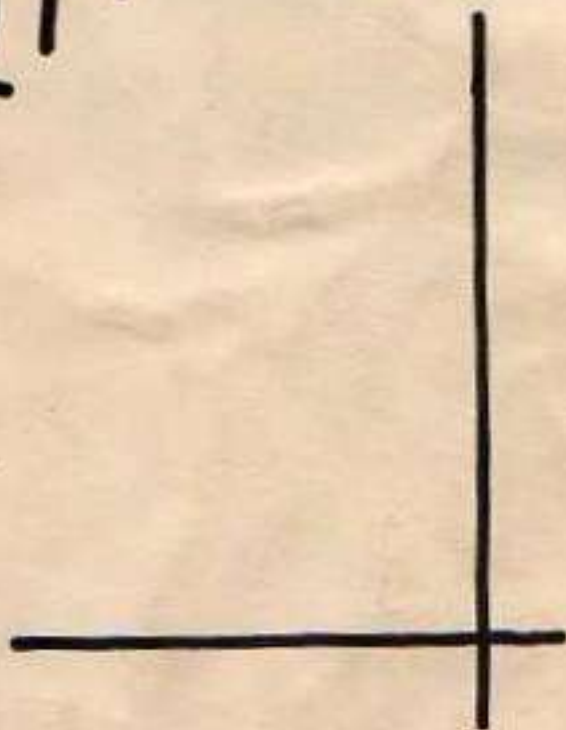


THE  
FARM.



### Position and Area

Our farm is situated about 8 miles south-east of Port Broughton, 12 miles north of Bute, and 5 miles south of Mundoon. The property consists of sections 115 (444 acres) and 119 (195 acres) in the Hundred of Wokurna, County of Daly.

### History

My grandfather, John Ireland, took possession of section 115 (a perpetual lease) in 1884, when aged twenty-one. He built a small hut on his uncleared land, which was still occupied by aborigines. He later received the freehold of section 119, which was the first freehold granted in the Hundred of Wokurna. During this time he was faced with the formidable task of clearing the land, which he did by mulmizing (chopping the trees off at ground level) and grubbing out the stumps.

Many difficulties were encountered during these early years, which called upon reserves of strength, courage and tenacity - the characteristics of all true pioneers. Droughts and depressions were passed through, mortgages paid off, until the boom years of the early fifties made him a fairly rich man. At his death in 1956, aged 93, my father had the right to buy sections 115 and 119, while other sections he owned went to two other sons.





# Land Grant.

(IN DUPLICATE.)

Register Book  
Vol. 56, Page 5  
Filed  
Register General

His Excellency the Governor is pleased to  
have granted and caused to be laid out a piece  
containing heretofore paid to the Treasury in advance by the receipt of him by  
John Ireland & Company Ltd

hereunder called the Grant and hereby in the name and on behalf of His Majesty Grant unto the  
Grant 20 Acres, more or less containing One Hundred and twenty five Acres  
situate in the  
Ward of St. Peter County of St. Peter  
and numbered 119  
and delivered to the public map deposited in the Survey Office at Adelaide and in the plan in the margin  
hereof together with all titles in and appurtenances. To hold unto and to the use of the Grantor  
and the Heirs of the Grantor for ever.

Given under the Great Seal of the Governor and the Public Seal of South Australia this First  
day of May one thousand nine hundred and twelve

BY COMMAND,

Richard Smith  
Commissioner of Crown Lands



Received of John Ireland & Co  
the sum of £170 12 6  
being  
purchase money as before expressed

£170 12 6

Richard Smith  
Treasurer

Montague & Co 63, 92, 100  
Adelaide  
By order of the Surveyor General  
11. 5. 12

John Ireland & Co  
11. 5. 12

SCALE  
0 1 2 3 4 5 6 7 8 9 10

Photostat copy of deed to Section 119.



John Ireland, 1945



Team of draught horses (c.1935)



My father at 15, holding race-horse 'Juggler Queen', bred on farm

Uncles and Grandad attending to working horse



Front view of house taken about 1925



Harvesting with the team



## House and Buildings.

We still live in the house in which my grandparents raised their family of thirteen, and which they named "Pine Villa." Additions and alterations have been made, but owing to the absence of any definite plan, it is rather "rambling." It is however solidly built of stone, and the large rooms are cool in summer.

