Scotland and New Zealand, or whether the idea developed in the one country and was then diffused to the other. If the latter is the case, and Sauer would have us believe that independent, parallel invention is extremely rare (Sauer, 1952, 3), then the writer would tend to give Scotland the credit for the original idea and New Zealand the credit for successfully transferring and implementing the innovation into a successful, practical and established industry.

The New Zealand deer farmer, then, is truly a pioneer. Those who started farming deer in the late 1960's and early 1970's were, of necessity, self-reliant. Knowledge was extremely limited and one could even, with some truth, say that it was non-existent. Farmers were forced to rely, in the first instance, on their own knowledge of feral deer behaviour, and, in the second instance, on trial and error. Expensive mistakes were made and these factors, among others, undoubtedly led to the initially slow expansion of the industry. With perseverance, however, successful ideas and methods were developed. These spread and diffused through the industry, and as they did so, the industry itself expanded. The triumph of the initial pioneers in developing successful working methods, together with the increasing prices being offered for deer products, caused a further and greater expansion of the industry from 1975-1978 (Table 5).

There was a small group who had obviously anticipated the change in the law and so had started deer farming activities before 1969. Thereafter, growth within the infant industry was slow until the 1975-1977 period when there occurred a substantial increase in the numbers deciding to farm deer. The numbers of applications for licences to hold deer subsequently increased, the applications for both 1976 and 1977 approximately doubling that

Table 5 Growth of the Industry by Numbers Involved[1]

Year	Pre 1969	'69	'70	'71	'72	'73	'74	'75	'76	'77	'78	Not Yet	Total
First Decided to Farm Deer	15	8	15	12	12	16	19	27	57	65	23		269
First Applied for Licence to hold Deer		15	8	10	18	14	20	21	45	83	29		263
First Began Operating Deer Unit	11	4	10	9	16	9	13	11	36	69	51	24	263

[1] Unless otherwise acknowledged, all work from here on is original and is based on survey results. The questionnaire may be seen in Appendix V.

of the preceding year, a clear reflection of the confidence within the industry as the result of the increasing prices and the success of the evolving methods of management. The year 1977 saw the largest number of farmers commence operations in the deer farming sector (Table 5). The smaller numbers shown for 1978 do not necessarily reflect a deceleration in the growth of the industry. Instead, they rather reflect an attitude by those farmers who may have contributed towards the 1978 figures, but who did not do so because they were new to the industry, and so felt that they could not contribute much to this investigation. Many of those who did not respond to the questionnaire circulated, it is felt, may have been such people. Of the 36 questionnaires returned that could not be used, the largest group of 12 were from people who had only home consumption units or pet deer. The second largest group of 10 , however, stated quite clearly that they were unable to answer since as yet they had no deer. Many of those who did not respond may have felt the same, and this perhaps accounted for their suspected lack of response. Furthermore, the year 1978 was only half completed at the time of the survey.

Capture of Deer

Except for the small and rare groups of deer being held as pets or by intending deer farmers, who anticipated the forthcoming change in the law, there were no domestic deer in New Zealand prior to 1969. This meant that all stock had to be captured from the wild herds, and several methods of achieving this were adopted. The most successful methods are described briefly as:

a) The installation of ramps outside the deer-proof fence that enable feral deer to jump into a paddock containing deer which were already being farmed.

b) The construction of capturing pens in the bush or elsewhere. The farmer or trapper would sometimes have oats, chou moellier, lucerne or swedes growing in the pens to attract the deer, it being well-known that deer would travel miles through native bush and grassy paddocks to

feed upon such crops (Dixon, 1977a, 53). When the deer were within the enclosure, they (or it) would eventually trip a wire which would result in the spring-loaded gate swinging shut.

c) The use of tranquilliser guns for darting wild deer, the marksmen operating from hovering helicopters. It sometimes took up to thirty minutes for a darted deer to drop, and in this time it would often travel for miles, sometimes losing the pursuing helicopter.

Three other methods which have been employed involve the captor leaping from a helicopter to bulldog a calf, particularly if the mother had been shot, and the use of a helicopter for herding large numbers of wild deer into a holding paddock which had specially-constructed lead-in wings to facilitate the task. The expense involved in this latter method ensured that its use was warranted only when the trapper was assured that its periodic use would ensure a continuous, large supply of deer. Finally, a few very fortunate individuals simply built their deer-proof boundary fences around herds already on their farms!

The deer, which had been captured at a distance from the farms, then had to be transported to them. Those darted by helicopter operators were frequently flown to the farm immediately after their capture, while they were still under the influence of the drug, but sometimes they were transported by road, particularly if the farm was some distance away. Deer captured in pens were usually transported by road too.

Deer are extremely nervous animals, but tend to travel well if treated gently and considerately. If this is not done, the stress caused by both capture and transportation can cause high fatality rates. Some like to keep the deer sedated while they are transporting them, but if this is impossible it is best to cover their heads so that they cannot see, or to transport them in darkened horse-float-type conveyances.

When the deer have arrived at the farm, it is expedient to keep them within a darkened shed for a day or two until they quieten down. An enclosure, so constructed that the deer cannot see through the walls, will suffice. Some farmers like to put already tamed deer in with them, particularly when they are eventually released into the open paddock. This, it is thought, helps to quieten them, and helps them especially to adjust to wire-fences. Wild deer tend not to see, or to ignore, wire strands.

The stress occasioned through capture, transportation and subsequent release into confined areas causes fatalities that, according to a 1974 account, amounted to as much as ten percent of the total caught. The same account related how a good hind, just captured at an expense of $200, upon release charged a fence and broke her neck (Wilson, 1974c, 21-23). The Annual Report of the Ministry of Agriculture and Fisheries in 1977, stated that this stress condition, called "myopathy", in recently-caught deer may kill from twenty to thirty percent of them (A.J.H.R., 1977, C.3, 29).

Even in the early 1970's, the cost of stocking the farm unit with deer was substantial, for example, by comparison with the cost of acquiring sheep. At $200 per head, although deer prices would vary according to the method of capture employed by the farmers, some of whom achieved a cheap but slow start by commencing only with fawns given to them by deerstalking friends, and with the risk of an immediate loss in stock of as much as thirty percent from myopathy, some farmers looked for alternative methods of stocking their farms or deer units.

A method, which is becoming increasingly popular, is to obtain stock by having an agreement with a game recovery or other established firm in the wild venison industry. Peter Elworthy of Papamoa deer farm in the Waitaki has described such an agreement:

> So great has been the capital cost of stocking with deer that we have entered into a partnership agreement with Wilson Neill. They provide the deer,

> while we at Papamoa provide the land and management. The progeny of the deer are divided between Wilson Neill and Papamoa for the five years of the agreement, and Papamoa replaces the original input of deer to Wilson Neill at the conclusion of those five years (Elworthy, 1977b, 173).

A variation on this theme is, for those situated in areas where feral deer are relatively numerous, to arrange for a helicopter company or private trapper to work over their private land for a proportion of the catch, usually one in every three or four captured.

Table 6 illustrates the numbers of deer farmers who did or did not have such an agreement when they commenced their deer farming operations. It is acknowledged that some farmers may already have established their herds by other means, but then decided to expand their operations and used such a method to enlarge their herds. Such a situation, however, was not allowed for in the questionnaire.

Consolidated Traders Ltd. of Wellington, in establishing the first licensed deer farm, signed the first such agreement, going into partnership with Rahana Station of Taupo. From there, the idea spread slowly throughout the Rotorua and Wellington areas, but in a short period it had also spread directly to the South Island where it rapidly gained acceptance. Some 36.8% of the nineteen West Coast respondents indicated that they had an agreement. The particular increase in the South Island of this method of obtaining stock must be largely due to the fact that the larger populations of feral deer there has resulted in the location there of more helicopter and other agencies involved in game recovery. For example, in May of 1978, the Forest Service had 79 current licences on issue for the capture of deer for sale. Of these, only 14 were to North Island companies and individuals! Furthermore, fallow deer farmers who tend to be situated in the North Island, have not as a rule used this method. Then again, the high price that

Table 6 Agreements for the Acquisition of Stock

Location of Unit	N.I.	S.I.	N.Z.	N.I.	S.I.	N.Z.	N.I.	S.I.	N.Z.	N.I.	S.I.	N.Z.	N.I.	S.I.	N.Z.
Time of First Operating Unit	1969-1971			1972-1974			1975-1977			Jan-June 1978			1969-1978		
No. with Agreement	1	0	1	1	3	4	2	11	13	3	6	9	7	20	27
No. without Agreement	17	9	26	17	14	31	34	61	95	36	17	53	104	101	205
% of Total with Agreement	5.6	0.0	3.7	5.6	17.6	11.4	5.6	15.3	12.0	7.7	26.1	14.5	6.3	16.5	11.6

breeding stock is currently fetching on the open market is effectively closing this source to many farmers who lack capital, and an agreement offers a way of stocking the farm without undue financial strain.

To examine the situation of those with agreements to those without them, the numbers of deer held by each group were compared (Table 7). Only red deer numbers were compared because farmers of fallow deer have not used agreements to obtain stock, and the numbers used were those of deer held at the time of the survey.

Table 7 Red Deer Numbers Held By Farmers With And Without Stocking Agreements

	No. of farmers	No. of Deer	Average No. of Deer Per Farmer
Farmers with an Agreement	27	4,440	164
Farmers without an Agreement	117	11,003	94
Total	144	15,443	107

Those with agreements have larger herds than those without. Perhaps it is because those who felt really committed to the idea of farming deer were prepared to bind themselves for several years with an agreement, or perhaps it is because the savings made in not having to pay for stock bought or caught for them would allow them to spend more on fencing. Larger areas could thus be fenced, and with the resources of a helicopter or professional trapping firm behind them, the farmers would quickly have the larger areas fully stocked.

Except for those farmers who reached an agreement over the acquisition of stock, very few farmers used a single method to acquire stock, but most employed one method more than any other. The methods employed by individuals in obtaining their stock, and this does not include natural increase through breeding, are tabulated (Table 8), and

Table 8 Methods Used to Initially Obtain Stock

	Auckland		Rotorua		Wellington		Nelson		Westland		Canterbury		Southland		N.Z.	
	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%
Young Fawns Given to Farmer	2	9.1	20	42.6	12	30.8	2	16.7	4	21.1	3	6.7	5	8.1	48	19.5
Stock Captured by Farmer	15	68.2	19	40.4	23	59.0	5	41.7	6	36.6	11	24.4	29	46.8	108	43.9
Stock Captured by Firm for Farmer	0	0.0	6	12.8	4	10.3	2	16.7	5	26.3	22	48.9	30	48.4	69	28.0
Stock Purchased at Market Price	8	36.4	32	68.1	16	41.0	6	50.0	8	42.1	29	64.4	33	53.2	132	53.7
Other Methods	0	0.0	3	6.4	3	7.7	1	8.3	0	0.0	4	8.9	2	6.3	13	5.3
Total Respondents and % ages	22	113.7	47	170.3	39	148.8	12	133.4	19	26.1	45	153.3	66	162.8	246	150.4

the principal methods so employed by each are also tabulated (Table 9). Because the methods employed by any one individual were frequently more than one, the percentages columns in Table 8 do not total 100, but the totals of the percentages are included as an indication of the number of methods given. A sum of 100 indicates the average individual used one method only, 200 indicates an average of two methods per person, and so on.

In Table 8 and Table 9, the order of the methods by the numbers of farmers using them is identical in all cases except for the Westland and Southland conservancies. In Westland, although over 42 percent of the farmers purchased stock at market prices, and this was the most common method employed, more farmers considered their major method of obtaining stock was by capturing their own. This is probably because the dense bush of Westland protects the deer to some considerable degree from the helicopter operations designed to kill or capture deer and, consequently, the deer are still relatively plentiful there. The relatively short distance from the mountains to the sea probably helps too, in that farmers have little distance to travel to construct and check their traps. In Southland, there are two changes in the minor rankings, but in view of the fact that only 66 respondents from the area contributed to Table 8, and of these seven did not contribute to Table 9, it is felt that these changes are not significant.

It is obvious from these tables that significant differences do exist between areas on the manner and means of acquiring stock. Well over half the farmers in the Auckland and Wellington areas captured deer themselves, and,of these, most consider it to be their major method. On the other hand, less than one in four of Canterbury farmers captured their own stock, and of these less than half consider it to be their major method. This major difference is probably caused by two main factors. Firstly, the deer farmers on Canterbury's coastal plains, and there is an increasing number of them, generally have no greater access to feral deer than does the general public. This access is further

Table 9 Major Methods Used to Initially Obtain Stock

	Auckland		Rotorua		Wellington		Nelson		Westland		Canterbury		Southland		N.Z.	
	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%
Young Fawns Given to Farmer	2	9.5	8	18.6	5	14.3	1	8.3	3	17.6	0	0.0	0	0.0	19	8.4
Stock Captured by Farmer	12	57.1	8	18.6	18	51.4	4	33.3	6	35.3	4	10.0	17	28.8	69	30.4
Stock Captured by Firm for Farmer	0	0.0	3	7.0	2	5.7	1	8.3	3	17.6	14	35.0	14	23.7	37	16.3
Stock Purchased at Market Price	7	33.3	22	51.2	9	25.7	6	50.0	5	29.4	20	50.0	27	45.8	96	42.3
Other Methods	0	0.0	2	4.7	1	2.9	0	0.0	0	0.0	2	5.0	1	1.7	6	2.6
Total	21	99.9	43	100.1	35	100.0	12	99.9	17	99.9	40	100.0	59	100.0	227	100.0

handicapped, moreover, by the great distances involved. This problem, although it does exist for many farmers in the Wellington and Auckland areas, is not so pronounced for these areas in general. Secondly, and this is felt to be the major cause for the difference between Auckland and Canterbury, over half the deer farms in Auckland concentrate exclusively on fallow deer whereas Canterbury has only one small unit stocked solely with fallow deer. The Wellington area has several fallow deer farms too, but not enough to make the difference with Canterbury. It is felt that this difference is occasioned by the fact that Wellington has an extremely high proportion of part-time deer farmers, the major portion of their incomes coming from non-farming occupations. Canterbury had 8 out of 45 or 17.8 percent, of its deer farmers in this category whereas Wellington had 16 out of 48, or 33 percent.

The three areas in which farmers mostly tend to have deer captured for them by the professionals are Canterbury, Southland and Westland. As has already been hypothesised, it is likely that the large feral herds in these areas have attracted many helicopters and professional trappers. Farmers in these regions use them, firstly, because they are there, and secondly, because the farmers are familiar with their operations, and finally, because the farmers know the successes achieved by them in the past. On the other hand, this practice does not apparently exist in the Auckland area where the fallow deer farmer prefers to catch his own stock while the red deer farmer tends to buy on the open market.

The most frequently cited method of getting stock throughout New Zealand, but particularly so in Rotorua, Nelson, Canterbury and Southland Conservancies, is to purchase them at market prices. This is a very significant point, for it is only a relatively recent trend in the industry (Table 10). Its widespread acceptance has perhaps been forced upon the industry by the increasing difficulty in capturing large numbers of deer from the wild and by the increasing growth of farm numbers, particularly in areas more distant from large feral herds. The practice

Table 10 Farmers Who Purchased Stock When First Operating Their Units

Conservancy	1969		1973		1974		1975		1976		1977		1st Half 1978		Total	
	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%
Auckland					1	14.3					2	28.6	4	57.1	7	100.0
Rotorua	2	9.5			3	14.3	2	9.5	1	4.8	7	33.3	6	28.6	21	100.0
Wellington							1	11.1	5	55.6	2	22.2	1	11.1	9	100.0
Nelson					1	16.7					4	66.7	1	16.7	6	100.1
Westland											4	80.0	1	20.0	5	100.0
Canterbury			1	5.3					6	31.6	5	26.3	7	36.8	19	100.0
Southland					2	7.4	2	7.4	5	18.5	15	55.6	3	11.1	27	100.0
N.Z.	2	2.1	1	1.1	7	7.4	5	5.3	17	18.1	39	41.5	23	24.5	94	100.0

of purchasing stock has been enhanced by two other factors. Firstly, the earlier-established farms have reached their carrying capacities, so these farms are annually producing surplus stock. The prevailing high prices encourage the farmers and firms concerned to sell this surplus for breeding purposes rather than have it all killed for the export markets. Secondly, the apparent success of the industry has encouraged banks, lending institutions and private investors to extend credit to deer farmers that they can buy stock at high prices.

Although stock has been sold privately from one farmer to another, the real value of it was not appreciated until the Criffel Game Park at Wanaka inaugurated annual deer sales in 1977. Both annual sales to date have attracted buyers from all areas where deer farming is permissible, and many North Island farmers travelled down to purchase stock. The high prices fetched surprised everyone, and established market values for deer sold elsewhere. It is no coincidence that the largest increase of farmers initially obtaining stock by purchasing it occurred in the same year as the first annual Criffel sale.

In Table 10, no figures are given for the 1970-1972 period as a nil return was received for these years. Once again, an idea originated in the Rotorua area, and reappeared in the South Island before having diffused further in the North Island. From 1973, the purchase of stock as the principal method of acquiring stock became slowly but steadily more acceptable to the industry, and of course the Criffel deer auction of 1977 produced a spectacular increase in acceptance for that year. The decline in numbers of stock purchased for 1978 does not necessarily indicate a general decline in the purchase of stock as it includes only the first half of the year. It must be remembered that the 23 respondents had just commenced operating their units, which means that they had only shortly before made major investments in fences and perhaps yards. In 1977, 69 people first began operating their deer units whereas in the first half of 1978 only 51 people commenced doing so (Table 5). This means that, comparing these numbers with

the totals given for 1977 and 1978 in Table 10, 56.5 percent of those who first operated their units in 1977 obtained their initial stock largely by purchasing it, whereas in 1978 only 45.1 percent did so. This is a significant difference, and the explanation can only lie in the investment already made in fences. Perhaps the gloomy outlook of the national economy has caused finance institutions to tighten up on credit, but as the prospects of the deer farming sector are very promising, as will be discussed in the final chapter, this is unlikely. Thus despite the lower figures obtained for the first half of 1978, it is anticipated that the major method for stocking farms by those just entering the deer farming industry will be through purchasing it.

While an increasing proportion of deer sold for breeding purposes have been raised in captivity, a large proportion of those sold is still comprised of recently-captured deer. With the high prices obtaining for stock today, adult red stags of good quality fetching $1500 or so and good hinds selling for $1100 each, some professional helicopter operators and professional trappers are now preferring, when working to capture deer for a farmer, to be paid in kind. Some are using the deer so earned as a nucleus for their own herds, while others are selling them at the current inflated prices.

In an effort to determine just why farmers used the methods they did to get stock, the major individual methods were compared in total with the most important reasons given (Table 11). This demonstrated that the time taken to stock units was of little overall importance, but that it was of some significance to those who purchased their stock, 31.8 percent of them purchasing stock because it was the quickest way of stocking their units. A further 10.6 percent purchased stock because they considered other methods took too long.

Of those who caught their own, over one-third did so because they considered it to be the cheapest way, and

Table 11 A Comparison of Stocking Methods With Reasons

	Fawns Given To		Captured Own		Captured on behalf of		Purchased	
	No.	%	No.	%	No.	%	No.	%
Cheapest Financially	7	43.8	19	37.3	13	43.3	12	18.2
Because Feral Deer Were There	5	31.3	23	45.1	10	33.3	3	4.5
Because Few Feral Deer Available	0	0.0	3	5.9	2	6.7	8	12.1
Too Much Own Time Involved in Capture	0	0.0	0	0.0	2	6.7	6	9.1
Too Long to Stock Unit Other Ways	0	0.0	0	0.0	1	3.3	7	10.6
Unit Stocked Quickly	0	0.0	4	7.8	2	6.7	21	31.8
Others	4	25.0	2	3.9	0	0.0	9	13.6
Total	16	100.1	51	100.0	30	100.0	66	99.9

almost one half of them did so because they knew the deer were there to be taken. These reasons are entirely logical, as few would go to all the trouble of catching them if there were cheaper ways, and having access to them permits the relatively easy and cheap capture of them.

Over 40 percent of those who hired firms to capture deer for them considered that they did so because it was the cheapest method. This may well have been the case if the farmer considered the value of his own time that would have been used in capturing his own deer, and especially if his farm was located at some considerable distance from the feral herds. The importance of this latter point is illustrated by the fact that one-third of those who hired firms to capture deer for them did so because they considered the deer were there to be taken.

Of the few who started by breeding from young fawns given to them, most considered they did so because it was the cheapest, but many also considered it was only because they lived in an area where feral deer were present. One in four, though, gave some other reason. This reason commonly turned out to be that the farmer concerned had kept such animals just as pets until they realised the potential of farming them for profit. They had not initially accepted the fawns with the intent of farming them.

The two who gave other reasons for capturing their own deer agreed that they did so to minimise the risk of paying high prices for deer and whose values may have dropped soon after purchase. Of the nine who purchased and gave other reasons, a large group considered it was the only available way of obtaining deer, but a similar-sized group considered that they were minimising risk by starting with better-bred and tamed stock. A smaller number considered it the most convenient way.

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Production of Farmed Venison

Deer farming was first and foremost concerned with providing carcasses to the game packing houses. Venison was to be the major income-producing product, as in fact it had been with feral deer recovery since 1958 (Fig.6).

Farmed deer were killed on the farm, mostly by shooting them in the paddock. After the carcasses had been gutted, cleaned and allowed to cool, they were sent to the game packing house. There, they received the same treatment as feral deer carcasses, and after being packed, were eventually sent off to the same markets.

Concern was then expressed within the industry that there might be taste differences between the farmed and feral venison. It was further pointed out that the major market for venison, West Germany, had what amounted to almost a phobia or fixation on obtaining only wild game meats. As an example, it was pointed out that the young and prospering export industry, based on game buffalo meat in the Northern Territory of Australia, was effectively curtailed when an investigating authority from Europe discovered that the buffalo were not all roaming wild, but that some were being held in captivity. Thereafter, the buffalo meat could apparently be exported to Germany only under the Cattle Regulations of the E.E.C. (Williamson, 194). These regulations required strict procedures for the slaughtering and packaging processes.

The agricultural research establishment at Invermay, which had established its own deer herd in 1973, conducted taste tests to determine the existence of, and extent of, any differences between venison from feral and farmed deer. The test results showed that the only detectable difference was in venison from 27-month-old deer, but that this was at the lowest statistical level of significance ($p < 0.05$). It was further found that this difference was not noticeable when the venison was served as part of a meal (Forss and Manley, 191-192).

This was heartening news indeed, but it had not solved the dilemma posed by the West German market. David Yerex, writing as the executive officer of the New Zealand Deer Farmers' Association (hereafter referred to as the N.Z.D.F.A.), wrote in 1977 that "Game exporters ... unanimously supported withdrawing all farmed venison from Europe" (New Zealand Deer Farming Annual, 1977, 5). This voluntary move by the Game Industry Association, which consists of game packing house operators and the N.Z.D.F.A., meant that West Germany continued to be the best customer of venison from feral sources. The meat from the few farmed deer that were being killed was easily absorbed by the other markets. In 1978, the Ministry of Agriculture and Fisheries reported that "West Germany will not now accept venison from deer farms as game, and this has made it necessary to introduce administrative controls over the export of this product (A.J.H.R., 1978, C.5, 54).

In the meantime, largely because some countries such as Australia and the U.S.A. would not accept venison that had not been slaughtered in approved facilities and that was not accompanied by post- and ante-mortem certificates, efforts were made within the industry to investigate slaughtering facilities that might be suitable. Because deer farming is still in its pioneering stage, it has attracted very independent-minded people to its ranks. These people do not wish to be fettered by over-regulation and controlled by, as they see it, "outsiders" in the form of unions. The N.Z.D.F.A. has always encouraged its members to retain control over their product for as long as they can in a desire to remain independent. To illustrate the strong sense of independence, the following statements made to the author by deer farmers have been selected from those received (the authorship of these statements shall remain confidential): "Trying to keep away from bureaucrats, unions and all handicaps normal farming has run into"; "Keep slaughter from trade unions"; "Keep Government and freezing works out or industry will be ruined". It is feelings such as these that have led the industry so far to spurn the

freezing works as processors of its produce.

The game packing houses which have so far handled the carcasses have no slaughtering facilities and consequently could not adequately fulfil the requirements of countries like the U.S.A. In an effort to overcome this, while still avoiding the freezing works, R. Brookes, of Southland, gathered interest in a mobile slaughtering facility. Because it could travel from farm to farm, it would eliminate any difficulties that the transportation of stock might cause, and labour problems would be largely overcome through deer farmers within a district helping one another with the slaughter. The Game Regulations 1975 specifically allowed for the licensing of deer slaughtering premises which could be either static or mobile (McNab, 184), and there is no doubt that the interest shown in the Southland prototype affected this legislation.

The mobile facility was modelled on those operating in such countries in North Europe as Finland for the slaughter of reindeer. It was operated under the guidance of the Ministry of Agriculture and Fisheries. After the first season, Brookes reported it to be a success, but added that further modifications to it would be required before the next season (N.Z. Deer Farming Annual, 1976, 24-25). Eventually, however, the trial facility proved to be unsuccessful because it was based on one that had an open-air nature and that had been used in far cooler climates. The late summer conditions of New Zealand, when slaughtering is done, were not ideal for such a facility. Wind-borne dusts and seeds, insects of various sorts, and flies in particular, meant that hygiene was lacking. In addition, the plant lacked a freezer. It had been hoped to use freezer trucks from the game packing houses, but while these were adequate for transporting in a frozen state carcasses that were already frozen, they were not really adequate for the task of freezing new carcasses. Furthermore, the facility proved to be rather slow and labour-intensive in its operation. Brookes stated that it took six men, excluding the meat inspector, to put through ten deer an hour, and this did

not include skinning (N.Z. Deer Farming Annual, 1976, 24).

After this brave but abortive attempt to provide for the slaughtering of deer, little further effort was made. The few farmers who were producing deer for venison, these being mostly those red deer farmers who had agreements to meet and those farming fallow deer, continued to kill rather than slaughter their stock[2].

It is ironic that the deer farming industry was established to provide a second source of deer carcasses to the game packing industry, for as yet it has provided very little. Farmers within the industry have tended to breed solely to expand their own herds, or have bred to sell stock to other farmers. Within recent years, they have also tended to retain their stags so that they could harvest the velvet antlers[3], a practice which has become increasingly lucrative.

