COMMONWEALTH  OF AUSTRALIA

REGIONAL STUDIES
OF THE
AUSTRALIAN WOOLGROWING INDUSTRY

---

1. AUSTRALIAN CAPITAL TERRITORY

2. LONGREACH—BLACKALL DISTRICT, QUEENSLAND

BUREAU OF AGRICULTURAL ECONOMICS
DEPARTMENT OF COMMERCE AND AGRICULTURE
CANBERRA, A.C.T.
1951

COMMONWEALTH OF AUSTRALIA

REGIONAL STUDIES
OF THE
AUSTRALIAN WOOLGROWING INDUSTRY

---

1. AUSTRALIAN CAPITAL TERRITORY

---

2. LONGREACH—BLACKALL DISTRICT, QUEENSLAND

BUREAU OF AGRICULTURAL ECONOMICS
DEPARTMENT OF COMMERCE AND AGRICULTURE
CANBERRA, A.C.T.
1951

SET UP, PRINTED AND BOUND IN AUSTRALIA BY
HALSTEAD PRESS PTY LIMITED, NICKSON STREET, SYDNEY
REGISTERED IN AUSTRALIA FOR TRANSMISSION BY POST AS A BOOK

FOREWORD

IN this volume are published the results of the first two regional studies of the woolgrowing industry undertaken by the Bureau of Agricultural Economics, and being published under the general title "Regional Studies of the Australian Sheep and Wool Industry". These are: "A Survey of Sheep Properties in the Australian Capital Territory" (as representative in most respects of much of the Southern Tablelands of N.S.W.) and "A Survey of Sheep Properties in the Longreach-Blackall District, Queensland" (as representative of the "downs" country of N.W. Queensland).

Unlike the dairy, wheat and some other primary industries, remarkably little factual information has previously been available on the economics of the Australian woolgrowing industry. No comprehensive survey has ever been undertaken and the only data published during the last 20 years have been the Report of the Wool Enquiry Committee of 1931-32, the Payne Report of 1939 on the industry in Queensland and the Fyfe Report of 1940 on the pastoral areas of Western Australia. Consequently, the Bureau of Agricultural Economics, when commencing its programme of economic wool research, gave particular attention to surveys designed to elucidate costs and returns and how these vary from property to property, from district to district, and from year to year.

Two points call for comment:

1. These surveys cover both costs and returns and thus enable a study to be made of the influence of property size and other factors on income, which is the measure of economic results. The results are more valid than those of "cost of production" surveys because the data can be analysed without recourse to arbitrary methods in the treatment of side-line income and certain other items.
2. Rather than a comprehensive survey covering the whole industry, a regional approach has been made. This has many advantages because of the wide range of conditions under which sheep are run and the influence of the environment on the financial results and economic problems of woolgrowing.

Both of these surveys show that, during the years immediately preceding 1946-47, there was little margin of profit in woolgrowing in the areas covered and in fact a considerable proportion of woolgrowers failed to achieve a satisfactory return for their labour. From 1946-47 onwards, however, there was a very marked improvement in financial results owing to higher wool prices, although at the same time a substantial increase in costs occurred.

Since that time spectacular increases in wool prices, coinciding with favourable seasons, have been responsible for a period of unprecedented prosperity within the industry. This has strengthened the financial position of woolgrowers, who, although hampered by shortages of labour and materials, have in many, but not all, areas been able to undertake a considerable development of the productive capacity of their properties.

Looking ahead, however, there are elements of danger to the industry in the current situation. On the one hand, costs rose quite sharply during the years studied in these surveys—by approximately 30% per annum in the A.C.T. area, and 10% per annum in the Longreach area. More recent work has shown that costs have since continued to rise in other areas at comparable rates.

On the other hand, although the statistical position of the world woolgrowing industry is particularly strong, current wool prices are so far above general commodity prices that a downward revision must eventually occur. This readjustment, when it comes, is likely to be intensified because of the exceptional opportunity which current wool price levels are giving for the accelerated development of competitive fibres. I am confident that after such price readjustments wool will be able to maintain its position. It is inevitable, however, that there will be a "battle of the fibres" and this will be decided on a quality-price basis.

It is possible that the relationship of costs of production to the general level of prices at which wool will ultimately be able to withstand all onslaughts from competitors will be critical to the continued prosperity of the industry. Hence a full knowledge of the economics of woolgrowing has added importance and for this reason the Bureau of Agricultural Economics is undertaking a fairly comprehensive programme of economic wool research as part of the general wool research programme.

Grateful acknowledgment for assistance and helpful advice is made to the officers of the Divisions of Plant Industry and Soils, C.S.I.R.O., Canberra; the Department of the Interior, Canberra; the Department of Agriculture and Stock, Queensland; the Lands Commissioners at Longreach and Barcaldine, Queensland; and the Queensland Government Statistician.

Thanks are also extended to the officers of the United Graziers' Association, Queensland; the Central and Northern Graziers' Association, Queensland; the Graziers' Association of N.S.W. (Queanbeyan Branch) and the A.C.T. Lessees' Association for their co-operation.

The Bureau is also indebted to those graziers who willingly co-operated and without whose support the projects could not have been carried out.

Mr. K. O. Davis was the Bureau Officer primarily responsible for the A.C.T. survey and Mr. J. P. Carney carried similar responsibilities for the Longreach survey. Both studies were carried out under the general direction and guidance of Mr. P. A. Reid.

T. H. STRONG,
Director,
Bureau of Agricultural Economics.
January, 1951.

Editor of Publications:
L. G. ASHTON.

TABLE OF CONTENTS

AUSTRALIAN CAPITAL TERRITORY SURVEY

APPENDICES

MAPS

LIST OF TABLES

AUSTRALIAN CAPITAL TERRITORY SURVEY

TABLE OF CONTENTS

LONGREACH—BLACKALL DISTRICT SURVEY

APPENDICES

MAPS AND DIAGRAMS

LIST OF TABLES

LONGREACH—BLACKALL DISTRICT SURVEY

A SURVEY OF SHEEP PROPERTIES IN THE AUSTRALIAN CAPITAL TERRITORY

SECTION I: INTRODUCTION

THE portion of the Australian Capital Territory to the North and East of the Murrumbidgee River was selected for the first Regional Survey by the Wool Section of the Bureau for the following reasons:

1. It comprised a reasonably uniform belt of country, representative, except in regard to land tenure, of a considerable area of the sheep country of the Southern Tablelands of New South Wales.
2. It was thought to be a suitable area for a supplementary study of the influence of pasture improvement on financial results.
3. The survey was undertaken partly as a means of training field staff and the proximity of the area to the Bureau's headquarters was a particular advantage in this respect.

The survey itself was designed to obtain factual information on the costs and returns of woolgrowing under these environmental conditions for the three years 1944-45, 1945-46 and 1946-47; how costs and returns moved from year to year, and how they were influenced by property size and pasture improvement.

SECTION II: DESCRIPTION OF THE AREA SURVEYED

Location.

The location of the Australian Capital Territory is shown on Map 1. The total area is approximately 576,000 acres, of which 360,000 acres are available for agricultural or pastoral occupation, the balance being reserved for forestry or Crown purposes.

The area within the Australian Capital Territory covered in this survey is shown on Map 2. It comprises the portion of the Territory North-east of the Murrumbidgee River.

Topography.

The general topography of the survey area may be divided into three regions, as shown on Map 3. The northern and the southern regions consist of moderately elevated hills (2,000-3,000 ft. above sea level), which are generally characterised by gentle slopes. These two regions represent residual hill development and interrupt the riverine plains of the Molonglo and Murrumbidgee Rivers.

The central region consists of the riverine plains adjacent to the Murrumbidgee and Molonglo Rivers and the Ginninderra Creek. The altitude of these plains is approximately 1,900 ft., but they are broken in places by low cone-shaped hills and ridges.

During the survey the topography of the farms visited was classified as either flat, undulating, hilly or mountainous, as described in more detail under "Vegetation and Pastures".

Soils.

A short technical description of the soils in the area surveyed is given in Appendix I. Briefly, there are two major soil groups, viz:

1. Grey podsolised soils, ranging from loams with compact structure to uncompacted gritty and sandy loams. These soils overlie a band of lighter coloured soil, below which there is red brown or yellow and grey clay.
2. Grey brown loams, carrying ironstone concretions and which overlie yellowish brown friable clay.

There are several soil types within each of these two groups, and there are also relatively small areas of alluvial soils. It is considered, however, that variations in soil type throughout the area surveyed do not markedly affect productivity at the present stage of pasture development.

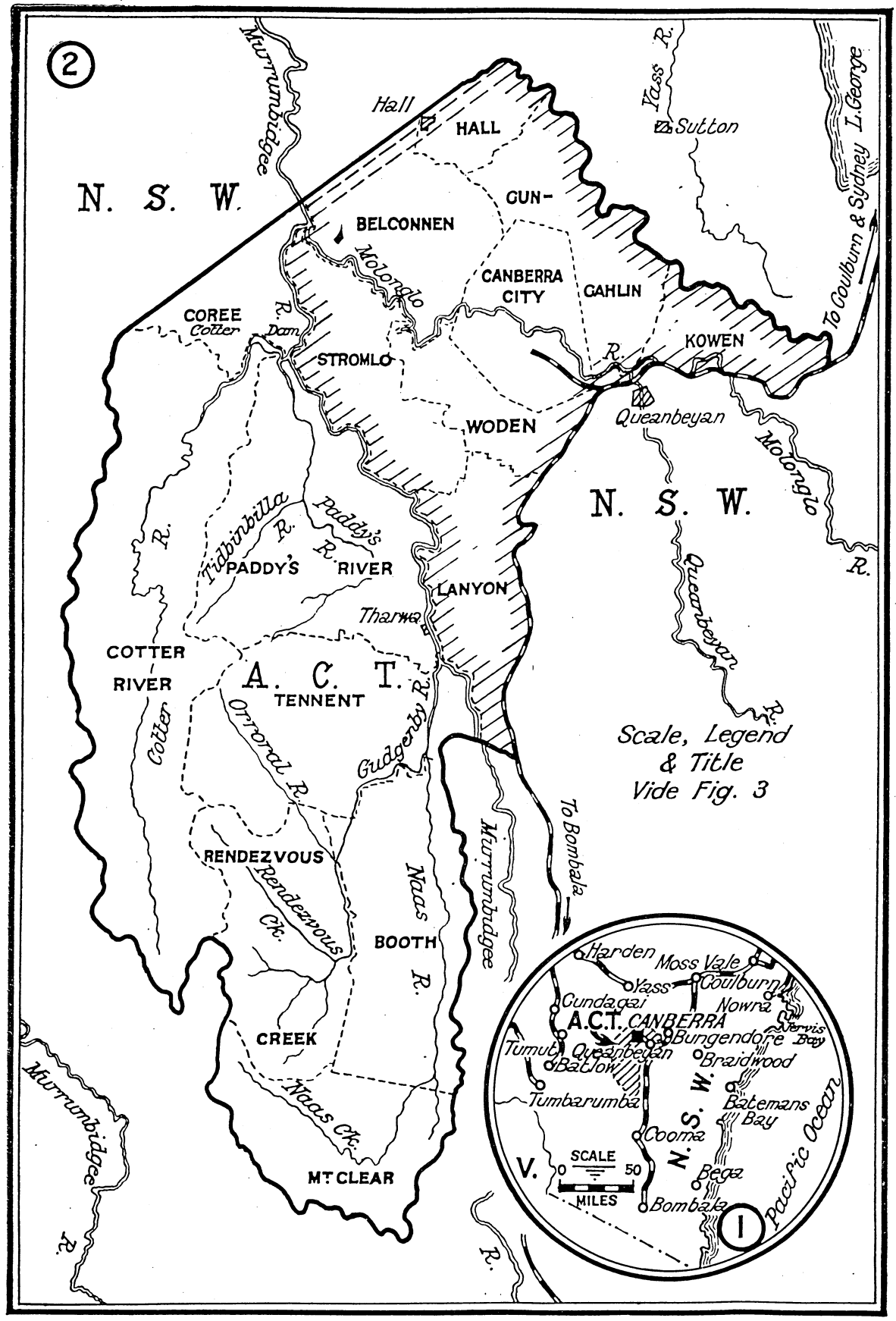
Extensive soil erosion was in evidence at the time of the survey on both occupied lands and public roads. Serious and active gullying was widely occurring and sheet erosion and scalding were also observed.

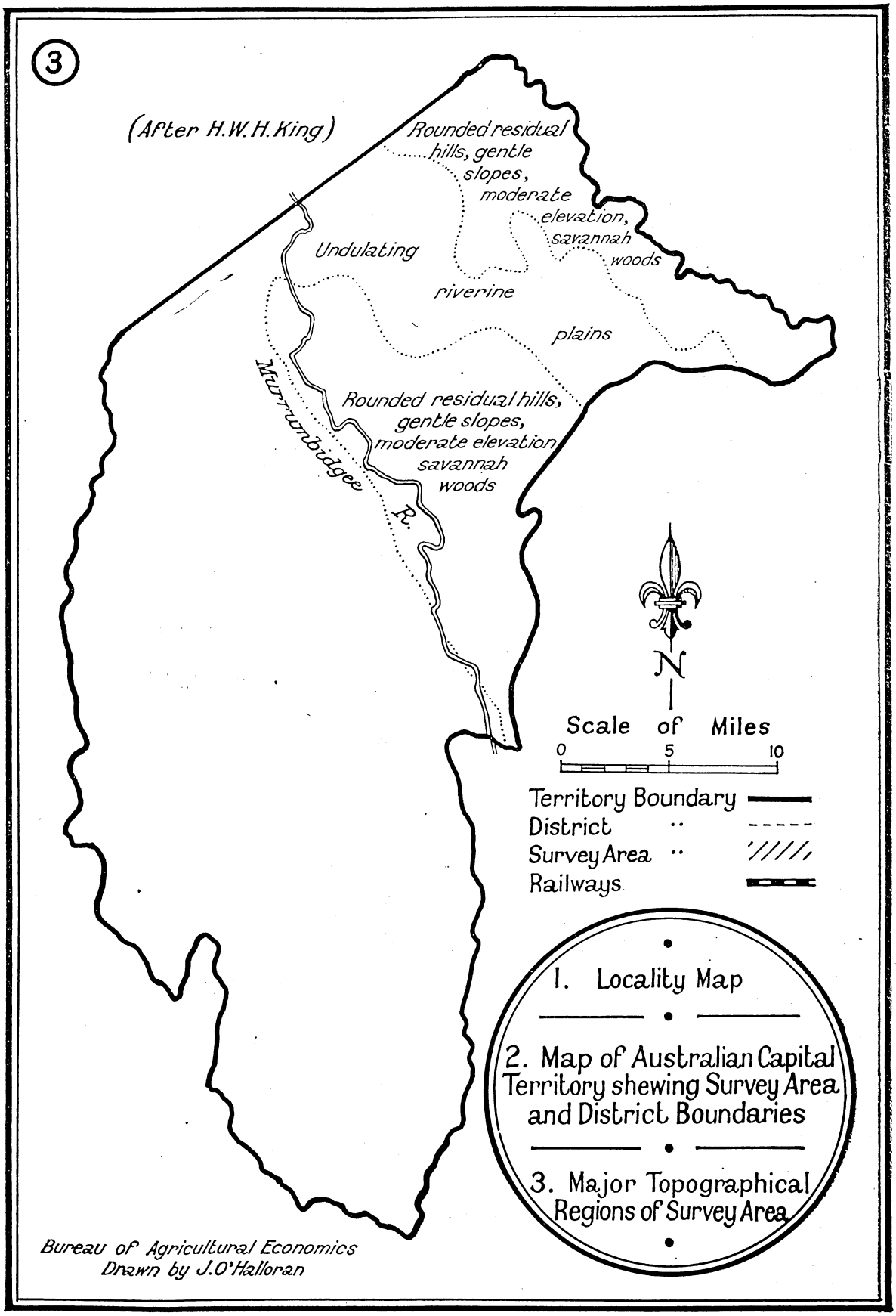
Control measures on the properties visited included contour furrowing on lower slopes, establishment of pine plantations along some water-courses, fencing of gullies to exclude stock, and diversion of gully-flow into dams. In no case were the results entirely effective owing to the lack of control higher up the slopes. The more widespread application of control measures appeared an urgent necessity.

Climate.

A detailed analysis of the climate of the area is given in Appendix II. A brief summary is as follows:

The average annual rainfall over the area varies between approximately 20 inches and 22 inches in


2
Murrumbidgee R.
Hall
HALL
Yass R.
Sutton
To Goulburn & Sydney
L. George
N. S. W.
GUN-
BELCONNEN
Molonglo R.
CANBERRA CITY
GAHLIN
COREE
Cotter Dam
STROMLO
KOWEN
To Goulburn & Sydney
Queanbeyan
WODEN
Molonglo R.
N. S. W.
Tidbinbilla R.
Paddy's R.
PADDY'S RIVER
LANYON
Tharwa
Queanbeyan R.
COTTER RIVER
A. C. T.
TENNENT
Cotter R.
Orroral R.
Gudgenby R.
Scale, Legend & Title Vide Fig. 3
To Bombala
Murrumbidgee R.
RENDEZVOUS
Rendezvous Ck.
Naas R.
BOOTH
CREEK
Naas Ck.
MT CLEAR
Murrumbidgee R.
Harden
Moss Vale
Yass
Goulburn
Cundagai
Nowra
A.C.T. CANBERRA
Jervis Bay
Bungendore
Tumut
Queanbeyan
Braidwood
Batlow
N. S. W.
Tumbarumba
Batemans Bay
Cooma
V.
SCALE
0 50
MILES
Bega
Bombala
1
Pacific Ocean


3
(After H.W.H. King)
Rounded residual hills, gentle slopes, moderate elevation, savannah woods
Undulating riverine plains
Rounded residual hills, gentle slopes, moderate elevation savannah woods
Murrumbidgee R.
N
Scale of Miles
0 5 10
Territory Boundary
District
Survey Area
Railways
1. Locality Map
2. Map of Australian Capital Territory shewing Survey Area and District Boundaries
3. Major Topographical Regions of Survey Area
Bureau of Agricultural Economics
Drawn by J.O'Halloran

the East and over 30 inches in the West. (See Map 2.)

Since temperature conditions during the period May to early August are unfavourable and rainfall during the months November-January is, in general, unreliable, the critical rainfall seasons in this area are March-April and late August to October.

Satisfactory rainfall conditions during the Autumn may, in general, be expected in six to seven years in 10, but in the eastern section the expectancy is as low as five years in 10. During the Spring the conditions are better. Satisfactory conditions may be expected in eight to nine years in 10 in the North-west and from six to seven years in 10 over the rest of the area, except in the East, where such conditions may be expected in only five years in 10.

Although Summer rainfall is in general unreliable, on occasions there is sufficient rain to carry pastures through until the Autumn break. Droughts of three months or more during the Summer may be expected one year in three, except in the North (one year in two) and the North-east (three years in five).

Conditions During the Survey Years.

Autumn conditions during 1944 were not good, January, February and March having rainfalls well below the average. Conditions improved in April when falls approximated to the "effective"* amount and in May good rainfall was received over the area. Except in the western part, where falls were satisfactory during August, the months August and September had low rainfall. October and November were satisfactory and were followed by good Summer and Autumn rains. In general, however, the dry Summer, Autumn and early Spring adversely affected the condition of stock and the 1944-45 wool clip.

Rainfall conditions during 1945 were very satisfactory and Winter conditions were not as severe as is usual, mean monthly temperatures indicating that temperatures during June and August were sufficiently high to permit some growth of pastures. The season was, therefore, favourable for the 1945-46 wool clip.

Highly satisfactory rainfall conditions continued until July 1946, when in the eastern section there was a period of two months with rainfall below the effective amounts for each month. Conditions were thus reasonably favourable for the 1946-47 clip.

December 1946 and January 1947 had rainfalls well below the effective amounts, but the Autumn of 1947 was generally satisfactory, with the exception of the Queanbeyan area, where conditions were only fair. Rainfall conditions during the remainder of 1947 were again highly satisfactory.

Vegetation and Pastures.

The area surveyed was classified into four topographical land classes. These were defined as:

A. *Flat*: Land capable of regular cultivation without undue erosion hazard.
(8% of area surveyed.)

B. *Undulating*: Land most of which could be occasionally cultivated, but with adequate precautions such as contour working, etc.
(48% of area surveyed.)

C. *Hilly*: Land over much of which a drill could be worked at least once, to mulch the soil surface for over-seeding purposes, and yet leave the natural perennial grasses undisturbed to protect the soil. This includes limited areas of Class B.
(37% of area surveyed.)

D. *Mountainous*: Land which, on account of steepness coupled often with rock outcrops and/or density of timber, precludes any treatment.
(7% of area surveyed.)

The essential requirement of any pasture improvement in the territory is the provision of adequate soil nitrogen. This is low because of the scarcity of legumes—the nitrogen fixers of the vegetation—and these in turn are sparse largely because of the inherent phosphate deficiency of the soil. It is fundamental, therefore, that phosphate be added, and to make full use of this fertiliser, well adapted clover species must be introduced to fix nitrogen.

Owing to the relative unreliability of Autumn and Spring rainfall, seasonal conditions can be critical to successful establishment of clovers. Those at present considered best fitted to the environment are Mt. Barker or Bacchus Marsh subterranean clover. For full nitrogen fixation the clovers also require other minerals, and of these, molybdenum, lime and sulphates are insufficient on some, and probably most A.C.T. soils. (Lime and sulphates are, of course, present in commercial superphosphate, and normal dressings of superphosphate are often enough to fulfil these requirements.)

With this data as a working guide, the four land classes were examined in regard to their present productivity and future potentiality.

Land Class A—Flat.

Either of three ecological associations occur on the lands of this class, and though they differ—or did differ before clearing—in their three flora, the natural pasture is rather similar throughout. The three associations are:

* See Appendix II.

(a) the *Stipa-Danthonia* association of the Savannah grassland formation;
(b) the fringing White Sallee (*E. pauciflora*)-Candlebark (*E. rubida*) fragmentary association; and
(c) the Yellow box (*E. melliodora*)-Red gum (*E. Blakelyi*) association of the Savannah woodland formation. In this occur also trees of Apple box (*E. Stuartiana*), Red box (*E. polyanthemos*), etc.

In these three associations the dominant species of the natural pastures are the perennial spear grasses (of which there are three: *Stipa variabilis, S. bigeniculata, S. falcata*) and wallaby grasses (of which there are also three: *Danthonia carphoides, D. auriculata* and *D. semiannularis*). Numerous herbs, annual grasses and some legumes occur amongst these, but their importance is generally only secondary, and varies with soil, aspect, season and previous management.

Though these natural pastures grow at any season of the year, except mid-winter, and can carry up to a sheep per acre, producing wool of high quality, the yield of feed is not high, and the nutritive value is only moderate.

In some cases the productivity has been increased by the incorporation of subterranean clover, but maximum improvement is attained by sowing to a permanent *Phalaris tuberosa*-subterranean clover pasture. The technique of establishment of this pasture is now becoming more widely known. Because of its capacity, once established, to withstand drought, to respond to rain at most periods of the year, to provide a good ground cover against erosion, to provide a well balanced and highly nutritious diet, to increase greatly the wool production from natural pastures, and to persist for many years without any treatment other than fertiliser dressings, it should in time become the dominant pasture in the district on Class A and also on Class B lands.

Class A land can also be used very satisfactorily for lucerne growing either for hay, or, where grazing is managed so that it is heavy and periodic (one week in five or six) rather than steady and continuous, for permanent sheep or cattle grazing.

High-yielding temporary pastures of Wimmera ryegrass-subterranean clover can also be used as grazing leys either in cereal rotations or in rotations with grazing oats for lambing ewes.

Land Class B—Undulating.

Both the Savannah grassland formation and the Yellow box and Red gum association of the Savannah woodland occur on Class B land, and the natural pasture is dominantly of the perennial spear and wallaby grasses, with patches of kangaroo (*Themeda australis*) and Red-leg grasses (*Bothriochloa decipiens*) in the wetter spots. Again, these perennial grasses are accompanied by the range of herbs, annual grasses and legumes mentioned above, and all of minor importance.

This pasture—similar to that on Class A land—has similar deficiencies, and can, with precautionary measures in land preparation, be converted into high-yielding *Phalaris*-subterranean clover pasture. Alternatively, lucerne can in many cases be readily established. However, in the main the only improvement that has been undertaken has been to scratch subterranean clover into the natural sward. In many cases the clover, as a result of heavy applications of super., has ousted the native perennial grasses.

Land Class C—Hilly.

The Yellow box-Red gum association covers the greater proportion of the Class C land surveyed, and the natural pasture is of similar composition to that already described, though generally less productive, and more liable to damage and erosion if mismanaged. It is on this land type that the native spear and wallaby grasses are the best perennials to grow, and they should be preserved and encouraged by careful management.

The carrying capacity can be considerably increased by scratching in subterranean clover with a drill or combine in Autumn, when the soil is moist. Favourable seasonal conditions are necessary for establishment and, later, judicious use of superphosphate is essential, so that the balance of native grasses and subterranean clover will be preserved, the fertiliser being withheld altogether if the clover begins to dominate the grass.

Very little improvement of this nature has at present been attempted on this land type.

Some Class C country carries, or did carry before clearing, the Dry Sclerophyll Forest formation. A description of this association is given below.

Land Class D—Mountainous.

On the mountainous, rocky and often heavily timbered Class D land two ecological associations may occur.

The Yellow box-Red gum association is frequently encountered, with its typical *Stipa* and *Danthonia* grasses and lesser plants, and management is the main factor in maintaining and increasing the productivity of this natural pasture. Lenient stocking and the long-term build-up of productivity by the droppings of sheep that have just come up from

the improved pastures below are the important aspects of good management.

The Dry Sclerophyll Forest formation also occurs in considerable area on this land class. The tree species, Red stringybark (*E. macrorrhyncha*), Scribbly gum (*E. Rossii*), White brittle gum (*E. maculosa*), Broad-leaved peppermint (*E. dives*) etc. have understories of shrubs, and the ground cover, which is very sparse, includes the perennial Silvertop wallaby (*Danthonia pallida*) and Tussock grass (*Poa caespitosa*), and Purple wire grass (*Aristida ramosa*). Clearing of the trees gives an increase of these grasses along with some *Stipa* species, but shrubby plants such as Tea tree (*Leptospermum triloculare*) and Buttercup bush (*Hibbertia obtusifolia*) regenerate. The pasture is poor and control of the regenerating shrubs and trees is difficult.

There is some indication from research that economic methods of establishing subterranean clover, and follow-on perennial grass may be evolved in the near future. To date, however, clearing and pasture improvement have generally given disappointing results on the Dry Sclerophyll formation.

Land Tenure.

Most of the land in the A.C.T. available for agricultural or pastoral occupation, including all of the farms surveyed, is held under Rural Lease. The more important provisions of this tenure system are:

1. Leases are granted for a term not exceeding 25 years, with provision for reappraisement of rental every fifth year. (In practice, the occupier receives priority when renewal of the lease is being considered.)
2. The Crown may withdraw at any time the whole or any portion of the land without payment of compensation to the lessee other than for improvements to which "tenant rights" apply.
3. Tenant rights are normally granted over buildings, fences, or other improvements for which approval was given prior to their erection by the lessee. Lands on which improved pastures have been established carry a tenant right which reflects the improved value of the pasture at the time of withdrawal.
4. The lessee is required to keep all fences, buildings or other improvements in repair and to destroy all rabbits and noxious weeds, and the Crown has the right to carry out any such work which he fails to execute, at the cost of the lessee.
5. The lessee is required not to overstock the land, the Minister for the Interior being the sole judge as to overstocking.

SECTION III: SURVEY METHOD

Details of definitions, procedure followed during the survey and methods of analysis are given in Appendix III.

In brief summary, particulars of area and sheep numbers were obtained for the 100 properties within the survey area. Of these 16 were excluded under definition (see Appendix III) and 57 selected at random from the 84 properties remaining.

The field party visited these properties and found it necessary to exclude a further nine properties which did not comply with the definitions; 12 properties were found to have insufficient records (mainly because of discontinuity of management over the period) to be included and on seven the occupiers were unwilling to co-operate (mainly because of ill-health).

Of the 29 properties actually surveyed, all had adequate records for 1946-47, 27 had adequate records for 1945-46 and 23 had adequate records for 1944-45.