Most of the old out-buildings also still exist. They are: a stone chaff-house, double-barn, and car-shed; galvanized-iron harness-house; two straw-covered pig sties and a stable. Straw is still used on buildings in which animals are kept because it is cooler in summer, and warmer in winter than the more modern galvanized iron sheds. The lime-kiln used to make the lime for the mortar used in the buildings, still exists, although not now used. A cement-lined stone horse-trough built in 1914 is still used - by the cattle man that draught horses are no longer kept. More recent additions are the galvanized-iron, cement floored milking shed, and the galvanized-iron shearing and implement shed. It is necessary to keep as many things as possible out of the weather, if you wish to use them for many seasons.



### Divisions

The land is divided up into paddocks of suitable size for the rotation of crops and to provide feed for the stock (also in rotation as cattle and sheep do not like being in the same paddock). Near the house there are several small paddocks which are used to keep the cows in if they are needed in a hurry, and to enclose the rams when they are not with the rest of the sheep. (See plan at end of project)

### Rainfall

The rainfall on the average is not heavy, but it is sufficient, the average being 13.53" per annum. The following shows the yearly rainfall 1945-1959

1945	: 1449	points	1957	: 731	points
1946	: 1760	"	1958	: 1123	"
1947	: 1767	"	1959	: 793	"
1948	: 1128	"			
1949	: 1239	"			
1950	: 1186	"			
1951	: 1582	"			
1952	: 1896	"			
1953	Incomplete				
1954	: 1180	"			
1955	: 1585	"			
1956	: 1531	"			

The amateur barber



Myself on "Ranger", aged 10 yrs

My father at the side of the house, 1953



Pools of water after a heavy rain several years ago.





A Sand-dune



Limestone residuals  
left after wind has  
shifted sandhill

**Cereal Rye Stabilises Sand**





# STABILIZING MALLEE SANDHILLS

By J. P. BLENCOWE, D.D.A.,  
Soil Conservation Adviser

WELL tried methods, based on more than 10 years' experience, will greatly reduce the risks of setbacks and disappointments in the task of stabilizing sandhills in Mallee country.

Main points in successful stabilization are:—

- Prepare the drift area, where necessary, before attempting to seed it.
- Cereal rye is at present the best known plant for drifting areas. Sow it at the rate of not less than 40 lb. per acre.
- Use 1cwt. 3:1 superphosphate/ammonia with the rye to promote rapid early growth.
- Sow early, from mid-April to the end of May, in wet soil.
- Use a combine with the cultivating tynes removed.
- Re-sow the following year any areas not effectively covered.
- Large sandhills should be temporarily fenced out.

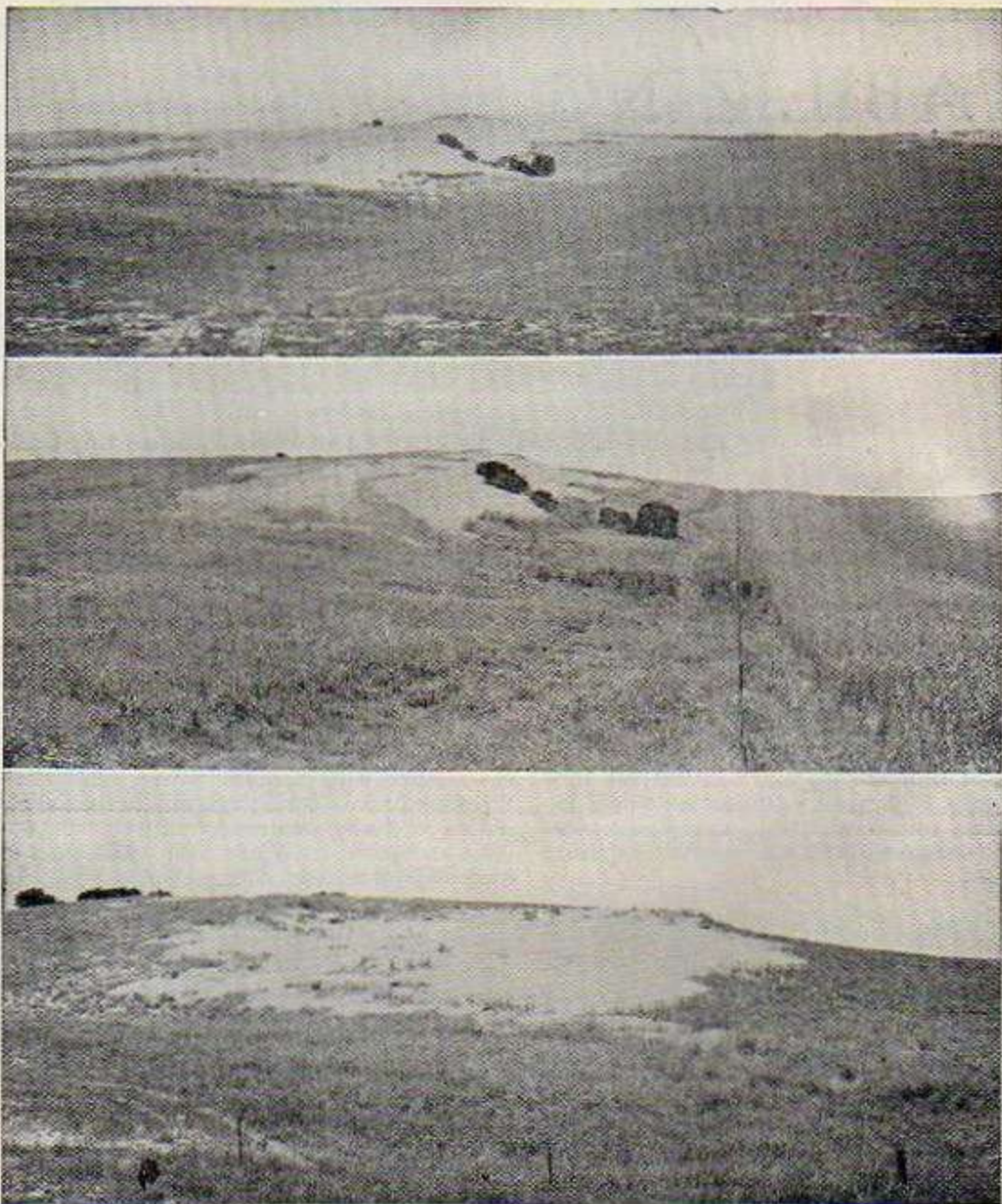
SINCE 1946 much time, labour and money has been spent on stabilization of drifting farm land. Some farmers have been very successful with the job and consider the time and money well spent. Others have had disappointing results, and as a consequence there are still large areas in the district requiring attention.