Of the 262 respondents who indicated their major current objective, only 1.5 percent stated that it was to produce venison. On the other hand, 12.2 percent indicated that it was to produce velvet, 9.9 percent to produce stock for sale, and 76.3 percent to expand their herds. Of those who are producing primarily velvet, over 75 percent indicated that their second objective was breeding to expand their herds. Only 165 of the 200 who are primarily expanding their own herds gave a second objective, and of these 57.6 percent indicated it was the production of velvet. It is thus clear that the breeding of their own further stock and the

[2] Slaughtered farmed deer is that which is bled to death in a hanging position, after being rendered insensible to pain, and in specified facilities. Deer not so treated must be classed as 'killed game' (Game Regulations 1975, 768 and 767).

[3] A stag's antlers grow each year, the previous year's antlers being discarded. While new antlers are growing, they have a soft, brown covering. Such antlers are termed as being "in the velvet", and within the industry they are referred to as "velvet".

production of velvet are the two greatest aims of the majority of those in the industry, and that most involved are currently doing both.

Of the total 262 respondents to the question, only 196 indicated a fourth and final objective, but of these 80.1% indicated it was carcass production. Clearly, then, the production and sale of venison is of little importance to the industry as a whole, although it is of more significance to those involved in fallow deer farming.

Warnings have been issued about the lack of killing and/or slaughtering of farmed deer. Peter Elworthy, as president of the N.Z.D.F.A., stated in 1977 that because of the lack of production of farmed venison, "We are at present developing neither markets for the product, nor perfecting our handling, slaughtering and processing facilities ..." (N.Z. Deer Farming Annual, 1977, 9). McNab, too, stated in 1977 that, in this area of providing slaughtering facilities, a decision could not be long delayed as "there are already problems developing in the market place" (McNab, 186). At the annual conference of the N.Z.D.F.A. in 1978, the Associate Minister of Agriculture, Mr Bolger, warned that with farmers keeping deer for breeding purposes and for harvesting the velvet, there was a danger that the first farmed deer to be slaughtered in any numbers would be old stags. He further stated that "Such a situation could raise grave questions among importing nations and could seriously jeopardise the quest for profitable export markets" (Christchurch Star, 11 May, 1978, 4).

A month later, Dr P. Joyce of the Invermay Agricultural Research Station, announced at the second annual sale of deer at Criffel Game Park that Invermay would have its own abattoir for the slaughter of deer before the year's end. Although the purpose of this abattoir is to help determine the factors necessary to condition deer for meat export, there is no reason why it could not be used as an experimental prototype of a static slaughtering facility that groups of deer farmers could later copy for their own local

slaughtering on a cooperative basis. It will be surprising if the N.Z.D.F.A. shows little interest in the abattoir itself, as well as in the conditioning factors determined because of it. Dr Joyce, too, warned on the dangers of concentrating on velvet production, stating that farmers would eventually end up with old, fat stags (Timaru Herald, 30 June, 1978, 3).

Velvet Production

Even before 1969, it was known by the game export industry that the young and still soft antlers of male deer were marketable in Asia. Known as velvet, it was either sliced thinly or ground into powder form by the Asiatics for human consumption. Originally, Westerners believed that it was used purely as an aphrodisiac, but later evidence points to the Asiatic belief that the velvet has medicinal properties. It has been argued that its use as an aphrodisiac is just a Western myth! (Wallis and Faulks, 195-198).

The greatest suppliers of velvet to Asia were the mainland countries of U.S.S.R. and China, but ideological differences resulted in the restriction of this trade, among others, over a twenty-year period. New Zealand helped fill the gap in supply, and exports of velvet to Asia boomed, particularly from the mid-1970's.

The major market was originally Hong Kong, which purchased all it could get, processed it, kept the quantity it required, and re-exported the remainder, but Taiwan, Singapore, Japan, Thailand and South Korea have all purchased substantial quantities direct from New Zealand. South Korea in particular has become a major market, and in 1977 it purchased 34.6 percent of the total export in comparison to Hong Kong's 28.7 percent[4].

[4] Unfortunately the Dept. of Statistics does not list velvet antler separately, but includes it with all antlers, horns, beaks and hooves.

Plate 2: Velvet, a Valuable Crop

In 1976, velvet was being sold by farmers for $24 per kilogram, but in 1977 the top price obtained was $66 per kilogram (Yerex, 1977b, 4). Mr Bolger, the Associate Minister of Agriculture, stated in 1978 that producers were then obtaining up to $130 a kilogram, and he cited the case of a two-year-old stag that produced five kilograms of velvet in the one season (Christchurch Star, 11 May, 1978, 4). At such prices, it is of little surprise that farmers are keeping their stags to harvest the velvet.

In reality, the prices quoted above for velvet are not as simple as they would appear to be. Buyers place the velvet into four grades according to its quality, freshness and the degree of damage it has sustained. The price offered for the velvet then reflects the grade it is placed in. For example, in 1977, it was only the top grade that fetched $66 while the other three grades obtained prices of $44, $26 and $11 per kilogram respectively (Wallis and Faulks, 197).

The farmer, however, can generally control the quality of the velvet, and hence its market value, by deciding when it should be cropped and by using sound methods for its removal and subsequent handling. The top grade velvet is cut when it is about 20 centimetres in length. If it is left to grow longer, a greater weight is obtained but the quality is likely to be lower, and by cutting early, another two or three crops from the same deer will be obtained in the one season.

It is advisable to have a veterinarian on hand, when harvesting the velvet, as the stags should have a pacifying drug administered and as they certainly need a local anaesthetic. As the velvet is rich with blood, excessive bleeding can occur unless tourniquets are applied to the pedicles. Without the exercise of care, and without the skilled assistance of a veterinarian, a valuable animal can easily be lost.

After the velvet has been removed, either by saw or shears, the velvet is usually placed up-side down so that it will retain all its blood. Once the blood congeals, it may

be placed otherwise. Soon after the velvet has been removed, the stag may be released into the paddock (Wallis and Faulks, 197).

If care and gentleness are exercised, the stags show no extra reluctance to enter yards again (Timaru Herald, 6 May, 1977, 6). Investigations have also shown that so far, the continued cropping of velvet over two or three seasons has not affected the animals' condition in any way (Elworthy, 1976c, 21).

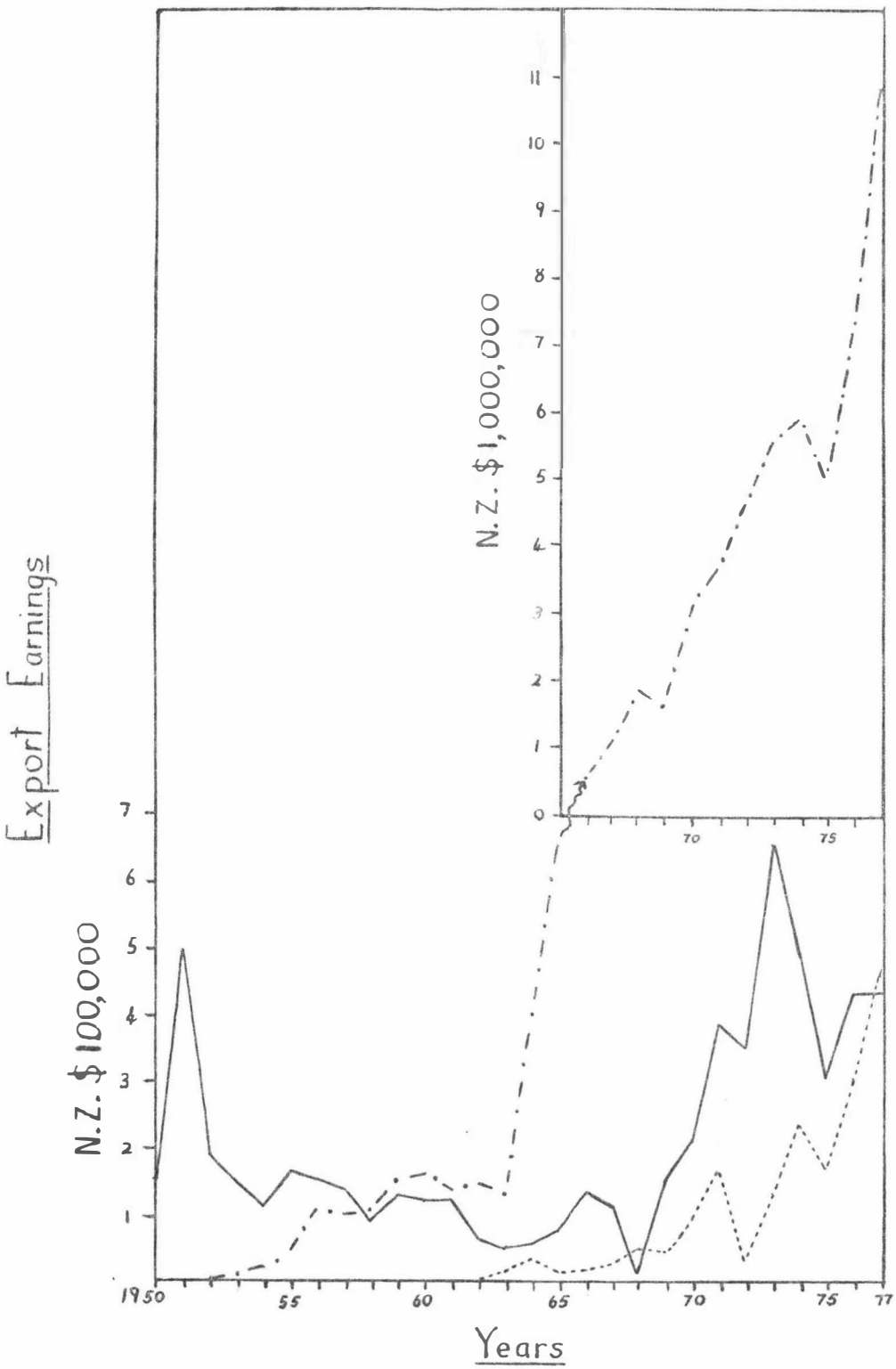
It should be noted that the practice of harvesting velvet has so far been confined to red deer farming. Although fallow deer are farmed in large numbers in the Kaipara and Wanganui areas, and although smaller fallow deer farms are becoming established in the Rotorua, South Canterbury and Southland areas, these animals are extremely nervous and it is difficult to handle them. To date, they have been proven to be not suitable for the harvesting of velvet, largely because of the difficulty experienced in handling them, although it has been stated that there is very little or no value in the by-products of fallow deer (Fitzi and Monk, 171).

In 1977, the value to New Zealand of the exported velvet exceeded for the first time the value of the deer skins exported (Fig.6). Almost 450,000 dollars were received for it. With demand increasing, it is anticipated that prices may rise still further, and so the value of the trade will increase. At the time of the survey, 119 out of 225 respondents, that is 52.9 percent, indicated that they had had as yet no velvet to sell, so a further great expansion in velvet exports can be anticipated as these people commence production.

Other By-Products

Deer hides are a significant by-product of deer farming, but as the trade and use of hides has already been fully discussed in Part One, little will be included here. Suffice it to say that the industry confidently expects

Figure 6: Incomes from Hides, Venison and Antlers.



Source: N.Z. Dept. of Statistics; "External Trade Exports."

the hides of farmed deer to be more valuable than those of feral deer as they will be larger, not damaged by bullets, and as the grain of the leather will not be marred to the same extent by scratches. The New Zealand Leather and Shoe Research Association tested and compared farmed and feral deer hides, and the leathers subsequently produced from them. Those from wild animals were found to be tougher, and it was felt that they could be used only to produce sueded leather because of the blemishes on the grain due to scratches, whereas the weaker skins of feral deer could be processed with a natural finish (Milnes and Peters, 200-201).

The tusks of mature red deer are marketable. West Germany and Austria provide the major markets for them. In these countries, they are used for hunters' jewellery in the form of cuff links, brooches and earrings, in which they are frequently set in silver as an acorn surrounded by oak leaves. Before they are exported, they are matched for size and extent of brown staining at the tip (Wallis and Faulks, 196).

Tails, sinews, testicles and pizzles of deer are marketable in Asia, as is the velvet, for the aphrodisiac and medicinal properties they are thought to contain. For consumption, they are apparently sliced and then served in soup or stew-type dishes (Clouston, 44). The pizzle must be sold with a portion of the aitch bone attached, and must be complete with the testes and tassel of hair (Wallis and Faulks, 196).

Using the prices obtainable in 1977, it has been calculated that, for a 45 kilogram carcass of a hind, twelve percent of its total value lies in the by-products. In comparison, for an 82 kilogram carcass of a stag, 47 percent of its total value, including top grade velvet, is made up of the by-products (Wallis and Faulks, 197).

The hearts, livers, tongues and kidneys will apparently have a ready market in Eurcpe and Scandinavia just as soon

as suitable slaughtering facilities are employed. At the moment they are not being utilised because the certificates required for export cannot be issued (Wallis and Faulks, 195).

Summary

Deer farming, when it was finally permitted in New Zealand, was definitely an innovation for both this country and the world at large. Those involved in the industry were, of necessity, innovators, as they initially had no successful models of deer farms to base their own on. With time, however, the industry more or less proved itself, and many more joined the ranks of the deer farmers.

The industry, established to provide the game packing industry with carcasses, soon departed in general from this objective. Instead, hinds were used for breeding purposes that the industry could expand at a faster rate than it would have done if all stock was to be captured from the wild, and stags were used for the production of velvet for the Asian market.

As the industry is still in its infancy, it is expected that these trends will change. Repeated warnings on the dangers of allowing stock to become too old, together with a possible rekindling of interest in slaughtering facilities engendered by the Invermay experiments, may encourage further killing, if not slaughtering, of deer. As the industry matures and adjusts, as its rate of expansion slows, and as it is discovered by trial and error how the production of velvet can best be combined with the production of meat, it is felt that farmed venison will be marketed in increasing quantities.

CHAPTER 6

THE DIFFUSION AND GROWTH OF DEER FARMING IN NEW ZEALAND

Since Hagerstrand's work on diffusion[1] in the 1950's and 1960's, diffusion studies have developed as an increasingly significant aspect of research in geography. Most such studies involve innovations for which the diffusion processes have more or less been completed, or at least operational for some considerable time, but this is far from being the case with deer farming.

Although an in-depth study of this aspect may add to present knowledge on diffusion, the interest here is rather on the more practical plane of attempting to understand more about the regional distribution and possible future growth of a new and growing industry. In this chapter, it is intended to examine the manner in which the idea of farming deer has spread, the speed with which the spread has taken place, the practicality of the ideas and methods which were disseminated, and finally to look for any spatial differentiation or variation in these patterns.

The Spread of the Innovation

The locations of deer farms, as they became operational on the basis of two-year periods, have been shown (Figure 7). From this, it is clear that some dissemination of the idea had occurred in the central North Island prior to 1969, and that it had spread to the Napier and Palmerston North areas in particular. It had, furthermore, also diffused to the South Island, a deer farm having been established in both the Reefton and Invercargill areas by then. Thus, in a very short time, the idea had diffused not only with-

[1] 1952. The Propagation of Innovation Waves. Lund Studies in Geography, Series B, No.4.

1967. Innovation Diffusion as a Spatial Process.

Figure 7 : The Biennial Growth and Unit Locations of The Deer Farming Industry

- (Red) Deer Units Established in Two - Year Period Being Considered
- (Black) " " " " Previous Periods

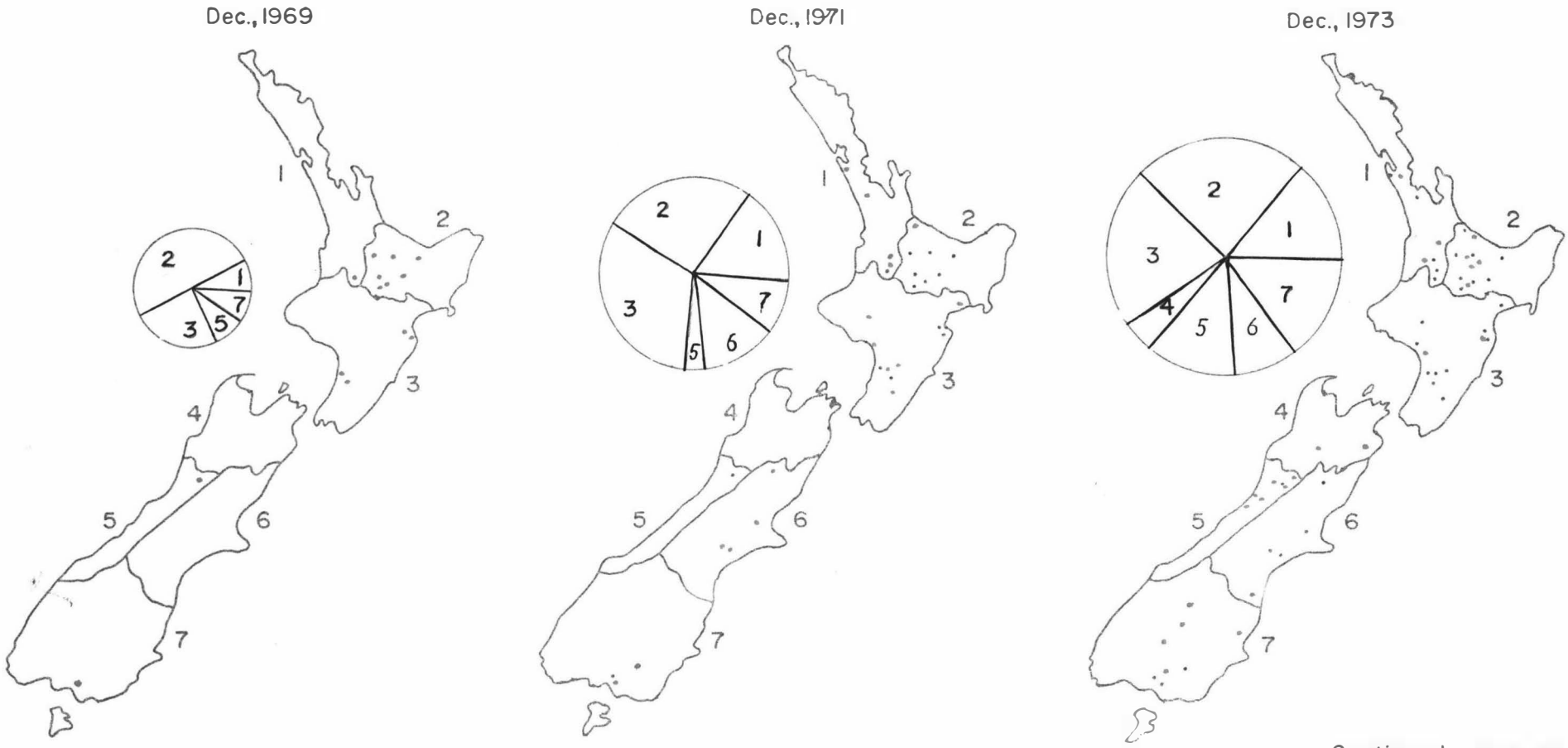


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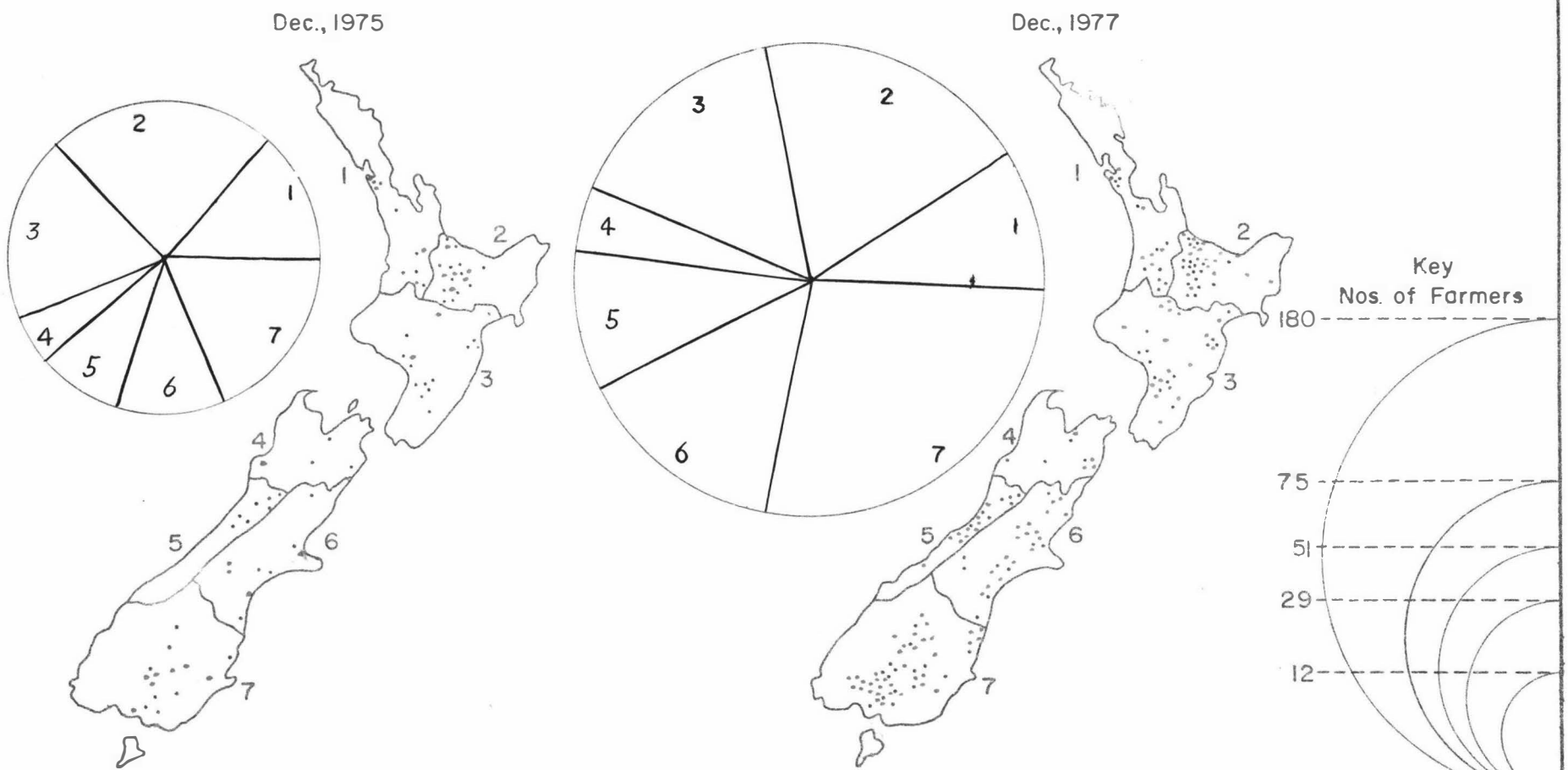
Figure 7 : Continued, The Biennial Growth and Unit Locations of The Deer Farming Industry



in the central North Island area, but also over relatively great distances to the South Island.

The succeeding two years saw further growth of the industry, but except for the Taumarunui and Invercargill areas, the new growth occurred in areas where no deer farms had previously existed. The majority of those adopting the new practice in this period were, obviously, innovators who were prepared to develop their own ideas and who were also prepared to accept a substantial risk in establishing their units. It is also of interest to note that the first fallow deer farms commenced operations during this period, one appearing in both the Kaipara and Wanganui areas.

The overall rate of growth slowed slightly during the next two-year period. In the North Island, all new farmers commenced operating deer units in areas relatively close to already-established deer farms. It is likely that the personal examples of the early innovators were having an effect in encouraging others to emulate them. In the South Island, however, the picture was different. The deer farming industry had had a slower start there, and consequently many of the South Island adopters during this period were also innovators in their districts, but further growth did occur around existing farms near Invercargill and Reefton.

During the 1974-5 period, both the slower rate and general pattern of growth were sustained. In the North Island, new deer farms tended to be set up in fairly close proximity to established ones, whereas in the South Island some farmers commenced operations in areas that were new to the industry. This was particularly so in the South Canterbury and South Otago regions.

The next two-year period saw a tremendous upsurge of growth in the industry. By now, the industry had more or less proven itself, the prices for deer products were good and looked like staying that way (Pinney, 1977, 204; Baigent and Jarrett, 210-211), and the idea of farming deer had had ample time to become widely disseminated and accepted. Growth in both islands was substantial, but it

was a little more so in the South Island. Throughout the country, most new adopters were located relatively closely to either existing deer farms or to other new adopters, but the industry also spread to several new areas, notably, Gisborne, Stratford, South Westland and the more remote parts of Southland.

In general, it is not surprising that the North Island experienced growth in the industry ahead of the South Island, although the latter had by now more than caught up. With a greater population, the North Island would normally also have had a larger number of innovators. It is also, furthermore, widely accepted that people in or near large urban areas accept and adopt innovative practices more readily than do people elsewhere (Morgan and Munton, 35). Although the South Island would have had a higher proportion of its population experienced in hunting deer and packaging the products, it was doubtless the smaller numbers of feral deer in the North Island that ultimately made the game recovery industry there, ahead of the South Island operators, more conscious of the fact that the feral herds had now become an exhaustible resource instead of the seemingly inexhaustible flow that earlier extermination efforts had made them seem to be (Chapter 3). It is significant that the first licenced deer farm was in the North Island, that it was initiated by a major deer-processing company, namely Consolidated Traders Ltd., and that this company was based in the major urban area of Wellington.

The faster rate of growth enjoyed by the industry, since 1975, in the South Island, as compared to the North Island, is doubtless due to the fact that deer are more easily accessible there to more farmers than is the case in the North Island, and to the fact that a higher proportion of the population would have had experience in the game recovery business (Chapter 8). Furthermore, it is likely that many would-be deer farmers in the Northland and Taranaki areas have been prohibited by legislation from farming deer (Chapter 7).

The pattern of adoption throughout the pre-1969 to 1977 period (Figure 7), has generally been one whereby a cluster of deer farms evolves in an area adjacent to an already-established deer farm, the earlier-established ones having occurred in a sparse pattern spreading mostly southward from the central North Island.

Modes of Diffusion

It has already been tentatively suggested that one of the major methods by which the idea of farming deer spread was through people coming into contact with established deer farmers. In an effort to determine how it did spread, and to discover how any information required to commence operations was disseminated, questions on this aspect were included in the survey (Appendix V, Q.32-33). To see whether any methods of diffusion were more important than others, and to determine whether there were any major shifts in the methods employed over time, the responses were tabulated against the years in which the farmers individually decided to farm deer (Table 12).