Three main considerations determined the method of analysis and presentation of data. The first was the need to maintain anonymity of data relating to individual properties by procedures involving grouping; the second was that the sample was small in the statistical sense, and the third, that the units comprising the small sample showed a considerable degree of variability among themselves. Averages, and the range of actual values, have been adopted as being more informative to graziers than standard deviations and these have been supplemented by frequency distribution and correlation tables as appropriate.

SECTION IV: LAND USE AND SYSTEMS OF FARMING ON FARMS SURVEYED

Farm Size.

The average area of 23 farms for which financial records for 1944-45 were available was 1,934 acres; for 27 farms with records for 1945-46 it was 1,948 acres and for 29 farms with records for 1946-47, 1,896 acres.

While natural pasture averaged 1,775 acres or 92% of total farm area, improved pasture represented

TABLE No. 1: FREQUENCY DISTRIBUTION OF FARM SIZE.

	1944–45	1945–46	1946–47
500 acres and under 1,000 acres	2	2	2
1,000 ,, ,, ,, 1,500 ,,	4	6	8
1,500 ,, ,, ,, 2,000 ,,	9	9	9
2,000 ,, ,, ,, 2,500 ,,	3	5	4
2,500 ,, ,, ,, 3,000 ,,	2	2	3
3,000 ,, ,, ,, 3,500 ,,	2	2	2
3,500 and over	1	1	1
Number of Farms	23	27	29

TABLE No. 2: LAND USE: AVERAGE AREAS PER FARM SURVEYED.

	1944–45	1945–46	1946–47	Average 3 years	
	23 farms	27 farms	29 farms		
	acres	acres	acres	acres	%
Natural pastures	1,811	1,803	1,712	1,775	92·2
Improved pastures	101	112	151	121	6·3
Cropped	22	33	33	29	1·5
Total Area	1,934	1,948	1,896	1,925	100

an average of 121 acres, or 6% only. The range of improved pasture acreage varied from none to 700 acres.

Five farms in each year had no improved pastures at all. On the remaining farms the average area improved was 152 acres, or 8%. The average area of improved pasture increased by about 52% over the three years.

The average area cropped per farm was 29 acres, or only 1·5% of the average farm area. The range was from none to 252 acres.

A summary of farming operations is given in Table No. 3.

TABLE No. 3: SUMMARY OF CROPPING ON FARMS SURVEYED.

	1944–45	1945–46	1946–47	Average 3 years
	acres	acres	acres	acres
Total area wheat (grain or hay)	206	285	563	351
Total area oats (grain or hay)	306	564	385	418
Total area other crops	–	30	–	10
Total area cropped	512	880	948	780
Number of properties undertaking cropping	10	15	19	15
Average area cropped per property undertaking farming	51	59	50	53

On properties which actually undertook any farming, the average area cropped for the three years was 53 acres, compared to 29 acres on all farms included in the survey. Only one farm cropped more than 100 acres in any of the years and with this one exception the cropping enterprise was very much subsidiary to grazing.

It will be noted that the average area cropped increased over the three years. The lower figures for 1944-45 reflect the shortage of superphosphate, labour and machinery and the fact that dry conditions were experienced at seeding time.

In the two succeeding years there was an improvement in superphosphate supplies, seasonal conditions were better and wheat prices per bushel showed a marked increase.

Cropping was generally carried out by the farmer using his own plant; in two cases it was done by contract and no cases of share farming were reported, although there is some share farming done in the district.

There was no general system of rotation. Some of the smaller areas were cropped each year or each second year. The grower with cereal cropping as the major enterprise used a 4-year rotation, viz. fallow, wheat, oats, pasture. Some growers considered, however, that a long-term ley programme will become popular with the establishment of more improved pasture and the higher crop yields resulting from this practice.

TABLE No. 4: AVERAGE NUMBER OF LIVESTOCK PER FARM

	1944–45	1945–46	1946–47	Average 3 years
Sheep	1,736	1,750	1,674	1,720
Cattle	27	29	32	29
Horses	6	6	6	6

Few livestock are carried, apart from sheep. The annual numbers of sheep varied little during the three years under review, in spite of drought conditions experienced in 1944-45. In other words, the

TABLE No. 5: FREQUENCY DISTRIBUTION OF NUMBER OF SHEEP PER FARM.

No. of sheep per farm	1944–45	1945–46	1946–47
1,000 and under	2	2	4
1,000 – 1,500	8	9	12
1,500 – 2,000	6	8	6
2,000 – 2,500	4	4	4
2,500 – 3,000	2	1	1
3,000 and over	1	2	2
Total No. of Farms	23	26	29

properties continued to carry the same number of sheep and drought effects were reflected mainly in weight of wool produced.

The greatest concentration of flocks was in the 1,000-1,500 group, followed closely by the 1,500-2,000 group. These two groups included two-thirds of the flocks in the survey.

The average composition of flocks, for the three years, as at 31st December, was:

Wethers	39%
Ewes	44%
Lambs	16%
Rams	1%

Systems of Farming.

The various systems of farming within the survey sample were classified as follows:

1. *Cereal cropping and grazing*: Cereal cropping was the predominant enterprise on only one property covered in the survey. Grazing comprised merino woolgrowing and breeding. The country was almost entirely topography Class A.

2. *Grazing with associated cereal cropping and pasture improvement*: This was the most common practice. The grazing enterprise, with three exceptions only, comprised merino woolgrowing and breeding. Of the three exceptions, one property ran Corriedales, the second carried, in addition to merinos, a small flock of crossbred ewes for fat lamb production, and the third ran merino wethers only.

Cast-for-age and surplus stock were usually sold as stores, except on properties where sufficient improved pastures were available for fattening.

A small herd of cattle, for household milk and commercial beef production, was almost invariably run in conjunction with the sheep, but usually in insufficient numbers to have much influence on "top growth" control.

The role of cropping was primarily to meet the fodder requirements of the property, except that on about 30% of the properties sufficient hay or grain was grown to enable a proportion to be sold. A further object of the farming was the establishment of improved pastures by sowing with the grain crop. This type of farm organisation was found mainly on land falling within topography Classes A and B, and occasionally in Class C.

3. *Grazing on natural pastures*: Grazing on natural pastures was solely associated with merino woolgrowing and breeding. Cropping, if undertaken, was restricted to very small areas to meet fodder requirements of horses and milking cows.

Cast-for-age and surplus stock, except in particularly good years, were sold as stores and small herds of cattle for household milk and commercial beef production were run in conjunction with sheep.

This type of enterprise was mainly undertaken on land falling within the topography Classes C and D, although some properties within topography Class B which have not undertaken any pasture improvement are included.

Features of Sheep Husbandry.

Sheep: Except for one Corriedale and one Corriedale-cross flock, the sheep were merinos and predominantly medium to fine woolled. Where pasture improvement is being carried out, a gradual change-over to strong-woolled sheep is contemplated by some owners. Most farmers breed their own flock replacements and sell their surplus and cull sheep as stores. Rams are generally purchased from recognised flock ram breeders.

Mating and Lambing: Lambing mostly takes place in the Spring; this is due to the cold and severe Winters and the greater availability of feed for both ewe and lamb later in the season. Accurate figures of lambing percentages were not readily available; however, it was considered satisfactory in the area if lambs marked totalled 75% of the number of ewes mated.

Shearing: Shearing is generally carried out in November. Most farmers visited used depot sheds and appeared to be satisfied with the arrangements and workmanship provided. The average cut per head for grown sheep on farms visited was 8·2 lb. in 1944-45, 9·14 lb. in 1945-46 and 9·62 lb. in 1946-47. The Corriedale flock averaged 9·5 lb. per head in 1946-47.

Dipping: Dipping is universally carried out, generally about four to six weeks off shears. The majority of farmers use plunge dips although one spray dip was noted. Lice and tick appear to be well under control in the area.

SECTION V: FINANCIAL ANALYSIS OF TOTAL FARM BUSINESS

Capitalisation.

Land and Improvements: Land Sale Control Regulations were in force at the time of the survey and consequently the valuations as assessed were similar to pre-war values.

The land tenure of all properties covered in the survey was leasehold, the Crown owning the land and certain structural improvements. Improvements made by the tenant with the approval of the Crown remain the property of the tenant.

The sale value of a property comprises the value of the improvements in which the vendor tenant has "tenant rights", plus "goodwill" or a contingency to the vendor for the transfer of the lease. This "goodwill" was generally considered to amount to about £2 per acre, but higher amounts have been paid at times. It is often considered that "goodwill" is as much, or more, a reflection of social as of production value. However, there was no firm basis on which to value "goodwill", because relatively few properties had changed hands; and since it had been paid on only about 10% of properties surveyed, it was decided to make no allowance for "goodwill" in capital value.

Computed capital value of land and improvements thus became:

1. Value of land and improvements owned by the Crown. This was computed in each case by the Bureau after consideration of all available information. The value of any land improvements, undertaken by the tenant and over which he had "tenant rights", was added.
2. Value of tenants' improvements. These comprise some fences, farm buildings and other structural improvements. Residence (owned by tenant) was excluded. Valuations were book values.

Plant: The book value of plant (original cost less depreciation) was taken.

Livestock: Valuations per head were uniform throughout the period and based on arbitrary values for each type and class of livestock. These arbitrary values were determined in relation to average prices for livestock products prevailing during the 3-year period.

The average computed value of land and improvements (excluding residence) is equivalent to approximately £4 6s. 0d. per acre, or £4 14s. 0d. per sheep area. This compares quite well with the then current Commonwealth Bank unit standard values of £4 15s. 0d. per sheep area for first-class woolgrowing and breeding country, and £4 5s. 0d. per sheep area for second-class woolgrowing and breeding country, in the surrounding Shire of Yarrolumla. The Bank's estimate of unit market (as opposed to unit standard) values for the 1938-42 period is 15s. per acre higher in each case. The computed values on a freehold basis of the A.C.T. leasehold land, however, make no allowance for "goodwill" and under the system of tenure there is no guarantee of long-term continuity of occupancy in the A.C.T. Consequently, it is considered that the Commonwealth Bank valuations offer good confirmation of the computations.

The average value of structures was low, but this is partly accounted for by the fact that most boundary fences are owned by the Crown and few properties have their own shearing sheds. A second factor was that not all tenants had complete records of the structural improvements they had installed. The average value of plant, which includes motor transport, is also low. This is due, in part, to the difficulty of replacement of equipment during the war and immediate post-war years, and consequently the depreciated value is abnormally low. A second factor is the relatively small plant on those grazing properties which do not carry their own shearing shed and equipment or mechanised pasture improvement or farming plant.

TABLE No. 6: AVERAGE CAPITAL VALUE PER FARM.

	1944–45	*1945–46*	*1946–47*	*Average 3 years*	
	£	£	£	£	%
Land and improvements	7,595	7,697	7,759	7,684	67·4
Structural improvements (owned by tenant)	238	343	395	325	2·9
Plant	358	346	389	365	3·2
Sheep	2,864	2,833	2,779	2,825	24·7
Cattle	197	204	221	207	1·8
Total	11,252	11,423	11,543	11,406	100

TABLE No. 7: DISTRIBUTION OF TOTAL CAPITAL VALUES 1946–47.

Value	*No. of Farms*
Less than £5,000	1
£5,000 and under £10,000	14
£10,000 ,, ,, £15,000	8
£15,000 ,, ,, £20,000	3
£20,000 and over	3
Total No. of Farms	29

RETURNS

TABLE No. 8: AVERAGE RETURNS PER FARM.

	1944–45		*1945–46*		*1946–47*		*Av. 3 years*	
	£	%	£	%	£	%	£	%
Wool	1,072	81·9	1,193	73·9	2,206	76·0	1,490	76·7
Sheep	124	9·5	247	15·3	431	14·9	267	13·7
Cattle	53	4·0	65	4·0	107	3·7	75	3·9
Crops	32	2·4	81	5·0	119	4·1	78	4·0
Other	28	2·2	29	1·8	39	1·3	32	1·7
Total	1,309	100	1,615	100	2,902	100	1,942	100

In 1944-45, when average total returns were £1,309, they ranged on individual farms from £604 to £2,583; in 1945-46, when the average was £1,615, from £644 to £4,000 and in 1946-47, when the average was £2,902, from £1,027 to £7,167.

Total returns in 1945-46 were 23% higher than in 1944-45, and in 1946-47 were 80% higher than in 1945-46. Alternatively, taking 1944-45 as 100, receipts in 1945-46 were 123 and in 1946-47 were 222.

Wool contributed an average of 77% of total returns. Returns from wool increased from 1944-45 levels as follows:

1944-45, 100; 1945-46, 111; 1946-47, 206.

Over the period, the average quantity of wool produced per property changed from 14,650 lb. in 1944-45, to 16,650 lb. in 1945-46, and to 16,500 lb. in 1946-47. This would account for some of the spectacular increase in the wool cheque, but the influence of price was far more important.

Prices of Wool: The last year covered by the survey was also the first post-war auction year, during which wool prices advanced sharply. By March of that season, about which time the bulk of A.C.T. wools would be going up for sale, the clean floor prices of spinners and topmaking wools of 64's and 70's quality had advanced to about 75% above their appraisement prices. However, the greasy averages calculated from survey returns show an increase of about 85% which is slightly higher. The position is shown in the Table below:

AVERAGE SALEROOM PRICES FOR WOOL.

Season	Averages for Survey	Sydney Averages Whole Clip Basis		Commonwealth Statistician's Wholesale Price Index. 1936-39=1,000
		Excl. Div.	Incl. Div.	
	pence	pence	pence	
1944-45	17·31	13·4	15·1	1,405
1945-46	18·05	13·2	15·0	1,412
1946-47	32·49	23·3	23·3	1,429

Though there was no significant change between 1944-45 and 1945-46 it is apparent that in 1946-47 A.C.T. wool prices advanced more than wool prices generally, and also that they were advancing while general commodity prices were relatively stable.

Returns from sheep trading account contributed about 14% of total returns. During the three years they increased: 1944-45, 100; 1945-46, 199; 1946-47, 347. Here again price per head was the main factor, the average for the farms surveyed increasing from 6·64 shillings (100) in 1944-45 to 12·52 shillings (189) in 1945-46, and 16·81 shillings (253) in 1946-47. Price was influenced by improved seasonal conditions, demand for store sheep and higher wool and meat prices.

Returns from cattle, crops and other sources provided about 10% of farm income and remained comparatively stable during the period. "Other" sources included sales of hides, skins, farmyard produce and horses.

COSTS

The detailed treatment of costs in available financial records varied from farm to farm, the lowest common denominator being the data required for the compilation of the income tax return. Hence it was not attempted to dissect costs into many component expense items but rather to analyse them in broad groups, corresponding as far as possible with the presentation adopted in the tax return.

In the analysis given in Table No. 9, "Costs" include all farm expenses with the exception of the value of the operator's own labour and all costs directly attributable to capital, viz. rent and all interest.

Comment on Cost Items in Table No. 9.

1. Wages, rations, and contracts showed an increase each year. All wages paid to employees other than the managing operator are included.

In the case of two or more partners actually working a property, one partner has been considered the managing operator and an allowance at current pastoral award rates included in this item for the labour of the other partner or partners. In two or three cases, a paid manager ran the farm and the owner took no direct part in its operation. Salary paid to the manager has been deducted from the item "wages paid" and the manager treated as the managing operator. The reasons for this treatment of labour costs will be apparent if reference is made to the discussion at the commencement of the subsection, "Analysis of Farm Income".

2. Shearing and crutching expenses showed very little change in 1945-46, compared with 1944-45. The increase in 1946-47 was due to a rise in award rates for shearers and shed hands in that year.

3. Building and fencing materials, purchased for repairs and maintenance, showed very little increase in 1945-46 compared with 1944-45. In 1946-47, however, the average expenditure under this group showed a marked increase, due in large measure to the greater availability of materials previously unobtainable, or rationed, e.g. fertiliser, building and

TABLE No. 9: AVERAGE COSTS PER FARM, 1944–45 TO 1946–47.

	1944–45		*1945–46*		*1946–47*		*Av. 3 years*	
	£	%	£	%	£	%	£	%
1. Wages, rations, contracts	125·2	20·1	135·8	18·9	161·9	16·3	141·0	18·2
2. Shearing & crutching	102·0	16·4	103·5	14·4	114·2	11·5	106·6	13·7
3. Building & fencing materials, fertiliser, seed, bags, etc., purchased fodder, drenches, licks, woolpacks & shearing supplies	158·9	25·6	175·5	24·5	230·9	23·3	188·4	24·3
4. Motor duplicates, tyres, farming exps.	60·7	9·8	89·0	12·4	115·8	11·7	88·5	11·4
5. Agistment paid & droving	4·3	0·7	6·8	1·0	10·2	1·0	7·1	0·9
6. Rates and taxes	6·1	1·0	6·0	0·8	7·5	0·8	6·5	0·8
7. Insurance	7·7	1·2	11·1	1·6	14·6	1·5	11·1	1·4
8. Wool selling charges & freight	57·2	9·2	64·7	9·0	182·2	18·4	101·4	13·1
9. Cartage and rail	16·7	2·7	23·0	3·2	27·1	2·7	22·3	2·9
10. Miscellaneous exps., bank charges, accountancy, subs. to organisations, stamps, telephone, and stationery	35·6	5·7	47·9	6·7	55·1	5·6	46·2	5·9
11. Loss on horse a/c.	5·1	0·8	–	–	4·1	0·4	3·1	0·4
12. Structural improvements and plant depreciation	41·9	6·8	53·4	7·5	67·1	6·8	54·1	7·0
Total	621·4	100	716·7	100	990·7	100	776·3	100

fencing materials, drenches and licks. In addition, prices of some of the materials had risen, e.g. woolpacks, cornsacks and fertiliser.

4. The group consisting of motor expenses, duplicates, tyres and farming expenses shows an increase over the three years which was due mainly to the greater availability of replacement parts for machinery and motor cars. In addition, a higher acreage of crop, sown in the latter two seasons, increased farming expenses. These items were grouped together because it was impracticable to separate them.

5. Agistment and droving charges did not show any significant change in 1945-46 and the increase in 1946-47 was due chiefly to the fact that during that year some labour was available for droving sheep from the farmers' paddocks to depot sheds for shearing.

6. Rates and taxes show no significant change from year to year. Rates are mostly water rates charged to farmers who have properties adjoining the Canberra main water supply and who receive water for stock and domestic purposes from this source.

7. Insurance increased from an average of £7 in 1944-45 to an average of £14 in 1946-47. The reason for this rise was the increased valuation of the items insured.

8. Wool selling charges and freight on wool showed very little change when comparing 1945-46 with 1944-45. The small increase was due to the larger amount of wool obtained in 1945-46. The substantial increase from £64 in 1945-46 to £182 in 1946-47 was largely the result of the 5% Contributory Charge.

9. Cartage and rail expenses showed an increase each year. This was due to the higher prices charged by carters for road transport and to increased production.

10. The group comprising legal expenses, miscellaneous expenses, etc., also showed an increase each year, but these increases were mainly in the miscellaneous section, which could not be itemised.

11. Depreciation on structural improvements and plant increased from an average of £42 in 1944-45 to £67 in 1946-47. This was the result of increased purchases of plant in 1946-47.

In 1944-45 when total costs per farm averaged £621, the range on individual farms was from £179 to £2,063; in 1945-46, when the average was £717, the range was from £220 to £1,565; in 1946-47, with the average £990, the range was from £325 to £2,164.

Costs increased from £621 to £991 between 1944-45 and 1946-47. Taking 1944-45 costs as 100 the position for the three years was:

1944-45, 100. 1945-46, 115. 1946-47, 159.

During the same period the wages group (including shearing and crutching) increased as 100: 105: 122 and the material groups as 100: 110: 145.

Capital Charges.

In addition to the costs analysed above, farmers had to meet charges for rent, and for interest on borrowed capital, in cash. These additional costs averaged:

	1944–45	*1945–46*	*1946–47*	*Average 3 yrs*
Rent	£348	£367	£352	£356
Interest actually paid	£24	£26	£35	£28

Rent paid was the largest single item of actual current expenditure, averaging £356 for the three years. Rentals on individual properties did not vary during the period except for a few slight adjustments, the variation in average rent paid being due mainly to the different number of properties surveyed in each year.

Average interest paid was a small item. However, not all farmers had to meet an interest charge. In 1944-45 eight farmers paid interest, the lowest amount being £17 and the highest, £157; in 1945-46 eight farmers paid interest, the amounts ranging from £16 to £196; and in 1946-47, eleven farmers had to meet interest charges ranging from £11 to £313.

ANALYSIS OF FARM INCOME

Farm Returns (Table No. 8) less Farm Costs (Table No. 9) represent Net Farm Income "A". This Net Farm Income "A" is thus the amount available to recompense the operator for his labour and management and to meet all charges on capital.

An alternative treatment is to include cash charges on capital (rent and interest actually paid) in Farm Costs before deducting from Farm Returns. This Net Farm Income "B" is therefore the amount available to meet the operator's labour and management return, and interest on the operator's equity in the capital investment.

The former treatment, Net Farm Income "A", however, is preferred, and is used in the subsequent analysis, because we are more concerned with each farm as a property than with the personal financial status of the operator. Interest is a legitimate charge on all the capital invested in a property, but the legal title to this interest and the rates chargeable differ widely in individual cases, due to factors often not connected with the current management of the farm. Anomalies arising from these variations have been avoided by applying a standard rate of interest over the whole of the capital investment of all farms.

The rate of interest has been taken as 4% throughout. This was necessarily an arbitrary decision.

Three measures of financial performance have been used:

(i) Return to operator's labour and management;
(ii) Return to capital and management, and
(iii) Return to operator's capital investment and management.

(i) Return to Operator's Labour and Management.

Net Farm Income "A" is the amount available to recompense the operator for his labour and management and meet all capital charges. By deducting interest on total capital as computed, the return to operator's labour and management is obtained.

TABLE No. 10: AVERAGE LABOUR AND MANAGEMENT INCOME PER FARM, 1944–45—1946–47.

Average	*1944–45*	*1945–46*	*1946–47*	*Av. 3 yrs*
	£	£	£	£
Total returns (Table No. 8)	1,309	1,615	2,902	1,942
Total costs (Table No. 9)	621	717	991	776
Net Farm Income "A"	688	898	1,911	1,166
Interest on computed capital @ 4%	450	457	462	456
Labour management income	238	441	1,449	710

The spectacular increase in the return to labour and management during the three years is, of course, a direct reflection of the movements in farm returns and farm costs as analysed in the relevant sub-sections. It is apparent that prices for commodities sold by the farmer increased at a greater rate than did the prices the farmer had to pay for goods and services. This affords an illustration of the usual relationship of costs and returns in times of rising agricultural commodity prices.

Departures from the average of labour management incomes on individual farms are shown in Table No. 11.

In 1944-45 three farms showed losses and the greatest concentration was in the £200-£400 group. In 1945-46, again three farms showed losses and

TABLE No. 11: FREQUENCY DISTRIBUTION OF LABOUR AND MANAGEMENT INCOMES

Labour Income	*1944–45*	*1945–46*	*1946–47*
Deficit	3	3	–
£0 and under £200	6	5	–
£200 ,, ,, £400	11	3	1
£400 ,, ,, £600	1	11	1
£600 ,, ,, £800	1	–	6
£800 ,, ,, £1,000	1	2	5
£1,000 ,, ,, £1,500	–	2	5
£1,500 ,, ,, £2,000	–	1	3
£2,000 ,, ,, £2,500	–	–	5
£2,500 ,, ,, £3,000	–	–	2
£3,000 and over ..	–	–	1
No. of Farms ..	23	27	29

the concentration was in the £400-£600 group. In 1946-47, no losses were recorded, the lowest labour income falling within the £200-£400 group. Almost all farms in this year recorded labour incomes of over £600 per annum, the modal group receiving incomes of from £1,000 to £1,500.

Taking £400 as the minimum return to the operator for his own labour and management, which can be regarded as equitable in relation to the responsibilities of farm management, it is shown that in 1944-45 only three of 23 farmers received an adequate labour income. In 1945-46, 11 of 27 received less than the specified minimum. In 1946-47, with higher prices, only one failed to reach this minimum standard.

In 1944-45 there is no close relationship between labour and management income and total computed capitalisation, although no farm with computed capitalisation of less than £10,000 returned a labour income of more than £400. In this year a drought was experienced and prices were relatively low and it has been demonstrated that there was little, and in some cases no margin between costs and returns; hence, little apparent advantage with increasing scale of enterprise is indicated. In 1945-46, a more normal season, there is more evidence of some degree of relationship. In 1946-47 when wool prices rose sharply, the relationship is much more apparent. In other words, with a definite margin between costs and returns, increasing scale of enterprise and presumably volume of production is reflected in labour and management incomes.

In 1944-45 little direct relationship between farm size and labour and management income is shown,

TABLE No. 12: COMPARISON OF LABOUR AND MANAGEMENT INCOME PER FARM WITH COMPUTED CAPITAL VALUE.

Labour and Management Income	*Total Calculated Capital Value of Each Farm*														
	1944–45					*1945–46*					*1946–47*				
	Less than £5,000	*£5,000 and under £10,000*	*£10,000 and under £15,000*	*£15,000 and under £20,000*	*£20,000 and over*	*Less than £5,000*	*£5,000 and under £10,000*	*£10,000 and under £15,000*	*£15,000 and under £20,000*	*£20,000 and over*	*Less than £5,000*	*£5,000 and under £10,000*	*£10,000 and under £15,000*	*£15,000 and under £20,000*	*£20,000 and over*
Deficit		1	1		1		2	1							
£0 and under £200 ..		3	3				4		1						
£200 ,, ,, £400 ..	1	6	2	2		1	1		1			1			
£400 ,, ,, £600 ..			1				5	5	1				1		
£600 ,, ,, £800 ..			1									6			
£800 ,, ,, £1,000 ..				1				1	1		1	2	2		
£1,000 ,, ,, £1,500 ..								1	1			4	1		
£1,500 ,, ,, £2,000 ..										1		1		2	
£2,000 ,, ,, £2,500 ..													4	1	
£2,500 ,, ,, £3,000 ..															2
£3,000 and over															1
No. of Farms	23					27					29				

TABLE No. 13: COMPARISON OF LABOUR & MANAGEMENT INCOME PER FARM WITH FARM SIZE.

Labour and Management Income	Farm Size (Acres)																				
	1944–45							1945–46							1946–47						
	500 and under 1,000	1,000 and under 1,500	1,500 and under 2,000	2,000 and under 2,500	2,500 and under 3,000	3,000 and under 3,500	3,500 and over	500 and under 1,000	1,000 and under 1,500	1,500 and under 2,000	2,000 and under 2,500	2,500 and under 3,000	3,000 and under 3,500	3,500 and over	500 and under 1,000	1,000 and under 1,500	1,500 and under 2,000	2,000 and under 2,500	2,500 and under 3,000	3,000 and under 3,500	3,500 and over
Deficit			2			1			1	2											
£0 and under £200	1	2	2	1				1	1	2	1										
£200 „ „ £400	1	1	5	1	1	1	1	1	1		1				1						
£400 „ „ £600			1						3	3	3		1	1			1				
£600 „ „ £800				1												5	1				
£800 „ „ £1,000					1					1		1			1	1	2			1	
£1,000 „ „ £1,500										1		1				2	2	1			
£1,500 „ „ £2,000													1				1	1	1		
£2,000 „ „ £2,500																	2	2	1		
£2,500 „ „ £3,000																			1		1
£3,000 and over																				1	
No. of Farms	23							27							29						

TABLE No. 14: COMPARISON OF LABOUR AND MANAGEMENT INCOME PER FARM WITH FLOCK SIZE.

Labour and Management Income	Flock Size																			
	1944–45						1945–46						1946–47							
	Less than 1,000	1,000 and under 1,500	1,500 and under 2,000	2,000 and under 2,500	2,500 and under 3,000	3,000 and over	Less than 1,000	1,000 and under 1,500	1,500 and under 2,000	2,000 and under 2,500	2,500 and under 3,000	3,000 and over	Less than 1,000	1,000 and under 1,500	1,500 and under 2,000	2,000 and under 2,500	2,500 and under 3,000	3,000 and over		
Deficit		1	1		1			2	1											
£0 and under £200	1	3	2				1	2	1	1										
£200 „ „ £400	1	4	3	2		1	1		3				1							
£400 „ „ £600				1				4	2	2		1			1					
£600 „ „ £800				1									2	4						
£800 „ „ £1,000					1				1		1		1	3		1				
£1,000 „ „ £1,500								1		1				4	1					
£1,500 „ „ £2,000												1			2	1				
£2,000 „ „ £2,500														1	2	2				
£2,500 „ „ £3,000																	1	1		
£3,000 and over																		1		
No. of Farms	23						26						29							

while in 1945-46 it was only slightly more apparent. In 1946-47, however, there was a definite general movement of the higher labour and management incomes to the higher acreage groups.