In the last ten to twelve years a lot of experience has been gained in the stabilizing of sandhills. The Soil Conservation Branch has co-operated with farmers where drifts have threatened roads or railways, and in the rehabilitation of badly eroded farms. On our own research centre at Wanbi over 1,000 acres of drift have been sown down.



A long mallee sand ridge. A hill like this will take several years to stabilize unless it is first levelled off mechanically. The sticks in the foreground are mallee roots, showing that several feet of sand has been blown away. In the background the piled up sand is burying trees.





#### STABILIZING A LARGE DRIFTING SANDHILL.

*Top:* The sandhill as it appeared before seeding to rye in 1955. The "slipping face" behind the trees was 20ft. high.

*Centre:* The sandhill in December, 1956. The area has been fenced off and the lower slopes seeded to rye in 1955. No more sand blown on to the peak from these lower slopes; consequently the peak is flattening and rounding off. In 1957 it will be possible to seed over much of the remaining sand.

*Bottom:* The small area of this sandhill which was too steep to sow has now flattened off. Note how sand has been trapped in the rye stubble.



Although there is always the risk that a violent wind at the critical time will undo one's best efforts, it is possible to minimize the risks by adopting certain well tried methods.

### THE PROBLEM.

The main problem areas are the long sand ridges. These were originally covered with mallee scrub, but have been cleared and farmed.

The piled up sand dune may have a "slip face" which is too steep and dangerous to traverse with a tractor.

All this area must eventually be covered with vegetation to stabilize it.

### CEREAL RYE.

By far the most satisfactory plant for providing initial cover on mallee sandhills is

Blown-out areas need some preparatory work before they can be sown.

*Top:* Wind eddies cause awkward "blow-outs" on sandhills. These "cliffs" of sand have to be broken down for seeding.

*Bottom:* Using the combine to break in the sides of blown out areas. It is usually better to level out the land somewhat by other means in the first place.



Many of these which are still a nuisance at the present time are a legacy from past droughts and depressions, and unsuitable farming methods.

The drifting sandhill presents a very unattractive appearance. In places feet of topsoil are blown off, exposing infertile limestone rubble or sandy clay subsoil. To the leeward of these "blown out" areas the topsoil is piled into high banks of sand, some of them up to thirty feet high.

The blown out portion of the sandhill is generally very rough, with remnant "pillars" of sand, and mallee stumps. Often there are almost vertical "cliffs" of sand more than 6ft. high.

cereal rye. This plant combines a capacity for rapid early growth with a hardiness which enables it to withstand and recover from a considerable amount of sand blasting.

When mature it provides a large bulk of tough straw which is unpalatable to stock and rots very slowly, providing cover for the soil for two or three years.