Rather surprisingly, personal contact with other like-minded people appears not to have been important in the initial years. Instead, the majority considered that they obtained the idea from some other source. Many of the later-comers to the industry indicated the same, although to a lesser extent. These other sources, over the whole time period, varied widely. The most common ones cited, such as "It was a hobby for years", "Have always been interested in deer", "Because of a love of deer" and "Had worked in the game recovery business" would indicate that the question was not sufficiently specific. The people who responded with these and similar answers had tended to confuse their personal reasons for getting involved in the farming of deer with the source from which they obtained the idea. Such responses tend to reflect convictions that the respondents themselves originated the idea, but this is highly unlikely. People in Britain and Europe have experienced strongly affective feelings for deer for hundreds of years now, yet they have not farmed them.

Table 12 How Respondents Gained the Idea of Farming Deer

	Up to Dec. 1969		1970-71		1972-73		1974-75		1976-77		Total	
	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%
By Contact with an Established Farmer	1	6.3	5	20.0	4	15.4	22	55.0	44	37.7	76	33.9
From an Agricultural Journal	0	0.0	2	8.0	1	3.8	9	22.5	30	25.6	42	18.8
From the Mass Media	2	12.5	0	0.0	0	0.0	2	5.0	11	9.4	15	6.7
From a Book	2	12.5	1	4.0	0	0.0	0	0.0	2	1.7	5	2.2
From Private Correspondence	1	6.3	1	4.0	0	0.0	0	0.0	2	1.7	4	1.8
Others	11	68.8	19	76.0	21	80.8	16	40.0	40	34.2	108	48.2
Total Respondents	16		25		26		40		117		224	

Some genuine sources were given, but most of these could have been marked against the possibilities provided, for example "T.V. - when legislation was first announced", and "Seeing another deer farm start up". A few sources, however, could not be marked against the possibilities provided, and generally these arose through contact with either the early Lincoln deer trial unit, the later Invermay unit, and even the Rowett Research Institute of Scotland, with game farms overseas, or through suggestions by contacts in the game recovery business.

As one would expect, getting the idea from an agricultural journal was not important in the 1960's, for it was not until about 1973 that articles by Boyd Wilson on deer farming started appearing regularly in the "New Zealand Farmer". From 1974, though, it would appear that this source has provided the idea and inspiration for an increasing number of deer farmers.

Although newspapers have widely publicised deer farming, often under extremely glowing headlines such as "Deer May Save Our Bacon" (Manawatu Evening Standard, 18 May, 1977) and "Deer for Velvet is Farmers' Road to Riches" (Christchurch Star, 11 May, 1978), to quote two recent examples, and although farming programmes on both radio and television have included programmes on the farming of deer, it is apparent that the mass media have had no great impact in persuading people to take up deer farming. They have, however, served to attract a few people to it. Other written material in the forms of books and letters have had even less impact.

To determine whether there were any regional variations of significance, the numbers of farmers using the various sources were tabulated according to locations within the New Zealand Forest Service's Conservancy Areas (Table 13). Because fractions of small total numbers, as for Nelson and Westland, are being compared with fractions of total numbers three or four times their size, a high degree of reliance cannot be placed on this comparison, but it does serve as an indication.

Table 13 Regional Variations on Obtaining the Initial Inspiration

	Auckland		Rotorua		Wellington		Nelson		Westland		Canterbury		Southland		N.Z.	
	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%
Through Contact with Established Farmer	6	30.0	16	36.4	11	28.9	4	26.7	3	18.8	15	35.7	27	43.5	82	34.6
From an Agric-ultural Journal	3	15.0	6	13.6	13	34.2	1	6.7	4	25.0	3	7.1	15	24.2	45	19.0
From the Mass Media	1	5.0	4	9.1	2	5.3	2	13.3	1	6.3	1	2.4	7	11.3	18	7.6
From a Book	1	5.0	1	2.3	0	0.0	1	6.7	1	6.3	0	0.0	1	1.6	5	2.1
From a Letter	0	0.0	1	2.3	1	2.6	0	0.0	0	0.0	0	0.0	1	1.6	3	1.3
Others	10	50.0	25	56.8	19	50.0	9	60.0	9	56.3	25	59.5	27	43.5	124	52.3
Total Respondents	20		44		38		15		16		42		62		237	

The responses from nearly all areas were similar to the national aggregate. The largest proportions of farmers gained their initial inspirations from other sources, and these have already been discussed. Members of the second largest proportion gained theirs from personal contact with established deer farmers, while those in the third largest proportion received inspiration from agricultural journals. Farmers in the fourth largest group found that the mass media gave them the idea. Books and letters were found to be insignificant in diffusing the idea.

Minor differences from the national pattern emerged in Nelson and Westland, but it is felt that these are explainable in terms of the small numbers of farmers involved in those areas. A more significant, but still small, difference occurred in Wellington where more individuals tended to have used agricultural journals rather than personal contact. A possible explanation for this is that, although the area is one of the larger conservancies in terms of physical size, it does not have as many deer farms as similarly-sized areas. The farms tend to be more scattered and a little more isolated from each other, so personal contact was likely to have been a little more difficult. This, however, does not appear to have affected the Nelson area, in which deer farms are also greatly scattered. It is significant that Southland, the area of greatest recent growth in the industry, considered personal contact equal to the other sources quoted. This reinforces the pattern already observed that this method has tended to gain in importance.

The Dissemination of Practical Information

After having decided to farm deer, an individual must then decide how to go about it, and establish what steps he must take to legalise his undertaking. As well as understanding how the idea of farming deer spread, it is important to understand how information relevant to the practical application of the idea was diffused throughout the country. In an effort to achieve this, findings (Appendix V, Q.33) were tabulated, first on a national basis

Table 14 Sources of Practical Information In Two-Year Time Periods

	Up to Dec. 1969		1970-71		1972-73		1974-75		1976-77		Total	
	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%
Nearby Contacts	4	25.0	9	36.0	10	37.0	24	61.5	73	59.8	120	52.4
Distant Contacts	2	12.5	5	20.0	8	29.6	23	59.0	50	41.0	88	38.4
Agricultural Journals	2	12.5	7	28.0	7	25.9	21	53.8	52	42.6	89	38.9
Mass Media	1	6.3	1	4.0	2	7.4	2	5.1	14	11.5	20	8.7
Forest Service	4	25.0	6	24.0	9	33.3	13	33.3	43	35.2	75	32.8
M.A.F.	2	12.5	4	16.0	8	29.6	7	17.9	26	21.3	47	20.5
N.Z.D.F.A.	1	6.3	4	16.0	7	25.9	11	28.2	33	27.0	56	24.5
Field Days	2	12.5	1	4.0	7	25.9	14	35.9	33	27.0	57	24.9
Others	8	50.0	11	44.0	9	33.3	3	7.7	16	13.1	47	20.5
Total Respondents	16		25		27		39		122		229	

Table 15 Sources of Practical Information By Regions

	Auckland		Rotorua		Wellington		Nelson		Westland		Canterbury		Southland		N.Z.	
	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%
Nearby Contacts	11	50.0	24	50.0	15	40.5	8	53.3	11	55.0	27	62.8	38	61.3	134	54.3
Distant Contacts	9	40.9	24	50.0	18	48.6	5	33.3	3	15.0	17	39.5	21	33.9	97	39.3
Agricultural Journals	10	45.5	19	39.6	19	51.4	8	53.3	8	40.0	11	25.6	26	41.9	101	40.9
Mass Media	1	4.5	5	10.4	1	2.7	2	13.3	2	10.0	1	2.3	13	21.0	25	10.1
Forest Service	7	31.8	26	54.2	10	27.0	6	40.0	6	30.0	9	20.9	22	35.5	86	34.8
M.A.F.	5	22.7	13	46.4	14	37.8	3	20.0	4	20.0	9	20.9	10	16.1	58	23.5
N.Z.D.F.A.	7	31.8	13	46.4	15	40.5	5	33.3	2	10.0	13	30.2	13	21.0	68	27.5
Field Days	5	22.7	20	41.7	11	29.7	2	13.3	2	10.0	10	23.3	13	21.0	13	25.5
Others	3	13.6	7	14.6	7	18.9	1	6.7	6	30.0	13	30.2	12	19.4	49	19.8
Total Respondents	22		48		37		15		20		43		62		247	

against time to determine any changes (Table 14), and secondly, by New Zealand Forest Service Conservancy Areas to examine whether any regional variations exist (Table 15).

It is clear that intending deer farmers found that personal contact with already-established deer farmers to be their major source of information. That this has not always been the case, however, is easily explainable by the fact that the early innovators frequently had no established deer farmers to turn to. The use of personal contact has been a generally increasing trend within the industry. As the industry has grown in terms of numbers of farmers involved, so it has widened geographically, and consequently intending deer farmers in recent years have not had to travel far to find an established or partly-established deer farm. Hence the proportion of those travelling some distance, and this distance was not defined in the questionnaire, after increasing more or less steadily to 59 percent in 1974-75, has decreased substantially to 41 percent in 1976-77.

The use of agricultural journals for gaining practical information has also generally increased over the years up to 1975, but has since declined. In view of the increasing exchange of information between those involved in the industry, it is possible that first-hand and demonstrated knowledge is being preferred. Furthermore, other printed material has become increasingly available. In 1976, the N.Z.D.F.A. published its first "Deer Farming Annual", and it also produces the monthly newsletter "Stagline" for its members. It has also published supplementary material, an example being "Basics of Deer Farming in New Zealand". The New Zealand Institute of Agricultural Science in 1977 devoted its entire November journal (Vol.11, No.4) to deer farming and associated subjects. Such publications may have partly pre-empted the agricultural journals as disseminators of deer farming information. Certainly, the industry is in a state of flux at the moment. With rapid changes in prices, methods of farming, and the like, it is to the individual's advantage to keep abreast with the

latest information, regardless of its source.

The mass media have never had much impact as disseminators of information to deer farmers, although a greater proportion of them have tended to use this source in recent years. The reason for this slightly greater use can perhaps be ascribed to the media having sensationalised the massive increases in prices obtained recently for deer products. Radio and television programmes directed specifically at the farmer, such as "Good Farming", have devoted more time to deer farming in recent years, and this must certainly have had some impact.

In 1969 and the early 1970's, the New Zealand Forest Service was understandably cautious in its approach to the farming of deer. It was concerned that deer might escape to breed in areas that were free of deer, or that were relatively free of a deer problem, and it was not to know whether or not some might be purposely allowed to escape by an ostensible deer farmer. It was fearful of possible changes in the attitudes of the population in general because of the 1969 legislation which permitted the farming of deer. It did not, consequently, go out of its way to make it easier for intending deer farmers. With time, the legal regulations pertaining to the security of captive deer appeared to be working satisfactorily, and the deer farmers had proved their responsibility by closely adhering to the regulations, so the New Zealand Forest Service relaxed its attitude. Relations between it and the bulk of the deer farming group became more amiable, and the Forest Service became more willing to help with information. This is clearly reflected (Table 14), with more substantial proportions of deer farmers receiving advice from this quarter, from 1972-73 onwards, when setting up their units.

When the industry was in its infancy, the Department of Agriculture was at as much of a loss as anyone else on how best to farm deer. Thus the help and advice from this source was generally very limited. Advisers and others within the Department, however, tended to show a keen

interest in the developments going on. Some advisers certainly spread new ideas developed by innovators within their areas to others in the same area. In 1977, the Deputy-Director (Farms) of the Department, by now renamed the Ministry of Agriculture and Fisheries (MAF), wrote of the deer farming industry that there were training activities organised to equip advisers, and that both Invermay and leading deer farmers were assisting in this (Scott, 213). This source is thus tending to be used more often, and it is likely to become more significant in the future.

The numbers of individuals who stated that they received information from the N.Z.D.F.A. are rather misleading. Fifteen respondents indicated that they received information from this source before 1975, but the N.Z.D.F.A. was not formed until that year. If the numbers of farmers had been correlated with the dates when they first commenced operating their units, six of the fifteen would have moved into 1975 or later, and thus they could well have sought advice from the N.Z.D.F.A. The nine remaining must have either mis-read the question and, not realising that it applied to the information required for setting up the unit, they marked that response because they had used this source since that time, or perhaps they did so because they had obtained information from individuals who later became stalwarts of the N.Z.D.F.A.

In the early days, of course, organised field days for deer farmers were non-existent. The N.Z.D.F.A. has, since its formation, organised several, and this is reflected in the increasing proportions of respondents who gained information from this source when setting up their own units. These field days, however, have not been particularly frequent in any particular area, and unless one is organised just prior to a farmer setting up his unit, he is obliged to look elsewhere for his information. For this reason field days have not been one of the major sources of information for those starting up, but then field days have other, possibly more vital, objectives to meet.

The proportion of those who obtained their information elsewhere was necessarily very large in the early days, but this proportion has decreased steadily in size as workable methods and ideas have evolved and have been disseminated. Of those respondents who marked other sources, most up to about 1972 stated that they had to provide their own ideas which they then employed on an empirical basis. In the later years, although the proportion of respondents in this category had declined, the diversity of their sources had increased. Three stated that, as agents for the collection of venison, they picked up valuable information from their contacts with the industry, and two stated that their ideas were adopted from seeing farms that had employed them as professionals to capture and trap deer. Several stated that they gained information by talking to Lincoln College students and graduates, while four in Southland considered Invermay had provided them with information.

With the exception of the Wellington area, the most common method employed for getting information pertinent to setting up deer farming units was to ask a nearby deer farmer. Even in recent years the distribution of deer farms in Wellington has been more scattered than elsewhere (Figure 7), and it is felt that this is the reason for the lower number of Wellington farmers who marked this response, particularly in view of the fact that, along with Rotorua, more farmers of this area apparently travelled greater distances to get first-hand knowledge. A very small proportion of farmers in Westland was prepared to travel some distance for this purpose, but the isolation of the area would account for this.

Rather surprisingly, although a smaller proportion of Nelson farmers obtained the idea of farming deer from agricultural journals than in any other area (Table 13), the greatest proportion who used this source for practical knowledge was from the Nelson area. On the other hand, the Canterbury area had a very small proportion which gained the initial idea from this source, but it also had the lowest proportion of people who obtained practical

information this way. The reason for this divergence between the two areas is not readily apparent, and can perhaps only be explained by the large group of Canterbury farmers who considered that they obtained information in other ways.

In all areas, the mass media have been little used by farmers in obtaining practical information. Southland farmers, though, stand out through having used the media at twice the national rate, whereas Wellington and Canterbury farmers rarely avail themselves of these services.

Over half of the Rotorua farmers made use of the New Zealand Forest Service in getting practical information before setting up their units, whereas in Canterbury only one in five did so. The proportion of farmers in other areas who did so fell between these two extremes. The difference between Rotorua and Canterbury perhaps lies in the fact that Rotorua City is more central to the spread of the bulk of deer farms in its area than is Christchurch (Figure 7), and so the farmers in the former area tend to have a greater accessibility to the Forest Service offices. Furthermore, with forestry providing the basis of a greater proportion of industry in the central North Island, the farmers there are possibly more aware of the New Zealand Forest Service and so are likely to be less diffident about making use of it.

The Rotorua farmers, and to a slightly lesser extent the Wellington farmers, made significantly more use of both the Ministry of Agriculture (M.A.F.) and Fisheries advisory officers and of the N.Z.D.F.A. As the Rotorua area was the centre of the innovation, the M.A.F. advisers there have perhaps had longer to absorb the ideas coming forward than elsewhere, and so possibly have been made more use of because they had more to offer than those elsewhere. Similarly, with the greater numbers of deer farms located in the central North Island at the time of the formation of the N.Z.D.F.A., it is likely that word of its formation spread by personal farmer-to-farmer contact more quickly

there, so that more people became aware of it earlier in that area than elsewhere. Most of the initial field days and other activities organised by the N.Z.D.F.A. would have been located in the central North Island where more members were clustered together than elsewhere, and so more people there would be exposed to its activities. This is borne out by the larger proportion of Rotorua farmers gaining practical information from field days than in any other area. Those areas with the fewest numbers of deer farms, namely Nelson and Westland, have had smaller proportions of farmers receiving information at field days because, in the past, there were insufficient numbers of farmers to make it worth while organising them.

Of the proportions of deer farmers who gained practical information from other sources, it is significant that Canterbury, Westland and Southland had larger such proportions than elsewhere. This is undoubtedly due in the first instance to the proliferation of firms engaged in game recovery and related activities in these areas, and in the second instance to the locations within these areas of Lincoln College and the Invermay Agricultural Research Station. Lincoln College had initiated the first deer unit for research purposes, and although this has since ceased functioning, students there are still apparently able to study papers relevant to deer farming. Many of these students have acted as carriers of information. The Invermay Station has, since 1973, maintained a deer unit for research purposes. Although its findings are published, many Southland farmers consider that they have learned much by being able to visit it in person.

Numbers Accepting the Innovation

Information supplied as to when individuals first decided to farm deer (Appendix V, Q.11) were tabulated by New Zealand Forest Service Conservancy Areas (Table 16). Thirteen people indicated that they had done so prior to 1969, but six of these, unfortunately, omitted to say precisely when they had so decided. The other seven, who replied positively, indicated the following years: 1950,

Table 16 The Annual Numbers of Individuals Deciding to Farm Deer

	Before 1969		1969		1970		1971		1972		1973		1974		1975		1976		1977		1978	
	No.	Tot.	No.	Tot.	No.	Tot.	No.	Tot.	No.	Tot.	No.	Tot.	No.	Tot.	No.	Tot.	No.	Tot.	No.	Tot.	No.	Tot.
Auckland	2	2	2	4	3	7	0	7	0	7	3	10	1	11	2	13	4	17	4	21	3	24
Rotorua	8	8	2	10	3	13	1	14	0	14	5	19	5	24	5	29	6	35	11	46	5	51
Wellington	1	1	0	1	3	4	1	5	4	9	1	10	2	12	5	17	10	27	10	37	2	39
Nelson	0	0	0	0	0	0	2	2	2	4	0	4	1	5	1	6	3	9	4	13	2	15
Westland	1	1	0	1	0	1	1	2	1	3	2	5	0	5	0	5	6	11	7	18	1	19
Canterbury	0	0	1	1	2	3	2	5	4	9	3	12	1	13	5	18	9	27	15	42	3	45
Southland	1	1	1	2	4	6	5	11	1	12	1	13	7	20	8	28	19	47	15	62	2	64
N.Z.	13	13	6	19	15	34	12	46	12	58	15	73	17	90	26	116	57	173	66	239	18	257

1962 (2), 1966 (2), 1967 and 1968. While these findings might well be questioned by sceptics asking "How could these people decide to farm deer when it was illegal and when they knew they most certainly would be prosecuted for doing so?", it is pointed out that these people could well have made the decision to set up deer farms when they did, but with the proviso that deer farming first become a legitimate enterprise. It is also acknowledged that the actual data given may be questionable, often being based on memory rather than on conclusive evidence.

From 1969 to 1975, there was a slow but steady increase in numbers making the decision to farm deer. This number increased dramatically in 1976, however, but then experienced a smaller increase in 1977, although it was thought that the smaller increase in 1977 does not necessarily indicate fewer people deciding to take up deer farming. To test this hypothesis, the years 1972 and 1974 were arbitrarily selected. The years in which the people, who decided to farm deer in these two years, initially applied for a permit to hold deer, and then actually started to operate their units, were tabulated (Table 17). It can be seen that, of those who had decided to farm deer in the two selected years, only two in every three actually applied for a permit in the same year. It is likely, then, that the 66 who decided to farm deer in 1977 in reality comprises only about 70 percent of the total of all those who actually so decided. This means, in effect, that as many as 94 people are estimated to have made the decision in 1977.[2] It was, of course, not possible to contact these extra people because, as they had not yet applied for their permits to hold deer, there was no record of their names.

The time interval of at least one year between deciding to farm deer and in making the first concrete move in this direction by applying to the New Zealand Forest Service for a permit, for some thirty percent of those involved, is also interesting. Few changed completely over to deer,

[2] If 70% = 66, then 100% = $66 \times \frac{100}{70} = 94$

Table 17: Years In Which Initial Decisions were Made, Permits Applied For, and Units First Operated

	1972	1974	Total	Total %
Total Numbers Deciding[1]	12	17	29	100
Nos. of These Applying for Permits that Year	8	12	20	69.0
Nos. of These Applying for Permits 1 yr Later	3	3	6	20.7
Nos. of These Applying for Permits 2 yr Later	1	1	2	6.9
Nos. of These Applying for Permits 3 yr Later	0	1	1	3.4
Nos. of These Who Operated that Year	5	8	13	44.8
Nos. of These Who Operated 1 yr Later	3	0	3	10.3
Nos. of These Who Operated 2 yr Later	0	3	3	10.3
Nos. of These Who Operated 3 yr Later	0	1	1	3.4
Nos. of These Who Operated 4yr+ Later	4	5	9	31.0

[1] These numbers were greater, but not all respondents stated when they obtained their permits and when they first operated their units

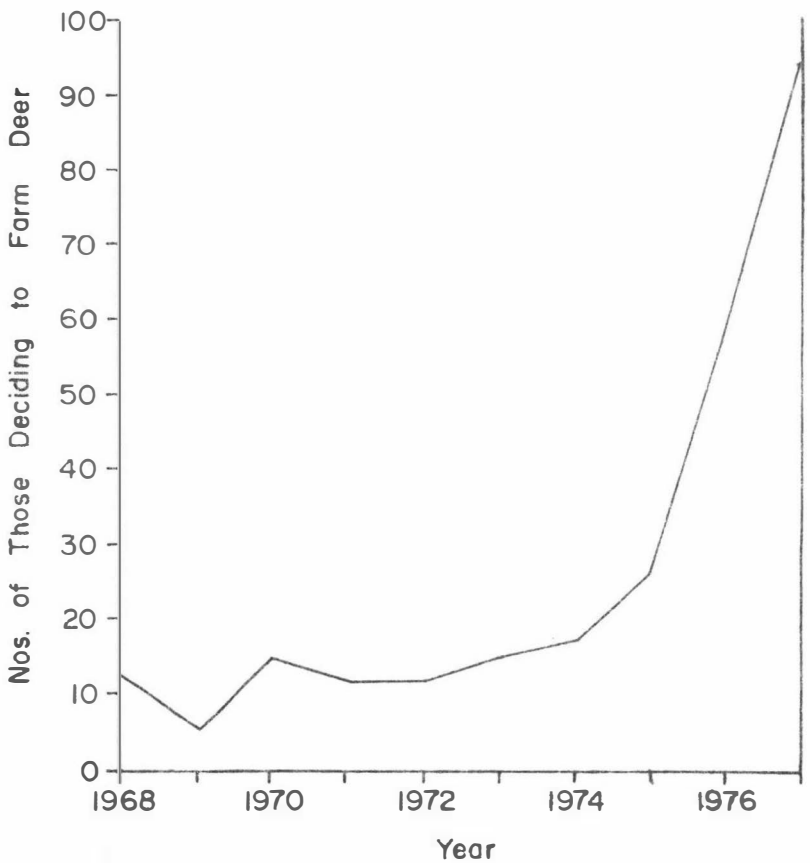
for the majority preferred to set up small units of eight hectares (or about twenty acres) or less; thus it was not the magnitude of the decision, as measured in terms of acreage involved, that intimidated them and caused them to retard their practical application of the decision, but rather, in all likelihood, it was the lack of knowledge as to what the first step should be that caused the delay. The interval was probably used in locating someone who could provide them with this information, in finding out about the legal requirements for holding deer, and in deciding which pieces of their land could best be used to meet these requirements. Furthermore, 21.8 percent, or about one in five, of the 266 respondents indicated that, at the time of the initial decision, they gained the major portion of their incomes from other, non-farming occupations. Since many of these would have had no land when they first decided to farm deer, a period for them of a year or more, in which to locate and purchase suitable land, may have been necessary.

The further delay in setting up their deer farms that many of them experienced after obtaining their permits is not surprising. Fences and yards, which will be discussed in the next chapter, had to be built, stock had to be located and either caught or purchased, while the deer unit itself had to be inspected to ensure it met the legal requirements. Such fences, yards and stock inevitably meant substantial investments, and the necessary finance may have taken some time to raise, if loans were required.

The total numbers of those deciding to take up deer farming (Table 16) were graphed (Figure 8). It would appear from this graph that the acceptance of deer farming has so far conformed fairly closely with the normal curve of adoption (Abler et al., 405). The graph omits the numbers prior to 1969 as the years were not known for many of them. Because the initial position of the curve is not known with complete certainty, and because its midpoint has not yet been reached, it is not possible to accurately extrapolate the curve to obtain reasonable predictions of future growth. Furthermore, few examples of diffusion curves based upon

Figure 8 : Annual Numbers Deciding to Farm Deer

(c.f. Fig. 9, 137)



real-life situations correspond to the perfect normal curve without some variation, and this must serve to negate the validity of any predictions so made. In this case, distortions to the curve are likely to be caused by the lack of readily-available stock and other features which will be discussed in succeeding chapters.

Summary

Deer farming, as an innovation, was centred in the central North Island. From there, it spread south in large leaps to centres near Napier, Palmerston North, Reefton, Invercargill, and so on, while at the same time the number of adopters within the area of the centre of innovation grew. Each new adopter in the other areas tended in turn to become a nucleus for a cluster of further adopters. This process continued steadily until the 1975-77 period when the growth rate escalated quickly, particularly in the Southland area.

While it was not possible to determine how the idea spread from the central North Island to distant areas such as Reefton, it was found that personal communication by these secondary innovators to other people caused the further expansion of the industry in clusters. This has also been the major method whereby practical ideas have spread. These findings agree with theory, Hagerstrand having stated that "personal communication between pairs of individuals and direct observation are still the basic instruments for the diffusion of innovation" (International Encyclopedia of the Social Sciences, Vol.4, 176).

Significant variations over time, and between areas, have existed for the modes of diffusion of both the basic idea of farming deer and the practical information permitting the practical application of the basic idea. They have both tended to spread increasingly through the medium of personal contact. More regional variations exist for the dissemination of practical information than for the basic idea itself, but this is understandable due to the practical information being so varied in nature and purpose.

The growth of the industry was initially fairly rapid until those who had desired to farm deer for some time succeeded in doing so around 1969. It then slowed to a steady growth, but accelerated again in 1975-76. The numbers of adopters appear to be following the normal acceptance curve for an innovation, but it is as yet too early in the life of the industry to say so with certainty.