The difference between Tables Nos. 12 and 13 is that computed capital value (Table No. 12) should reflect variations in productive capacity per acre to a greater extent than farm size, and hence the closer relationship in Table No. 12 was to be expected.

Here again it is emphasised that in 1944-45 no property of less than 1,500 acres achieved a return of more than the specified minimum of £400. In 1945-46 three out of eight farms of less than 1,500 acres, and in 1946-47, nine out of ten farms returned more than £400.

In Table No. 14, flock size is a definite measure of scale of enterprise, except in regard to cropping activities, which in one case only were of more than minor importance. It is also a measure of volume of production, except for some variations in output per sheep.

The relationship in the first two years is similar to that between labour income and capital value, but in the final year it is closer.

(The number of farms in Table No. 14 for 1945-46 is 26 instead of 27, as in previous tables. This is because one farm, while supplying all other data, had no records of sheep numbers in this year. In all comparisons of results with sheep numbers, the analysis is on the basis of 26 and not of 27 farms.)

(ii) Return to Capital and Management.

In the preceding sub-section, Net Farm Income "A" has been distributed between labour and capital by charging as a cost a uniform interest rate on total capital investment, the balance being the return to labour and management. In this case an allowance is made for the value of the operator's own labour. This is deducted as a cost from Net Farm Income "A" and the balance is the return to capital and management.

Since the return to "management" is included with the return to capital, the operator's labour has been charged at the pastoral award rates which applied in each year. In other words, wages are charged at the standard rate for employees—£234 per annum in the first two years and £255 per annum in 1946-47 —because the margin for management is included elsewhere.

In 1944-45 the average return to capital and management was £454 and ranged from minus £97 to plus £1,354. In 1945-46, the average return to capital and management was £664 and ranged from £16 to £2,213. In 1946-47 the return to capital and management was £1,656 and ranged from £333 to £4,748. Over the three year period the return to capital and management increased as follows: 1944-45—100; 1945-46—146; and 1946-47—365.

TABLE No. 15: AVERAGE RETURN TO CAPITAL AND MANAGEMENT.

Average	*1944–45*	*1945–46*	*1946–47*	*Av. 3 yrs*
	£	£	£	£
Total returns (Table No. 8)	1,309	1,615	2,902	1,942
Total costs (Table No. 9)	621	717	991	776
Net Farm Income "A"	688	898	1,911	1,166
Value of operator's labour	234	234	255	241
Return to capital & management	454	664	1,656	925

The average computed capital investment in the three years was £11,253, £11,423 and £11,543 respectively. If the average return to capital and management is related to the average capital investment, the percentage return on capital (and to management) was 4·0% in 1944-45; 5·8% in 1945-46 and 14·4% in 1946-47.

Variations in the return to capital and management on individual farms are shown in Table No. 16:

TABLE No. 16: FREQUENCY DISTRIBUTION OF RETURN TO CAPITAL AND MANAGEMENT.

Return to Capital and Management	*1944–45*	*1945–46*	*1946–47*
Deficit	2	–	–
£0 and under £500	13	11	1
£500 ,, ,, £1,000	6	10	10
£1,000 ,, ,, £1,500	2	5	6
£1,500 ,, ,, £2,000	–	–	2
£2,000 ,, ,, £2,500	–	1	5
£2,500 ,, ,, £3,000	–	–	2
£3,000 ,, ,, £3,500	–	–	2
£3,500 ,, ,, £4,000	–	–	–
£4,000 ,, ,, £4,500	–	–	–
£4,500 ,, ,, £5,000	–	–	1
No. of Farms ..	23	27	29

Comparisons have been made of relationships between return to capital and management per farm and total capital value, farm size and flock size. The tabulations are not reproduced because the relationships were, in general, similar to those between operator's labour income and these factors. There

TABLE No. 17: COMPARISON OF RATE OF RETURN TO CAPITAL AND MANAGEMENT PER FARM WITH COMPUTED CAPITAL VALUE PER FARM.

Percentage Rate of Return to Capital and Management	*Computed Capital Value per Farm*														
	1944–45					*1945–46*					*1946–47*				
	Less than £5,000	*£5,000 and under £10,000*	*£10,000 and under £15,000*	*£15,000 and under £20,000*	*£20,000 and over*	*Less than £5,000*	*£5,000 and under £10,000*	*£10,000 and under £15,000*	*£15,000 and under £20,000*	*£20,000 and over*	*Less than £5,000*	*£5,000 and under £10,000*	*£10,000 and under £15,000*	*£15,000 and under £20,000*	*£20,000 and over*
Deficit		1	1												
0% and under 2½% ..		1	1		1		4	1							
2½% ,, ,, 5% ..		4	4	2		1	2		2						
5% ,, ,, 7½% ..	1	4	1	1			6	5	2			1	1		
7½% ,, ,, 10% ..			1					1	1			2	2		
10% ,, ,, 15% ..								1		1		8	1	2	1
15% ,, ,, 20% ..											1	3	3	1	1
20% ,, ,, 25% ..													1		1
Total No. of Farms ..	23					27					29				

TABLE No. 18: COMPARISON OF RATE OF RETURN TO CAPITAL AND MANAGEMENT PER FARM WITH FARM SIZE.

Percentage Rate of Return to Capital and Management	*Farm Size in Acres*																				
	1944–45							*1945–46*							*1946–47*						
	500 acres and under 1,000 acres	*1,000 acres and under 1,500 acres*	*1,500 acres and under 2,000 acres*	*2,000 acres and under 2,500 acres*	*2,500 acres and under 3,000 acres*	*3,000 acres and under 3,500 acres*	*3,500 acres and over*	*500 acres and under 1,000 acres*	*1,000 acres and under 1,500 acres*	*1,500 acres and under 2,000 acres*	*2,000 acres and under 2,500 acres*	*2,500 acres and under 3,000 acres*	*3,000 acres and under 3,500 acres*	*3,500 acres and over*	*500 acres and under 1,000 acres*	*1,000 acres and under 1,500 acres*	*1,500 acres and under 2,000 acres*	*2,000 acres and under 2,500 acres*	*2,500 acres and under 3,000 acres*	*3,000 acres and under 3,500 acres*	*3,500 acres and over*
Deficit			2																		
0% and under 2½%		1	1			1			2	3											
2½% ,, ,, 5%	1	3	1	2	1	1	1	2		1	2										
5% ,, ,, 7½%	1		5		1				4	3	3	1	1	1	1		1				
7½% ,, ,, 10%				1						1		1				2	1			1	
10% ,, ,, 15%										1			1			5	3	2	1		1
15% ,, ,, 20%															1	1	3	2	2		
20% ,, ,, 25%																	1			1	
Total No. of Farms	23							27							29						

was however, a tendency for the relationships to be slightly closer because the deduction from Net Farm Income "A" for labour to obtain return on capital was standard irrespective of farm size while the deduction for interest on capital in the other case tended to increase with farm size.

In Tables Nos. 17, 18, 19 and 20 a comparison is made between the percentage rate of return to

TABLE No. 19: COMPARISON OF RATE OF RETURN TO CAPITAL AND MANAGEMENT PER FARM WITH FLOCK SIZE.

Percentage Rate of Return to Capital and Management	Flock Size																	
	1944–45						1945–46						1946–47					
	Less than 1,000	1,000 and under 1,500	1,500 and under 2,000	2,000 and under 2,500	2,500 and under 3,000	3,000 and over	Less than 1,000	1,000 and under 1,500	1,500 and under 2,000	2,000 and under 2,500	2,500 and under 3,000	3,000 and over	Less than 1,000	1,000 and under 1,500	1,500 and under 2,000	2,000 and under 2,500	2,500 and under 3,000	3,000 and over
Deficit		1	1															
0% and under 2½%		2			1			4	1									
2½% „ „ 5%	1	3	3	2		1	2		2	1								
5% „ „ 7½%	1	2	2	1	1			4	4	2	1	1	1		1			
7½% „ „ 10%				1					1	1				3		1		
10% „ „ 15%								1				1	2	6	2	1		1
15% „ „ 20%													1	2	3	2	1	
20% „ „ 25%														1				1
Total No. of Farms ..	23						26						29					

TABLE No. 20: COMPARISON OF RATE OF RETURN TO CAPITAL AND MANAGEMENT WITH IMPROVED PASTURE PERCENTAGE.

Percentage Rate of Return to Capital and Management	Percentage of Improved Pasture on Each Farm																	
	1944–45							1945–46						1946–47					
	Nil I.P.	Less than 5%	5% and under 10%	10% and under 15%	15% and under 20%	20% and under 25%	25% and under 30%	Nil I.P.	Less than 5%	5% and under 10%	10% and under 15%	15% and under 20%	20% and under 25%	25% and under 30%	Nil I.P.	Less than 5%	5% and under 10%	10% and under 15%	15% and under 20%	20% and under 25%	25% and under 30%
Deficit	1	1																			
0% and under 2½%		1		2				1	4												
2½% „ „ 5%	3	4	2		1			2	1	2											
5% „ „ 7½%	2	2	3					2	5	4	1		1		1	1					
7½% „ „ 10%			1						1			1			1	1	1	1			
10% „ „ 15%											1	1			1	5	2		1	2	1
15% „ „ 20%															2	1	5	1			
20% „ „ 25%																			1	1	
Total No. of Farms	23							27							29						

capital and management per farm with the factors as listed above.

It will be seen that there is no apparent relationship between the percentage rate of return on capital, and the scale of operations on the farms studied. A comparison was also made between the rate of return on capital per farm and the percentage of the farm under improved pasture.

The relationship, which appears to be indicated in the latter two years only, is by no means close.

In brief, the data proved to be too variable and the sample too small to establish any statistically significant relationship between topographical land class and carrying capacity or gross returns per acre. On the other hand positive influence of pasture improvement on both carrying capacity and gross returns per acre is suggested.

TABLE No. 21: AVERAGE RETURN TO OPERATOR'S COMPUTED CAPITAL INVESTMENT AND MANAGEMENT.

Average	1944–45	1945–46	1946–47	Av. 3 yrs
	£	£	£	£
Total returns (Table No. 8)	1,309	1,615	2,902	1,942
Total expenses (Table No. 9)	621	717	991	776
Net Farm Income "A"	688	898	1,911	1,166
Rent	348	367	352	356
Value of operator's labour	234	234	255	241
Return to operator's capital investment and management	106	297	1,304	569

(iii) Return to Operator's Capital Investment and Management.

In this analysis rent (but not interest paid) and an allowance for the operator's labour have both been deducted from Net Farm Income "A". The balance is the return to the operator for his capital investment as calculated, and for his management. If the operator is working on borrowed capital this balance also has to meet interest on his debt.

From these average returns the amount necessary in the three years to meet interest on borrowed money was £24, £26 and £35 respectively.

In 1944-45 the average rent liability was £348 and varied from £165 to £624. In 1945-46 the average was £367 and varied from £149 to £674. In 1946-47 the average was £352 and varied from £149 to £933.

The average capital investment of the operator was estimated at £3,860, £3,950 and £4,120 respectively in the three years. This investment includes the estimated value of the tenant's (or operator's) improvements excluding the residence, the estimated value of his plant and equipment, and the estimated value of his livestock. It does not include any allowance for "goodwill".

The rate of return on the operator's computed capital investment and for his management, was 2·7% in 1944-45; 7·5% in 1945-46; and 31·6% in 1946-47.

SECTION VI: FINANCIAL ANALYSIS OF THE SHEEP ENTERPRISE

As described in Section IV, a number of the properties surveyed undertook cropping and a few other minor enterprises in addition to sheep and woolgrowing. Consequently, in the preceding analysis of the total farm business it was impracticable to analyse performance in terms of sheep, viz. to study costs or returns, or income, per sheep. This Section has been included to enable this to be done.

Even if full financial records are kept, it is very difficult to segregate in detail costs for the sheep enterprise from those for the other farm activities. When, as in this survey, detailed financial records on cost accountancy lines are not available, the segregation is impossible. It is necessary, therefore, to use certain arbitrary measures for the approximate apportionment of costs as between the sheep and other farm enterprises.

Several such measures are available. The one used in this analysis has been to charge in full against the sheep enterprise those costs clearly attributable to sheep and wool only, and to apportion the remainder in the proportion that sheep enterprise returns bear to total returns. This rests on the assumption that the relationship between returns and costs, i.e. the rate of profit, is the same for both enterprises. This, of course, may or may not be correct.

A second difficulty under this method is that if price relationships between sheep and wool and other products change from year to year, costs of the sheep enterprise are shown to vary even although no such change may have occurred. This difficulty can be minimised by applying arbitrary but standard prices from year to year to the sideline products. This procedure was not necessary here, however, because the proportion of sheep enterprise to total returns varied by only 2% to 3% over the three years.

It is again emphasised that certain arbitrary assumptions have to be made in the analysis of the sheep enterprise. This section should therefore be regarded as less reliable than the analysis of the total farm business.

Returns from Sheep Enterprise.

Sheep enterprise returns comprise the returns from wool, sheep trading and skins. In 1944-45, the average wool return was £1,072 and ranged from £383 to £2,583. In 1945-46 the average wool return was £1,193 and ranged from £425 to £3,244 and in 1946-47 the average wool return was £2,206 and ranged from £840 to £5,374.

TABLE No. 22: AVERAGE RETURNS FROM THE SHEEP ENTERPRISE.

	1944–45		*1945–46*		*1946–47*		*Av. 3 years*	
	£	%	£	%	£	%	£	%
Wool	1,072	81·9	1,193	73·9	2,206	76·0	1,490	76·7
Sheep	124	9·5	247	15·3	431	14·9	267	13·8
Skins	5	0·4	6	0·4	8	0·3	6	0·3
Total returns from sheep enterprise	1,201	91·8	1,446	89·6	2,645	91·2	1,763	90·8
Other	108	8·2	169	10·4	257	8·8	179	9·2
Total Farm Returns	1,309	100	1,615	100	2,902	100	1,942	100

TABLE No. 23: AVERAGE RETURNS PER SHEEP.

	1944–45	*1945–46*	*1946–47*	*Av. 3 years*
	s.	s.	s.	s.
Wool.. ..	12·35	13·63	26·36	17·45
Sheep ..	1·43	2·82	5·15	3·13
Skins	0·06	0·07	0·10	0·07
Total Returns	13·84	16·52	31·61	20·65
	13s. 11d.	16s. 6d.	£1 11 7	£1 0 8

TABLE No. 24: FREQUENCY DISTRIBUTION OF RETURNS PER SHEEP.

Returns per Sheep	*Number of Farms*		
	1944–45	*1945–46*	*1946–47*
5 and under 10 shillings	2	–	–
10 ,, ,, 15 ,,	14	8	–
15 ,, ,, 20 ,,	7	15	1
20 ,, ,, 25 ,,	–	3	3
25 ,, ,, 30 ,,	–	–	8
30 ,, ,, 35 ,,	–	–	10
35 ,, ,, 40 ,,	–	–	6
40 ,, ,, 45 ,,	–	–	1
Total No. of Farms	23	26	29

The average sheep trading account return in 1944-45 was £124 and ranged from minus £610 to plus £474, four farms showing a loss on the account. In 1945-46 the average sheep trading account return was £247 and ranged from minus £17 to plus £654, one farm showing a loss. In 1946-47, the average sheep trading account return was £431 and ranged from £34 to £1,531.

Over the three years returns per sheep increased as 1944-45, 100; 1945-46, 119; 1946-47, 228.

It should be noted that in 1945-46 the analysis covers 26 farms instead of 27, as in the analysis of total farm business. This, as explained in Section V, is because one farm had no records of sheep numbers.

Costs of Sheep Enterprise.

As in Table No. 9, costs include all cost items except the value of the operator's labour and all capital charges. The proportion of sheep enterprise costs to the total farm costs of each expenses item not solely concerned with the sheep enterprise, was found by calculating for each farm the proportion of returns for the sheep enterprise to total returns for the farm, and adjusting the divisible expenses accordingly. Expenses wholly attributable, and charged in full to the sheep enterprise were: Shearing and crutching; agistment paid and droving; wool selling charges and freight.

The average total costs increased from £574 in 1944-45 to £651 in 1945-46 and to £940 in 1946-47. This was in the ratio, 1944-45, 100; 1945-46, 113; 1946-47, 164.

In addition to the costs outlined in Table No. 25, the sheep enterprise had to meet two cash costs of a capital nature; rent and interest on borrowed capital. The apportionment of these costs to the sheep enterprise was:

	1944–45	*1945–46*	*1946–47*	*Av. 3 years*
	£	£	£	£
Rent	306	317	309	310
Interest on borrowed capital	22	24	31	26

Over the three years average costs per sheep increased as follows: 1944-45, 100; 1945-46, 112; 1946-47, 170.

TABLE No. 25: AVERAGE SHEEP ENTERPRISE COSTS.

	1944–45		*1945–46*		*1946–47*		*Av. 3 years*	
	£	%	£	%	£	%	£	%
1. Wages, rations, contracts..	115·4	20·1	122·4	18·8	165·5	17·6	134·4	18·6
2. Shearing & crutching ..	102·0	17·8	103·5	15·9	114·2	12·2	106·6	14·8
3. Building & fencing materials, fertiliser, seed, bags etc., purchased fodder, drenches, licks, woolpacks and shearing supplies ..	143·2	24·9	153·9	23·6	211·5	22·5	169·6	23·5
4. Motor duplicates, tyres, farming expenses ..	53·9	9·4	77·7	11·9	102·1	10·9	77·9	10·8
5. Agistment paid & droving	4·3	0·7	6·7	1·0	10·2	1·1	7·1	1·0
6. Rates & taxes	5·7	1·0	5·5	0·8	7·0	0·7	6·1	0·8
7. Insurance	7·0	1·2	9·6	1·5	12·6	1·3	9·8	1·4
8. Wool selling charges and freight	57·2	10·0	64·7	9·9	182·2	19·3	101·4	14·0
9. Cartage & rail	15·0	2·6	17·7	2·7	24·2	2·6	19·0	2·6
10. Miscellaneous exps., bank charges, accountancy, subs. to organisations, stamps, tel. and stationery ..	32·8	5·7	42·7	6·6	49·9	5·3	41·8	5·8
11. Structural improvements and plant depreciation ..	37·6	6·6	46·9	7·3	60·5	6·5	48·3	6·7
Total	574·1	100	651·3	100	939·9	100	722·0	100

TABLE No. 26: AVERAGE COSTS PER SHEEP.

	1944–45	*1945–46*	*1946–47*	*Av. 3 years*
	pence	pence	pence	pence
1. Wages, rations & contracts ..	16·0	16·7	23·7	18·8
2. Shearing and crutching	14·0	14·2	16·3	14·9
3. Building & fencing materials, fertiliser, seed, bags etc., purchased fodder, drenches, licks, woolpacks & shearing supplies ..	19·8	21·1	30·3	23·7
4. Motor duplicates, tyres, farming exps.	7·5	10·7	14·6	10·9
5. Agistment paid and droving ..	0·6	0·9	1·5	1·0
6. Rates and taxes	0·8	0·7	1·0	0·9
7. Insurance	1·0	1·3	1·8	1·4
8. Wool selling charges & freight ..	7·9	8·8	26·1	14·1
9. Cartage and rail	2·1	2·4	3·5	2·7
10. Miscellaneous exps., bank charges, accountancy, subs. to organisations, stamps, phones, stationery	4·5	5·9	7·2	5·8
11. Structural improvements and plant depreciation	5·2	6·4	8·6	6·7
Total	79·4 6s. 7d.	89·1 7s. 5d.	134·6 11s. 3d.	100·9 8s. 5d.

If cash costs of a capital nature (rent and interest paid on borrowed capital) are added, the position becomes:

	1944–45	*1945–46*	*1946–47*	*Av. 3 years*
	pence	pence	pence	pence
Costs per sheep (Table No. 26)	79·4	89·1	134·6	100·9
Rent	42·2	43·4	44·2	43·2
Interest paid	2·9	3·1	4·3	3·4
Average costs per sheep (inc. rent and interest)	124·5	135·6	183·1	147·6
	10s. 5d.	11s. 4d.	15s. 3d.	12s. 4d.

If an allowance is made for interest on the operator's equity as computed, and the calculated value of the operator's labour, the resultant figure covers all costs except an allowance for the operator's management.

Average per Sheep	*1944–45*	*1945–46*	*1946–47*	*Av. 3 years*
	pence	pence	pence	pence
Costs (inc. rent & interest)	124·5	135·6	183·1	147·6
Interest on operator's equity (computed) ..	19·9	19·2	21·6	20·2
Calculated costs of operator's labour ..	29·4	28·7	33·5	30·5
Average total costs (excl. managerial allowance) per sheep	173·8	183·5	238·2	198·3
	14s. 6d.	15s. 4d.	19s.10d.	16s. 6d.

TABLE No. 27: FREQUENCY DISTRIBUTION OF COSTS PER SHEEP.

(Costs exclude operator's labour and all capital costs)

Total Costs per Sheep	*1944–45*	*1945–46*	*1946–47*
Less than 5/–	7	7	1
5/– and under 10/–	13	16	8
10/– ,, ,, 15/–	3	3	13
15/– ,, ,, 20/–	–	–	7
20/– ,, ,, 25/–	–	–	–
25/– ,, ,, 30/–	–	–	–
30/– and over	–	–	–
Total No. of Farms	23	26	29

TABLE No. 28: FREQUENCY DISTRIBUTION OF COSTS PER SHEEP.

(Costs include operator's labour and all capital costs)

Total Expenses per Sheep	*Number of Farms*		
	1944–45	*1945–46*	*1946–47*
Less than 5/–	–	–	–
5/– and under 10/–	2	3	1
10/– ,, ,, 15/–	16	15	5
15/– ,, ,, 20/–	4	8	13
20/– ,, ,, 25/–	1	–	6
25/– ,, ,, 30/–	–	–	3
30/– and over	–	–	1
Total No. of Farms	23	26	29

Costs per sheep are compared with flock size in Table No. 29. In the top section of Table No. 29, costs exclude operator's labour and all capital charges; in the lower section these items are included in costs. No relationship is shown.

TABLE No. 29: COMPARISON OF COSTS PER SHEEP WITH FLOCK SIZE.

Costs per sheep (excl. operator's labour and all capital costs)	Flock Size																	
	1944–45						1945–46						1946–47					
	Less than 1,000	1,000 and under 1,500	1,500 and under 2,000	2,000 and under 2,500	2,500 and under 3,000	3,000 and over	Less than 1,000	1,000 and under 1,500	1,500 and under 2,000	2,000 and under 2,500	2,500 and under 3,000	3,000 and over	Less than 1,000	1,000 and under 1,500	1,500 and under 2,000	2,000 and under 2,500	2,500 and under 3,000	3,000 and over
Less than 5/–	1	4	1	1			1	4	1	1					1			
5/– and under 10/–	1	2	5	3	1	1	1	3	7	2	1	2	1	5		2		
10/– „ „ 15/–		2			1			2		1			2	3	4	1	1	2
15/– „ „ 20/–													1	4	1	1		
20/– „ „ 25/–																		
25/– „ „ 30/–																		
30/– and over																		
Total No. of Farms	23						26						29					
Costs per sheep (incl. operator's labour and all capital costs)																		
Less than 5/–																		
5/– and under 10/–			1	1			1		1	1					1			
10/– „ „ 15/–	2	5	4	3	1	1	1	6	3	2	1	2		4		1		
15/– „ „ 20/–		3	1					3	4	1			2	3	3	2	1	2
20/– „ „ 25/–					1								1	2	2	1		
25/– „ „ 30/–													1	2				
30/– and over														1				
Total No. of Farms	23						26						29					

Return to Management from Sheep Enterprise.

Total costs per sheep, as calculated, include all capital costs and an allowance for the operator's labour. Since, however, the labour allowance was calculated at current pastoral award rates paid to station hands, no marginal allowance was given for

TABLE No. 30: AVERAGE RETURN TO MANAGEMENT PER SHEEP.

	1944–45		1945–46		1946–47		Av. 3 years	
	pence		pence		pence		pence	
Returns (Table No. 23)		161·1		198·2		379·3		247·8
Costs (Table No. 26)	79·4		89·1		134·6		100·9	
Rent	42·2		43·4		44·2		43·2	
Interest paid	2·9		3·1		4·3		3·4	
Interest on operator's equity at 4%	19·9		19·2		21·6		20·2	
Operator's labour	29·4		28·7		33·5		30·5	
Total costs		173·8		183·5		238·2		198·3
Return to management		—7·7 —8d.		14·7 1s. 3d.		141·1 11s. 9d.		49·5 4s. 2d.

management. If, therefore, total costs per sheep are deducted from returns per sheep, the balance is the return to management per sheep.

The return to management (see Table No. 30) can be regarded as a margin, above award rates, to recompense the operator for his management and for the risks of losses, which, at least in some years, are to be expected in woolgrowing. If the margin above award rates is too high to be regarded as equitable for these purposes, the surplus should be considered to be profit, above the 4% interest already allowed, on the operator's investment.

Variations on individual properties in the return to management per sheep are shown in Table No. 31.

Return to management per sheep is compared to flock size in Table No. 32. While a relationship is demonstrated, it is not a particularly close one.

TABLE No. 31: FREQUENCY DISTRIBUTION OF RETURN TO MANAGEMENT PER SHEEP.

	1944–45	*1945–46*	*1946–47*
Deficit	9	7	–
0/– and under 2/– ..	5	2	1
2/– „ „ 4/– ..	7	8	3
4/– „ „ 6/– ..	2	5	1
6/– „ „ 8/– ..	–	3	2
8/– „ „ 10/– ..	–	1	2
10/– „ „ 12/– ..	–	–	6
12/– „ „ 14/– ..	–	–	2
14/– „ „ 16/– ..	–	–	1
16/– „ „ 18/– ..	–	–	4
18/– „ „ 20/– ..	–	–	5
20/– and over	–	–	2
No. of Farms	23	26	29

TABLE No. 32: COMPARISON OF RETURN TO MANAGEMENT PER SHEEP WITH FLOCK SIZE.

Return to Management per Sheep	*Flock Size*																	
	1944–45						*1945–46*						*1946–47*					
	Less than 1,000	*1,000 and under 1,500*	*1,500 and under 2,000*	*2,000 and under 2,500*	*2,500 and under 3,000*	*3,000 and over*	*Less than 1,000*	*1,000 and under 1,500*	*1,500 and under 2,000*	*2,000 and under 2,500*	*2,500 and under 3,000*	*3,000 and over*	*Less than 1,000*	*1,000 and under 1,500*	*1,500 and under 2,000*	*2,000 and under 2,500*	*2,500 and under 3,000*	*3,000 and over*
Deficit	1	4	3		1		1	4	2									
0/– and under 2/–		2	1	1		1			1	1			1					
2/– „ „ 4/–	1	2	2	2				2	4	1		1	1	1	1			
4/– „ „ 6/–				1	1			3		2				1				
6/– „ „ 8/–							1		1		1			2				
8/– „ „ 10/–												1		1		1		
10/– „ „ 12/–													1	3		1		1
12/– „ „ 14/–														1	1			
14/– „ „ 16/–																1		
16/– „ „ 18/–													1	1	2			
18/– „ „ 20/–														2	2	1		
20/– and over																	1	1
Number of Farms ..	23						26						29					

SECTION VII: SUMMARY

The preceding Sections present a realistic picture of the financial results of woolgrowing in the A.C.T. for the period 1944-45 to 1946-47. Since, also, the treatment of the land component in capital investment has been on a freehold rather than a leasehold basis, it is probable that the results are reasonably representative of experience over a considerable proportion of the Southern Highlands of New South Wales.

The outstanding feature is the marked improvement in the various measures of income in 1946-47. During 1944-45 the season was bad, wool prices

averaged 17·3d. and the average labour and management income was only £238, which was equivalent to the award rate for station hands. In 1945-46, although the season was good, wool prices at 18d. resulted in an average labour and management income of £440, which again must be regarded as critically low. In 1946-47, however, when the season was again good and the average wool price had increased to 32·5d., the average labour and management income rose to £1,449.