### PREPARING THE AREA FOR SEEDING.

On badly eroded areas some preparatory work is usually required before seeding, particularly on the rough blown out areas.

To make these areas safe for seeding machines to travel over, mallee stumps should be removed and the area worked up to level the ground. In



most cases the exposed limestone is soft and will break up quite easily if worked when thoroughly wet.

The steep cliffs of sand on the sides of blown out areas present a special problem, as they must be broken down to enable the land to be seeded. If the sides are not too steep or high they can be pulled in with a plough or scarifier. A bulldozer mounted on a wheel tractor will also handle this problem satisfactorily.

On the deep steep sided blowouts a bulldozer on a wheel tractor is not satisfactory, as difficulty will be experienced with wheel spin when attempting to back out on a steep sandy grade. A blade mounted on a crawler tractor is the ideal tool, but these are not usually available, and the farmer must do his best with what he has.

On areas of piled up sand, the problems of preparation can be equally difficult.

Banks of sand with rounded tops are easily sown over. Where these banks have formed a high peak they have to be levelled out before seeding can take place.

Experience has shown that if the dune is seeded up both sides as far as possible and stabilization achieved here, the movement of sand is then restricted to the top of the dune. Sand blown from the rise lodges in the stubble below, and the peak gradually rounds off. Eventually it comes down sufficiently to allow an implement to seed over the remainder of the drift.

This rounding off may take up to three years, depending on the seasons and height of the peak. It may also be necessary to re-sow portion of the stabilized area from time to time as sand from the peak covers the stubble.

The main drawback to this method of levelling out high hills is the time factor and the need to keep out livestock and rabbits, which can undo the work in progress.

Sandhills can be stabilized in one year, or at the most two years, if steep ridges are levelled off with a bulldozer or other means. This is more expensive but has been shown to be worth while where it is urgently necessary to prevent drift onto roads or railways.

Whatever the method used to level out the peak, it is important that these areas requiring some time to stabilize are temporarily fenced to ensure that stock do not have access. A mob of sheep on a partially stabilized area, particularly during the summer months, can soon undo all the work that has been carried out.

### SEED AND FERTILIZER.

A seeding rate of 40 lb. per acre of cereal rye has been found satisfactory.

Trials carried out on the Wanbi Research Centre have shown that the addition of sulphate of ammonia to superphosphate when sowing cereal rye greatly increased the rate of early growth.

An application of 28 lb. of sulphate of ammonia per acre gave the most economic



The use of 28 lb. per acre of sulphate of ammonia enormously increases the early growth rate of rye and gives a much better chance of successful stabilization.

Left: Rye sown with 1cwt. 3 : 1 superphosphate/ammonia.

Right: Rye sown with superphosphate only.



Seeding into wet sand with a combine, using only the two rows of seeding tynes, places the seed well down into moist sand and leaves the surface rough enough to resist moderate winds. This photo. of a newly-sown area of drift sand shows the pronounced ridging left by the seeding tynes.



response for the vital first few weeks.\* Although larger amounts gave better total growth later on, this amount is considered sufficient in most cases.

Superphosphate and sulphate of ammonia are purchased ready mixed, and 1 cwt. of 3 : 1 mixture supplies the required amounts.

Sulphate of ammonia/superphosphate mixtures are now used widely for sand drift control, but many farmers do not use enough. Where the recommended quantity has been used excellent results have been obtained. It is false economy, however, to cut down the amount below that recommended.

#### EARLY SOWING IS ESSENTIAL.

Drift sand should be sown early. Experience at Wanbi has been that the best results have been obtained from sowings made between mid-April and mid-May. During these months the weather is usually calmest, and the soil is still warm.

Good results have sometimes been obtained from March sowings and even February sowings after late summer rains; but seeding as early as that is risky, as dry weather in those months can dry out the surface very quickly and high winds can cause large areas to blow out. However, the risk may be worth taking if there are large areas to be sown, and the farmer is prepared to re-sow areas which fail.

Seeding should if possible be delayed until at least the top foot of sand is wet. It is necessary to watch out for pockets of dry sand, caused by sand moving after the main rains and piling into localized drifts. These patches of dry sand can act as starting points for drift after seeding and cause partial failure. If they

are extensive it is wise to delay seeding until the next good rain.

Seeding later than the end of May is seldom successful, as the weather in June and July is too cold for the rapid germination and early growth which is needed.

Late sowings in August or September can be successful on flat drift areas, but seeding as late as this should only be necessary in very abnormal seasons.