CHAPTER 7

FACTORS AFFECTING THE GROWTH OF THE DEER FARMING INDUSTRY

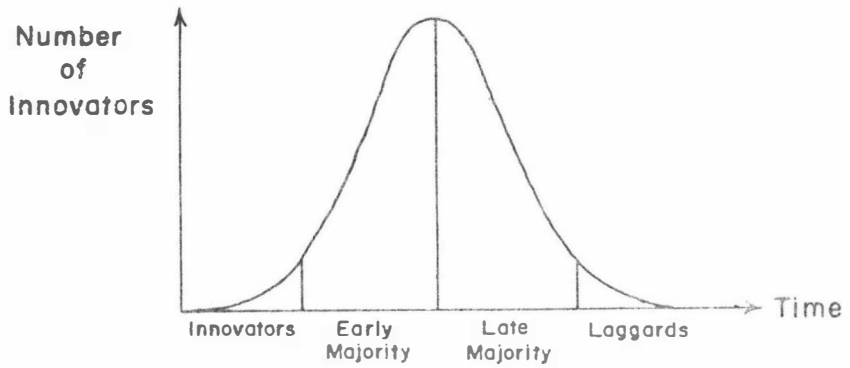
> In agriculture, the rate of diffusion and adoption of an innovation depends upon many variables. The spatial diffusion aspect has already been examined, albeit somewhat briefly, and so it is upon the various factors that affected each individual decision to adopt the practice of farming deer that this chapter will concentrate.

Innovation Adoption

Invention, like discovery, adds to human knowledge. The fact that people possess the knowledge, though, does not necessarily mean that they are making a practical use of it. When the new idea, invention, or discovery is first employed in a practical sense, it becomes known as an innovation, and the people who lead in the use of the innovation are known as innovators. Thus the farming of deer was invented when it was first thought of by a person, but the term "innovation" could not be applied to it until an individual, or individuals, first made a practical application of the idea.

It is now generally accepted that the total numbers of adopters of an innovation, over time, is likely to follow the curve given (Figure 9). It has, furthermore, become conventional to affix the labels 'innovators, early majority, late majority and laggards' to the groups of adopters, the label pertinent to any individual with respect to a particular innovation depending upon the length of time, relative to the whole time span from the first acceptance to what may be thought of as 'saturation' level of acceptance by the population, that has elapsed before that individual adopts it (Abler et al., 405).

Figure 9: The Distribution of Innovation Acceptors Over Time



Source : Abler et al, 405

Because there are only 350 deer farmers as yet, it is quite apparent that those who have adopted the practice of farming deer include the innovators and some of the early majority. The term "early adopters" has been used in this thesis to make it clear to the reader that not all the early majority group is included.

The Adoption Process

It is generally accepted that the process of adopting an innovation has five stages (Leagans, 138; Rogers, 81) namely:

1. Awareness. In this initial stage, the individual has been exposed to the innovation through the process of diffusion. He is aware of the innovation, but lacks complete information concerning it.

2. Interest. During this stage, the individual decides he possibly likes the innovation, but he has not yet judged its practical application in terms of his own situation. He actively sets out to gather more detailed information.

3. Evaluation. The individual now weighs the evidence and information accumulated in terms of his present and anticipated situation, and decides whether or not to attempt implementing the innovation himself. Further practical information and advice will be sought to reinforce the individual's faith in his decision because of the subjective risk involved.

4. Trial. The innovation is now tried in a limited small way on a trial basis. The adopter does not wish to risk too much by committing himself more or less totally to a relatively untried idea, so he experiments to find the extent of its general utility to him.

5. Adoption. It is in this final stage that the individual makes the decision to adopt the innovation. The extent of his previous application of it will be enlarged, and he may even utilise it for his entire production.

Each of these five stages may continue for different lengths of time according to the natures of the individuals involved. Some individuals may not persist through all five stages, but may stop, in fact, after any of the first four stages. The trial stage is likely to be a longer one for the innovators and early adopters than it is for those who follow. This is because the individuals in the first two groups have few or no examples to model their efforts on, whereas those in the last group have many examples to follow.

It would appear, from the data obtained (Appendix V, Q.26), that the majority of deer farmers are moving out of the trial period (Table 18). In both islands, the greatest proportion of farmers, about sixty percent, state that, although they do not wish to farm deer alone, they are desirous of enlarging their units. The North Island has a greater proportion of full-time deer farmers than the South Island, and it also has a higher proportion of farmers who have decided to concentrate on raising deer. It is felt that these differences are significant, but are explainable in terms of the hearth of the innovation being in the North Island. More North Island farmers have had longer to assess their trial units than have South Island farmers.

By combining the second and third categories (Table 18), it readily becomes apparent that, so far, over seventy percent of all deer farmers in both islands have decided to enlarge their units. As one does not have to fully commit all his production resources to a new innovation to prove he is in the adoption stage, it is clear that, by including

Table 18 : Present Attainments and Future Intentions

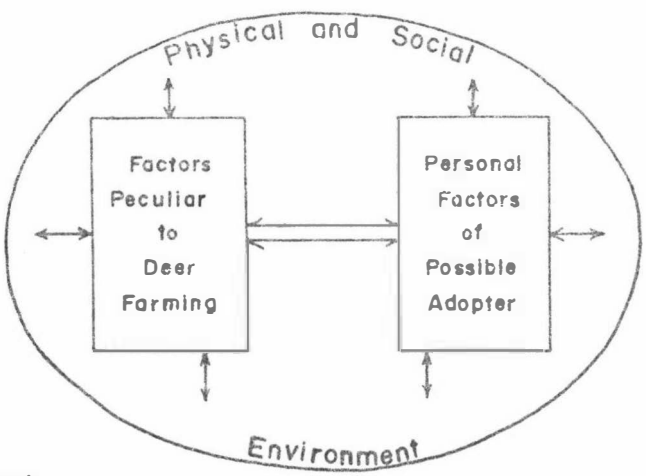
	North Is.		South Is.		N.Z.	
	No.	%	No.	%	No.	%
A small diversification only and will stay so	20	18.5	26	19.8	46	19.2
A small diversification only, but will concentrate on	14	13.0	13	9.9	27	11.3
A small diversification leading to greater diversification	63	58.3	81	61.8	144	60.3
Currently the major production effort	11	10.2	11	8.4	22	9.2
Total	108	100.0	131	99.9	239	100.0

the few who are now more or less farming deer alone, over eighty percent of those in the industry in both islands have adopted deer farming.

When exposed, through the process of diffusion, to the idea of farming deer, an individual has a choice. He may actively accept the idea and start farming deer himself, following the five stages set out above, or he may reject the idea. He may also, it is true, postpone his decision, but this is tantamount to a rejection that may become a permanent or a temporary one.

The decision to accept or reject the practice of farming deer must be based upon three sets of factors. These may be described as being the personal qualities of the farmer himself, the impersonal factors imposed upon him by his social and physical environment, and the innate qualities of deer farming itself. These three sets of factors interact greatly with each other (Figure 10), but to simplify the processes at work, they will be examined in isolation.

Figure 10: The Interaction of the Sets of Factors Affecting the Adoption of Deer Farming



Social Environment

Part One was devoted almost exclusively to tracing the historical aspects of social attitudes to deer in New Zealand. From this, three major factors will now be apparent. Firstly, there was a core of "hard-liners" who were still strongly opposed to deer because of their past depredations to forests and grazing lands, and these people would still

have felt some antipathy to the idea of farming them. Secondly, markets had been established for deer products. Finally, official legislation imposed sanctions upon the industry that, as will soon be shown, served to restrict the growth and distribution of the deer farming industry.

The first major factor, the existence of a core of people that was antipathetic to the cause of deer farming, meant that these people themselves would not adopt the principle of farming deer without much soul-searching. Certainly, when it was an untried innovation, they must have been averse to it, and it is only now, when it can be seen that at least a few people are making profits from it, that they might be prepared to re-examine their attitudes.

Because these people made a minority group, it is unlikely that their rejections of the innovation made much difference to the national rate of acceptance of it. If, however, individual members of this group were highly respected and articulate, their influence would undoubtedly serve to slow down the rate of acceptance of deer farming in their particular communities. This aspect was not tested as it would have required a separate survey of farmers not involved in the farming of deer.

The proven existence of markets for the products of deer was essential for the development and subsequent growth of the deer farming industry. Rational people will not produce goods in quantity unless they are certain that markets exist for them. In this sense, it is extremely unlikely that the farming of deer in this country would have occurred without the successful and prior establishment of the game recovery industry. The latter industry commenced, it will be recalled, only because people realised that possibly-marketable commodities were being destroyed at some cost to the nation. The deer were there to be taken, and so it was worthwhile searching for and establishing markets for the products of deer. In contrast, a farmer would not commence farming deer and then look for a market. He is not even likely to commence operations on the vague

promise of a market accepting his produce. On the contrary, he desires to know, with complete assurance, that a long-term market exists before he invests his time, money and skills into the new venture.

The third major factor affecting the adoption of deer farming is the law. The legislation enacted in 1969 to permit the farming of deer has also served, rather ironically, to effectively limit the growth and expansion of the deer farming industry.

The regulation which has had most affect on the distribution of the industry throughout the country was that which stated that no deer could be farmed outside the feral range of its own species (Noxious Animals in Captivity Regulations, 1969). Much to the writer's surprise, both the Wellington and Palmerston North offices of the Environmental Division of the New Zealand Forest Service could not, or would not, define where the different feral range boundaries lie, yet it is the task of this Division to decide whether a farmer who wishes to farm deer has property inside or outside of the boundary of the feral range for the species he wishes to farm.

It is apparent (Figure 11) that the feral range of red deer does not extend into the northern portion of the Auckland province and into the western portion of Taranaki, but otherwise covers most of the country. Fallow deer were restricted to smaller areas in both islands, and wapiti were found only in a western area of Southland.[1] A comparison of Figures 7 and 11 reveals no deer farms in Northland and Taranaki, yet the fairly extensive spread of them through other areas would tend to indicate that the likelihood of there being some people in these two areas, who would actively adopt the idea of farming deer if permitted to do so, is very strong. It can, therefore, be stated with some conviction that legislation has imposed an official restriction on the geographic distribution of deer

[1] Locations of other feral species were not mapped, as so far few people have evinced interest in farming them.

Figure II : Feral Ranges of Deer Species

Distribution of Feral Red Deer

Source : Harris, 1973, 8-9

Figure II : Continued Feral Ranges of Deer Species

Distribution of Feral Wapiti and Fallow Deer

Source : Harris, 1973, 22-23 & 64

farmers, particularly in so far as Northland and Taranaki are concerned.

Furthermore, and this was not assessable in the survey, it is possible that some people who desired to farm a particular species of deer were not permitted to do so because they lived within the feral range of another species, and so they did not farm any deer at all.

Perhaps the best way of assessing the impact of the feral range restriction on the deer farming was to ask the farmers themselves. This was done (Appendix V, Q's. 23-24).

There is certainly some divergence in the regional proportions of farmers who found the feral range regulations a handicap to themselves. Of major import is the fact that, whereas about half of the deer farmers in the Auckland region found it to be a definite handicap in their operations, over three-fourths of the farmers in all of the other regions found that it did not affect them. This variance of Auckland can only be explained by the fact that, whereas farmers in other districts had access to the species of their choice, usually red deer, half of those in Auckland were confined to the one species, fallow deer. Fallow deer, as has already been pointed out, are more difficult to control, and the remuneration from them is likely to be less.

While most farmers in New Zealand found that the feral range regulations provided no real restrictions to themselves, the position reversed itself when they considered the whole industry. A total of 57 percent considered that the regulation had been a definite handicap to the industry. In view of the fact that 17 percent of all individuals had intimated that they had been so adversely affected, it is, in fact, surprising that this 57 percent was not greater. It is felt that 17 percent was a significant proportion to be affected, particularly in view of the fact that it does not include those who were dissuaded from joining the industry because they found that they were unable to farm the species of their choice.

Table 19: How Deer Farmers Themselves Viewed the Feral Range Restriction

	Auckland		Rotorua		Wellington		Nelson		Westland		Canterbury		Southland		N.Z.	
	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%
A handicap to the Individual himself	10	47.6	7	14.9	8	23.5	2	16.7	1	5.9	5	12.5	7	11.7	40	17.3
No handicap to the Individual himself	11	52.4	40	85.1	26	76.5	10	83.3	16	94.1	35	87.5	53	88.3	191	82.7
Total	21	100.0	47	100.0	34	100.0	12	100.0	17	100.0	40	100.0	60	100.0	231	100.0
A handicap to the Industry in general	16	76.2	27	57.4	24	70.6	8	66.7	9	52.9	20	50.0	28	46.7	132	57.1
No handicap to the Industry in general	5	23.8	20	42.6	10	29.4	4	33.3	8	47.1	20	50.0	32	53.3	99	42.9
Total	21	100.0	47	100.0	34	100.0	12	100.0	17	100.0	40	100.0	60	100.0	231	100.0

Of further significance is the fact that, from Auckland to Southland, there appears to be, with the exception of Rotorua, a progressively marked increase in the regional proportions of farmers who saw the feral range regulations as having been no handicap to the industry. As has already been pointed out, the northern extreme, around the South Kaipara Head, has had no option but the fallow deer. Further south, more options tend to become available, and certainly most are happy with the red deer. Then, in Southland, some had access to the wapiti and wapiti-red cross. It is on these animals that many within the industry are relying for future greater productivity (Drew and Moore, 21).

The second aspect of this restrictive legislation was eliminated by the Wild Animal Control Act 1977, which stated that fallow deer, red deer, wapiti, and wapiti-red deer hybrids could be farmed on deer farms outside the feral range of the species provided that the land involved is not outside the feral range of any species of deer (Wild Animal Control Act 1977, 16). Thus, while the farming of deer in Northland and western Taranaki is still not permissible, a farmer in the Kaipara area, for instance, may now farm red deer, wapiti, or a red-wapiti cross if he so desires. The effect of this new legislation, particularly with regard to wapiti, has been almost instantaneous. At the time of the survey, respondents holding wapiti or wapiti-red cross numbered twelve in Southland, five in Canterbury, one in Rotorua, and one in Wellington. Admittedly the number of animals involved was small, totalling 120. Of these, 100 were in Southland where some farmers, of course, were legally holding them before 1977.

A second restriction imposed by officialdom affected not the geographic spread of acceptors, but the overall growth in their numbers. The Third Schedule of the Noxious Animals in Captivity Regulations(1969) listed the legal requirements for boundary fences and gates (Appendix VI). Although the legislators considered such requirements to be essential, the financial burden imposed upon the farmer in satisfying them has been evidenced by many writers.

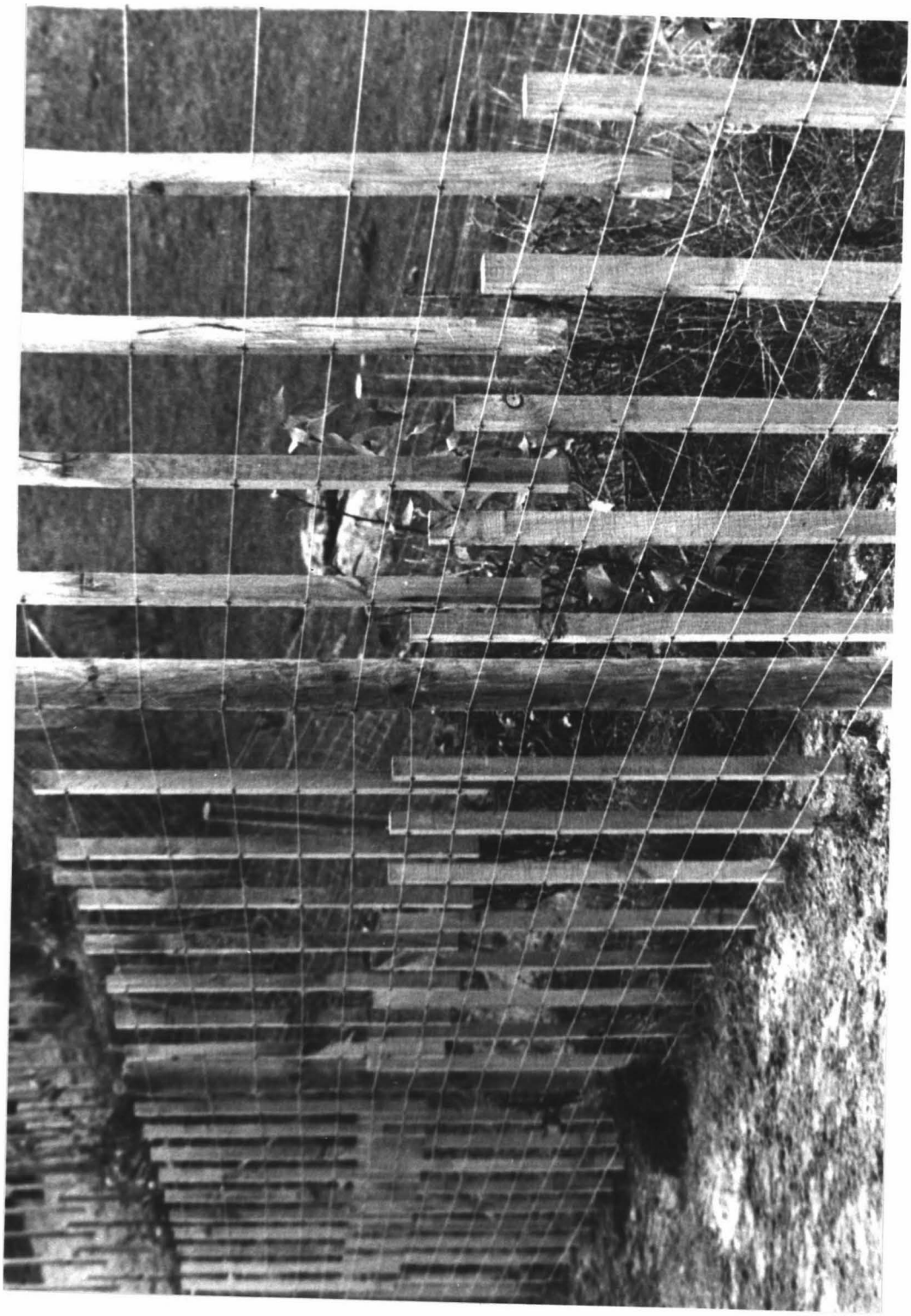


Plate 3: Expensive Batten and Wire Fences

"The very high capital costs of establishing facilities and purchasing livestock are key limitations for intending deer farmers" (Pinney, 1976a, 11). "Fencing remains the item initially high costing" (Whitelaw, 16).

In 1976 the costs of fencing the perimeter of a deer unit were estimated at $1.50 per metre (Clouston, 37) and at $2.10 per metre (Pinney, 1976a, 11). A year later, it was considered to be $3.00 per metre (Yerex, 1977b, 3). The variation in 1976 prices doubtless results from different expectations as to the amount of labour supplied by the farmer and as to the availability on the farm itself of timber suitable for posts, strainers and battens, but either way the cost is high. Pinney (1976a, 11) calculated the total fencing requirements for a 50 hectare unit as costing $11,400 in 1976. This is over and above the cost of stocking the unit!

Some farmers attempted to partly solve the cost-problem of fencing by utilising existing fences and extending them upwards, but such fences were not particularly satisfactory and will last only as long as the original lower fences. It was a short-cut that may prove expensive in the long-term, but it got those who used it through the trial stage without having to bear the full costs of fencing.

Other farmers, however, must have been dissuaded from the venture by the fencing costs. A deer-proof fence may be used for other stock, so if a farmer withdraws from farming deer, his fencing may not be an entire loss. It would still be an expensive investment, though, when compared with the normal fence. Although a person may wish to start farming deer, he may not find it possible to do so if he cannot finance the fencing required, or if he cannot borrow the wherewithal to do so. Westland is admittedly a small area, but it does have large numbers of feral deer and it did have one of the first two South Island deer farms, so it is surprising that it does not have more deer farms. It is possible that the depressed state of the regional economy there has meant a lack in the availability of funds for

Plate 4: Deer Within Netting Fence

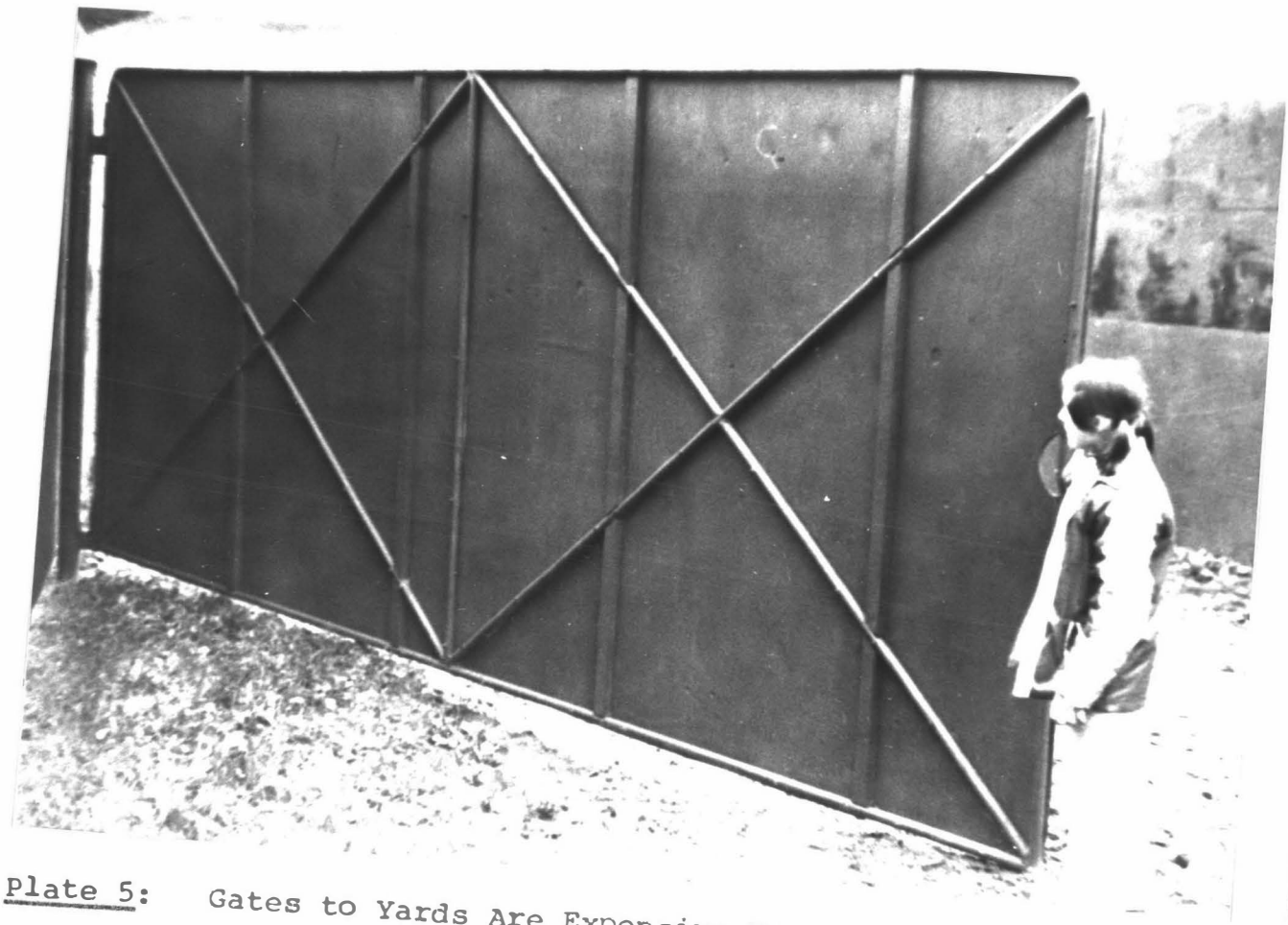


Plate 5: Gates to Yards Are Expensive Too

fencing purposes.

The N.Z.D.F.A., naturally concerned about the costs of meeting the fencing requirements, has made some representations to officials about it. K. Miers, head of the Environmental Division of the Forest Service, has been quoted:

> We took a shot in the dark when we drew up the regulations ten years ago, and it would certainly be possible now to look at the possibility of changing these to make cheaper fencing for deer possible (New Zealand Deer Farming Annual, 1977-78, 12).

So far, however, no changes in this direction have been made to the regulations.

Although they were not required for the permit to hold deer in captivity, the construction of suitable yards for veterinary inspections and other purposes has been a stipulated condition that had to be met before a deer farming licence could be issued by the Ministry of Agriculture and Fisheries. It is possibly because of this requirement that most individuals are today farming deer with only the permit from the Forest Service, and not with the licence from the Ministry of Agriculture and Fisheries.

Those who have constructed yards have evolved varied designs, but generally they are agreed that solid-walled, octagonally-shaped ones are best. Others, while agreeing with this, also feel that they should be wholly or partly covered over as darkness helps to quieten the deer. Similarly, it is generally felt that races should have solid walls (Plates 6 and 7).

As with fencing, the costs of yards and races are fairly steep. A few farmers have attempted to cut costs by making their races with wire fences covered in scrim, but these are not very permanent. Once more, it is likely that some individuals, who had achieved the stages of interest and evaluation in the adoption process, did not move on to the trial and adoption stages because of the costs involved.