This very marked improvement was due to the fact that returns increased more than costs during the three years; returns increasing by 106% and costs by 52%. Wool contributed about 76% of total returns and since 1946-47 wool prices have risen very much higher. At the same time, however, costs have increased considerably. Costs were increasing by approximately 25% a year during the survey period and have increased further.

Relationships between the various measures of income and scale of operations (farm size, etc.) were not as close as might have been expected, due probably to the relatively small sample and to variations in the individual efficiency of management. Even so, labour income and return to capital (but not rate of return) do tend to increase with scale of enterprise. In addition, it has been shown that none of the five properties of less than 1,500 acres or less than 2,000 sheep, and only one of the 15 properties of less than 2,000 acres, returned a labour and management income of more than £400 in 1944-45. This is a definite indication that the smaller properties are at a disadvantage during difficult times and it is reasonable to assume that if price-cost relationships again become critical this position would again occur.

APPENDIX I

SOILS

A large proportion of the soils occurring in this area are either residual or colluvial and the distribution of major groups is closely related to the occurrence of the various parent materials from which they have been formed. This enables a broad classification of the soils using the parent materials as a guide. The main groups of soils are intricately mixed in some parts of the area but mostly they occur extensively in well defined belts. All the soils are leached and slightly acid in the surface and both of the major groups appear to have been podsolised to some extent.

The podsolised soils occur on the Silurian and Ordovician sedimentary rocks and on the Devonian quartz-porphyries and dacites, those on the former parent materials having a loamy texture and compact structure while those on the latter are gritty and sandy loams, and have a less compact structure. Apart from structure and texture, the profiles of both of these groups of soils are similar, consisting of a grey A1 horizon over a light grey A2 horizon and either a red brown or yellow and grey with red mottled clay B horizon, according to the relative degree of drainage.

The other group of soils has been formed on the laminated porphyries and tuffs, and acid and intermediate volcanic rocks, and consists generally of soils having a brown loam surface with ironstone concretions over a yellowish brown friable clay with some ironstone concretions and black manganiferous inclusions.

Within each of these groups there are various soil types due to differences in texture and composition of the parent rock, drainage status and degree of development, but such distinctions are unwarranted for a survey of this kind and could only be sorted out by means of a detailed soil survey.

There are small areas of alluvial soils of mixed origin occurring in various parts of the district but they represent such a small proportion of the area used for sheep grazing that they assume no real importance.

It is unlikely, with the present standard of pasture development, that even the broad soil groups would constitute variables so far as the sheep industry is concerned, but if pasture improvement and more intensive grazing were to be introduced, then the soils of the broad groups, and even certain types within them, may assume considerable importance.

APPENDIX II

CLIMATE OF THE NORTHERN SECTION OF THE A.C.T.

(Based on report by Meteorological Branch, Department of the Interior)

Rainfall.

The average monthly and annual rainfall figures at stations in the survey area, together with those for a few neighbouring stations, are shown in Table No. 1.

(1) *Average Annual Rainfall* over the area varies between approximately 20″ to 22″ in the East, to over 30″ in the West. Along the Murrumbidgee Valley the average rainfall is between 26″ and 28″.

TABLE No. 1: AVERAGE MONTHLY AND ANNUAL RAINFALL.

	Inches of Rainfall												
	No. of Years of Record	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.	Year
Fairlight	58	2·81	1·78	2·13	2·17	2·21	3·11	2·59	2·79	2·54	2·65	2·30	2·25	29·33
Hall	39	2·14	1·60	2·01	1·96	2·10	2·92	2·28	2·32	2·16	2·31	2·01	2·22	26·03
Land's End ..	56	2·55	1·68	2·14	1·88	1·94	2·56	2·01	2·01	2·05	2·38	1·94	2·09	25·23
Kowen	20	2·10	1·94	1·78	2·21	1·33	1·65	1·51	2·12	1·60	2·18	2·04	2·56	23·02
Queanbeyan ..	74	2·19	1·72	1·94	1·68	1·76	1·89	1·53	1·68	1·79	2·17	2·10	2·04	22·49
Mt. Campbell ..	51	2·25	1·60	2·24	1·93	1·87	2·19	1·81	1·85	1·99	2·25	1·97	2·27	24·22
Canberra Forestry School	20	2·03	1·92	1·83	2·16	1·48	1·64	1·59	2·03	1·49	2·25	2·03	2·00	22·45
Cotter House ..	13	3·11	2·04	1·87	3·15	2·07	2·52	2·36	3·81	3·10	3·62	2·71	2·52	32·88
Uriar's Forest ..	19	2·45	2·15	2·05	2·56	1·93	2·56	2·37	3·02	2·05	2·83	2·52	1·93	28·42
Bull's Head ..	6	3·90	1·47	1·24	3·88	3·29	2·72	2·36	3·43	3·71	2·95	3·78	2·24	34·97

(2) *Average Monthly Rainfall.* The variation in time of occurrence of the wettest period of the year across the area is of interest. To the North-west of Canberra the wettest month is June, while subsidiary maxima occur in October and January. To the East and South-east of Canberra, January is the wettest month, but relatively heavy rain is also received in October. Records of rainfall to the South and South-west of Canberra are available over only a short period, but January is probably the wettest month.

(3) *Seasonal Rainfall.* The state of the sheep industry in this area is dependent largely on the flush growth made by pastures during the early Spring and on growth made during Autumn. Temperature conditions do not favour pasture growth during the months of May to August and Summer rains are in general too unreliable for any great dependence to be placed on them by the industry. In this section, therefore, attention is directed toward the period March to April and August to October as representing the critical rainfall periods.

It is assumed that a total of less than 2″ during March-April would constitute a dry Autumn and it is seen from Table No. 2 that such conditions prevail over the whole of the area at least one year in 10 and over the eastern section in as many as three years in 10. A total of at least 3″ during this period may be regarded as producing fair conditions, and it is seen that this may be expected in five years in 10 in the East and in six years in 10 over the rest of the area.

TABLE No. 2: PERCENTAGE CHANCE OF RECEIVING SPECIFIED AMOUNT OF RAIN, OR MORE.

	March-April		August-October		
	2″	3″	3″	4″	5″
Fairlight	78	65	96	96	87
Hall	87	61	91	87	78
Land's End	78	70	91	86	65
Queanbeyan	70	48	86	82	46
Mt. Campbell	78	56	96	87	57
Acton	89	58	92	81	62

With regard to the second period (August to October) it is assumed that 3″ would constitute a dry season and this condition may be expected three years in 20 in the East, varying from one year in 20 to one year in 10 over the rest of the area. The percentage chance of receiving at least 5″ (which would be considered satisfactory during this period) is 46 in the East; 65 to 78 in the North and as high as 87 in the North-west.

(4) *Effective Rainfall.* The incidence of rainfall must be considered as well as total rainfall during the critical Autumn and Spring periods. In the following discussion, the incidence of rainfall is analysed in relation to evaporation, which varies throughout the year. Effective rainfall is defined as the amount of rain necessary to maintain plant growth over a period. In the calculation of theoretical monthly values of effective rainfall in this report, the formula $\left(\frac{P}{E}\,0{\cdot}7 = 2{\cdot}54\right)$ established by Prescott has been used. The relation is directly applicable to natural growth such as pasture.

In this section an important consideration is the month of commencement of the Autumn rainfall period since this is one of the major factors influencing the amount of pasture growth which will take place during Autumn and provide Winter forage. Table No. 3 shows the percentage of years during which the Autumn rainfall period may be expected to commence during, or before, each of the months March and April. It is seen that over the northern

and central parts of the area this period may be expected to commence during or before March in six to seven years in 10, and in four to six years in 10 over the rest of the area. In 80% of the years the season would be expected to break during or before April.

TABLE No. 3: PERCENTAGE FREQUENCY WITH WHICH AUTUMN RAINFALL SEASON COMMENCES DURING OR BEFORE MARCH OR APRIL.

	March	*April*
Fairlight	52	78
Hall	61	82
Land's End	65	82
Queanbeyan	57	78
Mt. Campbell	48	82
Canberra	70	81

It may be seen from Table No. 4 that all months show reasonably high frequencies of effective rainfall, but that the months April to October have the highest, and this season has therefore the more reliable rainfall characteristics for pasture growth. The months December to February have frequencies of 5% or less. However, by April they have improved to approximately 70% over all the area except the eastern part where the frequency is under 60% during this month. During the Spring period (August to October) frequencies over the area range from approximately 90% to 70% except at Canberra, where the frequency during October is about 60%. This emphasises that the chances of receiving satisfactory rainfall conditions during Spring are greater than during Autumn.

Drought Frequency.

Drought may be studied from the point of view of effective rainfall, the basis of calculation being the periods during which monthly rainfalls were less than the respective effective amounts.

Table No. 5 gives the percentage frequencies of occurrence of periods of consecutive months when the rainfall was less than the effective amounts during each month.

Three consecutive months when the rainfall in each month is less than the effective amount may be expected over all the area in at least half the years and for seven years out of 10 at Queanbeyan. Four months will occur much less frequently, in general varying from one year in eight to one year in five, but again the frequency is high at Queanbeyan at one year in three.

The occurrence of drought during the Summer (October to March) when temperature conditions are satisfactory for pasture growth is important and has been made the subject of a separate analysis (see Table No. 6).

Periods of three months or more during Summer with less than the effective amount of rainfall would bring about a decrease in the rate of growth of introduced pasture species, and it is seen that such

TABLE No. 4: PERCENTAGE FREQUENCY OF OCCURRENCE OF MONTHLY RAINFALL GREATER THAN OR EQUAL TO THE EFFECTIVE AMOUNT.

	No. of Years of Record	*Jan.*	*Feb.*	*Mar.*	*Apr.*	*May*	*June*	*July*	*Aug.*	*Sept.*	*Oct.*	*Nov.*	*Dec.*
Acton	26	42	50	62	73	58	89	89	85	63	59	37	48
Queanbeyan	73	43	37	46	57	65	87	82	81	69	67	52	40
Mt. Campbell	51	47	39	59	69	67	90	88	80	67	69	50	50
Fairlight	59	46	36	37	71	75	95	97	92	78	78	57	45
Hall	42	43	41	50	69	81	91	96	91	69	79	47	42
Land's End		53	35	47	68	72	93	88	82	73	68	50	35

TABLE No. 5: PERCENTAGE FREQUENCY OF THE OCCURRENCE OF DROUGHTS.

Period (months)	*Fairlight*	*Hall*	*Land's End*	*Queanbeyan*	*Mt. Campbell*	*Canberra*
3 or more	47	59	54	77	46	55
4 or more	12	21	20	35	21	24
5 or more	4	8	12	12	8	16
6 or more	—	4	4	4	8	8
7 or more	—	—	—	—	4	8
8 or more	—	—	—	—	4	4

TABLE No. 6: PERCENTAGE FREQUENCIES OF THE OCCURRENCE OF DROUGHTS DURING THE PERIOD OCTOBER TO MARCH.

Period (months)	*Fairlight*	*Hall*	*Land's End*	*Queanbeyan*	*Mt. Campbell*	*Canberra*
2 or more	77	86	86	81	82	64
3 or more	36	50	41	62	32	36
4 or more	14	23	18	38	18	20
5 or more	—	5	5	—	9	16
6 or more	—	—	—	—	5	8

periods would be expected to occur approximately one year in two in the North and three years in five in the East, and roughly three years in 10 over the rest of the area. A period of four months or more would seriously depress pasture growth and such periods may be expected in approximately one year in five over most of the areas and in as many as two years in five in that part represented by Queanbeyan.

Growing Season.

In this section it is necessary to consider the interaction of temperature and rainfall. A study of Table No. 4 indicates that, considering rainfall alone, conditions are most suitable for plant growth during the months from March to October. However, in the section dealing with temperature conditions it is pointed out that the months June and July are too cold to permit significant growth of pastures. Also, temperatures during the months of May and August are too low for the growth of natural pastures. For natural pastures then, maximum growth would be expected during the periods March and April and September-October. For introduced species best conditions would be expected from March to May and August to October. In one-third to one-half the years sufficient rain would be expected in Summer to keep pastures productive until the following Autumn.

Temperature Conditions.

Table No. 7 shows the average maximum, minimum and mean temperatures, together with extremes at Acton, Mt. Stromlo and Queanbeyan. It will be realised that, because temperatures are influenced considerably by local topography, readings

TABLE No. 7: AVERAGE MAXIMUM, MINIMUM AND MEAN TEMPERATURES.

	No. of Years of Record	*Jan.*	*Feb.*	*Mar.*	*Apr.*	*May*	*June*	*July*	*Aug.*	*Sept.*	*Oct.*	*Nov.*	*Dec.*	*Year*
ACTON														
Av. Max. Temp.	22	82·1	81·7	76·2	67·0	59·5	53·2	52·1	55·6	61·4	68·1	74·9	79·6	67·6
Av. Min. Temp.	22	55·2	55·0	51·0	43·8	37·2	34·2	33·3	34·8	38·2	43·0	48·3	53·2	43·9
Av. Mean Temp.	22	68·7	68·4	63·6	55·4	48·4	43·7	42·7	45·2	49·7	55·6	61·6	66·4	55·8
Highest on Record	22	104·2	102·6	99·2	91·0	74·7	66·2	65·0	73·0	83·2	93·8	97·7	103·4	104·2
Lowest on Record	22	38·2	33·0	31·0	26·5	19·0	17·8	14·0	18·0	24·7	27·0	28·1	32·0	14·0
MT. STROMLO														
Av. Max. Temp.	16	79·1	78·5	71·9	62·8	56·1	49·2	48·7	52·1	58·0	64·1	70·2	75·6	63·9
Av. Min. Temp.	16	56·3	56·9	53·5	46·8	41·1	36·9	35·6	37·4	40·8	45·7	49·8	53·6	46·2
Av. Mean Temp.	16	67·7	67·7	62·7	54·8	48·6	43·0	42·1	44·7	49·4	54·9	60·0	64·6	55·0
Highest on Record	16	104·4	96·6	94·8	87·0	71·0	68·9	61·0	66·7	77·8	88·0	92·4	99·7	104·4
Lowest on Record	16	39·4	38·0	33·0	32·1	30·0	24·0	23·0	27·1	27·8	32·3	33·0	39·0	23·0
QUEANBEYAN														
Av. Max. Temp.	27	84·7	84·3	78·2	68·8	60·9	54·6	53·6	57·3	63·1	69·4	76·2	81·7	69·4
Av. Min. Temp.	27	54·9	55·9	51·4	44·2	37·5	33·4	31·8	33·7	38·0	42·9	47·8	52·6	43·6
Av. Mean Temp.	27	69·8	69·9	64·8	56·5	49·2	44·0	42·7	45·5	50·5	56·2	62·0	67·1	56·5
Highest on Record	27	110·0	105·0	100·0	93·0	77·0	71·0	69·0	78·0	85·0	98·0	105·0	105·0	110·0
Lowest on Record	27	34·0	34·0	30·0	23·0	23·0	19·0	18·0	20·0	24·0	21·0	29·5	31·0	18·0

TABLE No. 8: FREQUENCIES AND DATES OF OCCURRENCE OF LOW MINIMUM TEMPERATURES.

	First 36°F.			First 32° F.			Last 32° F.			Last 36° F.			Av. frost-free period
	1	2	3	1	2	3	1	2	3	1	2	3	
													days
Acton	Mar. 27	17	Feb. 21	Apr. 28	12	Mar. 24	Oct. 13	13	Dec. 3	Nov. 3	11	Dec. 7	143
Mt. Stromlo	May 2	15	Mar. 21	Jun. 12	10	May 4	Aug. 25	13	Sep. 26	Oct. 8	17	Nov. 24	205
Queanbeyan	Mar. 26	19	Jan. 6	Apr. 24	12	Mar. 28	Oct. 10	10	Dec. 3	Nov. 5	16	Dec. 3	140

taken at these stations will not be representative of the whole area, but will be satisfactory as the basis for a general discussion.

Accepting 43°F. to 45°F. (mean monthly temperature) as the minimum requirement for the growth of pasture plants, the period June and July is one of Winter dormancy. Temperatures during the months of May, August and September are between 45°F. and 50°F. and restricted growth, particularly of introduced pasture plants, should take place during these months. Mean temperatures for the period October to April are high enough for moderate to active growth, but on rare occasions the occurrence of frosts during these months will influence the amount of growth. An analysis has been made of the frequencies of occurrence of low minimum temperatures and the average dates of occurrence of the first and last screen temperatures of 32°F. or under (severe frosts) and 32°F.-36°F. (light frosts) have been determined. The results are shown in Table No. 8, the sub-headings having the following significances.

1. Average date of first/last occurrence.
2. Mean deviation from average date.
3. First/last recorded date of occurrence.

Table No. 9 shows the average frequencies of occurrence of days per month when the minimum screen temperature was 32°F. or less.

Mt. Stromlo shows lower frequencies than Acton and Queanbeyan, both of which have frequencies of six heavy frosts or over during each of the months May to September, whereas the maximum frequency at Mt. Stromlo is 6·6 in July. For those parts of the area represented by Acton and Queanbeyan, frost would severely limit pastures during the months June to August, and would have a smaller but real influence in May and September.

TABLE No. 9: AVERAGE FREQUENCIES OF DAYS PER MONTH WHEN THE SCREEN TEMPERATURE WAS 32°F OR LESS.

	Mar.	April	May	June	July	August	September	October	November	Total
Acton	0·1	1·0	8·9	12·4	14·8	10·9	5·9	1·1	0·2	55·3
Mt. Stromlo			0·2	4·8	6·6	4·0	0·6			16·2
Queanbeyan	0·2	1·0	6·4	12·8	16·2	11·4	6·8	1·4	0·1	56·3

APPENDIX III

SURVEY METHOD

SAMPLING.

Definition of "Sheep Properties" for the Purpose of the Survey.

1. *Size of Property*: It was decided that the holding or amalgamation of holdings run as one property should be of sufficient size to provide full-time employment for at least one labour unit. From prior knowledge of the area and from general knowledge of home maintenance requirements, it was decided that the minimum flock which could be considered, even if cash cropping were undertaken as a sideline, was not less than 600 sheep. All properties running fewer than 600 sheep were therefore excluded.

2. *Type of Farming*: It was decided that sheep husbandry should be the major enterprise on the holding. Properties where the major proportion of income was from sources other than sheep were excluded.

3. *Multiple Holdings*: Properties consisting of an amalgamation of blocks, even if not adjoining, but

operated under the same ownership and management, and with a composite shearing and composite records, were included.

Properties run in conjunction with land outside the area decided upon for the survey, were excluded if the revenue from the outside land comprised an appreciable proportion of the total revenue.

4. *Land Tenure*: All properties held under any system of land tenure other than leasehold were excluded.

Sampling Method.

For administrative purposes, the Australian Capital Territory is divided into 15 districts. Agricultural and pastoral statistics, on a district basis, are compiled by the Department of the Interior from returns furnished by the lessee-occupiers.

A list of lessee-occupiers in the eight districts of the survey area, together with information regarding the total area of each holding and sheep numbers as at 31st December 1946, was made available to the B.A.E. These details were supplied in respect of the 100 holdings in the following districts: Belconnen, Woden, Kowen, Hall, Lanyon, Stromlo, Gungahlin, Canberra City. Of the 100 holdings, 16 were found to be running fewer than 600 sheep and were accordingly excluded.

A summary, by districts, indicating the number of holdings running more than 600 sheep, average area and average flock size is as follows:

PROPERTIES RUNNING MORE THAN 600 SHEEP.

BELCONNEN	25	properties,	average	area	1,390	acres.	Average	number	of	sheep. 1,542
WODEN	9	,,	,,	,,	1,609	,,	,,	,,	,,	,, 1,443
KOWEN	5	,,	,,	,,	3,346	,,	,,	,,	,,	,, 1,813
HALL	9	,,	,,	,,	1,382	,,	,,	,,	,,	,, 1,618
LANYON	8	,,	,,	,,	2,279	,,	,,	,,	,,	,, 1,472
STROMLO	14	,,	,,	,,	1,970	,,	,,	,,	,,	,, 2,090
GUNGAHLIN	11	,,	,,	,,	1,465	,,	,,	,,	,,	,, 1,336
CANBERRA CITY	3	,,	,,	,,	1,445	,,	,,	,,	,,	,, 1,032
TOTAL NO.	84									

As between districts, there is a fairly wide range in average property size (1,380 acres to 3,350 acres), acres per sheep (0·8 to 1·8) and average flock size (1,032 to 2,100).

Of the 84 "sheep properties", 57 holdings were drawn at random and constituted the sample, subject to verification of their eligibility under definition and the co-operation of the occupier. After visits had been made to individual properties for this purpose, a further 28 properties had to be deleted for the following reasons:

Deleted by definition (after visit to property)	9
Insufficient records available	12
Unwilling to co-operate	7
Total number of holdings in survey	29
	57

FIELD PROCEDURE.

Preliminary Organisation.

The purpose of the survey was explained to the A.C.T. Lessees' Association and the Graziers' Association, Queanbeyan Branch, and their approval and co-operation sought. Resolutions were passed by both organisations requesting their members to give full co-operation. Following these meetings a letter, explaining the survey, was sent to the 57 lessees who had been selected at random. A personal visit was made to all the lessees selected in order to explain the questionnaire and verify their eligibility for inclusion in the survey.

Completion of Questionnaires.

The field party consisted of two field research officers. For a portion of the time an agrostologist seconded by the C.S.I.R.O. accompanied the field party.

The usual procedure was that the physical data concerning the farm was first obtained, followed by the collection of the financial data from either the farmer or his accountant.

Two days were usually required to complete the questionnaire for one property. Much time was spent in accurately assessing the areas of the different topography groups in each farm, and in inspecting and describing the pastures.

Owing to the excessive rainfall during the latter part of 1947 and early 1948, shearing and harvesting had been delayed. This resulted in some lessees not being able to co-operate until their work was finished. Other delays occurred because of the inability of some lessees to keep appointments which had previously been made.

Information Required.

The information sought from each farm comprised:

1. The physical characteristics of the farm.
2. The farm management practices, with particular reference to the sheep enterprise.
3. The financial records of the farm for the years 1944-45, 1945-46, 1946-47.

Availability of Information Required.

Physical information concerning the farm was freely given, but was generally limited owing to inadequacy of farm records. In this regard, flock records were particularly difficult to obtain. In all cases the financial information was obtained from financial statements or Income Tax returns prepared by the farmers or their accountants. In some cases farmers gave authority for the field officers to approach their accountants direct for this information.

Plan of Property.

Plans of each property surveyed were obtained through the courtesy of the Department of the Interior. The distribution of the different topography groups was plotted on the plans and their respective areas determined.

Method of Analysis of Data.

Three factors had to be taken into account in determining the approach to the analysis of the data collected. First, it was essential to honour undertakings given to the Lessees' Association to preserve the complete anonymity of the data relating to individual properties. This ruled out any question of presenting data *seriatim* and necessitated the use of procedures involving the grouping of data.

Secondly, the total number of units constituting the sample was small in the statistical sense, viz. 23, 27, and 29 for the successive years. Thirdly, the units comprising the small sample showed a considerable degree of variability among themselves.

In other words, the data collected on the survey related to a limited number of farms, each of which showed a high degree of individuality in regard to its specific attributes, e.g. area, flock size, area cropped, etc.

The sample, small numerically, but with a considerable degree of variability within the sample, meant that the "averages" or "means" used had to be interpreted with some reservations. The concept of an "average" farm may be easy to accept, and may be sufficiently descriptive of the group where deviations from the "average" are comparatively small. This condition did not apply to the A.C.T. data, where there was comparatively little tendency for values to cluster round a central point.

In presenting the "average" and "mean" values in relation to the A.C.T. data it will be noted that while "average" values are given, reference is also made to the *range* of values making up these averages. During the preliminary work on the figures, calculations were made in certain cases to determine the mathematical deviation from the mean value. This work confirmed earlier views on the wide difference between unit values.

It was felt, however, that the range of actual values would be more informative to graziers and others than calculations of the standard deviations and, in presenting the data, this course has been followed.

In certain cases the "average" values have been supplemented by frequency distributions which show the spread of various property characteristics around the average values. These frequency distribution series have been used in tabular analyses of the data and in some cases the figures have been presented in the form of correlation tables. The frequency distribution series approach gives a better idea of the spread of values encountered, than does the "average" or "mean" approach.

Moreover, the practice of allotting the individual farm data to appropriate "classes" ensures complete secrecy in regard to data from individual properties. In this connection it will be noted that class intervals for certain distributions have been varied, particularly in regard to the "top" classes. Again an open class at the end of a series has sometimes been introduced to preclude identification of individual properties.

APPENDIX IV

ANALYSIS OF PASTURE PRODUCTIVITY DATA

The analysis of productivity data was restricted to the listed farms, others being excluded because of the high percentage of arable land, portion of the property lying outside the territory, etc. The classes A, B, C, D of the analysis are the acreages of unimproved pastures in these topographical classes on each farm. Improved pasture has been separated and is classed as such, irrespective of the topographical class in which it occurs. Most of it naturally falls into the A and B classes, i.e. country

which is flat or gently rolling. Crop is separated in a similar manner. These acreages of pasture and crop are for the year 1946-47. The livestock numbers on the other hand are for the three years 1944-45—1946-47. This procedure could lead to some irregularity because of the variation in acreage cropped from year to year, but this will be only a small fraction of these farms in any one year. Taking the stock over the three years helps to reduce the variability due to selling and buying in, etc.

The analytical procedure is essentially one of fitting by least squares an expression of the form: Ax (area of Class A) + Bx (area of Class B) etc. = No. of sheep, i.e., A. B, C, etc. are the estimated carrying capacities on Class A land and so on.

The estimated values of these rates are:

A	Natural pasture	·966	±	·395
B	,, ,,	1·167	±	·100
C	,, ,,	·637	±	·172
D	,, ,,	1·192	±	·227
Improved pasture		1·814	±	·406
Crop		·804	±	2·021

The differences in estimates together with the corresponding standard error of difference, making due allowance for the covariances of the estimates, are:

	B	*C*	*D*	*Improved*	*Crop*
A	— ·201 ± ·428	·329 ± ·443	— ·226 ± ·488	— ·848 ± ·528	·162 ± 2·047
B		·530 ± ·213	— ·025 ± ·234	— ·647 ± ·432	·363 ± 2·077
C			— ·555 ± ·314	— 1·177 ± ·542	— ·167 ± 2·027
D				— ·622 ± ·451	·388 ± 2·108
Improved					1·010 ± 2·037

To be significant a difference should be at least twice as large as the corresponding standard deviation. None of the differences can be regarded seriously, both because of the general insignificance using the internal criterion of error variance, and also because of the poor correspondence with expected relative values of A, B, C, D.

In short, the data are too meagre and too irregular to give any trustworthy evidence on the relative carrying capacities of these land classes. However, the data do suggest an improvement following the sowing of subterranean clover and topdressing with super.

Using gross returns as a criterion of grass available, hoping thereby to introduce the factor of feed consumed per animal as well as number of animals per unit area, the following values in £/acre result:

A	Natural pasture	·785	—	·866
B	,, ,,	1·420	—	·219
C	,, ,,	1·642	—	·377
D	,, ,,	1·083	—	·498
Improved pasture		3·025	—	·890
Crop		5·764	—	4·432

The differences in estimates, together with the standard error of these differences, are:

	B	*C*	*D*	*Improved*	*Crop*
A	— ·635 (·939)	— ·857 (·971)	— ·298 (1·070)	— 2·240 (1·157)	— 4·979 (4·489)
B		— ·222 (·467)	·337 (·513)	— 1·605 (·947)	— 4·344 (4·555)
C			·559 (·689)	— 1·383 (1·189)	— 4·122 (4·445)
D				— 1·942 (·989)	— 4·681 (4·623)
Improved					— 2·739 (4·467)

The same remarks apply to these estimates as to the previous analysis.

A SURVEY OF SHEEP PROPERTIES IN THE LONGREACH—BLACKALL DISTRICT, CENTRAL-WEST QUEENSLAND

For Table of Contents See pages VII and VIII

SECTION I: INTRODUCTION

THE area covered by this, the second Regional Survey by the Wool Section of the Bureau of Agricultural Economics, is typical of the open downs country common to the greater part of the sheep belt of Central-western Queensland. It was selected as being reasonably representative of conditions under which a large proportion of Queensland's wool is grown and at the same time affording an interesting comparison with the results of the A.C.T. survey. The years covered in this survey were 1945-46, 1946-47 and 1947-48.

SECTION II: DESCRIPTION OF THE AREA SURVEYED

Location.

The area (Map 1) comprised the southern end of the Central and Northern Downs bounded by Longreach and Barcaldine, Blackall and Muttaburra. The boundaries (Map 2) enclosed an area of approximately 12,000 sq. miles in which climate and soil types were fairly uniform over the whole region, although in general, the soils became slightly heavier and the rainfall increased from North to South.

Topography.

The main drainage systems of the area are the south-westerly flowing Thompson and Barcoo Rivers and their tributaries. The topography of the Downs is flat to undulating and, over the greater portion would not exceed 1000 feet above sea-level.

Soils.

With the exception of sand ridges, which form a minor feature of the landscape, the soils of the area can be classified with Prescott's (C.S.I.R.O Bulletin No. 177; 1944) grey and brown soils of heavy texture which are of wide occurrence in the semi-arid regions of Australia. They are chiefly clay loams, clay silts and silt loams.

Common terms in use to describe the types of downs country are "ashy" downs as opposed to the firmer textured soils or "black soil" downs, and the gravelly or stony downs where a layer of stones or pebbles (the so called gibbers) are present.

Little evidence of soil erosion was noticed, and this was mainly around watering and other points of stock concentration. This is probably due to the relatively flat topography, which reduced the hazard of water erosion, and to the heavy nature of the soil, i.e. containing a high percentage of clay, which acts as a deterrent to wind erosion. Gully erosion was noticed only in isolated cases on the sandy country. Claypans are found throughout the area, but are more common in the southern sector. Local opinion is that they are not increasing in either size or numbers.

Climate.

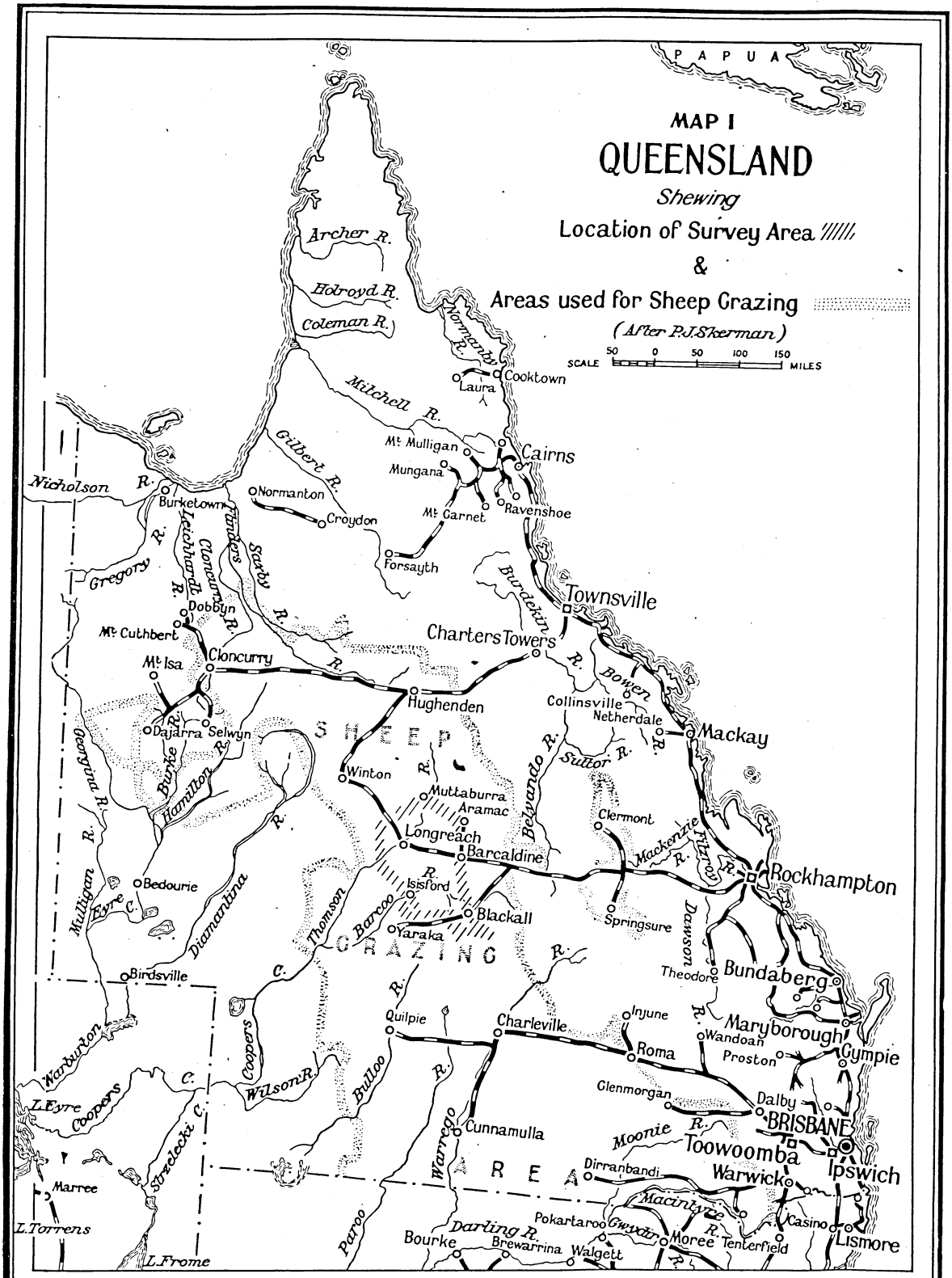
An analysis of the climate of the area is given in Appendix I. The more important features are:

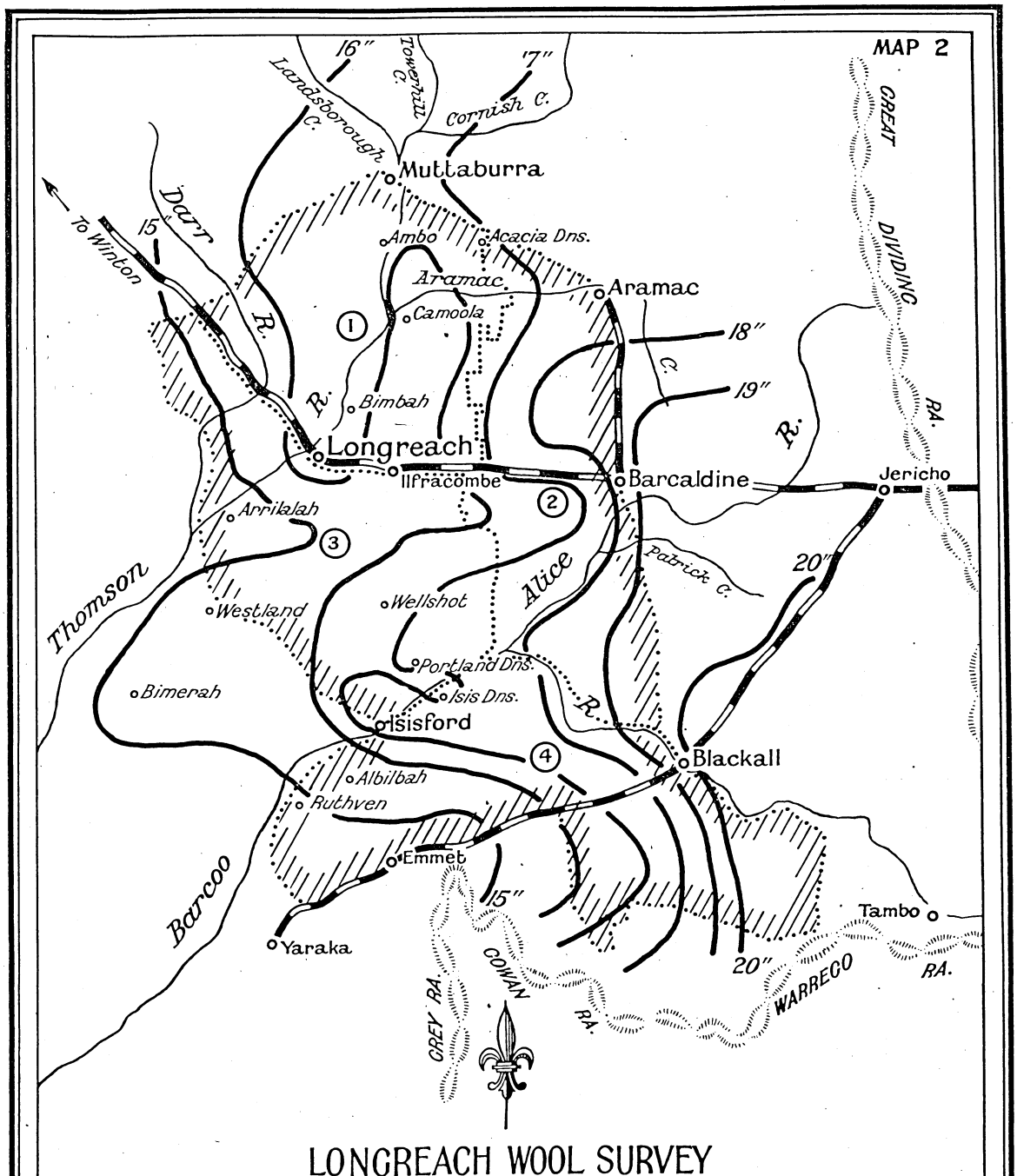
The annual average rainfall varies from 20 inches in the South-east to 17 inches in the North-west. The western section from Ambo to Wellshot has even lower rainfall and averages approximately 16 inches.

Average monthly rainfall figures show that there is a well marked trend towards summer rainfall and the sheep industry in the area relies largely on falls received during the period from October to March. Individual monthly totals during this period may occasionally be as high as 16 inches.

From a comparison of actual monthly rainfall totals and conditions experienced in the area, critical monthly rainfall values have been established. These are the minimum amounts considered necessary in any particular month to give rise to satisfactory pasture growth. An examination of records over many years shows that February is the most reliable month—satisfactory falls being received in about five years out of 10. The chances of receiving the critical amount (or more) decrease during the period March to May, but in June there is an increase and in the South the reliability in this month approximates to that of the summer months. In each of the months September and October, critical falls are received in fewer than two years in 10. After October the chances increase to the February peak.

An attempt has been made to evaluate seasonal (Summer) reliability. This is based on the percentage frequency of occurrence of seasons with two consecutive months with rainfall equal to or greater than the critical amount, or seasons during which one month had a total greater than twice the criti-


PAPUA
MAP 1
QUEENSLAND
Shewing
Location of Survey Area //////
&
Areas used for Sheep Grazing
(After P.J.Skerman)
SCALE 50 0 50 100 150 MILES
Archer R.
Hobroyd R.
Coleman R.
Normanby R.
Laura
Cooktown
Mitchell R.
Mt Mulligan
Mungana
Cairns
Gilbert R.
Nicholson R.
Burketown
Normanton
Croydon
Mt Garnet
Ravenshoe
Leichhardt R.
Flinders R.
Gregory R.
Calvert R.
Surby R.
Forsayth
Burdekin R.
Townsville
Dobbyn
Mt Cuthbert
Cloncurry
Charters Towers
Mt Isa
Bowen R.
Hughenden
Collinsville
Netherdale
Mackay
Dajarra
Selwyn
Georgina R.
Burke R.
Hamilton R.
SHEEP
Winton
Muttaburra
Aramac
Longreach
Barcaldine
Belyando R.
Suttor R.
Clermont
Mackenzie R.
Fitzroy R.
Rockhampton
Bedourie
Mulligan R.
Eyre C.
Diamantina R.
Isisford
Blackall
Springsure
Dawson R.
Thomson R.
Barcoo R.
Yaraka
GRAZING
Theodore
Bundaberg
Birdsville
Quilpie
Charleville
Injune
Maryborough
Wandoan
Roma
Gympie
Proston
Warburton R.
L.Eyre
Coopers C.
Wilson R.
Cooper's C.
Bulloo R.
Glenmorgan
Dalby
BRISBANE
Cunnamulla
Warrego R.
Moonie R.
Toowoomba
Ipswich
AREA
Dirranbandi
Warwick
Marree
Strzelecki C.
Macintyre R.
Pokataroo
Goondiwindi
Casino
L.Torrens
Darling R.
Bourke
Brewarrina
Walgett
Moree
Tenterfield
Lismore
Parroo R.
L.Frome
Drawn by J.O'Halloran


MAP 2
16"
17"
Townshu C.
Landsborough C.
Cornish C.
Muttaburra
To Winton
Darr R.
15"
Ambo
Acacia Dns.
Aramac
Aramac
Camoola
1
18"
19"
C.
R.
Bimbah
Longreach
Ilfracombe
Barcaldine
Jericho
GREAT DIVIDING RA.
2
Arrilalah
3
Thomson
Westland
Wellshot
Alice
Patrick C.
20"
Portland Dns.
Isis Dns.
Bimerah
Isisford
4
Blackall
Albilbah
Ruthven
Emmet
15"
Barcoo
Yaraka
Tambo
20"
COWAN RA.
CREY RA.
WARREGO RA.
LONGREACH WOOL SURVEY
Survey Area
Zone Boundaries
Railways
Isohyets
0
25
50
SCALE
MILES
Bureau of Agricultural Economics
Drawn by J. O'Halloran

cal amounts. On this basis, satisfactory conditions may be expected in the South-east three years in four; in the West and North-east in from five to six years in 10, and over the rest of the area in from six to seven years in 10.

Vegetation.

Timber: The dominant species of timber are the acacias.

In the northern portion of the survey area timber is rather sparse and there is little, if any, evidence of regeneration. Although it is probable that timber has always been fairly widely scattered in this sector, it is apparent that, for a variety of reasons, such as frequent droughts, cutting for fencing posts and firewood, death from old age, and prevention of regeneration by grazing animals, there is less timber growing now than formerly.

Regeneration of natural species may be practicable in many parts if stock could be excluded for a sufficiently long period.

Some properties have attempted, with varied success, to promote tree growth for shade, and of these, the parkinsonia (*Parkinsonia aculeata*) has proved most successful. Probably the athel tree (*Tamarix aphylla*) which has been grown successfully in other semi-arid areas would also be suitable in the Central-west of Queensland.

Timber is much denser over the southern portions of the area surveyed and thick scrub is still in evidence in many localities. Ringbarking of the scrub has been widely practised.

(For a list of the more common species of trees, grasses, etc., herbage plants and weeds, see Appendix II.)

Grasses and Herbage: The pastures consist of a variety of grasses and herbs, but the most important, and the dominant species are the Mitchell grasses (*Astrebla* spp.) which are found on the heavier soil types. These grasses are long lived, tussock forming, and can withstand heavy grazing. Among the other grasses present probably the most important are Flinders grass (*Iseilema* spp.) and Button grass (*Dactyloctenium radulans*) both of which are annuals.

Plants, other than the grasses, which form a portion of the pasture are usually referred to as herbage and normally make growth following winter rains.

Weeds: The Noogoora burr is one of the worst pests of the grazing areas, and is fairly prevalent in the survey area, particularly along water-courses. Most properties reported the presence of the weed but the degree of infestation varied greatly. Control measures ranged from pulling isolated plants by hand, or cutting by hoe, to spraying with hormone preparations for heavy infestations.

In an analysis of the 1947-48 wool clip in Queensland, the Australian Wool Realization Commission found that 3·03% contained Noogoora burr.

From the districts of Aramac, Ilfracombe, Longreach, Barcaldine, Jericho, Blackall and Tambo 2·09% of the clip contained burr. Two-thirds of this burry wool was from the Blackall-Tambo area.

Bathurst burr is not regarded so seriously as the Noogoora and is more easily controlled. Several types of poisonous plants are also found in the area.

Land Tenure.

The grazing areas of Queensland are practically all held under lease from the Crown, only comparatively small areas being freehold.

In conformity with the policy of the State to foster closer settlement, as the leases of the larger holdings (usually Pastoral Leases) expire the properties are resumed and made available for closer settlement.

Land is opened for selection throughout Queensland under different categories but the most important tenures in the survey area are those classified as Grazing Selections. There are several types of Grazing Selection, but the differences are minor only. Normally, the leases are for a period of 28 years, and the maximum area is 60,000 acres.

Selectors are given security of tenure by a provision which grants lessees a priority in obtaining a new lease of their selections before the expiry of the old lease. This enables the lessees to take a long range view in their management, the provision of improvements, etc., and in fact, on the properties visited, the lessees normally treated their holdings as if they were held under freehold.

Rents of Crown Lands are fixed by two authorities:

(i) The Land Court of Queensland, which determines the rents on all existing holdings when they come up for re-appraisement. (Grazing Selections are re-appraised every seven years).

(ii) The Lands Department which fixes rents on all new lands opened under all systems of tenure, and on all re-adjustments of tenure.

Rents are assessed on the "unimproved value" of the land, which includes its potential carrying capacity—i.e. its power to increase its productivity in relation to expenditure. As rents are commonly less than the full economic rent, lessees have a considerable goodwill value, and in fact, there is little difference between values for leasehold and freehold lands. This is probably due to the Land Tax levied on freehold land, but not on leasehold land in Queensland.

SECTION III: SURVEY METHOD

A more detailed description of the procedures followed for the survey is given in Appendix III. In brief, the first step was to define the survey area to conform with statistical boundaries while yet remaining sufficiently uniform as regards soil and climatic conditions. Detailed information was then obtained from Lands Commissioners and the Queensland Government Statist of all properties in the survey area, and from the total of 196, 40 were excluded as being too small (less than 2,000 sheep), predominantly stud properties, properties run as depots or by dealers, properties run in conjunction with holdings outside the area, or properties which had changed hands. The area was then divided into four zones, and the properties in each zone grouped into three flock-size groups. From each of these 12 sub-groups a sample of approximately 25% was drawn, giving a total of 42. Of this sample, 12 needed replacement for various reasons and this was done by random selection from the balance in the appropriate sub-group.

Only 31 full results were eventually obtained, due to delays and difficulties in the actual field work, and to the fact that in a number of cases complete records proved subsequently to be unobtainable. However, the distribution of this sample follows closely that of the full survey population.

As with the A.C.T. Survey, the method of presentation of the results has been governed by the obligation to preserve the anonymity of individual properties. Because of the relatively small size of the final sample, this has meant that the results can be given only in fairly broad sub-groups. Results have wherever possible been expressed in terms of frequency distributions, rather than averages, because of the wide ranges revealed by most of the calculations.

SECTION IV: SYSTEMS OF MANAGEMENT ON PROPERTIES SURVEYED

Property Size.

The areas of the sample properties varied considerably, but the mean property size was 37,900 acres. The range in acreage is shown in Table No. 1.

TABLE No. 1: DISTRIBUTION OF PROPERTY SIZES.

Acreage	*No. of Properties*
Under 15,000	2
15,000 and under 25,000	15
25,000 ,, ,, 35,000	5
35,000 ,, ,, 45,000	2
45,000 ,, ,, 55,000	1
55,000 ,, ,, 65,000	2
65,000 ,, ,, 75,000	1
75,000 ,, ,, 85,000	–
85,000 ,, ,, 95,000	–
95,000 ,, ,, 105,000	2
105,000 and over	1
Total	31

Sheep Numbers.

As with the acreage, the sheep numbers were dispersed over a fairly wide range of flock sizes.

For the period covered by the survey the calculated average flock sizes were:

Year	*Average Flock Size*
1946	7,574
1947	6,935
1948	7,057

TABLE No. 2: DISTRIBUTION OF SHEEP NUMBERS.
(Based on Stock Returns as at 1st January).

Sheep Nos.	*1946*	*1947*	*1948*	*Av. for 3 yrs(b)*
Under 2,000	1	5	2	1
2,000 and under 4,000	7	5	9	7
4,000 ,, ,, 6,000	8	10	7	12
6,000 ,, ,, 8,000	6	3	4	3
8,000 ,, ,, 10,000	3	2	3	2
10,000 ,, ,, 12,000	2	2	1	3
12,000 ,, ,, 14,000	2	2	1	1
14,000 ,, ,, 16,000	1	1	2	1
16,000 ,, ,, 18,000	–	–	–	–
Over 18,000	1	1	1	1
Total	31	31	30(a)	31

(a) No return from one property.
(b) Average for two years for one property.

Property Size and Average Sheep Numbers.

As would be expected, a well-defined relationship exists between property size and average sheep numbers, but the table suggests that the sheep area may tend to increase as the property size increases.

To offset the drought years in the survey period, sheep numbers have been averaged over a longer period in Table No. 4, but the relationship is very similar.

TABLE No. 3: AVERAGE SHEEP NUMBERS COMPARED WITH PROPERTY SIZE.
(Averaged for the three years 1946-48)(a).

Average Sheep Numbers	Property Size in '000 Acres											
	Under 15	15 and under 25	25 and under 35	35 and under 45	45 and under 55	55 and under 65	65 and under 75	75 and under 85	85 and under 95	95 and under 105	Over 105	Total
Under 2,000		1										1
2,000 and under 4,000	1	6										7
4,000 ,, ,, 6,000	1	7	4									12
6,000 ,, ,, 8,000		1	1	1								3
8,000 ,, ,, 10,000				1		1						2
10,000 ,, ,, 12,000					1	1	1					3
12,000 ,, ,, 14,000										1		1
14,000 ,, ,, 16,000										1		1
16,000 ,, ,, 18,000												–
Over 18,000											1	1
Total	2	15	5	2	1	2	1			2	1	31

(a) Average for two years for one property.
Source: Stock Returns.

TABLE No. 4: AVERAGE SHEEP NUMBERS COMPARED WITH PROPERTY SIZE(a).
(Averaged for the eleven years 1938-48).

Average Sheep Numbers	Property Size in '000 Acres											
	Under 15	15 and under 25	25 and under 35	35 and under 45	45 and under 55	55 and under 65	65 and under 75	75 and under 85	85 and under 95	95 and under 105	Over 105	Total
Under 2,000												–
2,000 and under 4,000		1										1
4,000 ,, ,, 6,000	2	10	1									13
6,000 ,, ,, 8,000		2	3									5
8,000 ,, ,, 10,000						1						1
10,000 ,, ,, 12,000				1			1					2
12,000 ,, ,, 14,000												–
14,000 ,, ,, 16,000					1	1						2
16,000 ,, ,, 18,000										2		2
Over 18,000											1	1
Total	2	13	4	1	1	2	1			2	1	27

(a) Excluding four properties for which Stock Returns were incomplete.
Source: Stock Returns.

Numbers of Sheep Carried.

In comparing the rated carrying capacities over the survey period with the actual sheep carried, it should be remembered that these were comparatively dry years and the sheep numbers were below the long-term average:

Period	Average Sheep Numbers
11 years (1938–48)	10,033
5 years (1944–48)	8,994
3 years (1946–48)	8,295

Diagrams I, II and III compare actual sheep carried on properties with the rated carrying capacity. Diagram I illustrates the position in fairly good seasons when 21 properties carried sheep equal to or more than the official rating and six properties carried less. In poor seasons, or in times of drought, the sheep numbers are reduced and most properties carry less than the official rating. This is shown to some extent in Diagram II, which covers the survey period and includes a period of drought. In this case only eight properties carried sheep equal to or greater than the official rating, while 21 carried less.

Diagram III (page 43) shows the position over a longer period (1938-48) when 12 properties carried sheep equal to or greater than the official rating and 17 carried less.

DIAGRAM 1.

ACTUAL SHEEP CARRIED COMPARED WITH RATED CARRYING CAPACITY.

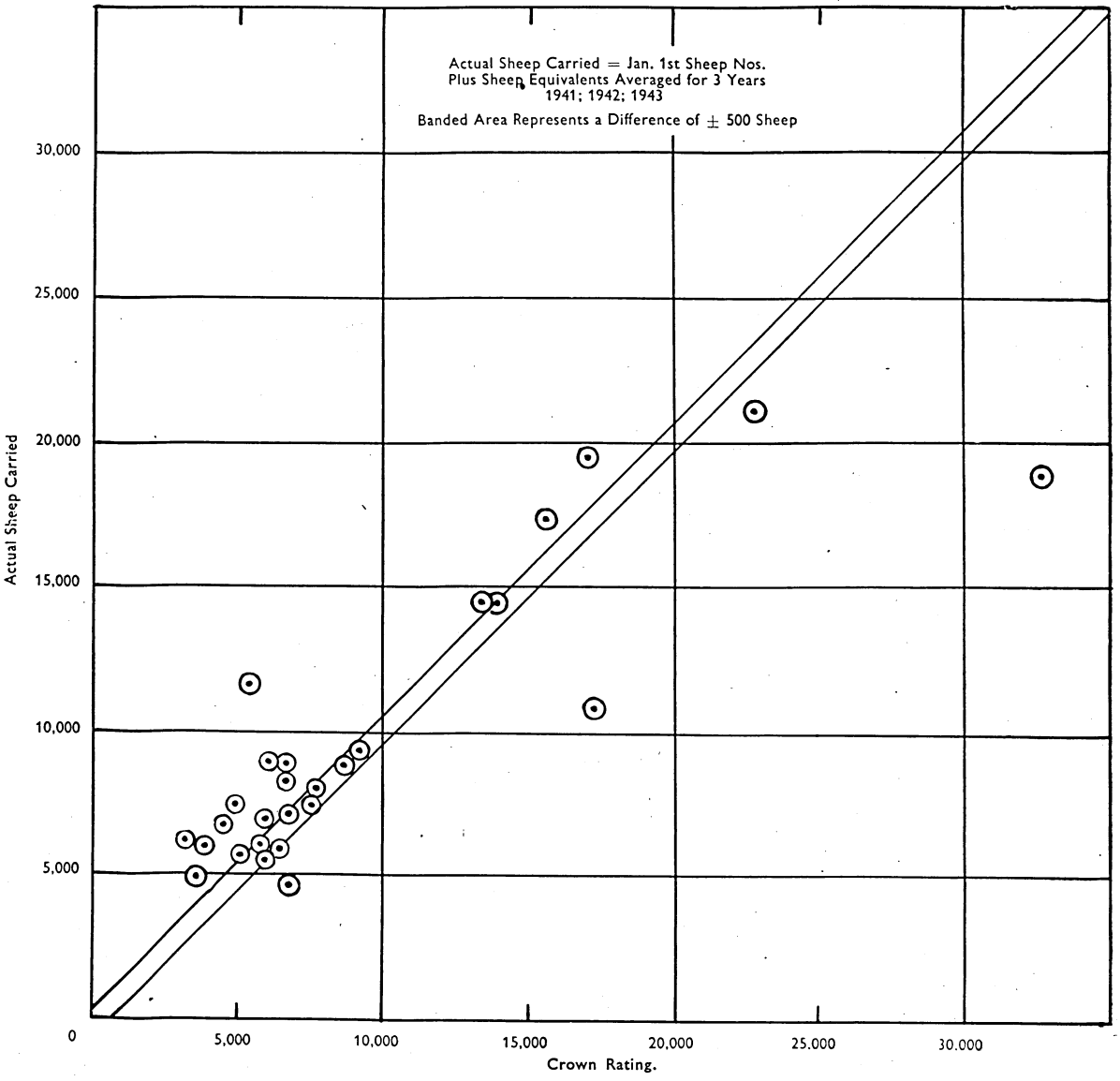


TABLE No. 5: DISTRIBUTION OF CATTLE AS AT 1st JULY.