Plate 6: Solid-Walled Race and Roofed Yards

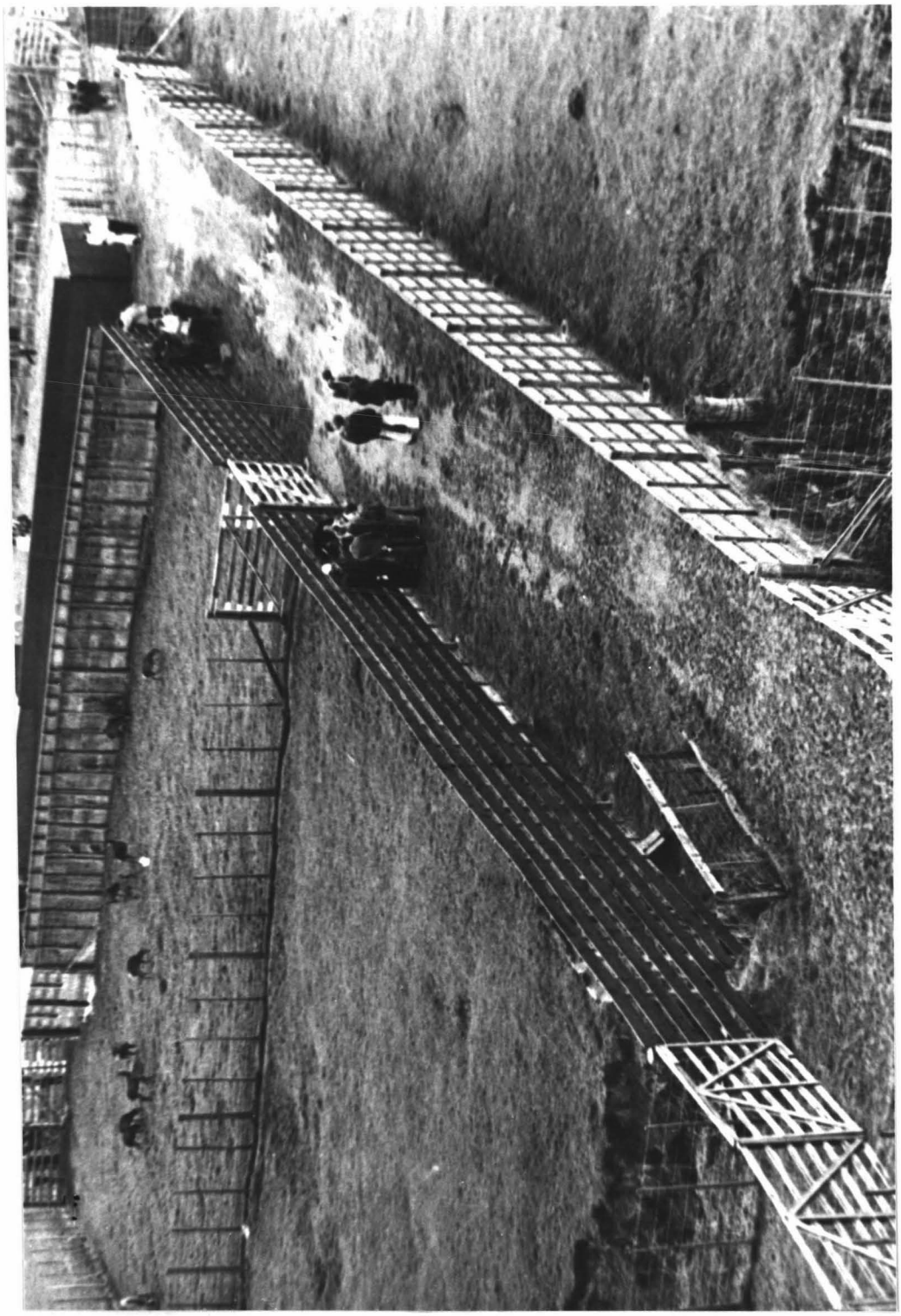


Plate 7: Two Types of Race Walls, but Both Solid and Expensive

Other social factors are at work, too, in affecting the rate of adoption of deer farming practices. In the first few years, a measure of the risk involved was the difficulty experienced by innovators in borrowing funds to establish their units. Banks and other lending institutions would, in general, not consider the proposition because of the risk entailed. This situation has changed for the better, in so far as the prospective deer farmer is concerned. The Rural Development Bank and others are now quite prepared to lend money for the purpose of establishing deer farms.

Although loans are presently easier to obtain, the increased costs of fencing materials and stock are of major concern to both expanding and prospective deer farmers. It is significant that, in response to the question "What differences in obstacles would you expect to meet today in setting up your unit?", nearly all stated that the financial strain today is greater, citing either or both of the reasons just mentioned.

Thus, in the initial years, the lack of availability of loan money was a problem. Then, as this situation was corrected, prices for fencing and livestock increased rapidly. Both these phenomena were due to the social environment, lending institutions not wishing to risk their clients' capital on a venture which they saw as unproven and hence risky, and price rises being occasioned by both the spiralling costs of manufacture and raw inputs, together with demand exceeding supply.

A major obstacle experienced by many deer farmers who could not provide their own timber for fencing purposes was the difficulty they had in obtaining posts of the stipulated length. This was a social factor in that commercial producers of posts were not geared-up for the production of posts nine feet in length. Then again, due to lack of demand for them, retail outlets had not been stocked with them. Similar difficulty was often experienced in obtaining the wire mesh which many saw as being preferable to nine strands of high-tensile wire (the latter were not legal

for boundary fences for fallow deer anyway!).

Data on how the deer farmers themselves were affected by such obstacles was obtained (Appendix V, Q.17). A total of 63 percent, almost two in every three of all 238 respondents, indicated that the financing and obtaining of stock was a major obstacle to overcome. A further 43 percent stated the same for the erection of fences and yards. In contrast, only 17 percent found that both the successful seeking of reliable information, and obtaining the necessary permits and/or licences, were major obstacles.

Physical Environment

Since their successful liberation in New Zealand, deer have thrived in all parts of the country that they have found themselves in. The environment has proven to be to their liking (Chapter 1). The hunting pressure exerted by man, however, has largely kept the deer confined to the bush and mountain areas of the country.

If a man was to farm deer, he would naturally desire them to remain in a good, healthy condition. This could be assured by providing them with a favourable physical environment. In their attempts to do this, the early innovators looked to the hilly and partly bush-clad areas as they considered these to be the natural habitat of deer. They tended to forget the reasons why deer largely inhabited such areas.

It was largely for this reason that the first deer farms were established in the central North Island, and then spread to similar country near Palmerston North, Reefton, and the like. Such decisions in location were, in fact, hailed at the time, as deer farming was seen to be a possible economic use of marginal and formerly unproductive land (Valler, 55).

By 1973, the picture had changed slightly. It had been discovered that deer did well on good pastures, but it was still thought advisable to provide scrub cover for the deer (Morcan, 39). In 1974, a future swing to the use of

more productive land for deer farming was hinted at: "There's evidence to suggest that some of our best finishing and dairying country could be the most profitable for venison production" (Wilson, 1974a, 8).

By 1976, the change in emphasis from the use of marginal and unproductive land to more highly productive land was more noticeable. In discussing the capital requirement for fencing and facilities for a 50 hectare deer unit, Pinney (1976a, 12) stated:

> In an extensive situation of land capable of carrying only 2½ S.U./ha the cost would be $100/S.U., but on first class land capable of 20 S.U./ha the setting up cost of fencing and facilities drop to $12.50/S.U.

The continuing empirical work in proving that deer did exceptionally well on highly productive land and under intensive farming techniques (Elworthy, 1977b, 173) opened the way for farmers on more productive country to adopt deer farming, and such hard-headed calculations as that given above doubtless served to hasten their rate of acceptance of deer farming. Although this is really a change in the social rather than in the physical environment, as it reflects a change in human attitudes and values, it is felt that the individual adopter's physical location has affected the time of his initial participation in the industry.

The previous land use of deer units, as given by survey respondents (Appendix V, Q.4), is given (Table 20). It is quite clear that some changes have occurred in the types of land being selected for deer units. Many farmers have tended to utilise land, which was previously unproductive, for their units. The proportion of farmers who did this was particularly high in the early 1970's, but this proportion has steadily declined since 1972. The great majority of the deer farmers have always tended to use land that was previously used for extensive grazing, and so was not highly productive. This, though, has declined in the

Table 20: Land Use Immediately Prior to Conversion for Deer

Period Operations Commenced	Prior to Dec. 69		1970-71		1972-73		1974-75		1976-77	
	No.	%	No.	%	No.	%	No.	%	No.	%
Unproductive	2	18.2	7	38.9	4	18.2	4	15.4	9	8.6
Extensive Grazing	6	54.5	7	38.9	13	59.1	16	61.5	56	53.8
Intensive Grazing	2	18.2	3	16.7	4	18.2	6	23.1	32	30.8
Others	1	9.1	1	5.5	1	4.5	0	0.0	7	6.7
Total	11	100.0	18	100.0	22	100.0	26	100.0	104	99.9

1976-77 period, and in view of the recent discussion, it is likely to remain as a steadily declining proportion. In contrast, the proportion of deer farmers locating on more fertile land, as evidenced by its prior usage for intensive grazing purposes, has shown a steady increase which became more emphasised in the 1976-77 period, and this finding, too, is in accord with the earlier discussion.

Characteristics of Deer Farming

The five major characteristics of an innovation that affect the readiness with which people will adopt it have been given as relative advantage, compatibility, complexity, divisibility, and communicability (Rogers, 124-132). These will be discussed now, with particular reference to deer farming.

1. Relative Advantage is the degree to which an innovation is superior to the ideas it supercedes. As it may be measured in terms of economic profitability, labour requirements, initial costs, ability to overcome crisis situations, and the like, it is very much dependent on the perception of the individual, and so interacts highly with the personal characteristics of the potential adopter.

It would perhaps be erroneous to say that farming deer has superseded another activity. Instead, deer farming has so far complemented other activities for the majority of farmers, particularly in the field of pastoralism (Table 20). Of the 14 (including those in 1978) who indicated that some other type of land-use had been replaced by the deer unit, two stated that horses had been grazed there, two stated that mixed farming had been carried on, one mentioned a bull paddock was his unit, one converted a holding paddock, and one a paddock that had been used for house sheep and pet lambs. Thus the other uses are largely pastoral too, but three did specify that orcharding, three that grain cropping, and one that pigs had been replaced by deer farming activities.

Table 21: Returns on Investments in Land and Money

	No.	%
A. Returns Per Acre Compared to Prior Use		
1. are presently greater	115	47.1
2. will be greater when more established	125	51.2
3. will never be greater	4	1.6
Total	244	99.9
B. Returns Per Dollar Investment		
1. are presently greater	83	35.0
2. will be greater when more established	150	63.3
3. will never be greater	4	1.6
Total	237	99.9

In an attempt to determine the relative advantage in terms of financial returns, responses to questions on per acre and per dollar investment returns (Appendix V, Q.5 and 6) were tabulated (Table 20). At the present stage of development, 98.3% of all deer farmers considered their returns on both land and investment in stock and facilities were either greater or will soon be greater than they were under their previous form of usage. Although these responses are applicable to the present time, and not necessarily to when the units were first set up, they do serve to indicate that the profit motive is likely to be quite high. This indication is further strengthened if consideration of the size of the initial costs involved is taken into account.

To assess any differences over time, factors that the farmers considered has positively affected them in deciding to take up deer farming were tabulated in two-year time periods (Table 22). Respondents had been asked to check all factors that they considered were pertinent to them.

The first three factors are more personal, depending upon the individual more than the innovation itself, and so

Table 22: Positive Factors in the Decision to Adopt Deer Farming

	Up to Dec 1969		1970-71		1972-73		1974-75		1976-77	
	No.	%	No.	%	No.	%	No.	%	No.	%
Personal Interest	12	100.0	16	94.1	20	90.9	20	83.3	91	86.7
Desire for Economic Diversification	1	8.3	6	35.3	8	36.4	10	41.7	58	55.2
Desire to "Give Something Else a Go"	3	25.0	2	11.8	7	31.8	6	25.0	45	42.9
Expected Greater Profits	3	25.0	5	29.4	6	27.3	9	37.5	46	43.8
Considered Future of Industry bright	3	25.0	10	58.8	11	50.0	13	54.2	73	69.5
Desire to use Non-Productive or Marginal Land	1	8.3	6	35.3	7	31.8	2	8.3	23	21.9
Was Disillusioned with Traditional Meat Industry	1	8.3	0	0.0	5	22.7	4	16.6	22	21.0
Considered Less Labour Involved	2	16.6	6	35.3	3	13.6	8	33.3	28	26.7
Others	0	0.0	1	5.9	0	0.0	1	4.2	5	4.8
Total Respondents	12		17		22		24		105	

they will be discussed shortly in the section on personal factors or attributes. The other factors, although they must be interpreted by the individual and so are highly coloured by his personal factors and by his perception of his environment, are definitely attributes of deer farming, and so will be discussed now.

It is quite clear that the initial group of innovators had fairly low expectations of farming deer. In view of the fact that they had no predecessors, it was a reasonable attitude on their part. They could not assess profits and the future of the industry when they did not know particularly well how deer would respond to farming practices. Yet even so, more marked these two options than any others, except for the factor of personal interest. It was clearly, then, the mixture of personal factors possessed by the individuals in this group that led them to take up deer farming.

Significantly, with the passing of time, greater proportions of adopters considered that, by farming deer, their profits would increase. Similarly, more and more adopters considered the future of deer farming to be bright and assured. Again, this is to be expected, for the later adopters had the examples of the group or groups of deer farmers who preceded them to consider. The earlier-established deer farmers certainly appeared to be making a success of their new venture, particularly in later years when prices for stock and deer products increased so dramatically. In the earlier years, the outlook for prospective deer farmers were dulled by such reports as "There is money to be made from deer, but not from farming them" (Morcan, 39).

The proportions of deer farmers, who considered their new ventures to be attractive, viable enterprises on non-productive or marginal land over the whole time period, is interesting. Although the early innovators had apparently not considered this as a good use for otherwise useless or near-useless land, it has already been established that most of them, in fact, located units on such land for other

reasons. Their apparent successes on such land, at least for the first few years, made subsequent adopters aware that deer either were, or were likely to become, an economic farming proposition on land that was previously barely usable in an economic sense. The sudden and substantial drop in the proportional number of farmers, who were positively affected by this factor, for the period 1974-5 is inexplicable. It does not compare favourably with other figures at all (Table 22).

While the state of the traditional meat industry, which is really a factor of the social environment, was of little concern to adopters in the first two time intervals, it has concerned significant proportions of farmers in the last three time periods. It has, furthermore, become apparent that many of the earlier-established deer farmers have certainly become imbued with this attitude in later years. Attitudes to unions by the deer farming group have already been discussed, and will not be reiterated here.

The idea of having a smaller labour involvement with deer compared to traditional livestock has apparently attracted farmers from the onset of deer farming. The proportion of deer farmers so attracted increased very quickly, declined in the 1972-3 period, and then increased again. While the reason for the fluctuations in proportional numbers is not known, it is clear that many farmers considered the relative lack of labour required as a positive inducement to adopt deer farming.

Very few respondents marked other factors. Thus, while the presence of them is acknowledged, they are considered to be insignificant, and so will not be discussed.

2. Compatibility is the degree to which an innovation is consistent with existing values and the past experiences of the adopters. Changes to legislation to allow for the legal farming of deer have already been considered, but it is likely that for a few "hard-liners", who resisted attempts to raise the status of deer from that of being 'noxious', the practice of farming deer is still not

compatible with their beliefs. Such people must be relatively few in number, though, and must be becoming fewer as the emotional arguments of the past recede and become forgotten.

New Zealand has, since the days of its first colonisation, based its economy upon pastoralism. Farming deer is a pastoral activity too, and so is highly compatible with the previous experiences of farmers. There are, certainly, different handling techniques being employed with farmed deer, and particularly with fallow deer, as compared with those employed for more traditional livestock, but there is no inherent incompatibility. Farmers have had no excessive adjustments to make to their cultural heritage in adopting the practice of farming deer.

3. Complexity is the degree to which an innovation is relatively difficult to understand and use. With his previous understanding of, and experience with, pastoral activities, the "average" deer farmer found the basic idea of farming deer to be quite simple and straightforward. Any complexities that arose lay in such matters as how to trap your own deer, what the best techniques and handling facilities were, how to treat for parasites, and the like.

The New Zealand farmer has been acknowledged, on frequent occasions and by varied authorities, for his resourcefulness. Such resourcefulness certainly served the innovators well, allowing them to solve most of the problems which occurred, and the scientific effort at Invermay has assisted in this too. As a group, the innovators, and those who followed them, have solved any complexities in general by remaining in personal contact with each other (Chapter 6).

4. Divisibility is the degree to which an innovation may be tried on a limited basis. The more it can be tried on a limited basis, the more likely it is to be tried on a trial basis, and hence the more likely it is to be readily adopted. By starting in a small way, the farmer will not feel he has over-committed himself to the adoption of the innovation.

Divisibility may be seen to operate in two major ways, either by stages or by the size of the area devoted to the implementation of the innovation. With the stage approach, a farmer adopts one small, basic part of the whole innovation, and this is evidenced in deer farming by the erection of the required fences. Then, as he finds that he can successfully farm deer, that the rewards are sufficient and that he enjoys farming them, he will adopt the next stage, namely that of building his yards. A third stage might involve the roofing-in of his yards.

Alternatively, or perhaps in sequence with stages enumerated, there is likely to be a progressive increase in the size of the unit. Initially, the deer farmer is likely to fence a small unit only, but then, for the same reasons that were involved in the progression through the stages, the farmer enlarges his unit, and then perhaps enlarges it again. This may go on until the farmer considers that all his suitable land is being employed for the farming of deer, or that he has enough deer.

The stage approach is definitely being employed. Of the deer farmers visited in the course of conducting the pilot survey, about half had not got to the stage of building yards. They were still increasing the sizes of their herds, and considered that yards were not yet warranted for their units.

The farming of deer is certainly divisible by area (Table 23), with few farmers even now having committed their land and productive effort wholly to it. Of the seventeen farmers who have done so, ten have properties of 16.2 hectares (i.e. 40 acres) or less, and so are obviously either part-time or semi-retired farmers. The other seven have properties ranging from 31.2 to 289.4 hectares, and it is obvious that most of these are full-time farmers who are wholly committed to the farming of deer.

Over half the farmers with properties that range from 10.1 to 500 hectares have deer units of 10 hectares or less, and 70 percent of deer farmers with properties of 500.1

Table 23: Areas of the Whole Farms and Deer Units Therein

Deer Units	Total Sizes of Farms Involved							
	10 ha. or less		10.1-100 ha		100.1-500 ha		500.1 ha +	
	No.	%	No.	%	No.	%	No.	%
10 ha or less	21	100	29	53.7	48	52.7	32	36.8
10.1-50 ha			25	46.3	33	36.3	29	33.3
50.1-100 ha					3	3.3	10	11.5
100.1 ha +					7	7.7	16	18.4
Total No. of Farms	21		54		91		87	

hectares or more have deer units of 50 hectares or less. As many respondents indicated that they were in the process of obtaining permits for larger units, or were actually in the process of extending their deer-proof fences to include a larger area, it is apparent that the proportions obtained will not be static. As more farmers complete their trial stages of adoption, and as they find that they can obtain, or have, the necessary finance, they will increase their units and so commit themselves more to the new industry. This, of course, will further slow the rate of availability of stock, and the industry is not likely to expand at such a great rate, in terms of numbers of farmers involved, in the future.

A further indication of the divisibility of deer farming is obtained by comparing the total area of land in deer production with the total area of land owned by people in the industry (Table 24). In the North Island, 6.6 percent of the land owned by deer farmers is actually being used for deer production. For the South Island, on the other hand, this proportion is only 1.1 percent. The different proportions in the two islands has arisen because of two major factors: firstly, the North Island had established an early lead over the South Island in the establishment of deer farms, and so a greater percentage of deer farmers there has had more time to pass through all five stages of adoption; secondly, a greater proportion of the South Island farms are large, back-country ones, and it is likely that farmers cannot see how or have not been able to see how, they can adequately fence such huge areas of relatively poorly-productive land.

Table 24: Proportions of Land Currently Under Deer

	Hectares Under Deer	Total (Deer Farms) Hectares	Percentage
North Island	4250.86	64842.26	6.6
South Island	3908.09	371942.08	1.1
New Zealand	8158.95	436784.34	1.9

5. Communicability, or the degree to which the results of an innovation may be diffused to others, is, in the case of deer farming, largely dependent upon the four preceding factors. If an individual feels that the idea of farming deer is abhorrent to him, or is too complex for him, or has no advantage over his present line of production, or is not divisible into small sections, he is unlikely to seek further information, and when further information is presented to him, he is not likely to absorb it, and to ask questions about it, as he otherwise might do.

Fortunately, however, the idea has been readily communicable, largely because it has been favourable to the four sets of factors outlined above. The diffusion of the basic idea, and of further relevant information as it became empirically determined, has already been examined. It was found that the information was most readily communicable during personal talk, discussion and observation.

Personal Factors

This is the third set of major factors that will, in interaction with the other two sets, influence an individual's decision whether or not to adopt such an innovation as deer farming. Personal factors have been considered to be age, social status, financial position, specialisation in production, and mental ability (Rogers, 172-177), but in reality this list can be extended greatly. For example, the goals of, the degree of urbanisation experienced by, and the physical and mental health of the individual concerned, are all important factors too.

Not all such factors can be tested in a survey of the kind undertaken, and so the following hypotheses were the only ones selected for testing:

(1) that the deer farmer had an interest in deer, probably due to some previous experience with them.

(2) that the deer farmer, as an innovator and early adopter, was likely to be younger than the average farmer.

(3) that the average deer farmer was better educated than the average farmer.

(4) that the average deer farmer has been alert and prepared to go out of his way to obtain useful information.

(1) Personal interest in Deer It was established (Table 22) that almost all deer farmers considered their personal interest in deer to be a major factor in deciding to farm them. This was particularly so for the early innovative group, and this is understandable in that only a great interest could have overcome the fear of financial failure, particularly in view of the fact that they were entering an unknown and untried field of endeavour. Although the proportion who considered this to be a major factor has decreased steadily, it is still very large.

This personal interest in deer was almost invariably occasioned through having had previous practical experience with them (Table 25), and it was found that of the 59 who had had no previous experience with deer, only 14 (or 18.7 percent of all deer farmers then established) of them had established their units before 1976, the remaining 45 (or 25 percent of the total) doing so in 1976 or later. There has been, thus, some tendency for a greater proportion of people with no experience with deer to take up the farming of them. It is, furthermore, significant that the proportions in Westland and Southland, of farmers with previous experience, are greater than the other areas. This, it is thought, is due to the larger numbers of game recovery workers employed in these areas.

It was discovered that, in all areas, 70-93 percent of all deer farmers considered they were keen deerstalkers, and for most deer farmers, this was their only form of previous experience. Rather surprisingly, the proportion of deer farmers in Southland, who are keen deerstalkers, is significantly below the national proportion, while those for all the North Island areas are significantly above it.

Although Nelson had the largest proportions with experience in both government shooting and in the game meat recovery industry, it is felt that the low numbers of

Table 25: Previous Experience of Deer Farmers With Deer

	Auckland		Rotorua		Wellington		Nelson		Westland		Canterbury		Southland		N.Z.	
	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%
Numbers with Experience	17	77.3	38	74.5	28	71.8	10	71.4	17	85.0	33	75.0	52	81.3	195	76.8
Numbers without Experience	5	22.7	13	25.5	11	28.2	4	28.6	3	15.0	11	25.0	12	18.7	59	23.2
Total	22	100.0	51	100.0	39	100.0	14	100.0	20	100.0	44	100.0	64	100.0	254	100.0

Table 26: How the Experience was Gained

	Auckland		Rotorua		Wellington		Nelson		Westland		Canterbury		Southland		N.Z.	
	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%
Government Shooter	2	10.0	4	10.8	4	13.3	3	33.3	3	17.6	3	9.1	9	17.0	28	14.1
Keen Deerstalker	18	90.0	34	91.9	28	93.3	8	88.9	15	88.2	26	78.8	38	71.7	167	83.9
Game Meat Recovery	2	10.0	5	13.5	5	16.7	3	33.3	5	29.4	8	24.2	12	22.6	40	20.1
Other	1	5.0	3	8.1	2	6.7	0	0.0	1	5.9	4	12.1	4	7.5	17	8.5
Total Respondents	20		37		30		9		17		33		53		199	

deer farmers in that region has given a slightly distorted picture in comparison with the other regions. With the exception of Nelson, then, Westland and Southland rather predictably had the highest proportions of farmers involved in government shooting and, along with Canterbury, in the game meat recovery industry.

The proportions of farmers with other types of experience with deer were felt to be not particularly significant, with the possible exception of Canterbury. Generally, these other experiences included having deer as pets, helping to trap deer, and working with deer farmers, but in Canterbury two had had experience as safari operators and guides, and it is felt that this fairly localised activity explained Canterbury's higher proportion. The one Auckland respondent with previous experience gained it, rather surprisingly, as an English deer park keeper!

(2) Ages of Deer farmers It was discovered that the current ages of deer farmers ranged from two in their late teens to two over seventy years of age. The industry, as hypothesised, does appear to have a predominance of younger farmers (Table 27), forty percent of all deer farmers being in the thirties, and well over half of them being under 40 years of age.

Even the earliest group of innovators, those who commenced farming deer before December 1969, reflected a broadly similar age pattern. As it was ten years ago, these respondents all move to the next youngest decade to determine their age pattern at that time. Sixty percent were less than forty years of age.

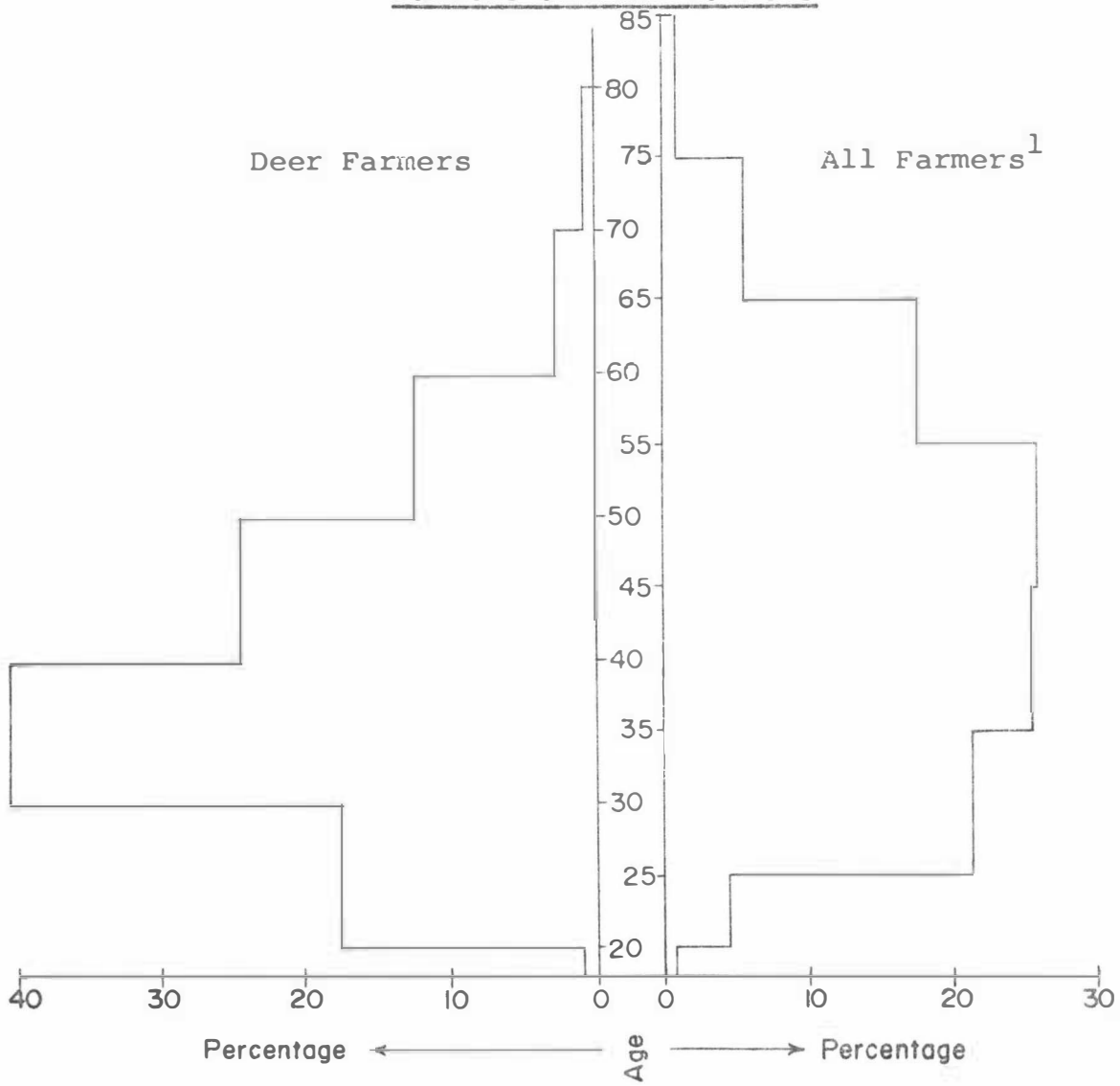
To determine whether deer farmers are in fact a group of younger people, the data presented in the total column (Table 27) was compared with similar data for all farmers in New Zealand. Unfortunately, the age groupings for the two sets of data differed, and this tended to make the comparison a little more difficult, but even so it is clear (Figure 12) that deer farmers, as a group, are younger

Table 27: Current Ages of Deer Farmers

Age in Years	Time that Deer Farm was Established									
	Pre-1969		1969-72		1973-76		1977 +		Total	
	No.	%	No.	%	No.	%	No.	%	No.	%
20-29	0	0.0	3	10.3	14	19.4	29	21.0	46	18.5
30-39	3	30.0	9	31.0	29	40.3	60	43.5	101	40.6
40-49	3	30.0	8	27.6	18	25.0	33	23.9	62	24.9
50-59	2	20.0	6	20.7	9	12.5	14	10.1	31	12.4
60-69	1	10.0	2	6.9	2	2.8	2	1.4	7	2.8
70 +	1	10.0	1	3.4	0	0.0	0	0.0	2	0.8

than all farmers. This is further borne out in calculating the average of both groups; for the deer farmers, the average age is 38.3 years, whereas for all farmers it is 43.8 years. The difference between the two average ages is 5.5 years, and this is certainly a significant difference.

Figure 12 : A Comparison of the Age Structure of Deer Farmers and All Farmers



[1] Source: N.Z. Census of Population and Dwellings, 1971, Vol.4

(3) Levels of Education of Deer Farmers It was considered that deer farmers would comprise a relatively well-educated group, and this at first sight tended to be borne out (Table 28). In addition to the data presented, it was found that of the 253 respondents, 54 had continued on to a tertiary educational institute. Of these 54, some 32 had

attended agricultural degree or diploma courses at Massey or Lincoln, another 13 had attended a university course other than at Massey or Lincoln, three had attended a Teachers' College, and six had been to a Technical Institute.

Table 28: Years at Secondary School by Deer Farmers

	No.	%
No Secondary Schooling at all	21	8.3
Up to 2 years	75	29.6
3-4 years	107	42.3
More than 4 years	50	19.8
Total	253	100.0

Again, however, the figures given are meaningless unless they can be compared with comparative figures for other groups. For this purpose, a comparison was undertaken with all New Zealand farmers and with the national labour force (Table 29).

A significantly smaller proportion of deer farmers received only a basic primary school education in comparison with the other two groups, and a greater proportion of them received varying amounts of secondary schooling. Insofar as the level of secondary schooling attained by the three groups being considered is concerned, it was not possible to compare the number of years spent at secondary school by deer farmers with the number spent there by all farmers as the census did not provide the information for the latter group. It was, however, possible to compare them with those of the total labour force, which were given. It was found that while 67.7 percent of the deer farmers who attended secondary schools did so for over two years, only 60.2 percent of the total labour force did so. Thus not only did a greater proportion of deer farmers attend a secondary school, a greater proportion of them tended to stay there longer.

Table 29: A Comparison of Educational Levels Attained

	Deer Farmers		All Farmers		Total Labour Force	
	No.	%	No.	%	No.	%
University	13	5.1	2,644	4.1	122,007	6.2
Secondary School	219	86.6	49,518	75.8	1,507,496	77.2
Primary School and Others	21	8.3	13,123	20.1	323,505	16.5
Total	253	100.0	65,285	100.0	1,953,008	99.9

Source: N.Z. Census of Population and Dwellings, 1971, Vol.6, 13 and 35

The proportion of deer farmers who attended a university appears to be halfway between the total for all farmers and the national population as a whole. In view of the small size of the deer farming group as compared to the other groups, this may not be significant. The total of 13 deer farmers who attended university, however, does not include the 32 who attended the agricultural courses at Lincoln and Massey. If these are included, the proportion of deer farmers who attended a university rises to a total of 45, or 17.8 percent. This proportion is far larger than for the other two groups.

Although no account has been made of relative successes at school and university in the sense of the comparative proportions of those who gained School Certificate, University Entrance, diplomas, degrees, and other educational awards, it is extremely likely that the deer farming group gained such successes, at least in proportion to the number of them who attended secondary schools, because of the relatively large numbers of them who continued on to tertiary institutions. Without this information, however, it would certainly appear that deer farmers are, as a group, better educated than are most farmers and than is the adult workforce in general.

(4) Level of Activity of Deer Farmers in Searching for Information In an attempt to assess this, survey respondents were asked to indicate whether they attended field days and conferences for deer farmers, and if so, the extent or frequency with which they did so. They were also asked whether they remained in constant communication with other deer farmers, and whether they were members of the N.Z.D.F.A. (Appendix V, Q's 41-44).

The results obtained are necessarily open-ended, in the sense that there was no similar data available for other groups that comparisons could be made. Without such comparisons, the figures obtained are almost valueless for proving or disproving any hypotheses relating to the characteristics of deer farmers in general. They can, instead, serve only as the base for discussion rather than

for deduction.

Furthermore, it is now realised, the categories into which respondents were asked to place themselves were not sufficiently defined. Of the large numbers of people who first commenced farming deer in 1977 and early 1978, many may not have had the opportunity of attending field days or conferences. They, therefore, had to place themselves in the 'never' category, yet it is not known why they have never attended them. Some of them, in fact, may attend the next few without fail.

Table 30: Attendance at Field Days and Conferences

	Field Days		Conferences	
	No.	%	No.	%
Never	76	29.8	122	47.8
Occasionally, but not often	55	21.6	25	9.8
Whenever the Chance Offers	102	40.0	80	31.4
Always	22	8.6	28	11.0
Total	255	100.0	255	100.0

It is rather surprising that such a large proportion of deer farmers has never attended field days on deer farming. Generally, these functions mean a day's absence from the farm at the most, so it is likely that this group is made up of those who cannot get away for a day. Part-time deer farmers, who may be tied down by their non-farming occupation, make up 20 percent of all deer farmers, and dairy farmers, who may feel tied to the morning and afternoon milking routine, make up a further 10 percent of deer farmers. Furthermore, some deer farmers are fairly isolated. Having taken these factors into account, it is perhaps not so surprising that such a large group have never attended field days.

Seventy percent of all deer farmers have attended one or more field days, and almost half attend either whenever they get the chance or on all occasions. Although the term

'always' was not clarified, it was assumed that it refers only to those functions that were accessible to the individual. Furthermore, 'whenever the chance offers' does not indicate the degree of difficulty to be overcome in attending the field day. The assumption could be made that any little incident might act to prevent the 'chance', but it is felt that this is not the case because, of the 255 respondents, a total of 215, or 84.3 percent, of them indicated that they remain in constant communication with other deer farmers. This high figure is in accord with previous findings on the importance of personal communication in the sharing and learning of new ideas. Field days and conferences provide an opportunity for personal communication, and field days in particular provide this with other people whom the farmer is already likely to know or know of.

On the other hand, it is not so surprising that almost half of the respondents had never attended conferences. So far, there have only been three conferences, and these may mean substantial travel costs. The three have been spread around the country, being held in Wellington (1976), Dunedin (1977), and Rotorua (1978), but many of these farmers who established their deer units in the South Island in 1977 may not have thought it fitting for them to attend the Dunedin one, and they may have considered the subsequent Rotorua one to be too distant and hence too expensive in travel costs. The distance, and hence cost, factor may be a major one in view of the expenditure made in operationalising a deer unit. The question a farmer may ask himself may not be "Do I want to go?", but rather "Can I afford to go?". There will also be some who feel that they cannot leave their farms for five or six days to attend a conference, even though the time for the conference was selected to make it more convenient for farmers to attend. Even so, over half of those farming deer have attended at least one conference, and eleven percent say they have attended all three! This is surely an impressive tally!

Table 31 : Membership of the New Zealand Deer Farmers' Association

	No.	%
Farmed deer before association formed and joined on its formation	59	23.2
Joined before started farming deer	53	20.9
Farmed deer between formation of association and own membership of	35	13.8
Have never been a member	40	15.7
Was a member, but not now	6	2.4
Farming deer now, and intend to join soon	61	24.0
Total	254	100.0

In so far as membership of the N.Z.D.F.A. is concerned, the largest proportion is that which consists of people who are intending to join the association shortly. In fact, it is likely that several of these have done so already, between the filling-in of the questionnaire and the writing of this thesis. It is, furthermore, quite likely that some who responded with "Have never been a member" had full intentions of joining[2] the association, and this would further increase the size of that group.

Of significance is the fact that one in every five deer farmers joined the association before starting to farm deer. As the association was not formed until June, 1975, the 53 farmers in this category must have come from the 180 respondents who have commenced, or are beginning to commence, operations since that date. Thus, since the formation of the association, almost 30 percent of all new deer farmers joined it before commencing operations in deer farming.

[2] Two respondents marked both such categories, but were included within the table in the 'intending to join' category.

Of further significance is the fact that over 80 percent of all current deer farmers are, or soon expect to be, association members. It would be interesting to compare this figure with that of other, similar farming organisations. Even without a comparison, it is felt that this figure is substantial, particularly in view of the already-acknowledged fact that deer farmers as a group are very independent.

The six who have let their membership lapse are a minor group. They are, perhaps, representative of those who feel that the annual $50 membership fee is too great. Furthermore, there is a feeling among some members that the N.Z.D.F.A. is becoming increasingly controlled by the game recovery firms, and apparently a splinter group of farmers has already been formed in Southland. As the industry is still very small, this, if true, is very unfortunate. A united body can speak and act with more weight and authority, and so is more likely to be effective in changing official policies, than is a divided one.

To digress no further, however, it is felt that the data presented, while not conclusive, indicates that the farmer of deer is definitely an active agent in searching for further information and knowledge for himself. Lack of comparable information for other groups of farmers means that it cannot be proven that the deer farmer is more active in this regard than is the conventional farmer.

Summary

In general, then, it has been discovered that most current deer farmers have tried farming deer, have found it to be so far a successful venture that is to their taste, and are presently proving their acceptance of it by enlarging their herds and units. They have had to operate under certain sanctions imposed by both the central government and by society in general, but these sanctions have been considerably eased by both the more favourable attitudes prevailing and by legislation. This has occurred as the

industry, and the individuals within it, have proven themselves.

The characteristics of deer farming correspond very closely to those of the traditional pastoral industries of New Zealand, and this, together with other factors such as the proven existence of markets for deer products, has served to make its acceptance, by large numbers of individuals, more rapid than might otherwise be the case. Furthermore, in common with innovators elsewhere and in other fields, deer farmers, as a group of innovators and early acceptors, portray characteristics of youth, better education, and alertness to opportunities of gaining information. They also tend to have a feeling of some affinity towards deer, largely through having had some previous experience with them.

CHAPTER 8

PROSPECTS FOR THE FUTURE

Because of the uncertainty of the European Economic Community as a market for our traditional livestock products, and because of the frequent fluctuations of the values of the various foreign currencies which thus cause fluctuations in our agricultural earnings, it is felt by many deer farmers that, by diversifying into deer production, they are widening the scope of our exports and are opening up further markets. They are thus assuring themselves, and the country as a whole, of some degree of future prosperity by ensuring that all our agricultural 'eggs' are not in the one 'basket'. Farmers can only do this, though, if they are achieving adequate returns to compensate them for their initial heavy investments, and if they are assured that markets will not only continue for their products, but will also sustain adequate prices for them.

It is intended, in this chapter, to examine the future prospects of the deer farming industry by examining the relative productivity of the industry, and the marketing prospects for the products. Future possible directions of growth in the industry will then be examined, both in terms of the degrees of emphasis likely to be placed on the different deer products and of geographical areas which are likely to sustain the future growth of the industry. The chapter will conclude with a brief examination of the possibilities of processing and manufacturing industries linking up with the deer farming industry.

Productivity of the Deer Farming Industry

It has already been pointed out that it is impossible to assess the present productivity of the deer farming industry because most farmers are still breeding deer to expand their own herds, as well as adding captured feral deer to them when possible. The game packing houses, too, are loathe to reveal the number of carcasses and the weight of velvet that they have received from farms. It is, therefore, not the intention to compare the productivity of the deer farming industry with that of others, but rather to examine the productivity per unit area under deer with that achieved under more traditional livestock.

As early as 1970, it had been established that farmed deer had the potential to achieve heavier body weights than their feral counterparts. With the first killing of farm-raised deer at Maroa, near Taupo, the average dressed carcass weight was 273 pound, or 124 kilograms. In comparison, the feral deer shot and processed in the Taupo district had averaged a dressed carcass weight of 125 pounds, or 57 kilograms (Valler, 53). It was considered that this considerable weight difference, the farmed deer averaging 2.18 times heavier than the feral, was due to more sustained feeding without seasonal checks and to the lack of harassment from hunters. It must be remembered, too, that the land used for deer at Maroa was not particularly productive land, and so bigger weight differences may be gained elsewhere. Furthermore, if the present interest in wapiti-red cross leads to anything, the resultant hybrids will be of an even heavier body-weight.

It has, in fact, since been established that deer do experience seasonal checks in their growth patterns, regardless of the availability of feed. Dr Drew of Invermay established that deer have extremely low winter feed requirements, but that they respond to spring conditions with very high growth rates (Boyd, 1975, 25). This high growth rate continues until about March. Thus the efficient conversion of feed to meat by deer corresponds very closely with the

seasonal growth rate of pastures. Many deer farmers are finding that the requirements for supplementary winter feed is minimal compared to that required by traditional livestock.

In effect, deer utilise the spring and summer pasture growth at the time it occurs. The farmer does not, therefore, have to spend so much time, money and labour in harvesting any extra pasture growth to tide his animals over the winter period. In this sense, the savings over a period of several years for an all-deer farmer could well help to offset his greater investments in fences and the like. Boyd (1975, 25) himself considered that a management scheme integrating both sheep and deer would be extremely efficient. The lambs would, after utilising the spring growth, be shipped to the works fairly early in summer, and the culled deer would be sent off at the end of the summer growth. Such a scheme would also spread the farmer's workload, as the busiest times with deer do not coincide with the busiest times with sheep and cattle (Ford, 168).

It has been reported that the amount of venison produced per hectare by young stags is most impressive. Investigations at Invermay on highly productive land revealed that, in the six months between August and February, 800 kilograms of carcass meat per hectare was produced at a stocking rate of 35 young stags per hectare. In comparison, the best weaner beef system devised there yielded about 500 kilograms per hectare over a whole season. These figures on deer production are even more remarkable in that half the stags were castrates, and it was found that the growth rates of castrates was 20 percent lower than for non-castrates (Drew, 1976a, 13-14). It is likely, then, that if the stags had all been non-castrates, the production of carcass meat in the six-month period would have totalled about 873 kilograms per hectare. This is some 373 kilograms, or 75 percent, more than the best weaner beef system mentioned had attained over a whole year.

This large difference in meat production per hectare is explained by the fact that deer are much more efficient

at converting feed to carcass meat. It was found that for every kilogram of carcass-weight gain, deer require 9.5 kilograms of feed dry matter. In comparison, for a similar carcass-weight gain, lambs require 30 kilograms of feed dry matter (Drew and Greer, 188).

The efficiency of the deer in converting feed into carcass weight is largely explained by the fact that deer carcasses consist of a greater proportion of live-weight than is the case with sheep and cattle. On a clean deer carcass, dressing out percentages[1] at Invermay have ranged from 58-61 percent (Drew, 1976a, 13), whereas similar percentages for cattle and sheep are generally recognised as being 50 and 45 percent respectively (Wilson, 1975, 27). Less wastage is thus experienced with slaughtered deer.

Invermay successes over a four-year period indicate that calving percentages in excess of 90 percent can be achieved in farmed red deer, and that weaning percentages of 85 percent or better should be possible on commercial farms (Kelly and Moore, 181). It has been found by experience that, at calving time, the hinds should be left to their own devices as interference creates its own problems (Dixon, 1975, 31), but care must be taken to ensure that the fawns are not mismothered or savaged by hinds that are not their mothers.

Deer are prone to sudden, 'inexplicable' deaths in the winter months, but it is now generally accepted that these deaths are due to the high metabolic rate, in conjunction with the low quantities of fat, or stored energy, that the animals possess (McAllum, 24). These deaths, which presumably will be higher in number during particularly cold winters, must inevitably lower the annual level of productivity of a deer farm. It is not known whether covers, similar to ones used on cows and horses, have been tried on deer in an attempt to prevent such deaths, but it is likely that the deer would not tolerate them.

[1] Dressing out percentage = $\frac{\text{clean carcass weight - hide}}{\text{liveweight}} \times \frac{100}{1}$

The earliest-established deer farmers found that their deer were singularly free of disease, but the Invermay Animal Health Laboratory have succeeded in identifying some diseases that affect deer, such as salmonellosis, enterotoxaemia, polioencephalomalacia, enteritis, malignant catarrhal fever, and ricketts (McAllum, 24). Generally, however, it has been found that deer are certainly not more likely to contract diseases than are other stock, and many feel, in fact, that they are less likely to.

Some concern has been felt that the practice of intensively farming deer would result in more outbreaks of disease, but this has, so far, not proven to be the case (McAllum, 24). Concern was also recently expressed by a veterinarian, at the animal diagnostic station, Lincoln, when discussing the possibility of two children having become infected with yersinia because of their contact with farmed deer. He believed that the high stocking rates on some deer farms could be a contributory cause of yersinia (Evening Standard, 9 September, 1978, 3).

Much work on the disease aspect has yet to be done, however, and little comment can be made at this stage. It would appear that deer are no more prone to disease than other animals, and so this aspect is not likely to substantially lower the productivity of deer farms.

It must be remembered that by-products, and in particular the velvet, are also valuable. They add considerably to the productivity of the deer unit if this is measured in monetary terms. Thus the productivity of a deer unit will depend upon the production emphasis of the farmer concerned, that is whether or not he is farming to produce velvet alone, to expand his own herd, to produce venison, or the varying combinations of these. Various production strategies have been considered, and surplus cash to provide debt servicing, profits and the like have been variously estimated as being, for each hectare and at 1977 prices, $574.81 (Pinney, 1977, 204) and $898.00 (Elworthy, 1977b, 174). The surplus cash per stock unit has been given by these two

same sources as $92.98 per stock unit and $163 per deer unit (or $107.58 per stock unit at one deer unit being equivalent to 1.5 stock units) respectively. In 1978, the Associate Minister of Agriculture, Mr Bolger, reported that $50 per stock unit could be obtained from a deer farm that sold only venison and velvet, and he contrasted this with sheep which provide $20 per stock unit (Christchurch Star, 11 May 1978: 4). Thus it would appear that deer yield surplus cash from $50 to $107 per stock unit, and it is felt that the latter figure is likely to be more realistic for those who do have stock to sell. No other form of pastoralism can compete with this in terms of hard cash.

It is, of course, acknowledged that the high prices presently obtainable for stock cannot continue indefinitely, but it would appear at this stage that the prices will remain at high levels until the prices obtaining on foreign markets for the deer products decline relative to other agricultural products. While product prices remain high, and as long as it appears that they will remain high for some time to come, stock prices will remain correspondingly high as more farmers endeavour to enter this field of production.

Market Prospects:

1. Venison. At the moment, farmed venison is not exportable to Western Germany (and other EEC countries). It is also denied entry to most states in the U.S.A., as well as Australia, because the deer are not slaughtered under approved conditions. Fortunately, other markets in Asia and elsewhere are prepared to accept the product, and a small part of the U.S.A. is accepting some too.

As soon as the industry establishes approved slaughter houses for deer, either by its own efforts in the form of cooperatives that are established close to game packing houses, or by modifying the mobile prototype, or by accepting traditional freezing works, or by contriving some other solution, venison markets would appear to be almost unlimited in number. They would be likely to accept all the venison that the New Zealand industry is likely to produce

in the forseeable future.

Venison is, in most countries, very much a delicacy, a treat that is not to be sampled every day. This attitude to it has occurred because the meat is relatively scarce, but both the attitude and the scarcity of the venison have worked to keep its prices high. As the meat becomes more readily available because of the growth of the industry here in New Zealand, and perhaps overseas, it is possible that prices will drop. This is unlikely to happen in the immediate future, however, due to the time lag, between initial demand and satisfaction of the demand, caused by the biological processes involved. Furthermore, prices are not likely to drop too much in relative value until the markets become fairly saturated with the product, because of the peculiarities possessed by the product.

It has long been known that venison contains very little fat, but fears had been held that farmed venison would contain greater quantities of fat. Investigations at Invermay found that, whereas feral red deer carcasses contained 1.3 to 5.8 percent of fat by weight, the farmed equivalents contained from 5.7 to 11.9 percent of fat. The greatest amount of fat, that of 11.9 percent, was found in the older stags of 27 months, but even this amount is still only about one-third of that found in commercial 'low-fat' sheep and cattle. What is more, most of the little fat that there is is found in subcutaneous layers and pockets between muscles, and so is easily avoided by consumers. Because of the low fat content, a leg of venison yields energy measuring 628 Joules per 100 grams, whereas for a leg of lamb and a rump steak the equivalent measures are 1130 and 1465 Joules per 100 grams respectively. Venison is clearly a low-fat health meat (Drew and Greer, 187-189).

Furthermore, it has been discovered overseas that, of the small amount of fat in venison, 50 to 55 percent is polyunsaturated. By comparison, the polyunsaturated fat in beef and mutton is 4 to 5 percent (Wilson, 1974a, 9). As it not only contains less fat, but also has a higher proportion of that fat polyunsaturated, as compared with

traditional farmed meats, venison is certainly a health food of note.

The long-term prospects for venison, provided that the approved slaughtering facilities and the requisite post- and ante-mortem certificates are gained, are thus exceptionally good. The U.S.A. alone, particularly in view of the fact that it has as yet no quota restrictions on deer meat, would probably absorb all our production of venison because of the health aspect alone, but it is likely that all developed countries would compete for it. This will ensure that, barring major economic crises, prices will remain high for many years until the supply has caught up with the demand.

2. Hides. Although farmed hides are not as strong and tough as those obtained from feral deer, they do possess an added attraction to buyers in that they are relatively unblemished. They do not have the scars and bullet perforations of many feral hides. The likelihood of scarring is further lessened by the practice of cropping the velvet of all stags except, perhaps, those actually being used as sires (Dixon, 1976b, 33). Furthermore, the hides of farmed deer are likely to be larger than those of their feral counterparts.

Because of their scarring, feral hides have, except in the war years, largely been used for sueded leathers, but farmed deer hides will not suffer from this restriction. Instead, they will be used for, among other things, top quality leathers in footwear, clothing, and clothing accessories. Being lighter and more pliable in nature, the leather obtained from deer hides is more suitable for such purposes than is the leather from more traditional farmed animals. With the current social trends being towards the more 'natural' materials for clothing and coverings, the value of the leather will be further enhanced.

In this sense, still-born fawns will have a greater economic value than will still-born lambs and calves. The spotted hides are valued for the production of ladies' purses and handbags, antimacassars, and the like. Other

still-born fawns, particularly in the near future while they still have connotations pertaining to the wilderness, will be treated and mounted by taxidermists for sale to tourists and others.

The outlook for sales of deer hides thus appears to be good. Since little difficulty has been experienced in selling the feral deerskins obtained from attempts at deer-extermination, the farmed hides must be more attractive to buyers because of their greater practical versatility.

3. Velvet, and Other By-Products. "The partly religious Chinese belief in the medicinal and tonic properties of deer is unlikely to change rapidly ensuring continued market opportunities" (Moore, 15). Most New Zealand exporters of deer products are of this view too (Elworthy, 1976c, 21; Williamson, 1977a, 45), so it would appear that market prospects are assured. Asia certainly cannot produce all of its own requirements in velvet and other by-products, and unless the U.S.S.R. and China recommence exporting them in large quantities, New Zealand is assured of the major portion of this large market. Even at today's inflated prices, Asian demand cannot be met, and so prices for the by-products will inevitably remain high for several years to come.

An export line, yet to be fully developed, lies in such edible offals as hearts, livers, kidneys and tongues. At the moment, these are not being exported in quantity because most of the deer are being 'killed' rather than 'slaughtered', and so these products do not meet with export criteria. That markets for them do exist, however, is a known fact, and it has been considered that the return to the farmer will be in the region of 25 to 30 cents per pound (Wallis, 1977, 37).

Future Trends in Production

The present high prices that are being offered for farm-bred stock, together with the fact that many deer farmers have obtained a few deer, either by capturing them

or by purchasing them, and are now using them to breed further stock for themselves, has meant that this is currently a major feature of the industry. As more people become attracted to the industry, so this will remain a major feature, but ultimately a stage will be reached when newcomers to the industry will be but a small group compared to the well-established deer farmers. When this stage is attained, the price of stock will decline, and this will not be such a major feature.