Cattle Nos.	*1945*	*1946*	*1947*	*Av. for 3 years*
Nil	4	6	5	4
Over 0 and under 25	15	15	13	14
Over 25 ,, ,, 50	4	4	7	6
Over 50 ,, ,, 100	4	2	2	3
Over 100 ,, ,, 150	1	1	–	1
Over 150 ,, ,, 200	1	1	1	1
200 and over	2	2	3	2
Total	31	31	31	31

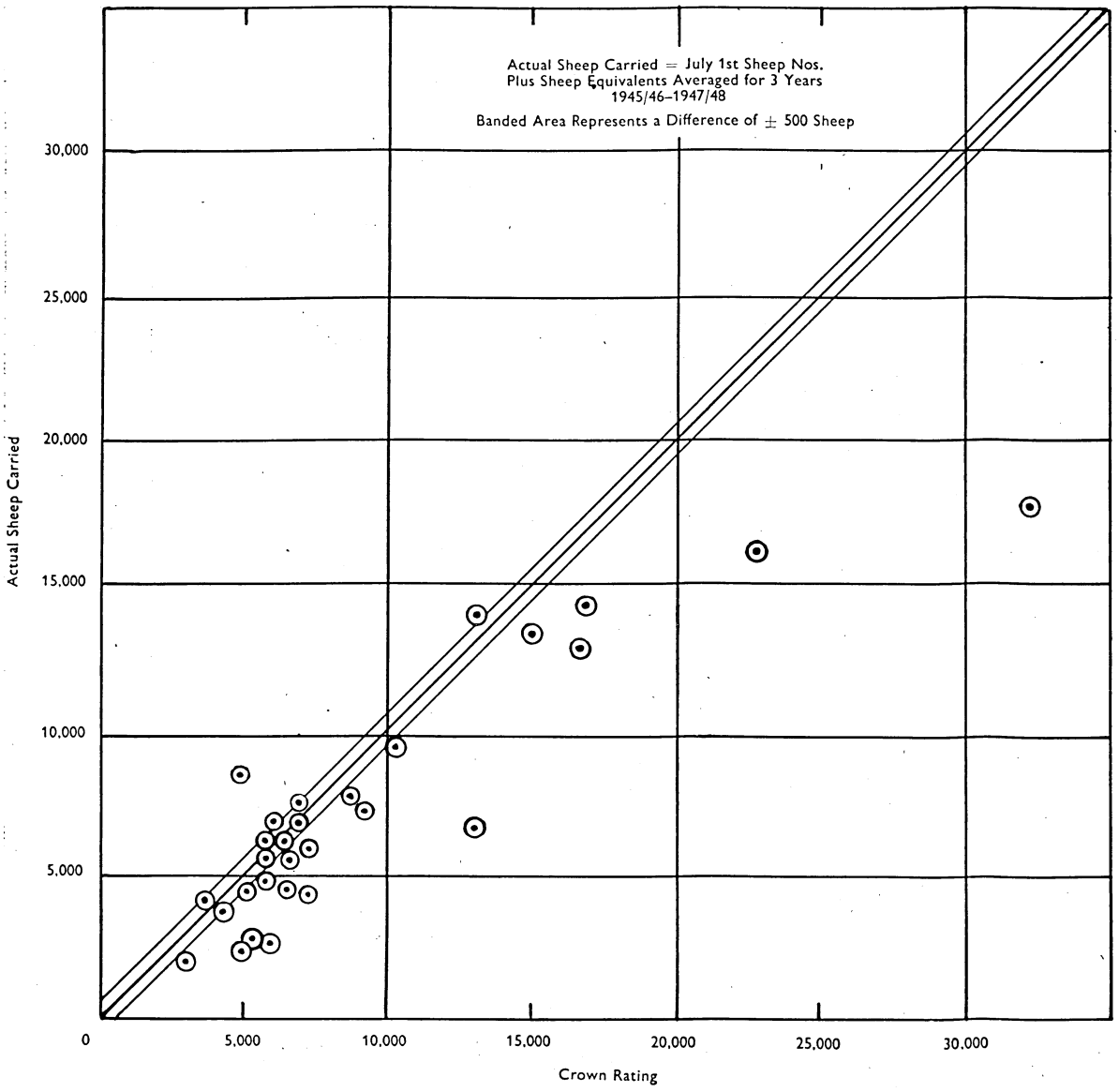
Other Stock.

The most common number of cattle is shown in Table No. 5 to be in the 0-25 class and there is little variation over the survey years. A few properties have no cattle at all, and in most instances, the cattle represent a small herd for the provision of milk and an occasional ration beast. The few cases where an appreciable number of cattle could effectively contribute to income have warranted special consideration in Section VI.

The number of horses is consistent with the ex-

DIAGRAM 2.

ACTUAL SHEEP CARRIED COMPARED WITH RATED CARRYING CAPACITY.



pectation that horses in this area are merely "plant" used in connection with the basic enterprise of woolgrowing. The most common number per property was found to be between 0-10 and only two properties ran more than 50 horses.

FEATURES OF SHEEP HUSBANDRY

Breed of Sheep.

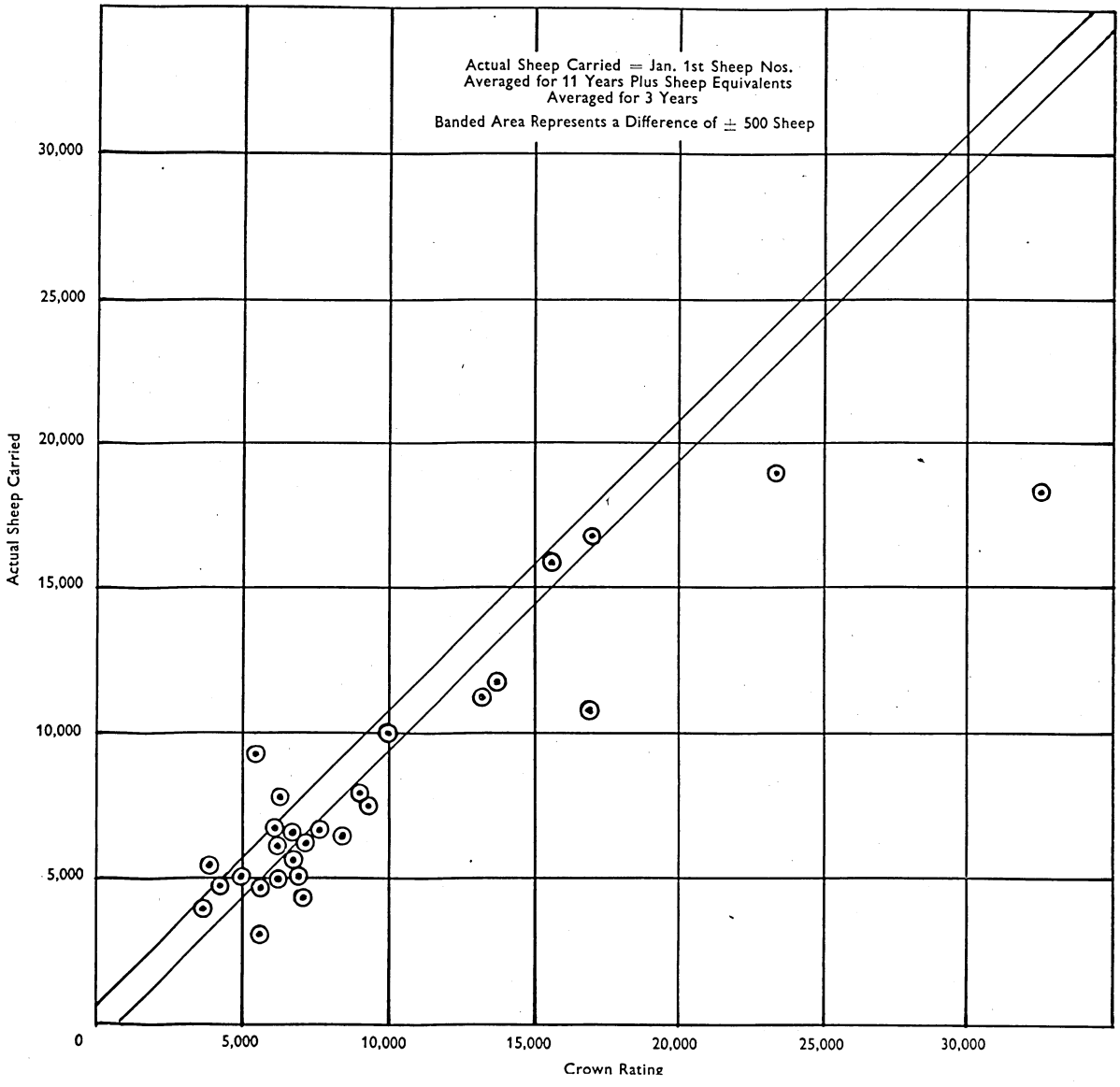
Merinos are the only breed run in the area and woolgrowing, with breeding of replacements, is the dominant enterprise. Exceptions are stud properties and properties which carry dry sheep only. Flock sheep are fairly large framed and cut approximately 9 lb. of medium quality (64's-70's) wool.

Lambing.

In the southern portion of the area, lambing is usually planned to occur in November and December, but further North the lambings are later and often extend into the Winter months of June and

DIAGRAM 3.

ACTUAL SHEEP CARRIED COMPARED WITH RATED CARRYING CAPACITY.—1938-48.



July. Percentages of lambs marked are normally not very high, averaging between 50% and 60% throughout the region.

Shearing and Crutching.

Shearing is normally carried out in the Winter months of June, July and August, although some properties plan the shearing time in either February/March or September/October to avoid the normal period of activity of the blowfly. Sheep are usually crutched once annually, although some properties crutch twice a year as a normal practice.

Fly Strike.

Blowflies are probably the most troublesome pest in the survey area. The fly is prevalent in the Autumn and Spring and following wet weather, but is inactive during hot dry weather. Several methods were adopted to control the fly and minimise the effect of strikes.

Mules Operation: Mules operation was performed on five of the sample properties and another five intended to commence the operation as soon as labour was available. Three properties had abandoned the operation, the reason, in two cases, being labour shortages while in the other the operation was not considered worth while. The general opinion among graziers, however, contradicts this last viewpoint.

Crutching: Even with sheep that have been mulesed, crutching is still normal practice.

Jetting: Jetting is not general, but is adopted on some holdings as an alternative to a second crutching.

Crutch Dipping: Some properties have installed a crutch dipping apparatus which dips the hind-quarters of a sheep into an arsenical solution.

Diseases.

The area is particularly free from sheep diseases which cause loss in other areas. Worm infestation is common on the sandy "desert" country just outside the limits of the survey area, but on the heavier open country of the downs, worms are no problem.

Scabby Mouth: Scabby mouth (*Labial dermatitis*) is a comparatively minor disease but is causing worry at present as shearers refuse to handle affected sheep and, in some cases, refuse to shear flocks with any affected animals in evidence.

Fluorosis: Fluorosis has been suspected in several areas, and is due to excessive amounts of fluorine in bore water.

Noxious Animals.

Dingoes are uncommon, but foxes were fairly numerous and, together with eaglehawks, caused losses at lambing time throughout the survey area.

Where shade and water formed a natural harbour for them, pigs were found in appreciable numbers. Pigs cause damage to water-holes and bore-drains and also some minor sheep losses. When present in small numbers they are of some use in destroying carrion. Kangaroos do not cause much damage. Control measures vary, but generally are confined to shooting, with occasional campaigns with poison when numbers begin to increase.

One or two rabbits were seen during the survey but they do not multiply and are no problem in the area.

Water Supplies, Rivers, etc.

The main water-courses in the region are the Thompson and Barcoo Rivers and their tributaries, the Darr and Alice Rivers. Other creeks are fairly small water-courses.

These drainage systems carry large volumes of water in flood periods, but, for the greater portion of the year are merely strings of water-holes which supply water for domestic and stock use for varying periods.

Excavated Tanks.

At present, as a result of tax concessions, a stimulus has been given to the construction of excavated tanks or dams. These additional improvements should provide for an increased number of stock as well as being a safeguard against dry periods.

Bores.

As the survey area lies within the Great Artesian Basin the main source of water is bores, either artesian (flowing) or sub-artesian (non-flowing). With the flowing bores it is customary to distribute the water along bore-drains which are so constructed as to provide watering facilities for the maximum amount of country. In many cases a single bore will run water through many miles of bore-drain and service thousands of acres of grazing land.

With the non-flowing bores, pumping equipment, normally a wind-mill, has to be erected, and the water is usually lifted into holding tanks which, in turn, provide water for sets of troughing or earth excavations.

Some of the water from sub-artesian bores carries a high salt content, and the percentage increases as evaporation from tanks and troughing takes place.

Fodder Conservation.

Very little fodder is conserved on properties as an insurance against periods of scarcity. One or two holdings in the area do conserve Mitchell grass as a hay reserve, and one property held a reserve of approximately five tons of grain, but these are the exceptions. Probably the reason for the lack of conservation is the fact that not every season provides suitable grass for hay-making and graziers are unwilling to purchase expensive plant that may only be used infrequently. Also in this grazing area there is little knowledge of hay-making, such as the time of cutting, curing, etc., and the labour available is unskilled in what may be termed "farming pursuits".

Drought Feeding Practices.

Most properties have a policy of selling cast-for-age sheep and/or wethers to lighten stock numbers when drought conditions commence. As the supplies of natural feed become scarcer, the policy on individual holdings varies somewhat; some graziers prefer to dispose of practically all stock on the best market available, while others will purchase agist-

ment, cut scrub (if suitable trees are plentiful and labour can be procured), or commence hand-feeding. The following shows the practices followed on the properties visited:

Send on agistment	11
Cut scrub	6
Hand-feed	7
Sell off surplus stock	25

Hand-feeding as a drought policy has been abandoned by several graziers who fed sheep in previous droughts. The reason for this is that the droughts were prolonged (e.g. as in 1926) and feeding, once commenced, had to be maintained. As a result, many thousands of pounds were spent on feedstuffs and large debts were accumulated. It took a number of years to remove this financial burden and the graziers are unwilling to take the same risks again.

In an endeavour to minimise costs, and to maintain a nucleus of breeding stock, some graziers feed only rams and young ewes; others, however, will provide feed for the bulk of the flock.

The type of fodder utilised depends on the availability of the fodders to be purchased and the amount of roughage that remains on the pastures. In the last drought (1948) the main feedstuffs were maize, lucerne, sheep nuts and, to a lesser extent, grain sorghum.

The concentrates portion of the ration was spread in trails along the ground (claypan areas were utilised in several instances) while the lucerne was either left in the bale with the tie-wires removed or scattered in clumps.

When the feed was spread on the looser soil, and large mobs of sheep were being fed, losses of foodstuffs occurred through trampling. Wooden or bag troughing was utilised for the feeding of concentrates in several cases to avoid this loss.

Losses of sheep attributed to drought during the period of the survey are set out in Table No. 6:

TABLE No. 6: SHEEP LOSSES ATTRIBUTABLE TO DROUGHTS.

Sheep Losses	*1945–46*	*1946–47*	*1947–48*	*Av. 3 years*
	Number of Properties			
Nil	15	10	13	7
Over 0 and under 500	8	2	9	6
500 and under 1,000	2	4	4	10
1,000 ,, ,, 2,000	3	6	3	6
2,000 ,, ,, 3,000	1	5	2	1
3,000 ,, ,, 4,000	2	1	–	–
4,000 ,, ,, 5,000	–	1	–	1
Over 5,000	–	1	–	–
Total	31	31	31	31
Total Losses of Sheep	14,750	38,976	12,286	

Transport Facilities.

The survey area is serviced by rail from Rockhampton, the line passing through both Barcaldine and Longreach (Map 1). A branch line from Barcaldine to Blackall, Emmet and Yaraka serves the lower sector and a private line (owned by the Aramac Shire Council) runs from Barcaldine to Aramac.

One of the disadvantages of the rail service is the lack of any connecting link between the Rockhampton-Longreach-Winton line and the Brisbane-Roma-Charleville line. In the opinion of graziers in the area, a rail link between Blackall and Charleville would be of inestimable value during droughts, as it would provide a speedy means of moving stock to agistment country.

In the recent drought pastures were relatively good from Charleville south and stock were moved from the Winton area to agistment in the Cunnamulla and Dirranbandi districts by rail via Rockhampton and down the coastal line. This involved days of travel which adversely affected sheep in weakened condition. Large numbers of stock were also moved by road transport to agistment areas, but the full demand for road transport could not be met. Motor transport, although more costly, is more convenient in that it provides paddock to paddock transport and obviates the need for droving weakened sheep to and from railheads.

SECTION V: FINANCIAL ANALYSIS

CAPITALISATION

The properties covered by the survey were all held under leasehold tenure, but there is considerable goodwill value attached to the leases. This "lease value" has been taken into account in determining total capitalisation.

In assessing lease values, records of all recent sales in the area, showing prices obtained for leases, were examined, and opinions were obtained from valuers and bank managers in the district.

The other constituent items of capital were valued as follows:

Valuations of improvements and plant, consisting of water supply, fencing, yards, station buildings, vehicles and machinery, were taken at book values for the three years. The value of the residence was excluded.

Livestock values were taken as unaltered throughout the survey period and were based on arbitrary values for each class of livestock. The arbitrary values, e.g. £1 per head for sheep; £8 per head for cattle and £12 per head for horses, were decided after investigation of the records of purchases and sales of the various livestock classes over the survey period.

The main items of capital are shown to be the lease value and sheep, with improvements next most important; plant and other stock being comparatively minor items. The average computed capital over the three years is £23,717, which represents a capitalisation of 12/6 per acre. This figure compares reasonably well with prices obtained in recent property sales in the area.

TABLE No. 7: AVERAGE COMPUTED CAPITAL PER PROPERTY.

Item	1945–46		1946–47		1947–48		Av. of 3 yrs	
	£	%	£	%	£	%	£	%
Lease value	9,601	39·5	9,601	39·8	9,601	42·3	9,601	40·5
Plant	863	3·5	832	3·4	908	4·0	868	3·7
Improvements	4,571	18·8	4,547	18·9	4,633	20·4	4,584	19·3
Sheep	8,710	35·8	8,498	35·2	7,009	30·9	8,072	34·0
Other stock	582	2·4	631	2·6	565	2·5	593	2·5
Total	24,327	100·0	24,109	100·0	22,717	100·0	23,717	100·0

During the three years the average computed capital decreased by £1,609 or 6·8%. This was due mainly to fewer sheep being held in 1947-48, probably owing to the influence of drought.

TABLE No. 8: DISTRIBUTION OF COMPUTED CAPITAL.

Computed Capital	1945–46	1946–47	1947–48	Av. for 3 yrs
Under £10,000	2	5	3	2
£10,000 and under £20,000	15	14	16	17
£20,000 ,, ,, £30,000	7	5	6	5
£30,000 ,, ,, £40,000	4	5	4	5
£40,000 ,, ,, £50,000	1	–	–	–
£50,000 and over	2	2	2	2
Total	31	31	31	31

The distribution by properties of the capital values is shown in Table No. 8.

Table No. 8 shows the most common capital value to be less than the average given in Table No. 7. Indeed, for the three-year average, 19 properties (representing 61% of the total number) are capitalised at under £20,000, although the average capital value for the same period is given as £23,717. The most common capital value per property is the £10,000-£20,000 group into which approximately half the properties fall each year.

RETURNS

Wool is the main source of revenue, with profits on sheep second in importance. Profits from other stock (cattle and horses) and receipts from other sources (skins, hides, agistment, etc.) are comparatively minor items, except in isolated cases.

The loss on sheep accounts and the decrease in other stock accounts in 1946-47 are a reflection of drought conditions then prevailing. Revenue from other sources rose slightly in 1947-48 with some properties increasing agistment earnings.

TABLE No. 9: AVERAGE RETURNS PER PROPERTY.

Source	1945–46		1946–47		1947–48		Av. of 3 years	
	£	%	£	%	£	%	£	%
Wool	5,278	88·8	7,903	99·7	13,078	91·0	8,753	93·5
Sheep a/c	615	10·3	–	–	1,040	7·2	503	5·4(a)
Other stock a/c's	23	0·4	1	0·01	152	1·1	58	0·6(a)
Other	30	0·5	23	0·3	95	0·7	50	0·5
Total	5,946	100·0	7,927	100·0	14,365	100·0	9,366	100·0

(a) In calculating 3-year averages, losses made on Stock Trading Accounts in any year are subtracted from profits made in other years.

TABLE No. 10: INDEX OF AVERAGE RETURNS PER PROPERTY.

Item	1945–46	1946–47	1947–48
Wool	100	150	248
Sheep a/c	100	–	169
Other stock a/c's	100	3	663
Other	100	76	314
Total	100	133	242

Wool receipts rose despite the decrease in the quantity of wool produced which resulted from a decline in sheep numbers over the survey period:

	Av. Pounds of Wool Produced.		
Year	1945–46	1946–47	1947–48
Pounds weight	72,484	67,355	66,427

The rise in wool receipts is explained by the average prices received for greasy wool in Brisbane over the same period:

Year	1945–46	1946–47	1947–48
Price lb. greasy	15·87d.	26·48d.	45·35d.

The 1945-46 period was the last year under the war-time appraisement system and prices rose sharply following the resumption of auctions. The prices received in 1946-47 and 1947-48 are considerably above the long term average and the following prices are shown for comparison purposes. Since 1949 prices have risen to exceptionally high levels.

Period	Average Price per lb.
1929-30—1933-34	10·45d.
1934-35—1938-39	12·67d.
1939-40—1941-42(a)	13·36d.
1942-43—1945-46(a)	15·82d.

(a) Appraisement years.

The distribution of returns shows the influence of the larger properties on the average returns shown in Table No. 9. Although the average return per property for three years is £9,366, Table No. 11 indicates that 21 properties (64% of the sample) received £8,000 or less.

TABLE No. 11: DISTRIBUTION OF TOTAL RETURNS.

Returns	1945–46	1946–47	1947–48	Av. for 3 years
Under £2,000	5	1	1	1
£2,000 and under £4,000	11	9	1	5
£4,000 ,, ,, £8,000	9	11	11	15
£8,000 ,, ,, £12,000	5	3	8	3
£12,000 ,, ,, £16,000	–	5	3	2
£16,000 ,, ,, £20,000	–	–	1	4
£20,000 ,, ,, £24,000	–	1	1	–
£24,000 ,, ,, £28,000	–	–	2	–
£28,000 and over	1	1	3	1
Total	31	31	31	31

COSTS

For the purposes of this survey, costs include all charges on the property except the value of the operator's labour and capital costs (rent and all interest). However, rent and interest paid are shown separately.

TABLE No. 12: AVERAGE COSTS PER PROPERTY.

Item	1945–46		1946–47		1947–48		Av. for 3 years	
	£	%	£	%	£	%	£	%
1. Wages	718	20·1	696	15·4	764	18·0	726	17·9
2. Shearing, crutching and woolpacks	687	19·2	792	17·6	782	18·4	754	18·6
3. Stores and rations	193	5·4	243	5·4	227	5·4	221	5·4
4. Stock charges and sheep classing	51	1·4	26	0·6	55	1·3	44	1·1
5. Building & fencing materials, duplicates and repairs	275	7·7	340	7·5	373	8·8	329	8·1
6. Petrol, oil, fuel, motor and travelling exps.	232	6·5	280	6·2	311	7·3	274	6·8
7. Purchased fodder, agistment paid, droving and drought exps.	154	4·3	281	6·2	171	4·0	202	5·0
8. Rates and taxes	182	5·1	216	4·8	242	5·7	213	5·3
9. Insurance	34	1·0	36	0·8	43	1·0	38	0·9
10. Freight, wool selling costs & scouring charges	526	14·7	844	18·7	659	15·5	676	16·7
11. Cartage & rail	92	2·6	120	2·7	99	2·3	104	2·6
12. Subs, to organisations, stamps, stationery, telephones, bank, legal and accountancy charges	66	1·8	70	1·5	84	2·0	73	1·8
13. Miscellaneous exps.	68	1·9	88	2·0	89	2·1	82	2·0
14. Losses on Sheep A/c(a)	–	–	141	3·1	–	–	–	–
15. Depreciation	291	8·1	335	7·4	345	8·1	323	8·0
Total Costs Excluding Rent and Interest Paid	3,569	100·0	4,505	100·0	4,245	100·0	4,059	100·0

(a) In calculating 3-year averages, losses made on Stock Trading Accounts in any year are subtracted from profits made in other years.

In addition to the items of Table No. 12, the following average expenses were also incurred:

	1945–46	1946–47	1947–48	Average for 3 years
Rent	480	475	485	480
Interest paid	369	378	319	355

The principal items of expense are wages, shearing and crutching costs, and wool selling costs which, together, constitute more than 50% of total costs.

Table No. 13 should be considered in conjunction with Table No. 12 in analysing the change in costs.

TABLE No. 13: INDEX OF AVERAGE COSTS PER PROPERTY.
(Base: 1945–46 = 100)

Item	1945–46	1946–47	1947–48
1. Wages	100	97	107
2. Shearing, crutching and woolpacks	100	115	114
3. Stores and rations	100	126	118
4. Stock charges and sheep classing	100	50	107
5. Building & fencing materials, duplicates and repairs	100	123	136
6. Petrol, oil, fuel, motor and travelling exps.	100	120	134
7. Purchased fodder, agistment paid, droving and drought expenses	100	183	111
8. Rates and taxes	100	119	133
9. Insurance	100	106	128
10. Freight, wool selling costs and scouring costs	100	160	125
11. Cartage and rail	100	130	108
12. Subs. to organisations, stamps, stationery, telephone, bank, legal and accountancy charges	100	106	127
13. Miscellaneous expenses	100	129	130
14. Losses on Sheep A/c.	Profit	–	–
15. Depreciation	100	115	119
Total Costs Excluding Rent and Interest	100	126	119

The major items of costs are:

Wages: Wages include all wages paid to employees other than the managing operator. Where there are two or more partners actually working a property, one partner has been considered the managing operator and an allowance at current pastoral award rates has been included in wages for the labour of the other partner or partners. Where a paid manager ran the property and the owner took no direct part in its operation, the salary paid to the manager has been deducted from the item "Wages" and the manager treated as the managing operator. This approach places all properties on a uniform basis for the subsequent analysis of income.

Over the period 1945-46—1947-48 the award rate for station labour increased from £3/12/0 per week with keep to £5/15/0 per 40 hour week with keep. However, the fluctuations in wages paid are mainly dependent upon the availability of labour. Practically all properties reported a shortage of labour, and improvements such as yards and fencing have deteriorated to some extent through lack of proper maintenance. In some instances stock numbers have been reduced and work such as the mules operation has been postponed indefinitely because of the labour situation.

The difficulties in obtaining labour were due to several causes—mainly isolation and the more attractive wages and conditions obtaining in the larger towns and the capital city.

Shearing, Crutching and Wool Packs.

The award rates for shearing and crutching increased over the survey period but the rise in the total of this item has been reduced by the decline in sheep numbers. The cost of wool packs also increased by approximately 80% between 1945 and 1948.

Freight, Wool Selling Costs and Scouring Costs.

The substantial rise in this item between 1945-46 and 1946-47 is due to the operation of the 5% Contributory Charge in 1946-47. Figures for 1947-48 reflect the fall in the Contributory Charge to ¾%.

Relatively little wool was scoured at the well-equipped local scouring works before the long haul to Brisbane via Rockhampton for sale. Graziers said that this was largely because rail freights per ton on scoured wool were so much higher than on greasy wool that little saving was effected in spite of a reduction of roughly 50% in gross weight.

Every other cost item showed increases on the 1945-46 figure, except stock charges and sheep class-

TABLE No. 14: DISTRIBUTION OF TOTAL COSTS.
(Excluding Rent & Interest Paid)

Costs	1945–46	1946–47	1947–48	Av. 3 yrs
Under £2,000	9	4	5	5
£2,000 and under £4,000	15	15	17	18
£4,000 ,, ,, £6,000	5	6	3	3
£6,000 ,, ,, £8,000	1	3	4	3
£8,000 ,, ,, £10,000	–	2	1	1
£10,000 and over	1	1	1	1
Total	31	31	31	31

ing, a minor item, which decreased in 1946-47. Large increases in 1946-47 in purchased fodder, agistment paid, droving and drought expenses and on cartage and rail arise from the drought conditions of that year. The 1946-47 loss on sheep account, as against profits in 1945-46 and 1947-48, is attributed to the same cause.

The distribution of costs by properties is given in Table No. 14, which shows that most properties fall into the £2,000 to £4,000 group.

ANALYSIS OF FARM INCOME

In analysing farm income, the following measures have been taken as determining the financial success or otherwise of the properties.

(a) Labour and management income.
(b) Return to capital and management.
(c) Rates of return to capital and management.

A figure representing the net farm income was obtained by deducting the costs (Table No. 12) from the total returns (Table No. 9) and this amount is the sum available for payment of all charges on the capital invested in the property and to recompense the operator for his labour and management over the year.

(a) From the net farm income, interest (arbitrarily fixed at 4%) on the average computed capital, and rent (interest on Crown investment, i.e. land) was deducted, leaving a figure representing the labour and management income as a residual.

Interest is a legitimate charge on all the capital invested in a property, but the legal title to this interest, and the rates chargeable, differ in all cases. As this study is concerned with properties, rather than the financial status of the operators, a standard rate of interest has been applied over the total capital investment of all properties, irrespective of owners' equity.

(b) The return to capital and management was derived from the net farm income by deducting an allowance (at current pastoral award rates) for the value of the operator's own labour only, as distinct from the management function.

(c) The rate of return to capital and management was obtained by relating the return to capital and management to the computed capital values.

Over the period of the survey, the average net farm income was £2,377 in 1945-46; £3,422 in 1946-47; and £10,120 in 1947-48. This increase reflects the increased returns received for wool over the same period.

Labour and Management Income.

A substantial rise in the average labour and management income, from £924 in 1945-46 to £8,726 in 1947-48 is shown in this table, but the distribution table (No. 16) indicates that averages are influenced profoundly by the larger properties and that most properties receive less than this average.

TABLE No. 15: AVERAGE LABOUR AND MANAGEMENT INCOME PER PROPERTY.

Average per Property	*1945–46*	*1946–47*	*1947–48*	*Av. of 3 yrs*
Returns	5,946	7,927	14,365	9,366
Costs (excluding rent & interest)	3,569	4,505	4,245	4,059
Net Farm Income	2,377	3,422	10,120	5,307
Interest on Computed Capital @ 4%	973	964	909	949
Rent	480	475	485	480
	1,453	1,439	1,394	1,429
Labour/Management Income ..	924	1,983	8,726	3,878

TABLE No. 16: DISTRIBUTION OF LABOUR AND MANAGEMENT INCOMES.

Labour/Management Income	*1945–46*	*1946–47*	*1947–48*	*Av. for 3 yrs*
Deficit	15	8	1	2
£0 and under £2,000	12	11	4	12
£2,000 ,, ,, £4,000	2	4	9	9
£4,000 ,, ,, £6,000	1	5	4	3
£6,000 ,, ,, £8,000	–	2	4	–
£8,000 ,, ,, £10,000	–	1	3	4
£10,000 and over	1	–	6	1
Total	31	31	31	31

In 1945-46, 15 properties showed a deficit and only four properties received a labour and management income of over £2,000. By 1947-48, conditions

TABLE No. 17: LABOUR AND MANAGEMENT INCOME COMPARED WITH PROPERTY SIZE.

Property Size in '000 Acres

1945–46

Labour and Management Income	*Under 15*	*15–25*	*25–35*	*35–45*	*45–55*	*55–65*	*65–75*	*75–85*	*85–95*	*95–105*	*Over 105*	*Total*
Deficit	2	8	2	1		1				1		15
£0 and under £2,000		6	2	1		1	1			1		12
£2,000 ,, ,, £4,000		1	1									2
£4,000 ,, ,, £6,000					1							1
£6,000 ,, ,, £8,000												–
£8,000 ,, ,, £10,000												–
£10,000 and over											1	1
Total	2	15	5	2	1	2	1	–	–	2	1	31

1946–47

Labour and Management Income	*Under 15*	*15–25*	*25–35*	*35–45*	*45–55*	*55–65*	*65–75*	*75–85*	*85–95*	*95–105*	*Over 105*	*Total*
Deficit	1	5	1	1								8
£0 and under £2,000	1	7	2								1	11
£2,000 ,, ,, £4,000		3				1						4
£4,000 ,, ,, £6,000			2		1	1				1		5
£6,000 ,, ,, £8,000				1			1					2
£8,000 ,, ,, £10,000										1		1
£10,000 and over												–
Total	2	15	5	2	1	2	1	–	–	2	1	31

1947–48

Labour and Management Income	*Under 15*	*15–25*	*25–35*	*35–45*	*45–55*	*55–65*	*65–75*	*75–85*	*85–95*	*95–105*	*Over 105*	*Total*
Deficit		1										1
£0 and under £2,000		2	2									4
£2,000 ,, ,, £4,000	2	6		1								9
£4,000 ,, ,, £6,000		2	2									4
£6,000 ,, ,, £8,000		2		1		1						4
£8,000 ,, ,, £10,000		2	1									3
£10,000 and over					1	1	1			2	1	6
Total	2	15	5	2	1	2	1	–	–	2	1	31

Average for 3 years

Labour and Management Income	*Under 15*	*15–25*	*25–35*	*35–45*	*45–55*	*55–65*	*65–75*	*75–85*	*85–95*	*95–105*	*Over 105*	*Total*
Deficit		2										2
£0 and under £2,000	2	7	2	1								12
£2,000 ,, ,, £4,000		6	2			1						9
£4,000 ,, ,, £6,000			1	1						1		3
£6,000 ,, ,, £8,000												–
£8,000 ,, ,, £10,000					1	1	1			1		4
£10,000 and over											1	1
Total	2	15	5	2	1	2	1	–	–	2	1	31

TABLE No. 18: LABOUR AND MANAGEMENT INCOME COMPARED WITH SHEEP NUMBERS.

(Based on Stock Returns as at 1st January).

Sheep Numbers in '000's

1945–46

Labour and Management Income	*Under 2*	*2–4*	*4–6*	*6–8*	*8–10*	*10–12*	*12–14*	*14–16*	*16–18*	*Over 18*	*Total*
Deficit	1	6	3	3		1	1				15
£0 and under £2,000		1	5	2	2	1		1			12
£2,000 ,, ,, £4,000				1	1						2
£4,000 ,, ,, £6,000							1				1
£6,000 ,, ,, £8,000											–
£8,000 ,, ,, £10,000											–
£10,000 and over										1	1
Total	1	7	8	6	3	2	2	1	–	1	31

1946–47

Labour and Management Income	*Under 2*	*2–4*	*4–6*	*6–8*	*8–10*	*10–12*	*12–14*	*14–16*	*16–18*	*Over 18*	*Total*
Deficit	2	2	3	1							8
£0 and under £2,000	3	1	5	1						1	11
£2,000 ,, ,, £4,000		2	1		1						4
£4,000 ,, ,, £6,000			1	1		2		1			5
£6,000 ,, ,, £8,000					1		1				2
£8,000 ,, ,, £10,000							1				1
£10,000 and over											–
Total	5	5	10	3	2	2	2	1	–	1	31

1947–48

Labour and Management Income	*Under 2*	*2–4*	*4–6*	*6–8*	*8–10*	*10–12*	*12–14*	*14–16*	*16–18*	*Over 18*	*Total*
Deficit	1										1
£0 and under £2,000		2	1	1							4
£2,000 ,, ,, £4,000	1	4	2	1							8
£4,000 ,, ,, £6,000			3	1							4
£6,000 ,, ,, £8,000		2			1			1			4
£8,000 ,, ,, £10,000		1	1	1							3
£10,000 and over					2	1	1	1		1	6
Total	2	9	7	4	3	1	1	2	–	1	30

Average for 3 years

Labour and Management Income	*Under 2*	*2–4*	*4–6*	*6–8*	*8–10*	*10–12*	*12–14*	*14–16*	*16–18*	*Over 18*	*Total*
Deficit	1	1									2
£0 and under £2,000		4	6	2							12
£2,000 ,, ,, £4,000		2	5	1		1					9
£4,000 ,, ,, £6,000			1		1		1				3
£6,000 ,, ,, £8,000											–
£8,000 ,, ,, £10,000					1	2		1			4
£10,000 and over										1	1
Total	1	7	12	3	2	3	1	1	–	1	31

had improved considerably, and only one property recorded a deficit, while 26 properties received a labour and management income of over £2,000. In this year, the one deficit recorded was due to the sale as a drought measure of practically the entire flock.

If it is assumed quite arbitrarily that £500 was, at the time, the minimum return which could be regarded as adequate to the operator for his labour and the responsibility of management, it is found that in 1945-46, 65% of the sample received less than this minimum. In 1946-47 an improvement was shown, but still 32% of the sample received less than £500, while in 1947-48 only 3% (one property) received less than the minimum.

In any single year, labour and management income is more probably determined by factors such as price of wool, seasonal conditions or management policy, than by property size. Over a longer term however, there is a definite tendency for labour and management income to vary in accord with property size. In 1945-46 practically all properties received a low labour and management income, but in subsequent years, larger incomes were obtained, the greatest movement being shown by the larger properties. For the average of the three years, a fairly good relationship between labour and management income and property size is indicated. (See Table No. 17.)

While Table No. 15 shows that the average labour and management income for 1945-46; 1946-47; and 1947-48 was £924; £1,983; and £8,726 respectively, an analysis of the labour and management incomes in property size groups reveals that the average income for properties of under 40,000 acres (comprising 74% of the sample) was £171; £1,215; and £4,196 for the same years. The average income for properties of 40,000 acres and larger (25% of the sample) was £3,090; £4,190; and £21,756 over the same period.

A similar trend to that shown in Table No. 17 is indicated in Table No. 18, i.e., no clear relationship in any individual year, but a definite pattern for the three-year average.

When the labour and management incomes are analysed in flock size groups, 77% of the sample, comprising those flocks of less than 9,000 sheep, received an income much less than the average as shown in Table No. 15. The average incomes received by this group were £151 in 1945-46; £1,114 in 1946-47; and £4,160 in 1947-48. For the remaining 23%, consisting of those properties with 9,000 sheep and more, the labour and management incomes for the same periods were £3,576; £4,961; and £24,389.

TABLE No. 19: LABOUR AND MANAGEMENT INCOME COMPARED WITH COMPUTED CAPITAL.

Average Labour and Management Income	Computed Capital in £'000's																								
	1945–46							1946–47							1947–48						Average for 3 years						
	Under 10	10–20	20–30	30–40	40–50	Over 50	Total	Under 10	10–20	20–30	30–40	40–50	Over 50	Total	Under 10	10–20	20–30	30–40	40–50	Over 50	Total	Under 10	10–20	20–30	30–40	40–50	Over 50	Total
Deficit	2	8	3	1		1	15	1	5	2				8	1						1		2				2
£0 and under £2,000		6	3	2	1		12	3	6	1			1	11	1	3					4	2	8	2				12
£2,000 ,, ,, £4,000		1	1				2	1	2		1			4	1	7	1				9		7	1	1			9
£4,000 ,, ,, £6,000				1			1		1	1	2		1	5		2	2				4			2			1	3
£6,000 ,, ,, £8,000							–			1	1			2		1	3				4							–
£8,000 ,, ,, £10,000							–				1			1		3					3				4			4
£10,000 and over						1	1							–				4		2	6						1	1
Total	2	15	7	4	1	2	31	5	14	5	5	–	2	31	3	16	6	4	–	2	31	2	17	5	5	–	2	31

As with Tables Nos. 17 and 18, Table No. 19 shows that the relationship between labour and management and computed capital is again clearest in the average over three years.

Return to Capital and Management.

The average return to capital and management increased from £2,113 in 1945-46 to £3,136 in 1946-

TABLE No. 20: AVERAGE RETURN TO CAPITAL AND MANAGEMENT PER PROPERTY.

Average per Property	1945–46	1946–47	1947–48	Av. 3 yrs
Returns	5,946	7,927	14,365	9,366
Costs (excluding rent & interest)	3,569	4,505	4,245	4,059
Net Farm Income "A" ..	2,377	3,422	10,120	5,307
Value of operator's labour	264	286	304	285
Return to Capital & Management.. ..	2,113	3,136	9,816	5,022

TABLE No. 22: RETURN TO CAPITAL AND MANAGEMENT COMPARED WITH PROPERTY SIZE.

Property Size in '000 Acres

1945–46

Return to Capital and Management	Under 15	15–25	25–35	35–45	45–55	55–65	65–75	75–85	85–95	95–105	Over 105	Total
Deficit		6	1									7
£0 and under £2,000	2	6	3	1		1						13
£2,000 ,, ,, £4,000		2	1	1		1	1			2		8
£4,000 ,, ,, £6,000		1			1							2
£6,000 ,, ,, £8,000												–
£8,000 ,, ,, £10,000												–
£10,000 and over											1	1
Total	2	15	5	2	1	2	1	–	–	2	1	31

1946–47

Return to Capital and Management	Under 15	15–25	25–35	35–45	45–55	55–65	65–75	75–85	85–95	95–105	Over 105	Total
Deficit	1	2										3
£0 and under £2,000	1	9	2	1								13
£2,000 ,, ,, £4,000		3	1									4
£4,000 ,, ,, £6,000		1	1			1						3
£6,000 ,, ,, £8,000			1		1	1						3
£8,000 ,, ,, £10,000				1			1			1	1	4
£10,000 and over										1		1
Total	2	15	5	2	1	2	1	–	–	2	1	31

1947–48

Return to Capital and Management	Under 15	15–25	25–35	35–45	45–55	55–65	65–75	75–85	85–95	95–105	Over 105	Total
Deficit												–
£0 and under £2,000		3	1									4
£2,000 ,, ,, £4,000	2	6	1									9
£4,000 ,, ,, £6,000		2	1	1								4
£6,000 ,, ,, £8,000		1	1									2
£8,000 ,, ,, £10,000		3	1	1		1						6
£10,000 and over					1	1	1			2	1	6
Total	2	15	5	2	1	2	1	–	–	2	1	31

Average for 3 years

Return to Capital and Management	Under 15	15–25	25–35	35–45	45–55	55–65	65–75	75–85	85–95	95–105	Over 105	Total
Deficit												–
£0 and under £2,000	2	8	2									12
£2,000 ,, ,, £4,000		6	1	1								8
£4,000 ,, ,, £6,000		1	2			1						4
£6,000 ,, ,, £8,000				1								1
£8,000 ,, ,, £10,000										1		1
£10,000 and over					1	1	1			1	1	5
Total	2	15	5	2	1	2	1	–	–	2	1	31

TABLE No. 23: RETURN TO CAPITAL AND MANAGEMENT COMPARED WITH SHEEP NUMBERS.

Sheep Numbers in '000's

1945–46

Return to Capital and Management	Under 2	2–4	4–6	6–8	8–10	10–12	12–14	14–16	16–18	Over 18	Total
Deficit		5	1	1							7
£0 and under £2,000	1	2	5	4		1					13
£2,000 ,, ,, £4,000			2	1	2	1	1	1			8
£4,000 ,, ,, £6,000					1		1				2
£6,000 ,, ,, £8,000											–
£8,000 ,, ,, £10,000											–
£10,000 and over										1	1
Total	1	7	8	6	3	2	2	1	–	1	31

1946–47

Return to Capital and Management	Under 2	2–4	4–6	6–8	8–10	10–12	12–14	14–16	16–18	Over 18	Total
Deficit	1	1	1								3
£0 and under £2,000	4	1	7	1							13
£2,000 ,, ,, £4,000		2	1	1							4
£4,000 ,, ,, £6,000		1	1		1						3
£6,000 ,, ,, £8,000				1		2					3
£8,000 ,, ,, £10,000					1		1	1		1	4
£10,000 and over							1				1
Total	5	5	10	3	2	2	2	1	–	1	31

1947–48

Return to Capital and Management	Under 2	2–4	4–6	6–8	8–10	10–12	12–14	14–16	16–18	Over 18	Total
Deficit											–
£0 and under £2,000	1	2	1								4
£2,000 ,, ,, £4,000	1	4	2	1							8
£4,000 ,, ,, £6,000			2	2							4
£6,000 ,, ,, £8,000		1	1								2
£8,000 ,, ,, £10,000		2	1	1	1			1			6
£10,000 and over					2	1	1	1		1	6
Total	2	9	7	4	3	1	1	2	–	1	30

Average for 3 years

Return to Capital and Management	Under 2	2–4	4–6	6–8	8–10	10–12	12–14	14–16	16–18	Over 18	Total
Deficit											–
£0 and under £2,000	1	5	5	1							12
£2,000 ,, ,, £4,000		2	5	1							8
£4,000 ,, ,, £6,000			2	1		1					4
£6,000 ,, ,, £8,000					1						1
£8,000 ,, ,, £10,000							1				1
£10,000 and over					1	2		1		1	5
Total	1	7	12	3	2	3	1	1	–	1	31

47 and £9,816 in 1947-48. Over the three years, the average return was £5,022. These averages are influenced by the higher returns received by the larger properties and Table No. 21 shows the departures from the averages.

TABLE No. 21: DISTRIBUTION OF RETURNS TO CAPITAL AND MANAGEMENT.

Return to Capital & Management	*1945–46*	*1946–47*	*1947–48*	*Av. for 3 yrs*
Deficit	7	3	–	–
£0 and under £2,000	13	13	4	12
£2,000 ,, ,, £4,000	8	4	9	8
£4,000 ,, ,, £6,000	2	3	4	4
£6,000 ,, ,, £8,000	–	3	2	1
£8,000 ,, ,, £10,000	–	4	6	1
£10,000 and over	1	1	6	5
Total	31	31	31	31

In 1945-46, 20 properties received less than £2,000; in 1946-47, 16 properties received less than £2,000 while in 1947-48, although the average return was £9,816, 19 properties received less than £8,000.

In 1945-46, 42% of the sample received less than 4%. In the subsequent years 26% and 3% of the sample received less than this rate.

Table Nos. 22, 23 and 24 compare the return to capital and management with property size, flock size and the computed capital. A similar pattern to that shown by the comparison tables of labour and management income is displayed in these tables; the relationship is best seen in the 3-year average rather than in any individual year.

Although the average return to capital and management (of the 31 properties) as shown in Table No. 20 was £2,113 in 1945-46; £3,136 in 1946-47; and £9,816 in 1947-48, the average return to those properties of under 40,000 acres, comprising 74% of the sample, was £832, £1,840, £4,774 in the same years. The larger properties, i.e. over 40,000 acres, received £5,799, £6,861 and £24,317.

Similarly, when an analysis is made in flock size groups, those properties with less than 9,000 sheep (77% of the sample) received £845, £1,777, and £4,773 in the individual years of the survey, while the remaining properties with 9,000 sheep and more (23% of sample) received £6,462, £7,796 and £27,110.

Rate of Return to Capital and Management.

The rate of return to capital and management gives a measure of profitability independent of scale of enterprise and is the most important indicator of efficiency.

Table No. 25 shows the distribution of rates of return to capital (as computed) and management for the survey period and demonstrates the improved position in 1947-48.

The average rates of return for the three survey years were 8·7%, 13·0% and 43·2% respectively, but

TABLE No. 24: RETURN TO CAPITAL AND MANAGEMENT COMPARED WITH COMPUTED CAPITAL.

Return to Capital and Management	*Computed Capital in £'000's*																							
	1945–46							*1946–47*							*1947–48*							*Average for 3 years*						
	Under 10	*10–20*	*20–30*	*30–40*	*40–50*	*Over 50*	*Total*	*Under 10*	*10–20*	*20–30*	*30–40*	*40–50*	*Over 50*	*Total*	*Under 10*	*10–20*	*20–30*	*30–40*	*40–50*	*Over 50*	*Total*	*Under 10*	*10–20*	*20–30*	*30–40*	*40–50*	*Over 50*	*Total*
Deficit	1	4	2				7	1	2					3							–							–
£0 and under £2,000	1	8	3	1			13	3	8	2				13	2	2					4	2	10					12
£2,000 ,, ,, £4,000		2	2	2	1	1	8	1	2	1				4	1	8					9		5	3				8
£4,000 ,, ,, £6,000		1		1			2		2		1			3		2	2				4		2	1	1			4
£6,000 ,, ,, £8,000							–			1	2			3		1	1				2			1				1
£8,000 ,, ,, £10,000							–			1	1		2	4		3	3				6						1	1
£10,000 and over						1	1				1			1				4		2	6				4		1	5
Total	2	15	7	4	1	2	31	5	14	5	5	–	2	31	3	16	6	4	–	2	31	2	17	5	5	–	2	31

TABLE No. 25: DISTRIBUTION OF RATES OF RETURN TO CAPITAL AND MANAGEMENT.

Rates of Return	*1945–46*	*1946–47*	*1947–48*	*Av. for 3 yrs*
Deficit	7	3	–	–
0% and under 10%	14	12	1	8
10% ,, ,, 20%	8	7	6	9
20% ,, ,, 30%	2	7	6	10
30% ,, ,, 40%	–	2	7	4
40% ,, ,, 50%	–	–	2	–
50% ,, ,, 60%	–	–	5	–
Over 60%	–	–	4	–
Total	31	31	31	31

TABLE No. 26: RATE OF RETURN TO CAPITAL AND MANAGEMENT COMPARED WITH PROPERTY SIZE.

Property Size in '000 Acres

Rate of Return to Capital and Management	1945–46											
	Under 15	15–25	25–35	35–45	45–55	55–65	65–75	75–85	85–95	95–105	Over 105	Total
Deficit		6	1									7
0% and under 10%	2	5	3	1		1				2		14
10% ,, ,, 20%		3	1	1	1	1	1					8
20% ,, ,, 30%		1									1	2
30% ,, ,, 40%												–
40% ,, ,, 50%												–
50% ,, ,, 60%												–
60% and over												–
Total	2	15	5	2	1	2	1	–	–	2	1	31

Rate of Return to Capital and Management	1946–47											
	Under 15	15–25	25–35	35–45	45–55	55–65	65–75	75–85	85–95	95–105	Over 105	Total
Deficit	1	2										3
0% and under 10%	1	7	2	1							1	12
10% ,, ,, 20%		3	1		1	1				1		7
20% ,, ,, 30%		2	2			1	1			1		7
30% ,, ,, 40%		1		1								2
40% ,, ,, 50%												–
50% ,, ,, 60%												–
60% and over												–
Total	2	15	5	2	1	2	1	–	–	2	1	31

Rate of Return to Capital and Management	1947–48											
	Under 15	15–25	25–35	35–45	45–55	55–65	65–75	75–85	85–95	95–105	Over 105	Total
Deficit												–
0% and under 10%		1										1
10% ,, ,, 20%		3	2	1								6
20% ,, ,, 30%	1	4								1		6
30% ,, ,, 40%	1	3	1	1		1						7
40% ,, ,, 50%		1	1									2
50% ,, ,, 60%		2	1				1			1		5
60% and over		1			1	1					1	4
Total	2	15	5	2	1	2	1	–	–	2	1	31

Rate of Return to Capital and Management	Average for 3 years											
	Under 15	15–25	25–35	35–45	45–55	55–65	65–75	75–85	85–95	95–105	Over 105	Total
Deficit												–
0% and under 10%	1	4	2	1								8
10% ,, ,, 20%	1	6				1				1		9
20% ,, ,, 30%		4	3	1			1			1		10
30% ,, ,, 40%		1			1	1					1	4
40% ,, ,, 50%												–
50% ,, ,, 60%												–
60% and over												–
Total	2	15	5	2	1	2	1	–	–	2	1	31

TABLE No. 27: RATE OF RETURN TO CAPITAL AND MANAGEMENT COMPARED WITH SHEEP NUMBERS.

Sheep Numbers in '000's

Rate of Return to Capital and Management	1945–46										
	Under 2	2–4	4–6	6–8	8–10	10–12	12–14	14–16	16–18	Over 18	Total
Deficit		5	1	1							7
0% and under 10%	1	1	5	4		1	1	1			14
10% ,, ,, 20%		1	2	1	2	1	1				8
20% ,, ,, 30%					1					1	2
30% ,, ,, 40%											–
40% ,, ,, 50%											–
50% ,, ,, 60%											–
60% and over											–
Total	1	7	8	6	3	2	2	1	–	1	31

Rate of Return to Capital and Management	1946–47										
	Under 2	2–4	4–6	6–8	8–10	10–12	12–14	14–16	16–18	Over 18	Total
Deficit	1	1	1								3
0% and under 10%	3	1	6	1						1	12
10% ,, ,, 20%	1	1	1	1	1	1		1			7
20% ,, ,, 30%		1	2	1		1	2				7
30% ,, ,, 40%		1			1						2
40% ,, ,, 50%											–
50% ,, ,, 60%											–
60% and over											–
Total	5	5	10	3	2	2	2	1	–	1	31

Rate of Return to Capital and Management	1947–48										
	Under 2	2–4	4–6	6–8	8–10	10–12	12–14	14–16	16–18	Over 18	Total
Deficit											–
0% and under 10%	1										1
10% ,, ,, 20%		2	2	2							6
20% ,, ,, 30%	1	3		1			1				6
30% ,, ,, 40%		2	3		1			1			7
40% ,, ,, 50%			1								1
50% ,, ,, 60%		2		1		1		1			5
60% and over			1		2					1	4
Total	2	9	7	4	3	1	1	2	–	1	30

Rate of Return to Capital and Management	Average for 3 years										
	Under 2	2–4	4–6	6–8	8–10	10–12	12–14	14–16	16–18	Over 18	Total
Deficit											–
0% and under 10%	1	2	3	2							8
10% ,, ,, 20%		3	4			1	1				9
20% ,, ,, 30%		1	5	1	1	1		1			10
30% ,, ,, 40%		1			1	1				1	4
40% ,, ,, 50%											–
50% ,, ,, 60%											–
60% and over											–
Total	1	7	12	3	2	3	1	1	–	1	31

TABLE No. 28: RATE OF RETURN TO CAPITAL AND MANAGEMENT COMPARED WITH COMPUTED CAPITAL.

Rate of Return to Capital and Management	Computed Capital in £'000's																								
	1945–46							1946–47							1947–48							Average for 3 years						
	Under 10	10–20	20–30	30–40	40–50	Over 50	Total	Under 10	10–20	20–30	30–40	40–50	Over 50	Total	Under 10	10–20	20–30	30–40	40–50	Over 50	Total	Under 10	10–20	20–30	30–40	40–50	Over 50	Total
Deficit	1	4	2				7	1	2					3							–							–
0% and under 10%	1	7	3	1	1	1	14	2	7	2			1	12	1						1	1	6	1				8
10% ,, ,, 20%		3	2	3			8	1	2	1	2		1	7		5	1				6	1	4	2	1		1	9
20% ,, ,, 30%		1				1	2		3	1	3			7	1	3	1			1	6		6	2	2			10
30% ,, ,, 40%							–	1		1				2		3	4				7		1		2		1	4
40% ,, ,, 50%							–							–	1	1					2							–
50% ,, ,, 60%							–							–		3		2			5							–
60% and over							–							–		1		2		1	4							–
Total	2	15	7	4	1	2	31	5	14	5	5	–	2	31	3	16	6	4	–	2	31	2	17	5	5	–	2	31

Analysing by property size, those properties of less than 40,000 acres (74% of sample) received an average rate of return over the three years of 5·2%; 11·7%; and 32·0%, while those of 40,000 acres and over received 12·0%; 14·3%; and 53·9% during the same period.

Similarly, properties with less than 9,000 sheep, comprising 77% of the sample, received an average rate of return during the survey period of 5·1%; 10·9% and 31·2%, while those with 9,000 or more sheep received 12·6%; 15·3% and 56·4%.

When rates of return are compared with the variables, property size, sheep numbers and computed capital (see Tables Nos. 26, 27 and 28) no well-defined relationship is demonstrated, even over a 3-year average.

This suggests that while actual amount of returns is connected with scale of enterprise, the profitability of the enterprise (as measured by the rate of return), is more probably a function of management.

SECTION VI: FINANCIAL ANALYSIS PER HEAD OF SHEEP

As discussed in Section V, the area is typical grazing country and the sheep enterprise is dominant—there being practically no scope for other activities. Returns are almost entirely confined to receipts from wool and profits from sheep trading; cattle are mainly small milking herds, and horses are part of the plant used in the operation of the sheep enterprise.

Consequently, the problem of treatment of sideline enterprises does not arise. In the final year, several properties sold off the main portion of the sheep flock as a drought measure and received income from agistment and abnormal sale of cattle. In these cases, the properties have been deleted from this analysis in the 1947-48 year.

Returns.

The average returns, which increased in the order 100, 141, 283, over the three years are dominated by the receipts from wool, which, in turn, were

TABLE No. 29: AVERAGE RETURNS PER SHEEP.

Item	1945–46	1946–47	1947–48(a)	Average for 3 yrs(a)
	pence	pence	pence	pence
Wool	147·1	232·5	432·2	263·9
Sheep a/c	17·1		32·5	13·3
Other stock a/c's	0·6	0·02	2·1	0·8
Other	0·8	0·7	1·4	1·0
Total Returns per Sheep	165·7	233·2	468·2	279·0
	13s. 10d.	19s. 5d.	39s. 2d.	23s. 3d.
Index	(100)	(141)	(283)	

(a) Three properties excluded: two because abnormally high proportion of income received from agistment; one because abnormally high proportion of income received from sale of cattle.

influenced by the increased prices for wool over the last two years.

The variation from the average returns as given in Table No. 29 is shown in the distribution table (Table No. 30).

TABLE No. 30: DISTRIBUTION OF AVERAGE RETURNS PER SHEEP.