The emphasis for several years to come, though, will be on breeding, firstly to build up the individual herds concerned, and secondly, to sell to others. Hinds will not be culled unless they are barren. It has been found that female deer remain fertile until they are very old. For example, of 200 old does[2] killed at 14-16 years of age, 98 percent were in calf (Fitzi and Monk, 170). Thus little venison will be produced from culled hinds and does.

Harvesting the velvet on the red deer stags has proven to be a major money earner too. Few deer farmers do not, today, indulge in this profitable activity, and there are some who are currently specialising in it, having almost stags alone on their units. This practice, too, will continue for several years yet, and so little venison from stags will be forthcoming for some time.

Warnings have been issued by individuals, both within the industry (Elworthy, 1977a, 9) and without it (Christchurch Star, 11 May 1978, 4) that farmers should not try to retain stags almost indefinitely in order to harvest the velvet. The practice of doing so will, inevitably, mean that most of those stags which are slaughtered will be old, and hence the venison obtained will be tougher and fattier than buyers might reasonably expect. It is, therefore, possible that prospective long-term markets for our farmed venison could be lost for some time after receiving one or

[1] Female fallow deer are termed does, and female red deer are called hinds.

two such shipments. Furthermore, with little farmed venison to sell, the industry is not actively establishing markets for the product, and so is not really looking to the future.

Despite such obvious dangers and the timely warnings issued, however, it is likely that the natural desire to achieve a maximum return as soon as possible after the initially heavy expenditure in getting established will result in a major disregard by farmers of these warnings. It is, perhaps, not cupidity as much as the very human desire to keep the accountant and bank manager happy by getting on to the better side of the ledger as quickly as possible, that will ensure that farmers will retain stags for velvetting, and hinds for breeding, long after they should have been culled. It is likely, then, that for some time to come, the only farmed venison to be marketed will originate from the few fallow deer farms and from those red deer farmers who have agreements with game packing firms to honour.

The retention of stock will necessarily delay decisions and actions on slaughtering facilities. Perhaps this will benefit the industry in that full and considered evaluations may be completed on the small Invermay facility. It will also allow further time for alterations to, and further trials with, the mobile facility. What must be avoided at all costs, however, is the presence of a "She'll be right, there's plenty of time" attitude, for this may result in later, hurried decisions on the provision of facilities that may be regretted in subsequent years. Such decisions cannot be delayed indefinitely.

Clearly, then, breeding for stock is going to be the major concern of the industry for some years yet. It is felt that the export of live deer should be abolished until the industry is more established in this country. In so far as foreign earnings are concerned, the cropping of velvet is going to be a major sector of the industry for several years to come. Venison will tend to take second place to velvet, in so far as the majority of producers are concerned, until the industry becomes more firmly established and

passes beyond this present early stage of frenetic growth.

A few farmers, mindful of the future, will continue with a practical interest in hybrid deer, particularly the wapiti-red cross. Two major reasons for this are the heavier carcasses of the hybrid, and the potentially superior growth for velvet cropping, but many expect the hybrid to have easier-handling characteristics. If it is found that the wapiti-red hybrid does not have a lowered fertility rate as has been feared (Drew and Moore, 1977, 21), there will be an increasingly wide spread of wapiti and wapiti-red cross through the country. Unfortunately, the fallow deer cannot be crossed as it is the sole representative of a different genus, but it is likely that some fallow deer farmers will, while continuing to farm fallow deer, diversify a little by obtaining some red and perhaps hybrid deer. Several farmers have also intimated their interests in setting up stud farms for deer, and it is quite possible that this will become a reality of the future, particularly in so far as the larger strains of red deer and wapiti are concerned.

Future Trends in Regional Growth of the Industry

It need hardly be spelled out that, while existing legislation continues to be enforced, Northland and the greater part of Taranaki will not be growth areas for the deer farming industry. This inhibitory legislation may be changed, of course, and such a change may occur because of four major factors operating together:

(1) That the individuals living in these areas may feel that the legislation is discriminating against them, and so they may bring political pressure to bear that they too may be permitted to farm deer.

(2) That the value of the deer products exported increases to assume a more significant proportion of our total exports.

(3) That the New Zealand Forest Service comes to appreciate that the safeguards set up to prevent deer, both in the transportation and in-farm situations, from escaping are highly successful.

(4) That the authorities come to realise that one or two isolated incidents of a deer escaping will not necessarily lead to the occurrence of a feral deer infestation, as one deer by itself cannot breed. To cover the rather remote occurrence of a mass escape, legislation could be enacted that would empower the controlling authority to offer substantial rewards for each deer proven to have been destroyed by local inhabitants, or some other measures that would guarantee the successful slaying of the escaped stock.

It is felt, however, that such a change in legislation to permit the farming of deer in areas outside the feral range of any deer species, will be in the more distant future. The increase in the exports of deer products will be slow for it will take time for individuals to organise sufficiently to exert political pressure of some magnitude, and sociologists often claim that social institutions, of which the New Zealand Forest Service is one, tend to act so as to maintain the status quo.

In view of the economic aspects involved, it is anticipated that the present trend, in which deer farms are being set up in greater proportions on the more productive soils than on the more marginally-productive lands, will continue. As it has extensive fertile plains, and as it has a greater degree of access to feral herds than have most other areas, it is considered that Southland is likely to remain as the major growth area of the industry. Other fertile areas in Canterbury, Manawatu and on the Heretaunga and Tauranga plains, however, are also likely to be areas of significant growth. Although it is felt that the economics of the deer farming operation is mostly responsible for the trend to locate units on better pastures, it is also felt that the already-demonstrated importance of personal farmer-to-farmer contact in persuading other individuals to adopt the practice of farming deer, and in diffusing practical ideas to that end, will further strengthen the trend.

This does not mean, however, that areas with more marginal lands will not experience a greater density of deer farms, but it is felt that the growth of the industry in such areas will be slower. The new sites in these areas that are developed for the farming of deer are likely to occupy pockets of richer pasture lands. With the approach to ultimate maturity and stability of the industry, prices for deer stock will decrease. It is also likely that, by then, the New Zealand Forest Service will have reviewed fencing requirements with the result that the erection of deer-proof fences will be cheaper. These two factors will then act to produce a relatively larger number of deer farms on the less productive lands of the country.

Future Possibilities in the Processing of Farmed Deer Products

The deer farming industry has, so far, been content to work with the game packing houses that were established by private enterprise to process and distribute the products of feral deer. It was logical to do this as the game packing house (G.P.H.) operators had the expertise, the facilities, and the marketing outlets. Furthermore, the G.P.H. operators had, admittedly in their own self-interests, assisted in applying the pressure that resulted in the legislation that permitted the farming of deer, and many of them had assisted individual deer farmers to establish their herds.

Although the N.Z.D.F.A. is an autonomous body, in control of its own destiny, it has further strengthened its ties with the G.P.H. operators by becoming a member of the Game Industry Association, which is a body whose members consist of all G.P.H. operators and the N.Z.D.F.A. It is, perhaps, this organised association with the G.P.H. operators that has caused several Southland farmers, who suspect that the motives and actions of the G.P.H. operators are to achieve the complete, or near-complete, dominance of the deer farming industry, to form their own body.

As this latter group of farmers is a very small minority of the total group of farmers, it would appear that the bulk of the deer farmers will continue to market most of

their products through the established G.P.H.'s. This, of course, must be beneficial to all concerned, as it will avoid the unnecessary and costly duplication of facilities and marketing arrangements. Furthermore, employed labour within the deer processing industry will be utilised more fully, with consequent savings to the industry as a whole.

Currently, venison is mostly exported in a semi-processed state. Cuts are taken from the carcasses after the latter have been cleaned and trimmed of wastes, and these cuts are then packed, frozen, and exported. There are, however, some firms in the country which are actively processing the venison further. At the present stage, the four firms of Prepared Foods Ltd. of Palmerston North, Luggate Game Packers of Luggate, Donaghys Industries Ltd. of Dunedin, and South Seas Trading Co. Ltd. of Christchurch, have obtained licences for the further processing of deer products. Prepared Foods Ltd. and Donaghys Industries Ltd. are particularly interested in processing venison, while the South Seas Trading Co.Ltd. is run by people of Asian origins, and so is more interested in the by-products.

The diversified forms in which New Zealand-processed venison appears on the market have been listed (Sutherland, 89-90), and it is quite apparent that this sector of the food processing industry could expand greatly. Most of the products are sold overseas, but there is no reason why more of them cannot be marketed within New Zealand. At the moment, for instance, New Zealand expatriates in Hong Kong find it very easy to purchase venison that was canned in New Zealand, but on their return to their homeland, they find it is unobtainable.

Venison, whether further processed or not, may, in fact, be legally sold in this country. It must first pass the usual Ministry of Agriculture and Fisheries inspections, and this means it must be initially processed by a registered G.P.H. (Ford, 44). Hotels and restaurants can thus legally provide diners with venison, so there is no need for the back-door dealing that has occurred between such establishments and hunters.

There is, however, a problem of conflicting interests. Prepared Foods Ltd. of Palmerston North, for example, find that they are having to accept venison for canning, from the game packing industry, on a "where and when it is available" basis. They feel that this not only adds to the cost of their input, but that the game packing industry is giving priority to servicing its overseas markets rather than its home markets.

Apart from such minor problems, which will doubtless be ironed out with time, such linkages which have already been established between the game packing industry and other food processors are likely to be further strengthened and diversified. This will be beneficial to both the whole deer industry, in the long-term sense that the more diversified the forms of the product, the greater the number of markets and retail outlets that can be established, and to the national economy which will benefit in terms of both the greater employment offered and the additional foreign funds earned through the value added to the initial product.

There is some diversity of opinion as to whether such by-products as velvet, pizzles and tails should be processed locally before being exported. While one exporter urges the industry "to process its own by-products just as China and Russia have already done" (Wallis and Faulks, 196), another investigator considers that this should not be done because the market may not accept them so easily, although it was admitted that a joint venture could be established (Moore, 13). As New Zealand has competition only from China and the U.S.S.R., and as these countries are not satisfying the full market demand, it would seem reasonable to expect that the Asian market would have to accept a New Zealand-processed product, but as Dr Moore investigated the question in Asia itself, he is likely to have a sound assessment of the situation. South Pacific Traders Ltd., which is a firm of orientals settled in New Zealand and which is currently processing by-products, would appear to be just such a joint venture as that suggested by Dr Moore. As with the further processing of venison, the local processing of

by-products would make the deer industry, both the farming and the hunting segments, that much more valuable to the country.

Extensive links have also been already developed between the G.P.H.'s and the local tanning and leather industries. Of all the skins produced, including those from feral deer, New Zealand is currently processing 20 percent (Wallis and Faulks, 195). Some skins are partly or wholly tanned and dyed in New Zealand before they are exported overseas, but others are manufactured into souvenir and garment items for retail in New Zealand. Garments produced include ties, skirts, waistcoats, and gloves (Sutherlands, 119-120), but accessories such as handbags and purses are produced too.

Again, it becomes quite clear that, if local manufacturers can produce from the skins items such as those that they are already producing, but in greater quantities so that the items surplus to our own requirements are exported instead of the raw or partly-processed hides, the industry and the national economy will benefit. Major markets for such items exist in West Germany and the U.S.A., but other markets such as Japan, Australia and West Europe do exist. All these countries have and are purchasing large amounts of our total export of relatively unprocessed skins.

Consolidated Traders Ltd. of Wellington are, it is believed, setting up a tannery and skin processing plant in Woodville right now, and this certainly appears to be a step in the right direction. Woodville was probably selected because it has good road access from both the Consolidated Traders' packing houses at Rongotea and Rotorua, and because it has good rail outlets to internal markets and export ports. The fact that Woodville has a stable workforce will not have gone unnoticed either, and as some of this work-force has had experience with the clothing industry, perhaps the firm is considering, or will consider, a further diversification into the manufacturing aspect. If this is the case, the firm is certainly portraying the forward thinking that the industry needs if it is not to stagnate.

Deer farming can become a leading sector for the further development of the national economy. With linkages direct to food processing, tanning and leather industries, as well as to the apparel, accessories and even jewellery manufacturing industries, its multiplier effects in terms of employment and hence further income generated may, if the opportunities are fully utilised, be substantial. It must be remembered, however, that a significant proportion of these linkages will merely be supplanting linkages established for previous land uses, such as with the shearing industry, wool scouring plants, cheese and butter factories, and the like, but it is felt that the variety of uses of the deer products will create more linkages and hence foster greater economic growth.

Summary

It has been found, and the evidence is quite conclusive, that deer are more efficient in converting grass to carcass meat than sheep or cattle. Furthermore, the feed requirements of deer correspond very closely with the seasonal patterns of pasture growth, thus eliminating much of the expensive winter feed-out that traditional stock require.

The production of carcass weight per acre is greater for deer in a six-month period than it is for other stock over a whole year, largely because deer have a higher dressing out percentage. This, together with the facts that deer have very good calving and weaning percentages, makes the deer very attractive to the farmer. The superior profitability of farming deer, as against sheep and cattle, can not, at today's prices, be denied.

The markets for venison appear to be assured, particularly in view of the innate properties of the product as a health meat. To ensure that these markets are developed and exploited in harmony with the growth of the industry, it has been urged by knowledgeable and concerned people that suitable slaughtering facilities be developed as soon as possible. The markets for hides, velvet and other by-products would also appear to be assured for a lengthy period to come.

The industry is presently concentrating upon, and will continue to concentrate upon for several years yet, the expansion of the national farming herd, and upon the cropping of velvet. The former activity is only to be expected in a young and rapidly expanding industry.

Regional growth within the industry will continue to be concentrated on the better pasture lands, such as are found in the plains of Southland, Canterbury, Manawatu, Hawkes Bay and Poverty Bay. This trend will be emphasized for those areas mentioned which have a readier access to feral herds.

It appears that there will be no major changes in marketing methods, with the deer farmers working in cooperation with the G.P.H. operators. It is, however, felt that there is ample scope for the products to be processed to a greater degree before they are exported, and it is hoped that the industry will exert some effort to attract manufacturers and processors to its products, or, alternatively, initiate its own additional processing plant.

CHAPTER 9
CONCLUSIONS

The deer farming industry in New Zealand is very much the result of the changing triadic interrelationships between man, deer and the environment. The animal was introduced by man to provide sport, in the form of hunting, for the citizens of a new colony that was otherwise bereft of wild game. The deer flourished in their new homeland, however, and soon it was realised that, because the New Zealand forests had evolved in the absence of browsing animals, and because the deer had increased so greatly in numbers, they were causing incalculable harm to the natural protective cover of the land. This was resulting in widespread erosion and associated problems, as well as lower agricultural productivity in some areas due to the deer competing with the sheep and cattle for the pasture and fodder crops.

Controversy arose. While complaints on the impact the deer were having were lodged in increasing numbers, the Tourist Department commenced and continued for some time to arrange for further liberations of deer in areas in which they had previously been absent. Some government departments started lodging complaints too, and the Department of Internal Affairs commenced shooting deer found on its plantations.

Control of the herds was in the hands of the acclimatisation societies, bodies which had been responsible for many of the liberations, and it is to their credit that they attempted to control the growing problem by culling out the less desirable deer. Real control of the problem, however, was beyond the resources of the societies. The central government was finally forced to take action. Its initial attempts were rather half-hearted, and involved the removal of protection in certain areas only. Soon, however, these areas were extended, and protection on deer was lifted for the whole country.

In the meantime, the State Forest Service had gone ahead and organised its own 'war' on deer. It had organised deer-destruction parties in areas under its control, it

had located and established markets for deer hides and antlers, and it had urged that all efforts to eliminate the deer menace be placed in its hands. It was somewhat surprising, therefore, that the legislation, which finally authorised official extermination attempts, placed the control of such attempts in the hands of the Department of Internal Affairs.

It was under the guidance of this Department, then, that absolute war was declared on deer. They were vermin to be exterminated. Although the eradication attempts failed, they were successful in lowering the density of the deer population in certain areas. The Department continued the policy, which had been established by the State Forest Service, of exporting hides. This export was not designed to show a profit, but was rather to help defray the costs of the extermination programme.

Private individuals were encouraged to assist in the 'war' on deer. Bounties were paid for the tails of deer shot, cheap ammunition was made available, and money could be earned by selling the hides recovered. Many individuals, in fact, made a good living by hunting deer as a private, full-time occupation.

An earlier attempt to export venison, which otherwise was wasted, had been made under the auspices of the State Forest Service, but it had failed due to the lack of suitable technology. The fact that hunters were earning a living by shooting deer, however, doubtless served to keep alive the interest in the possibility of exporting venison. In 1953, a second attempt to commercially export venison was successful.

At about this time, though, the Department of Internal Affairs acknowledged that the deer eradication problem was beyond its resources, and in 1956, control of the problem was transferred to the New Zealand Forest Service. This body made some subtle changes to the techniques employed, but basically its aim was unchanged. The growing game recovery industry aided attempts to eliminate deer, but even so the Forest Service came to recognise the almost complete

impossibility of successfully attaining extermination, and so altered its stance more to one of maintaining control over deer populations.

The wild game recovery industry experienced success in this second attempt because technology, initially in the forms of small freezer units and improved road transport, allowed stocks of carcasses to be amassed at various key points before they were conveyed to the game packing houses. Air Transport, in the form of fixed-wing aircraft, was used, almost from the start, to lift carcasses out of relatively inaccessible areas, and this practice grew. It soon evolved into the employment of helicopters for such purposes, and this practice led to another innovation, namely that in which the helicopter was used as a shooting platform.

With time, practice and the employment of these new innovations, the wild game recovery industry became so efficient that the numbers of feral deer declined markedly, although many people claimed at the time that it only appeared that the deer were more scarce because they were, by now, wiser to the new methods employed by the hunter. The industry was now in an invidious position. It had become so efficient that it was rapidly exhausting its supply of raw material to the point where further commercial exploitation would be uneconomic.

Pressure was then exerted on the government to permit the farming of deer, so that any shortfalls in the annual kill of deer could be made good by the killing or slaughtering of farmed deer. The New Zealand Forest Service was agreeable, provided that certain strict control measures be imposed, as it was aware that the future participation of the game recovery industry was essential if cheap and effective control over feral deer populations was to be continued. If the farming of deer would assist this industry to remain economically viable, by ensuring for it a constant and reliable source of carcasses, then let people farm deer.

As the New Zealand Forest Service did not wish farmed deer to provide a source of deer for further infestations in the hills and forests, it ensured that deer were not to be farmed beyond the feral range of the species concerned. This has definitely affected the distribution of deer farms. Although this legislation has been eased, farmers in large parts of the country are, even now, prohibited from farming deer.

The security of farmed deer was also of concern to the New Zealand Forest Service. Stringent regulations specifying the types and heights of fences to be employed by deer farmers were gazetted. These regulations meant that the intending deer farmer had to make a considerable outlay in cash before he obtained even his first deer. This factor inhibited the growth of the deer farming industry, particularly in the early 1970's when banks and other lending institutions were not keen on making loans available for people who wished to adopt this farming activity.

There was thus a basic chain of events that culminated in the practice of farming deer. The introduction of deer to New Zealand resulted in them being ultimately acknowledged as noxious animals, this occasioned the expensive efforts to exterminate them, and this in turn caused the establishment of an export trade in deer skins. Eventually, as new technologies developed, this export trade was expanded to include the more valuable part of the deer, its meat. The rapid growth of the game recovery industry, together with its undoubted efficiency, resulted directly in the farming of deer.

Paralleling this chain of events was a sequence of changes in attitude to deer by the human population. At the time of the first liberations of deer, people were generally in favour of deer, and this overall attitude persisted until the 1920's. Because of the many, varied sources of complaints regarding the depredations of the deer, public attitudes took a marked swing against deer. The government was finally forced to act firmly in 1931 because of the prevailing public opinion which had become strongly entrenched in

opposition to arguments favouring deer. The increasing scarcity of the deer, partly through official extermination efforts, but largely through the later efficiency of the game recovery industry, resulted in public opinion against deer becoming less vehement. This almost cyclical swing back in favour of deer by the public attitude was further enhanced by the increasing sums of foreign currency being earned through the export of deer products. This more favourable public attitude softened the official attitude, and so opened the way for the legalisation of deer farming.

The New Zealand Forest Service, however, considered that there was a moral to be learnt from the previous sequence of events. If the cycle was not to be repeated, with perhaps even graver end results, attitudes could not be relaxed too much. The stringent regulations controlling the holding of deer in captivity are the direct result of this concern, and so reflect in part the previous attitudes to deer as noxious animals.

The evidence presented is fairly conclusive. Apart from the initial, general hypothesis, the first two hypotheses to be tested, namely that the deer farming industry occurred because the historical treatment of deer in New Zealand led to a cultural reappraisal of them as a resource and that the consequent public and official attitudes to deer affected the distribution of the resultant deer farms, at least up to the present, are thus true and valid statements.

The third hypothesis, that deer farming has characteristics favourable to its adoption by other, subsequent individuals, it was found that the operation of farming deer, as a largely pastoral activity, was akin to the farming of sheep and cattle. As these activities have, almost since the first colonisation of New Zealand by Europeans, always been major economic and nationally-spread occupations, the concept of farming deer was not entirely new, nor was it culturally offensive.

It has long been considered by those in the industry that deer require a smaller labour input than do comparative numbers of sheep and cattle. Some 14 to 35 percent of all deer farmers who established their units in any two-year period found this to be a positive factor that influenced their decision to farm deer.

A further favourable characteristic of deer farming is that it does provide an economical use of what would otherwise be economically-marginal land. This is still the case, although it has been found that better quality land used for deer will yield greater profit margins than will land of poorer quality. Approximately one-third of all deer farmers who established their units in the early 1970's considered that this factor of using poorer land influenced them positively.

The inputs of deer farming are highly divisible. Capital input, whether in the form of land, stock, labour, fencing or yards, can be applied in a piecemeal manner. A few hectares can be fenced, stocked as the opportunity arises, and if required, more adjoining land can be fenced later. Yards may be added when the farmer feels that he is sufficiently committed to the further farming of deer. It was found that nearly all deer farmers have used such an approach, and so it is surely a favourable characteristic.

Other favourable characteristics have been discovered more recently. The feed requirements of deer are cyclical and correspond closely to the seasonal pasture growth. This means that less exacting tasks for the provision of extra winter feed have to be carried out. Deer are also more efficient at converting feed into meat, and the values of the products of a deer unit are currently very high. It has, furthermore, been found that, so far, deer have been less prone to disease than are other livestock.

The industry, though, does have its less favourable characteristics. Deer farms have attracted the attention of poachers, although this study discovered that the poaching problem has not been as severe as has been made out to be the case, and it can be justifiably argued that poaching is

not a characteristic of deer farming, but is rather a characteristic of the attitudes certain people have to ownership. In addition, apparently healthy stags may succumb to the cold on a winter's night. Then again, the expenses involved in building the stipulated fences and the special yards required, not to mention the purchase of stock at highly inflated prices, are further adverse factors.

For the first innovators in deer farming, the only characteristic involved, other than those already-mentioned, namely, the capital cost involved, divisibility, and the suitability of poor land, was the high degree of uncertainty involved. It was only because the first innovators accepted the uncertainty and risk that the other characteristics of deer farming became generally known and thus could serve as an incentive, attracting others to the practice. Since the initial work of the innovators, it is clear that for most adopters the favourable characteristics of deer farming outweigh the unfavourable ones. It is thus felt that the hypothesis does hold true in that deer farming does have characteristics favourable to its adoption, but that it has tended to become progressively more so with the greater the time span since 1969.

The fourth hypothesis, which stated that deer farmers will tend to possess common characteristics that led them to adopt more easily the practice of deer farming, was by no means fully tested to ascertain just how many common characteristics they had. Only their ages, levels of education, levels of activity in obtaining information, and the types of previous experiences, if any, that they had had with deer were examined.

It was discovered that the average age of the deer farmer was significantly lower than was that of the average farmer for the country as a whole, and that the levels of education attained by deer farmers as a group tended to be higher than those achieved by the total national group of farmers. Although it was far from proven, evidence indicated that deer farmers may well be more active in seeking

information than is the case for the bulk of the farming population. Over 75 percent of the deer farmers considered that they had had previous experience with deer. Of this group, 20 percent had participated in the commercial recovery of game meat, 14 percent had been government shooters or deer "cullers", and 84 percent considered that they were relatively keen deerstalkers.

The conclusion must be that the possession of the first two characteristics, namely youth and a good education, will enhance the likelihood of an individual adopting the practice of farming deer, and that the possession of the last two characteristics, namely involvement in seeking information and the amount of previous experience with deer, is likely to enhance the likelihood of his doing so. A more definite statement on the last two cannot be made here as a similar group of farmers, who are not involved with deer, were not tested for a valid comparison. The first two characteristics, however, definitely prove that the hypothesis is true.

In investigating the fifth hypothesis, which stated that new knowledge concerning suitable habitats for deer has caused man to reappraise his selection of optimum locations for his deer farming units, it was found that the first group of innovators tended to establish their deer units on marginal land that was covered in scrub and bush. They did this because they considered such country to be the natural habitat of deer, and so they expected farmed deer would be better in such a habitat. The later findings of those who located their units in a different environment, together with a comparison of the costs involved in, and the likely profits of, units situated on marginal and high-quality lands, however, resulted in the knowledge that deer could be more profitably farmed on highly-productive pastures than they could be on more marginal land. This opened the way for many farmers who were situated on highly-productive land to adopt deer farming. A marked swing resulted, with a greater proportion of the later units being located on more productive land than had been the case before. Thus the hypothesis is true.

The sixth hypothesis stated that the method by which the innovation of deer farming diffused through the country has largely caused the present distribution of deer farms. The major methods of diffusion were discovered to have been that of personal farmer-to-farmer discussion and personal example. Adopters were prepared to travel some distance to meet established deer farmers, and to view their units.

This was not proven to account for the longer-distance transmission of the innovation, but it was found to have been the cause of the innovation spreading within a region once there was an adopter in that region. A single adoption within an area shortly after resulted directly in several further adoptions within the area, and cluster-like groups of locations of deer farms now scatter the country. Thus the sixth hypothesis was found to be partly, if not wholly, true.

The seventh hypothesis, which stated that deer farmers were attracted to the industry because of their interest in deer, has already been partially examined in the discussion on the characteristics of deer farming and of deer farmers. When the industry was first allowed for by legislation in 1969, its major characteristics were its newness, its uncertainty, and the great risk faced by an adopter. Only a very deep interest in deer could have motivated an individual into accepting the high degree of risk involved.