Average Returns per Sheep	1945–46	1946–47	1947–48(a)	Av. for 3 yrs(a)
Under 10/–	7	–	–	–
10/– and under 15/–	16	8	–	–
15/– ,, ,, 20/–	6	7	–	9
20/– ,, ,, 25/–	1	9	2	14
25/– ,, ,, 30/–	–	6	7	3
30/– ,, ,, 35/–	–	–	8	1
35/– ,, ,, 40/–	1	–	2	–
40/– ,, ,, 45/–	–	1	1	1
45/– ,, ,, 50/–	–	–	5	–
50/– and over	–	–	5	–
Total	31	31	28	28

(a) Three properties excluded: two because abnormally high proportion of income received from agistment; one because abnormally high proportion of income received from sale of cattle.

Costs.

In Table No. 31, the items have approximately the same relative importance as in the total costs per property (Table No. 12).

Over the period of the survey, the average cost per sheep increased in the order 100; 133; and 137, i.e. from 8s. 4d. to 11s. 4d. During the same period the actual sheep numbers declined in the order 100; 95; and 85.

Total costs, including rent and interest, are given separately at the foot of Table No. 31.

The distribution of the average costs per sheep

TABLE No. 31: AVERAGE COSTS PER SHEEP.

Item	1945–46	1946–47	1947–48	Av. for 3 years
	pence	pence	pence	pence
1. Wages	20·0	20·5	24·6	21·4
2. Shearing, crutching & woolpacks	19·1	23·3	25·4	22·5
3. Stores and rations	5·4	7·1	7·4	6·7
4. Stock charges and sheep classing	1·4	0·8	1·7	1·2
5. Building & fencing materials, duplicates and repairs	7·7	10·0	11·9	9·7
6. Petrol, oil, fuel, motor & travelling exps.	6·4	8·2	9·8	7·9
7. Purchased fodder, agistment paid, droving and drought expenses	4·3	8·3	5·0	5·6
8. Rates and taxes	5·1	6·3	7·8	6·3
9. Insurance	0·9	1·1	1·4	1·1
10. Freight, wool selling costs and scouring costs	14·7	24·8	21·9	20·4
11. Cartage and rail	2·6	3·5	3·1	3·1
12. Sub. to organisations, stamps, stationery, telephones, bank, legal and accountancy charges	1·8	2·1	2·6	2·1
13. Miscellaneous expenses	1·9	2·6	2·8	2·4
14. Losses on sheep a/c	–	4·1	–	–
15. Depreciation	8·1	9·8	10·6	9·3
Total Costs excluding Rent & Interest Paid	99·5 8s. 4d.	132·5 11s. 1d.	136·1 11s. 4d.	119·5 10s. 0d.
16. Rent	13·4	14·0	15·5	14·1
17. Interest paid	10·3	11·1	10·7	10·9
Total Costs Including Rent & Interest Paid	123·1 10s. 3d.	157·6 13s. 2d.	162·2 13s. 6d.	144·5 12s. 1d.

by properties is given in Table No. 32 and indicates the variations from the average costs as shown in Table No. 31.

In addition to the working expenses which have been used in the construction of Table No. 31, other legitimate charges against the property are interest on capital invested, an allowance for the operator's own labour, and an allowance for managerial skill. However, as managerial skill is entirely dependent on the personal factor, it cannot be accurately assessed, and, at best, a purely arbitrary amount would have to be taken. In this analysis, efficient management has been assumed and no allowance has been estimated.

The variation from the average costs in all years is shown in the distribution table, No. 34.

In comparing average costs per sheep with flock size, there is a tendency for costs to decline slightly as sheep numbers increase. This is shown in Table No. 35.

TABLE No. 32: DISTRIBUTION OF AVERAGE COSTS PER SHEEP.
(Excluding Rent & Interest Paid).

Average Costs per Sheep	*1945–46*	*1946–47*	*1947–48*	*Average for 3 yrs*
Under 5/–	1	–	–	–
5/– and under 7/6	9	1	1	3
7/6 ,, ,, 10/–	16	11	7	11
10/– ,, ,, 12/6	–	8	10	8
12/6 ,, ,, 15/–	1	3	5	4
15/– ,, ,, 17/6	2	2	3	1
17/6 ,, ,, 20/–	1	3	–	1
20/– and over	1	3	2	–
Total	31	31	28	28

TABLE No. 33: AVERAGE COSTS PER SHEEP INCLUDING OPERATOR'S LABOUR AND CAPITAL CHARGES.

Per Sheep	*1945–46*	*1946–47*	*1947–48*	*Av. for 3 yrs*
Costs (excluding rent & interest)	8/3·5	11/0·5	11/4·1	9/11·5
Rent	1/1·4	1/2·0	1/3·5	1/2·1
4% Interest on computed capital	2/3·1	2/4·4	2/5·0	2/3·7
Operator's labour..	7·4	8·4	9·3	8·0
Total Costs per Sheep (excluding managerial allowance) ..	12s. 3d.	15s. 3d.	15s. 10d.	14s. 1d.

TABLE No. 34: DISTRIBUTION OF AVERAGE COSTS PER SHEEP INCLUDING OPERATOR'S LABOUR AND CAPITAL CHARGES.

Total Costs per Sheep (Ex. Managerial Allce.).	*1945–46*	*1946–47*	*1947–48*	*Av. for 3 yrs*
Under 5/–	–	–	–	–
5/– and under 7/6	–	–	–	–
7/6 ,, ,, 10/–	3	–	1	–
10/– ,, ,, 12/6	16	6	1	4
12/6 ,, ,, 15/–	6	10	6	11
15/– ,, ,, 17/6	1	3	10	7
17/6 ,, ,, 20/–	–	3	3	2
20/– ,, ,, 22/6	2	3	2	3
22/6 ,, ,, 25/–	1	2	3	–
25/– and over	2	4	2	1
Total	31	31	28	28

TABLE No. 35: COSTS PER SHEEP COMPARED WITH NUMBER OF SHEEP SHORN.
(Costs exclude operator's labour and capital charges).

Costs per Sheep	Shearing Numbers in '000's																																							
	1945–46											1946–47											1947–48											Average for 3 years									
	Under 2	2–4	4–6	6–8	8–10	10–12	12–14	14–16	16–18	Over 18	Total	Under 2	2–4	4–6	6–8	8–10	10–12	12–14	14–16	16–18	Over 18	Total	Under 2	2–4	4–6	6–8	8–10	10–12	12–14	14–16	16–18	Over 18	Total	Under 2	2–4	4–6	6–8	8–10	10–12	12–14	14–16	16–18	Over 18	Total
Under 5/–			1								1										1	1										1	–									–
5/– and under 7/6			2	2	3		1	1			9			1							1	11			1							1	7		1	3		2				3	11
7/6 ,, ,, 10/–		3	5	3		1	2	1		1	16		1	4	1	2			2	1		11		1	2		1					10		1	3	3		1	1	2			11
10/– ,, ,, 12/6											–		1	2	2	2				1		8		2	2	2	1		3						4	1			1		1	1	8
12/6 ,, ,, 15/–		1									1		1					1			1	3		3				1				1	5		1							4
15/– ,, ,, 17/6		1	1								2			2								2		2	1								3		1							1
17/6 ,, ,, 20/–		1									1			3								3											–									–
20/– and over	1										1	1	2									3	1	1									2		1								1
Total	1	6	9	5	3	1	3	2	–	1	31	1	5	12	3	4	–	1	2	2	1	31	1	9	5	5	2	1	3	–	1	1	28	–	5	10	4	2	1	2	2	1	1	28

SECTION VII: SUMMARY

In the preceding sections an analysis of the financial results of woolgrowing in Central-west Queensland during the years 1945-46, 1946-47 and 1947-48 has been presented.

Over the period studied, returns have increased by 142%. Costs increased by 19%. As a result, incomes received by woolgrowers showed a substantial rise, especially in the latter years. Although this increase was mainly due to higher prices received for wool, other factors such as lack of labour and materials also influenced the rise. There was evidence that, because of these shortages, assets such as property improvements had to be allowed to deteriorate and money which would normally have been spent in maintaining and improving these assets has been shown as profit.

The labour and management income increased from an average of £924 in 1945-46 to £8,726 in 1947-48 and the return to capital and management rose from an average of £2,113 in 1945-46 to £9,816 in 1947-48. These average figures are influenced by the larger incomes received by the larger properties and tend to obscure the fact that the majority of properties received much less than the average, e.g., in 1945-46, 15 properties in a total of 31 returned less than £500 as a reward to the operator for his labour and management.

As might be expected, a reasonably clear relationship has been demonstrated between labour income, or return to capital, and property size, flock size or total capital investment as measures of the scale of operations.

On the other hand, there is no clear relationship between the *rate* of return to capital and the magnitude of the undertaking. In other words, it cannot be shown that in this area the larger properties are operated more efficiently in terms of financial results than the smaller properties.

The analysis on a per sheep basis shows that returns per sheep increased from 13s. 10d. in 1945-46 to 19s. 5d. in 1946-47 and 39s. 2d. in 1947-48; or in the ratio 100 : 141 : 283.

At the same time, total costs per sheep increased from 10s. 3d. to 13s. 2d. and 13s. 6d.; or in the ratio 100 : 128 : 132. This proportionate increase was greater than at a per property basis because sheep numbers declined by 15% during the survey period.

It should be remembered that the survey covered three years which, although certainly not above average in regard to seasonal conditions, did not include a really bad drought year. In fact, near-drought conditions prevailed in the northern half of the area for some months after June 1948, but the effects were not reflected in the financial results for the year ended 30th June 1948.

Drought risk is a very real factor in sheep raising in these areas and an annual overhead cost, to build up financial reserves to meet future losses when droughts inevitably recur, can be regarded as a legitimate annual cost. An overhead cost of this nature has not been included in the foregoing analysis simply because sufficient data could not be obtained to allow a valid assessment of a reasonable allowance. Nevertheless, it should not be disregarded when considering the financial results revealed.

APPENDIX I

CLIMATE OF MUTTABURRA, LONGREACH, ISISFORD, BLACKALL, ARAMAC AREA

(Based on a report of the Commonwealth Meteorological Bureau)

Definite information regarding the necessary amounts of rainfall required in any month to maintain satisfactory grazing is not available. Isolated small amount of rain in Winter do more harm than good as they are insufficient to promote pasture growth and depreciate the nutritive value of any dry feed available. Monthly figures have been compared with the local knowledge and experience of graziers in this area. From these it appears that approximately an inch of rain is required in the Winter months rising to 2-2¼ inches during Summer.

Temperature Conditions.

The area is represented by four climatological stations (Longreach, Isisford, Barcaldine and Blackall). However, since temperature conditions over the area are reasonably uniform, Longreach has been selected as representative. Table No. 1 shows mean maximum and minimum, mean monthly and extreme temperatures at this centre.

Mean monthly temperatures do not fall below 58°F. and are therefore high enough to permit moderate to active growth. However, the occasional

TABLE No. 1: LONGREACH.
Temperature Conditions (°F).

	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
Mean maximum	99·4	97·1	94·4	88·0	80·5	74·3	73·6	78·5	85·6	92·9	97·2	99·5
Mean minimum	73·3	71·8	68·2	60·3	52·2	46·9	44·2	46·7	53·9	61·7	67·7	71·3
Mean monthly	86·0	84·6	81·2	74·1	66·4	60·6	58·9	62·6	69·7	77·3	82·4	85·4
Extreme maximum	117·0	113·4	113·0	103·0	96·8	92·0	92·0	96·8	104·2	109·2	114·5	115·6
Extreme minimum	43·9	55·4	48·2	38·1	35·1	26·7	26·7	31·3	31·0	39·1	41·0	43·9

severe frosts have serious effects on herbage and may result in shortage of feed. Table No. 2 shows the average number of days per month when temperatures are 32°F. or less (i.e. days with severe frosts).

TABLE No. 2: AVERAGE NUMBER OF DAYS PER MONTH WHEN TEMPERATURES ARE LESS THAN 32°F.

	May	June	July	August
LONGREACH	–	0·2	0·1	–
BARCALDINE	0·2	–	0·2	–
ISISFORD	–	0·4	0·3	–
BLACKALL	–	–	0·1	0·1

Thus, severe frosts are rare, occurring on the average less than once a year.

Summer temperatures in the area are high, and although it is considered that the maximum temperatures experienced are not sufficient to inhibit plant growth, high temperatures are of consequence in animal husbandry. For instance, prolonged periods with high temperatures adversely affect the fertility of rams and it seems likely that where matings are carried out during Summer, this factor may account for low lambing percentages.

Rainfall.

Table No. 3 gives average monthly and annual rainfall for a number of stations in the survey area. For convenience, the area has been divided into sections for this purpose. Averages of 19″—20·5″ are obtained in the eastern and south-eastern sections, and these are the highest in the area. The rain-

TABLE No. 3: AVERAGE MONTHLY AND ANNUAL RAINFALL.

	No. of years of record	Jan.	Feb.	Mar.	April	May	June	July	Aug.	Sep.	Oct.	Nov.	Dec.	Year
Northern Section														
Muttaburra	53	3·28	2·85	2·44	1·15	0·85	1·02	0·72	0·30	0·60	0·74	1·23	1·75	16·93
Aramac	58	2·87	2·79	2·25	1·21	0·94	1·14	0·84	0·37	0·67	0·96	1·40	1·95	17·39
Camoola Park	43	2·95	2·68	1·88	0·81	0·77	0·78	0·61	0·31	0·46	0·82	1·34	2·21	15·62
Central & Western Section														
Longreach	45	2·15	3·42	2·48	0·95	0·89	0·86	0·78	0·27	0·59	0·91	1·16	1·88	16·34
Ilfracombe	43	2·21	2·57	2·63	0·98	0·75	0·87	0·67	0·40	0·45	1·01	1·19	1·98	15·71
Saltern	44	2·83	2·84	2·29	1·03	0·78	0·94	0·75	0·41	0·50	0·96	1·33	2·17	16·83
Eastern & South-Eastern Sections														
Barcaldine	51	3·11	2·79	2·57	1·42	1·17	1·13	1·00	0·51	0·71	1·13	1·34	2·31	19·19
Blackall	58	2·78	3·20	2·68	1·33	1·38	1·25	1·12	0·62	0·79	1·39	1·52	2·49	20·55
Evora	51	3·11	3·29	2·47	1·43	0·99	1·32	0·99	0·80	0·74	1·02	1·42	2·39	19·97
South-Western Section														
Wellshot	46	2·47	2·49	2·10	1·23	0·73	0·99	0·76	0·43	0·56	0·95	1·32	2·19	16·22
Isisford	53	2·44	2·80	2·72	1·37	1·01	1·11	0·93	0·54	0·65	0·98	1·35	1·95	17·86
Albilbah	44	1·94	2·04	2·15	1·16	0·73	0·99	0·94	0·42	0·57	1·01	1·61	1·90	15·46

fall decreased irregularly to 17¾″ in the South-west and to 17″ in the North. The central section received 15½″ to 17″.

Monthly Rainfall: Average figures are misleading since rainfall is highly variable, and particular years show big variations from the average. Averages do, however, give a general idea of differences in rainfall expectation throughout the area.

The monthly rainfall distribution is characterised by a well-marked seasonal trend. The wet season commences in October-November with an average of ¾″ to 1″ in October and 1″ to 1½″ in November, increasing from 2¼″ to 2½″ to 3″ in January and February and decreasing after March (2″ to 2½″) to 1¼″ to 1½″ in April.

The winter months are comparatively dry and in August (the driest month) less than ½″ is received on the average. The south-eastern quarter of the area receives the highest average fall each month except in January, when an average rainfall of 3″ to 3¼″ occurs in the northern and north-eastern parts of the area, North of a line joining Barcaldine and Camoola Park. To the South and South-west of this line, average rainfall decreases to 2¼″ to 2½″. In February the average rainfall is fairly evenly distributed, average amounts being 2¾″ to over 3″ with just under 2½″ at Wellshot. From 2½″ to 2¾″ are received in March over most of the area, diminishing to 1¾″ in the Camoola Park-Ambo area. From April onwards places in the North-west of the area receive less rainfall than other parts, although no part of the area except the south-eastern border districts records 1″ average in July. In August and September the rainfall ranges from ¼″ in the North-west to ¾″ in the South-east.

Critical Rainfall: The concept of effective rainfall has been discussed in the Appendix to the A.C.T. report. Critical monthly values of the precipitation/evaporation ratio have not been established for this area. It has therefore been necessary in this case to adopt arbitrary amounts considered in the light of local experience to approximate the critical values. These values vary slightly over the survey area, but in general it has been assumed that 1″ is effective in the Winter months and 2″ to 2¼″ per month are required in Summer when evaporation is high.

TABLE No. 4: PERCENTAGE FREQUENCY OF MONTHLY RAINFALL TOTALS GREATER THAN THE CRITICAL AMOUNTS.

	Jan.	Feb.	Mar.	April	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
Northern Section												
Muttaburra	52	52	38	24	24	31	22	7	12	7	12	33
Aramac	44	44	35	21	23	30	23	9	18	9	22	31
Camoola Park	48	67	29	17	17	25	21	17	13	8	25	52
Central & Western Section												
Longreach	35	49	40	25	20	29	31	5	9	9	20	31
Ilfracombe	38	42	35	25	19	29	25	10	8	8	17	27
Saltern	36	44	33	21	16	45	26	13	16	11	21	38
Eastern & South-Eastern Sections												
Barcaldine	51	51	33	30	33	41	31	13	16	18	26	39
Blackall	48	55	48	29	31	47	36	19	19	22	28	45
Evora	53	47	28	28	21	52	36	16	17	10	30	43
South-Western Section												
Wellshot	35	40	35	16	21	41	30	4	8	17	19	40
Isisford	31	45	33	25	23	31	30	8	16	13	25	30
Albilbah	26	46	34	24	18	32	24	8	12	12	22	32

Actual rainfall totals for each month during the full period of rainfall records have been compared with these critical monthly values and the percentage frequency of occurrence of occasions when actual rainfall exceeded the theoretical value has been calculated. These are shown in Table No. 4.

Highest frequencies occur in the Summer months, but there is a secondary peak in June. In the northern part of the area the June peak is weak. In the southern and eastern parts of the area the percentage chances of receiving the critical amount of rainfall in June are as good as those in the Summer months. These results are of interest from the point

of view of rainfall meeting feed requirements for May/June mating and October/November lambing. It is seen that these requirements are best met in the southern and eastern sections of the area.

Although mid-summer and mid-winter chances are almost equal in the south-western section, they are limited to the range of 30% to 40%, reaching 45% in February, the best month. The Central section has a frequency of 30% to 40% in January, but improves to 40% to 50% in February. February is the best month for the remainder of the area, in which there is an approximately even chance of receiving critical rainfall.

Seasonal Rainfall: The sheep industry in the area relies largely on pasture growth made during the Summer months. Since there is very little information available as to the seasonal rainfall requirements of the area, it is difficult to assess minimum conditions. It is realised that a number of factors, such as the importance of an early seasonal break, the influence of small Winter falls and the actual incidence of rain during a given period, are important in determining if a season has been satisfactory or

TABLE No. 5: PERCENTAGE FREQUENCY OF OCCURRENCE OF SATISFACTORY SUMMER CONDITIONS(a).

Northern Section	
Muttaburra	68
Aramac	56
Central & Western Section	
Longreach	54
Eastern & South-Eastern Section	
Barcaldine	62
Blackall	74
South-Western Section	
Isisford	66
Emmet	64

(a) As defined in the text.

not. Because of the complexity of these factors and because it is desirable to have some indication of seasonal reliability, the following conditions have been arbitrarily taken as being sufficient at least to avoid drought conditions: A season during which the actual total for each of two consecutive Summer months is equal to or greater than the critical amount for each month; or any one Summer month has a total of 5″ or more.

Table No. 5, based on these assumptions, shows the percentage frequency of occurrence of satisfactory seasons.

It is seen that Blackall, where satisfactory conditions may be expected in three years in four, is best served. Longreach in the West and Aramac in the North-east may expect such conditions five to six years in 10. The rest of the area has frequencies varying between 60% and 70%.

Conditions During the Survey Years.

The season 1940-41 was very satisfactory. Two inches to three inches of rain were received in December and in both January and March falls of 8″ to 12″ were recorded. However, the seasons 1941-42 to 1944-45 were bad to fair and there was a decrease in sheep numbers over this period.

1945-46: Following indifferent Summer conditions in 1944-45, good falls were received over the whole area during May, June and July of 1945. August and September were typically dry, the two monthly totals being generally less than 30 points. In the East, South-east and South-west, falls of 2½″ to 3″ were recorded in October. However, in the northern section less than 1½″ fell during this month and less than ½″ was received in the West. Only small falls were recorded during November and December, but except in the East (2½″), January recordings varied from 4½″ to over 8″ and conditions were generally satisfactory. At Muttaburra almost 3½″ were recorded in February, but elsewhere no major falls were received and late Summer and Autumn were dry.

1946-47: From March to October inclusive the total for each month was below ½″ over the whole area and in most months no rain was recorded. Except for isolated places, totals during November and December 1946 and January 1947 were less than 1½″. Although falls of 3½″ to 6″ were recorded over the area during January, the North-east (3½″ in February) was the only part to receive satisfactory follow-up rains. In general this was a very unsatisfactory season.

1947-48: After a dry Autumn and Winter, totals of between 2″and 3″ in each of the months August and September were recorded. These were followed by 1″ to 2″ in October and falls of 2″ to 4″ in either November or December and early conditions were very satisfactory. The North-east and East received moderate falls during February and March but elsewhere late Summer and Autumn were dry.

APPENDIX II

VEGETATION AND PASTURES

The following lists the more common species of vegetation:

Timber.

Acacia Cambagei	Gidyea
Acacia homalophylla	Boree
Atalaya hemiglauca	Whitewood
Ventilago viminalis	Vinetree or Supple-Jack
Flindersia maculosa	Leopard-wood
Owenia acidula	Emu-apple
Eucalyptus Coolabah	Coolibah
Eremophila Mitchelli	Sandalwood or buddah
Albizzia basaltica	Dead finish
Eucalyptus pyrophyra	Bloodwood
Grevillea striata	Beefwood
Acacia aneura	Mulga
Acacia harpophylla	Brigalow
* *Parkinsonia aculeata*	Parkinsonia
Acacia farnesiana	Mimosa bush
Muehlenbeckia Cunninghamii	Lignum

Grasses.

Astrebla spp.	Mitchell grass
Iseilema spp.	Flinders grass
Dactyloctenium radulans	Button grass
Chloris spp.	Star grass
Enneapogon spp.	Feather grass
Dichanthium spp.	Blue grass
Aristida spp.	Wire grass

Herbage.

Salsola Kali	Roly-poly
Portulaca spp.	Pig-weed
Daucus brachiatus	Carrot weed
Atriplex spp.	Salt bush
Calotis spp.	Daisy burr
Erodium cygnorum	Crowsfoot

Weeds.

* *Xanthium pungens*	Noogoora burr
* *Xanthium spinosum*	Bathurst burr
Threlkeldia proceriflora	Soda bush
Euphorbia Drummondii	Caustic creeper
Eremophila maculata	Fuchsia bush

* Introduced species.

Sources: S. T. Blake, "Plant Communities of Western Queensland . . .", University of Queensland, 1938.

APPENDIX III

SURVEY METHOD

With the co-operation of the Lands Commissioners at Barcaldine and Longreach, and the Government Statist, detailed information was obtained of all properties within the survey area, and the sheep they carried over a number of years. Properties were then tested for conformity with the following definitions of acceptable sheep properties:

(a) *Property Size*: No upper limit was established, but an average of 2,000 sheep was taken as the lower limit of commercial woolgrowing; viz., large enough to provide full-time employment and the main source of livelihood for the operator. This figure was assumed to be an acceptable lower limit for properties whose main source of income was woolgrowing, as Land Court determinations consider that 5,000-6,000 sheep are necessary to provide a reasonable home maintenance area in this district.

(b) *Type of Husbandry*: Woolgrowing and breeding is the predominant industry of the area, few cattle being run, and stud properties being the main exception. Properties where sales from stud stock form a major portion of the revenue were excluded from the main sample, but information where available, for comparison purposes only, was not ruled out.

(c) *Depot or Dealing Properties*: Excluded, as woolgrowing is not the major enterprise.

(d) *Multiple Holdings*: (i) Properties run in conjunction with land outside the area were excluded when the greater portion of the revenue was derived from the outside area.

(ii) Properties run in conjunction with land outside the area were included when the minor portion of revenue was derived from the outside area. Where land held outside the area was used mainly for drought relief purposes, the property was included.

(iii) Multiple holdings run under the same ownership and management with composite records were included and treated as one property.

(iv) Properties run under the same ownership but different management and different sets of records were treated as individual properties.

(e) *Change of Ownership*: Properties which had been sold or had changed ownership, either in whole or in part, during the previous four years were excluded.

(f) *Properties on Boundary of Area*: Where a property crossed the boundary of the survey area, the property was included provided the homestead and the major portion of the property was within the area.

From the 196 properties in the survey area, 40 were excluded by definition in the following manner:

Average less than 2,000 sheep	11
Depot and dealing properties	2
Major portion outside survey area	7
Run in conjunction with land outside survey area	2
Recent change in ownership	17
Resumed for closer settlement	1
	40

The area was stratified into four zones (see Map 2), and each zone into three flock size groups (2,000 and under 5,000; 5,000 and under 9,000; 9,000 and over).

The sample size was fixed at 42 properties. This was divided among the zones in proportion to the total number of properties in each zone. The sample of each zone was then divided among flock size groups in proportion to the number of properties in each group. The actual properties in the sample were then drawn at random from each group.

Field Procedure: After the co-operation and assistance of the Central and Northern Graziers' Association had been obtained, a letter from the Principal Research Officer was forwarded to each property owner drawn in the sample. The purpose of the survey was explained, and guarantees given that all information received would be treated as strictly confidential.

Property owners were contacted by telephone and appointments made for interviews when further information regarding the survey could be given, and any queries answered. The usual method was to collect the physical data first, and then to complete the final section of the questionnaire. In some cases it was necessary to visit accountants to complete the financial section.

The questionnaire was designed to gather information regarding:

(i) The physical characteristics of the property.
(ii) Management practices.
(iii) The financial records of the property for the years 1945-46, 1946-47 and 1947-48.

Of the original 42 properties drawn, 12 needed replacement on the following counts:

Recent change of ownership	4
Unable to separate records from those of other properties, or records not available	3
Unco-operative	2
Owner absent from area or ill	2
Stud property	1
	12

In addition, the contemplated sample size of 42 properties was not realised for the following reasons:

(a) Owners became less easy to contact with the advent of their annual holidays in the hot season.

(b) Inspection had to be made of some properties' records in Brisbane and any subsequent refusal of co-operation meant that a replacement could not be made without return to the area.

Sample Checked with Population: The final sample of 31 properties is compared below with the requirements of a theoretical sample of similar size:

Sample	*Zone 1*	*Zone 2*	*Zone 3*	*Zone 4*	*Total*
Theoretical	8	8	7	8	31
Actual	9	7	8	7	31

5-year Average Flock Size.

Sample	*2,000 and under 5,000*	*5,000 and under 9,000*	*9,000 and over*	*Total*
Theoretical	11	12	8	31
Actual	13	10	8	31

These tables show the chief defect of the actual sample to be some small over-weighting in favour of the smaller flock-size properties. This point is further illustrated by comparing the actual 5-year average sheep numbers of all properties not excluded by definition with the sheep numbers obtained by rebuilding the sample figures back to population size.

(5-year average)	Actual sheep numbers of 156 properties	1,342,011
(5-year average)	Calculated sheep numbers based on sample of 31 properties	1,255,108

This difference is only 6%.

Method of Analysis of Data.

Information had to be presented in a grouped form rather than serial number fashion because of

guarantees of complete anonymity given to the Graziers' Association and the individual property owners.

The major method was the use of the mean ("the average") but the representativeness of this average is weakened by the considerable variability of individual items, coupled with their relatively small number. The lack of a tendency to cluster around a central value left the mean open to domination by a few extreme values, so in addition to the mean value of a measure, the range of that measure over the individual properties was shown. Frequency distributions were used rather than standard deviations, which it was felt would give less information and be subject to the influence of extreme items. Preserving anonymity has resulted in "open-end" classes, change in class-interval width within a table, and sometimes a certain clumsiness in the width of the class-interval or the starting point of classes. Correlation tables were used to compare, in the most easily understood manner, any two measures expected to show a relationship. In those instances where the tables suggested a significant result, the co-efficient of correlation was calculated.

HALSTEAD PRESS PTY LTD, NICKSON STREET, SYDNEY