It was discovered that, of those who commenced their deer farming activities prior to the end of 1969, all without exception stated that their personal interest in deer was a positive factor that helped induce them to do so. This proportion, in the subsequent two-yearly intervals, has declined from 100 to 94.1, 90.9, 83.3 and 86.7 percents. Thus personal interest in deer, particularly in the years up to 1970-71, was a factor of considerable importance, and the hypothesis is held to be true, although the proportion so motivated is declining now as others are increasingly adopting the practice of farming deer for profit and other reasons.

The eighth hypothesis, which stated that the later adopters of deer farming are becoming increasingly attracted to the industry by its apparent profitability, follows on from the seventh one. Only 25 percent of the deer farmers who established their units before the end of 1969 expected to eventually reap greater profits, but this proportion has increased steadily over the subsequent two-year periods to 29.4, 27.3, 37.5 and 43.8 percent. The hypothesis is thus held to be correct.

Because of the evidence offered in support of the eight hypotheses that were selected for testing, it is evident that the initial hypothesis, that was selected as a starting point, is also true. The current distribution of deer farms in New Zealand has, to a large degree, been explained.

While it is felt that some of the causative factors of the distribution have not been dealt with as fully as they might have been, and while it is acknowledged that some factors have not been dealt with at all, it is felt that in view of the time and expense involved in the study, the major factors have been included and dealt with in a reasonably competent and full manner.

The second, and somewhat less important, aim of the study was to provide a coherent account of the development of deer farming, the current standing of the industry as an economic activity, and its prospects for the future. This has been achieved, largely by drawing together the findings of deer farmers themselves, of scientific workers who are associated with the industry and who are largely based at Invermay, and of those involved with the processing and marketing of deer products.

There is no doubt left that deer farming is currently a viable economic proposition, that this will continue in the future, and that the industry will expand further. Markets, particularly when appropriate slaughtering facilities have been established, are not only assured, but are also likely to be insatiable for all the products of

the deer farming industry, for many years to come. In so far as no calamity such as a foot and mouth outbreak occurs in New Zealand, the deer farming industry, both in the near and distant future, is likely to enjoy a very prosperous future. The New Zealand farming community would be wise in diversifying its agricultural production by accepting deer farming as a worthwhile economic activity.

Appendix I

Total Number of Hides Exported and the Average Value Per Hide

Year	Total No. Exported	Total Export Value $NZ	Average Value Per Hide $NZ	X_i	Y_i	d_i	$(d_i)^2$
1931	4,942	2,116	0.43	20	22	-2	4
1932	11,768	5,782	0.49	18	20	-2	4
1933	1,734	784	0.45	22	21	1	1
1934	3,920	2,470	0.63	21	17	4	16
1935	11,296	5,664	0.50	19	19	0	0
1936	15,891	8,092	0.51	17	18	-1	1
1937	20,429	16,412	0.80	16	14	2	4
1938	22,512	15,406	0.68	15	16	-1	1
1939	28,361	20,634	0.73	14	15	-1	1
1940	38,477	41,414	1.08	13	13	0	0
1941	45,382	79,982	1.76	12	11	1	1
1942	53,190	112,160	2.11	10	9	1	1
1943	51,300	113,986	2.22	11	7.5	3.5	12.25
1944	100,935	276,254	2.74	2	5	-3	9
1945	95,788	271,102	2.83	4	3	1	1
1946	97,051	303,168	3.12	3	2	1	1
1947	93,639	241,330	2.59	5	6	-1	1
1948	63,111	111,962	1.77	8	10	-2	4
1949	60,232	83,102	1.38	9	12	-3	9
1950	65,982	146,352	2.22	7	7.5	-.5	0.25
1951	103,194	491,942	4.77	1	1	0	0
1952	66,409	185,990	2.80	6	4	2	4
1953	68,330	144,084	2.11	N=22		$\Sigma d_i = 0$	$\Sigma (d_i)^2 = 75.5$

Spearman's Formula:

$$r_s = 1 - \frac{6\sum d_i^2}{N^3 - N}$$

$$= 1 - \frac{453}{10646}$$

$$= 1 - 0.0425$$

$$= 0.9575$$

where X_i = Numerical Order of number of hides exported

Y_i = Numerical Order of values of hides,

and $d_i = X_i - Y_i$

Source: N.Z. Dept. Statistics; "External Trade Exports, 1931-77

Continued over page

Year	Total No. Exported	Total Export Value $NZ	Average Value Per Hide $NZ
1954	58,976	114,152	1.94
1955	69,730	162,636	2.33
1956	58,942	153,586	2.61
1957	62,451	139,078	2.23
1958	53,683	91,068	1.70
1959	59,046	123,398	2.09
1960	53,211	122,406	2.30
1961	65,082	121,280	1.86
1962	Not included as 6-month period only		
1963	61,782	54,379	0.88
1964	55,717	58,217	1.04
1965	78,553	78,447	1.00
1966	73,671	129,260	1.75
1967	73,788	117,792	1.60
1968	102,723	187,761	1.83
1969	57,543	149,139	2.59
1970	81,540	202,222	2.48
1971	128,135	381,742	2.98
1972	96,440	353,281	3.66
1973	120,676	655,932	5.44
1974	94,808	482,917	5.09
1975	79,039	301,025	3.81
1976	112,001	423,065	3.78
1977	41,346	424,509	10.27

Appendix II

Percentage of Total Deer Hide Income from Five Principal Export Markets

Year	1930	1931	1932	1933	1934	1935	1936	1937	1938	1939	1940	1941
USA	Not specified	1.3	7.6	0.0	27.1	91.0	85.6	88.2	93.0	100.0	100.0	100.0
U.K.		0.0	17.5	0.0	54.3	6.8	13.9	9.3	6.8	0.0	0.0	0.0
West Germany		0.0	0.0	0.0	0.0	1.4	0.0	0.0	0.0	0.0	0.0	0.0
Japan		0.0	0.0	2.8	0.3	0.6	0.1	0.2	0.0	0.0	0.0	0.0
Australia		98.7	74.9	97.2	18.3	0.2	0.4	1.1	0.2	0.0	0.0	0.0
Total		100.0	100.0	100.0	100.0	100.0	100.0	98.8	100.0	100.0	100.0	100.0
Year	1942	1943	1944	1945	1946	1947	1948	1949	1950	1951	1952	1953
USA	100.0	99.3	100.0	99.95	98.6	89.8	74.8	72.0	80.1	98.4	89.5	77.5
U.K.	0.0	0.0	0.0	0.0	1.0	8.2	15.6	2.8	1.6	0.7	0.2	2.6
West Germany	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.5	5.7	0.0	7.7	15.8
Japan	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	2.6	4.1
Australia	0.0	0.7	0.0	0.05	neg	0.4	0.0	0.3	0.0	0.0	0.0	0.0
Total	100.0	100.0	100.0	100.0	99.6	98.4	91.4	75.6	87.4	99.1	100.0	100.0

Abbreviation: neg - negligible

Continued over page

Year	1954	1955	1956	1957	1958	1959	1960	1961	1962*	1963	1964	1965
USA	73.5	95.2	87.0	75.8	81.7	74.6	77.7	83.7	78.3	73.7	78.5	62.5
U.K.	1.1	2.9	4.6	4.0	0.0	2.5	1.6	0.0	0.0	neg	0.1	0.0
West Germany	22.9	1.6	6.3	18.4	10.3	14.4	18.6	11.9	21.7	16.9	19.4	21.8
Japan	2.4	0.3	0.3	0.0	0.0	3.5	0.3	0.0	0.0	0.0	0.0	0.0
Australia	0.0	0.0	0.0	0.0	0.0	0.0	neg	1.0	0.0	0.3	0.4	0.3
Total	99.9	100.0	98.2	98.2	92.0	95.0	98.2	96.6	100.0	90.9	98.4	84.6
Year	1966	1967	1968	1969	1970	1971	1972	1973	1974	1975	1976	1977
USA	60.1	64.0	59.2	39.8	52.3	57.3	38.3	19.8	24.2	21.1	12.0	0.0
U.K.	2.0	3.6	8.3	5.7	3.7	2.8	3.6	2.6	7.5	0.1	9.3	4.1
West Germany	32.0	25.9	22.3	49.5	41.6	38.5	50.9	52.7	42.9	40.3	39.1	50.3
Japan	0.0	0.0	neg	0.1	0.4	1.2	2.0	24.5	24.0	33.6	36.7	31.8
Australia	0.5	0.5	0.2	0.0	0.3	0.0	0.0	0.0	0.7	2.9	0.0	6.6
Total	94.6	94.0	90.0	95.1	98.3	99.8	94.8	99.6	99.3	98.0	97.1	92.8

Source:Based on Figures Given in "External Trade Exports" by the N.Z. Dept. of Statistics, 1931-1977

* 6-month period only

Appendix III

Weights, and Income Earned, from Exports of Venison

Year	Weight Given[1]	Weight in Kg[2]	Income $NZ Earned[1]	Average Price Per Kg
1953	337 cwt	17,111	9,254	0.54
1954	639 cwt	32,444	20,628	0.64
1955	4,753 cwt	241,326	46,554	0.19
1956	11,828 cwt	600,547	105,126	0.18
1957	10,240 cwt	519,919	102,342	0.20
1958	10,199 cwt	517,837	105,738	0.20
1959	13,330 cwt	676,809	154,652	0.23
1960	10,844 cwt	550,586	160,304	0.29
1961	7,716 cwt	391,767	139,304	0.36
1962[3]	6,675 cwt	338,912	143,930	0.42
1963	1,061,695 lb	481,302	131,194	0.27
1964	2,713,005 lb	1,229,896	371,607	0.30
1965	3,723,579 lb	1,688,022	653,297	0.39
1966	4,576,529 lb	2,074,693	1,587,870	0.77
1967	5,962,622 lb	2,703,055	2,063,088	0.76
1968	7,933,489 lb	3,596,515	2,805,205	0.78
1969	6,113,589 lb	2,771,494	2,614,456	0.94
1970	6,515,654 lb	2,953,763	4,052,581	1.37
1971	8,006,408 lb	3,629,572	4,683,202	1.29
1972	9,679,149 lb	4,387,881	5,642,337	1.29
1973	9,180,973 lb	4,162,041	6,571,511	1.58
1974	3,259,189 kg	3,259,189	6,883,541	2.11
1975	3,206,678 kg	3,206,678	5,995,236	1.87
1976	2,670,051 kg	2,670,051	8,191,177	3.07
1977	2,908,195 kg	2,908,195	11,859,617	4.08

1 Source: "External Trade Exports", N.Z. Dept.Statistics

2 Conversion factor from pounds to kilograms of 0.4533 used

3 A six-month period only here, as methods of recording changed from a calendar year to a July-June period of 12 months

Appendix IV

Some Conditions Applicable to Deer Farmers

(as in Noxious Animals in Captivity Regulations 1969)

A. General Conditions Regarding Holding of Specified Noxious Animals

(1) No person, not being the holder of a permit to capture or convey, shall keep in captivity any specified noxious animal, except pursuant to a permit in his name.

(2) Every person who at any time keeps without an appropriate permit, or who intends to keep, one or more specified noxious animals in captivity shall forthwith advise the Director-General in writing of the number, species and sex of the animals kept and an adequate description of the land on which they are to be kept or are already kept.

(3) Every enclosure erected or maintained by a commercial trapper for the keeping of living captured specified noxious animals shall be sited on licensed land within the feral range of the species captured.

(4) No permit to hold a noxious animal in captivity shall be issued except to the person having immediate control over the enclosure in which the animal is to be kept.

(5) In any case where the last mentioned person is the employed, agent, or representative of the owner of the enclosure, the owner shall at all times be required to ensure compliance with the conditions of the permit as though the permit had been issued in the name of the owner.

(6) No permit to keep a living specified noxious animal of any species in an area outside its feral range shall be issued, unless the animal is certified by a registered veterinary surgeon as being incapable of breeding.

(7) No noxious animal shall be removed from the licensed land or sold or otherwise transferred to any other authorised owner of noxious animals or other person unless the recipient holds the appropriate permit under these regulations.

(8) Specifications for enclosures for the keeping of specified noxious animals shall be laid down by the Conservator, and any permit issued shall be subject to the owner's carrying out any repairs, alterations, additions, or modifications to the enclosure that the Conservator may from time to time decide as being necessary.

(9) Every holder of a permit under this regulation shall ensure that every enclosure used pursuant to the permit is maintained in a good state of repair, and that the animal or animals permitted to be held do not escape from the enclosure.

(10) Every person who, pursuant to a permit under this regulation, keeps a specified noxious animal which he knows or suspects to be diseased or injured shall arrange an immediate inspection of the animal by a registered veterinary surgeon and shall follow his advice.

(11) Where any specified noxious animal that is being kept in captivity is sold or escapes or dies or is stolen or is lost by any other means, the owner of the animal shall notify that fact, or cause that fact to be notified, to the Conservator as soon as practicable ....

(12) No permit to keep a specified noxious animal in captivity shall be issued where in the opinion of the Director-General the proposed enclosure in which the animal is to be kept, or the animal itself, would obstruct an access route to which the public is entitled as of right to recreational lands or in any manner create a local or public annoyance or nuisance.

(13) Where specified noxious animals are kept in captivity under any of the provisions of these regulations, the holder of the permit shall maintain a written register of all such animals received, or that die, or are disposed of, which register shall be kept up to date and open to inspection by a Forest Officer at any time.

(14) Where any specified noxious animal dies or is killed while held in captivity, the holder of the permit in respect of the animal shall, unless he has the prior written authority of a Forest Officer to do otherwise, ensure that the entire hide or a strip of skin from across the scalp to which are attached both ears shall be retained in a dried and vermin free condition for not less than three months for surrender to a Forest Officer as proof of the death of the animal or animals.

B. Holding of Specified Noxious Animals for Breeding in Captivity

(1) The Director-General may, on being satisfied that the animals will at all times be under adequate supervision, issue permits .... to breed specified noxious animals to supply carcasses, skins, or other by-products of any species of specified noxious animal for processing and export or for sale or for home consumption within New Zealand.

(2) Holders of permits issued under this regulation shall provide the Director-General with an annual return of animals ....

C. For fencing specifications, see Appendix VI.

Appendix V

Survey Questionnaire

Unless asked otherwise, please tick the most appropriate answer for each question

Place your tick just to the left of the letter a, b, c, d, e etc. If answering n.a. place n.a. just to the left of the number of the question.

1. Are you farming deer
   a. as your major farming pursuit?
   b. to diversify your production, deer not being your major pursuit?
   c. as a part-time farmer, most of your income coming from another, non-farming job?

2. Number these 1, 2, 3, 4 in order of importance as they apply to you.
   "I am farming deer currently to produce mostly
   a. venison
   b. velvet
   c. stock for sale
   d. stock to expand my own herd"

3. Could the land you are currently using for deer be economically used for any other form of agriculture?
   a. Yes b. No
   If yes, state its possible agricultural uses.

4. Before setting up your deer unit, was the land
   a. unproductive?
   b. used for extensive sheep grazing?
   c. used for intensive lamb fattening?
   d. used for extensive cattle grazing?
   e. used for intensive cattle fattening?
   f. used for dairying?
   g. used for other purposes? If so, please state what.

5. Do you consider that your land now used for deer
   a. presently gives you a greater return per acre than before?
   b. will give a greater return per acre with a larger herd?
   c. will never yield a greater financial return per acre?

6. Do you consider that your land now used for deer
   a. presently gives you a greater return per dollar investment in stock and facilities than it did before?
   b. will yield a greater return per dollar investment in stock and facilities when you have a larger herd?
   c. will never yield a greater financial return per dollar investment?

7. If you have deer carcasses, are they
   a. collected by the game packing firm?
   b. delivered by you to the game packing house?
   c. left by you at a game collecting depot for collection?
   d. collected another way by a packing house? If so, state how .....

8. Is your antler velvet
   a. collected by the game packing house?
   b. delivered by you to the game packing house?
   c. left by you for collection at the game collecting depot?
   d. collected another way by a packing house? If so, state how .....
   e. sent to the Deer Farmers' Association velvet pool?
   f. otherwise sold privately?
   g. I have had no velvet yet to sell.

9. Do you consider your closeness to the nearest major highway as
   a. unfavourable due to poaching of stock, disturbing stock etc?

b. favourable due to income from charging sightseers, tourists, etc?
c. both a and b factors above apply?
d. neutral, it not affecting your deer farming activities at all.

10. Do you consider your closeness to the nearest town as
a. unfavourable due to poaching stock, disturbing of stock, etc?
b. favourable due to income from charging sightseers, tourists,etc?
c. both a and b factors above apply.
d. neutral, it not affecting your deer farming activities at all?

11. When did you first decide to farm deer?

a.	before 1969. State the year if possible	d.	1971	h.	1975
		e.	1972	i.	1976
b.	1969	f.	1973	j.	1977
c.	1970	g.	1974	k.	1978
				l.	1979

12. When did you first apply to the Forest Service for a licence to hold deer in captivity, with the idea of farming them?

a.	1969	e.	1973	i.	1977
b.	1970	f.	1974	j.	1978
c.	1971	g.	1975		
d.	1972	h.	1976		

13. When did you first begin operating your deer farming unit?

a.	before 1969. State when	f.	1973	l.	I have not as yet started to.
		g.	1974		
b.	1969	h.	1975		
c.	1970	i.	1976		
d.	1971	j.	1977		
e.	1972	k.	1978		

14. Is your unit owned either freehold or leasehold
    a. solely by one person, that person managing it?
    b. solely by one person, but with a paid manager?
    c. by a partnership, with one or both partners managing it?
    d. by a partnership, with a paid manager on it?
    e. by a company, with a major shareholder managing it?
    f. by a company, with a paid, non-shareholding or minor shareholding manager?

15. If the unit is owned by a partnership or company, was the partnership or company formed to overcome
    a. initial costs (fences, stock, yards etc.) in starting the unit?
    b. the problem of obtaining stock from the wild?
    c. neither a nor b? Please give the reason .....
    .....
    d. both a and b?

16. Did you have a partnership arrangement (temporary) with a game or other firm to obtain stock?
    a. Yes b. No.

17. When you first set up your unit or deer farm, which of these did you find as real or major obstacles to overcome? You may mark several or all, and please add others not mentioned.
    a. the financing of, and building of, fences, yards etc.
    b. the financing and obtaining of stock.
    c. getting reasonably reliable information.
    d. obtaining the necessary licences and permits.
    e. others (please state what they are).

18. (Just for those who set up their units a year or more ago). If you were to set up a unit now comparable to the one you already have, would you expect the same obstacles or different ones, assuming you were as before with the same knowledge, expertise, etc? If

you would expect some changed situations, please write them down.

19. Write the number for each type of deer that you are holding now.

a. Red
b. Fallow
c. Sambar
d. Rusa
e. Sika
f. Wapiti-Red cross
g. Other - please state

20. Write the total number of deer that you were farming on the 31 March for the following years. (NOTE! This date has been chosen to help you as you may have it recorded from your returns to the Forest Service). If you have not a record of it, please write the numbers you think from memory, but add the note "by memory".

a. 1970
b. 1971
c. 1972
d. 1973
e. 1974
f. 1975
g. 1976
h. 1977
i. 1978
j. 1979

21. Please mark the methods by which you initially obtained your stock. This does not include natural increase. You may mark more than one, as long as they were applicable to you.

a. from young fawns given to you by deerstalking friends.
b. by capturing feral deer for yourself.
c. by having feral deer captured for you by a helicopter or other firm.
d. by purchasing at market prices.
e. others. (Please state them)

22. Mark the reasons that led you to obtain stock by your most common method in the initial stage. Again, you may mark more than one.

a. because it was cheapest in money terms.
b. there were many feral deer in my locality.
c. there were few feral deer in my locality.
d. it would have taken too much of my time to catch my own.
e. it would have taken too long to stock my unit.
f. I got my unit stocked quickly this way.
g. Others (please state them).

23. Do you consider the feral range restriction to have been, in the past,
    a. a handicap to you and your operation?
    b. no handicap to you and your operation?

24. Do you consider the feral range restriction to have been, in the past,
    a. a handicap to the deer farming industry in general?
    b. no handicap to the deer farming industry in general?

25. Now that the feral range restriction is partly lifted, and if further changes are made to it, are you or do you intend ...
    a. stocking entirely with another breed of deer?
    b. partly diversifying your deer unit by having a second breed of deer?
    c. cross-breeding with wapiti?
    d. cross-breeding with other types of deer? (Please state which)
    e. making no change whatsoever?
    f. other response? (Please state what)

26. If you started with deer only as an experiment or to diversify your production, are you now
    a. still with only a small portion of your land for deer, and likely to stay so?
    b. still with only a small portion of your land for deer, but hoping to move almost completely over to deer?
    c. still with only a small portion of your land for deer, and hoping to enlarge this portion, but not wanting to farm only deer alone?
    d. almost completely over to deer farming alone?

27. What is the total number of deer you are licensed by the Forest Service to hold? Answer only if you definitely know, otherwise write "Don't know".

28. What is the total acreage of your full holding of land?

29. What is the total acreage of your deer unit?

30. Are you stocking deer,
    a. intensively (4+ red deer or 7+ fallow deer per acre)?
    b. at medium rates (2-3 red or 3-7 fallow deer per acre)?
    c. extensively (one or less red or 2 or less fallow deer per acre)?

31. What is the form of ownership or tenure of the land used for deer?
    a. owned under mortgage.
    b. owned free-hold.
    c. crown lease.
    d. lease-hold by private treaty.
    e. other (Please explain)

32. Where did you get the idea of farming deer from?
    a. by talking to one or more deer farmers.
    b. by reading articles in the Journal of Agriculture, the New Zealand Farmer, and other agricultural journals.
    c. from newspaper, T.V. or radio reports.
    d. from a book I read.
    e. from a letter from a friend.
    f. others (Please state them.

33. Where did you get the information from to set up your unit? Mark all applicable.
    a. by talking to deer farmers nearby.
    b. by travelling some distance to talk to deer farmers.
    c. by reading articles in the Journal of Agriculture, the New Zealand Farmer, and other agricultural journals.
    d. from newspaper, T.V. or radio reports.
    e. from the Forest Service.
    f. from Ministry of Agriculture and Fisheries Advisory Officers.

g. from the New Zealand Deer Farmers' Association.
h. by attending deer farmers' field days.
i. others (Please state fairly fully, and include all).

34 Have you had previous practical experience of any kind with deer?

a. Yes b. No

35. If yes to the last question, was the experience gained as a

a. Government shooter or culler?
b. keen private deerstalker?
c. worker with a game meat recovery firm?
d. other (Please state what it was)

36. In which age group are you?

a. 20-29 years
b. 30-39 years
c. 40-49 years
d. 50-59 years
e. 60-69 years
f. 70+ years

37. How much secondary schooling have you had?

a. none at all
b. up to two years
c. three or four years
d. more than four years

38. At secondary school, did you follow an agricultural course?

a. Yes b. No

39. If you attended a tertiary institute, mark which one(s).

a. Agricultural College or University (Massey, Lincoln).
b. University.
c. Teachers' College.
d. Technical Institute.

40. Tick all the factors below that you consider positively affected you in deciding originally to take up deer farming.

a. personal interest in deer.
b. desire to diversify production for economic reasons.
c. desire to "give something else a go".
d. thought deer farming would be more profitable than farming ventures.

e. thought deer farming had a bright future.
f. thought it a good way of using your unutilised or marginally productive land.
g. was disillusioned with the traditional meat industry.
h. thought less labour would be involved with deer.
i. others (Please state them).

41. Do you attend deer farming field days?
a. never
b. occasionally, but not often.
c. whenever I get a chance.
d. always. I make a point of going.

42. Do you attend deer farmers' conferences?
a. never.
b. occasionally, but not often.
c. whenever I get the chance.
d. always. I make a point of going.

43. Do you keep in constant communication with other deer farmers, thus getting new ideas and sharing your own?
a. Yes b. No

44. Are you a member of the New Zealand Deer Farmers' Association, and when did you become a member?
a. I was already deer farming and joined soon after or when the Association was formed.
b. I joined before I started farming deer.
c. I was not farming deer when the Association was formed, but started farming deer before I joined.
d. I have never joined or been a member.
e. I was a member once, but am not now.
f. I am deer farming now, and intend to join soon.

45. Have you any further comments or information to divulge that you think may be relevant to this study? If so, please write them below.

Appendix VI

Regulations Pertaining to Perimeter Deer Fences

(As taken from the Noxious Animals in Captivity Regulations 1969)

Part 1: Posts and Battens (Third Schedule, Section One)

(a) Fence Posts

Type of Deer	Type of Post	Measurement of top (inches)	Minimum Length (feet)	Maximum spacing (feet)	Minimum Height (feet)
Any deer, wapiti, chamois or thar	Split or Sawn	12 sq.inches	9	16	6.5
	Roundwood	3.5 diameter	9	16	6.5
	Half Roundwood	3.5 radius	9	16	6.5
	Concrete/Steel	As approved			6.5

(b) Strainer Posts and Stays

Strainer Posts				Stays	
Type of Deer	Type of Post	Measurement of top (inches)	Minimum Length (feet)	Measurement of top (inches)	Length
Any deer, wapiti, chamois or thar	Split or Sawn	24 sq.inches	10	9 sq.inches	7.5-9
	Roundwood	7 diam.	10	3.5 diam.	7.5-9
	Half Roundwood	4 radius	10	3.5 radius	7.5-9
	Concrete/Steel	As approved		As approved	

(c) Battens Battens are to be 6.5 feet in length and are to have a cross-sectional measurement of 2 inches by 2 inches, or 2 inches by 1.5 inches.

Part 2: Wire and Gates (Third Schedule, Section Two)

(a) Wire

Type of Deer	Type of Wire	Minimum Height (feet)	Minimum No. of Line Wires	Maximum Space Between Line Wires	Maximum Space Between Verticals (ins).
Red Sambar or Wapiti	No.8-12½ g galvanised high tension	6½	9	9in. up to 4½ft high 10in. from 4½ft high	24
	High tensile mesh of 12½ g galvanised	6½	13	3 to 9in. up to 4½ft 9 to 11in. from 4½ft	12
Any other deer or chamois	No.8-12½ g galvanised high tension	6½	13	6in.	12
	High tensile mesh of 12½ g galvanised	6½	13	6in.	6

(b) Gates (Third Schedule, Section Three) Gates are to measure 6½ feet by 9 feet or 6½ feet by 4 feet. They are to be constructed of timber or pipe and wire mesh, and one hinge must be reversed on the other so that the gate cannot be lifted off. The gate must be locked. The construction of all gates must be approved.

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