#### SEEDING MACHINERY.

Experience has shown that a combine and tractor, both mounted on rubber tyres, do the best job. In using the combine the cultivating tynes are removed, using the seeding tynes only. This method has a number of advantages:—

1. The draught is less and it is easier to get over rough ground.
2. The seed can be placed at least 3 in. deep, where it remains in moist soil.
3. Rubbish passes through the machine more readily.
4. The seeding tynes form ridges that protect the land against further drift, especially if they run across wind.

A combine is preferred to a disc drill. The drill will not place the seed deep enough and leaves the seed and superphosphate rows open to the wind. Also there is no ridged effect.

#### DRIFTS CAN BE CONTROLLED.

Drifting mallee sandhills can be controlled, but not by half-hearted methods.

To control them the farmer must get on to the job early and be prepared to keep at it until it is completed.

Once the drift is controlled, then it is vital that no acts of mismanagement should allow the sand to start moving again.

\* This recommendation applies to the mallee districts comparable to Wanbi Research Centre. In areas of higher rainfall, where the sands are whiter in colour and more severely leached, it is necessary to increase the amount of sulphate of ammonia to 56 lb. per acre.





Drift sand blocking a road in the Murray Mallee. This is made up of sand particles too heavy to be lifted and carried away as dust, but which move along near the surface by the saltation process.



Below is the monthly rainfall for 1957, which is the driest year shown in the list.

January	NIL	feints	July	201	points
February	NIL	"	August	64	"
March	16	"	September	38	"
April	8	"	October	76	"
May	54	"	November	52	"
June	171	"	December	45	"

### Soil

The soil is primarily a sandy loam, which is quite suitable for cultivation under normal conditions. The soil that has been continually worked however, has very little cohesive power, and so is apt to drift. After the land was first cleared it was worked continually to produce quick returns, but this caused the sand to drift. Red sand dunes were formed in an approximately parallel east-west formation.

It is only by prolonged careful work that the drift can be checked and eventually brought under control. First of all the residuals must be knocked down. This is done by dragging railway iron behind the tractor. Then the sand must be sown with any plant that will bind it with its roots. Cereal



age (with 3:1 ammonia superphosphate) is best for this purpose. Any dunes which are too steep to be cultivated are usually covered with straw.

### Vegetation

#### (a) Native

Nearly all the larger trees found on the farm are eucalypts, a native of Australia. Various types are found, the most common being the mallee (white, black, and red). Other trees are native pines and several species of acacias (wattles).

The trees are not tall, the average height being 20-30 feet. Some are not as tall as this though, especially the acacias, which are more usually from 6-15 feet.

To provide easy working of the paddocks, all the trees, with a very few exceptions, have been cleared out. Along the fences trees were left to provide shade and shelter for the stock. There are several small patches of uncleared scrub, from which domestic firewood is obtained.

#### (b) Introduced

There is little introduced vegetation except that around the house and garden. The front garden contains long wind-breaks of almonds and





Foreground : fruit trees

Background : native eucalypts.



Case tractor and hay binder



The Chevrolet truck



Sundercut disc plough



figs; also orange, peach, apricot, nectarine and plum trees, and grape vines. There are three large alhol pines at the back of the house, and the garden contains a variety of flowers and shrubs.

### Implements.

A large number of implements have to be kept to carry out the varied seasonal occupations on a farm. They may be classified into four main types:

#### a) Tractors, etc.

A Case tractor is kept for doing all the main work, and to it are fixed the various implements when needed. It is run on kerosene.

A two ton Chevrolet truck is used for carting and general work, such as carting sheep, feed and carrying fencing material.

We also have an elevator which is run by a belt off the tractor, and is used to lift the bags of grain from the ground onto the truck.

#### b) Sawing

Before the seed is actually sown, the ground has to be cultivated. For this we have three ploughs: two twenty-four furrow discs and a seven furrow mouldboard plough. The type



used depends on how wet the soil is, the type of soil (sand, clay, stony, etc) and the vegetation growing on it.

The seed is either sown with the combine or sower-seeder. The former is an implement which makes a furrow, drops the seed (mixed with fertilizer) into it, in a regulated flow down a tube, and covers it over again with soil.

#### (c) Harvesting.

The harvester or header as it is sometimes called, is an intricate machine for reaping the grain. We have a McRay 12ft. power-take-off header. The upper part of the stalk is cut by the comb, and the head of the grain with the attached stalk is conveyed to the thrasher, where the chaff and the stalk are beaten from the grain by a revolving drum. Grain, chaff and stalk is then carried to the "walkers," which allow the grain and chaff to drop onto the sieves, and the straw is carried by the walkers and dropped over the tail of the machine onto the ground. The sieves separate the grain and chaff, the grain being carried into the bin.

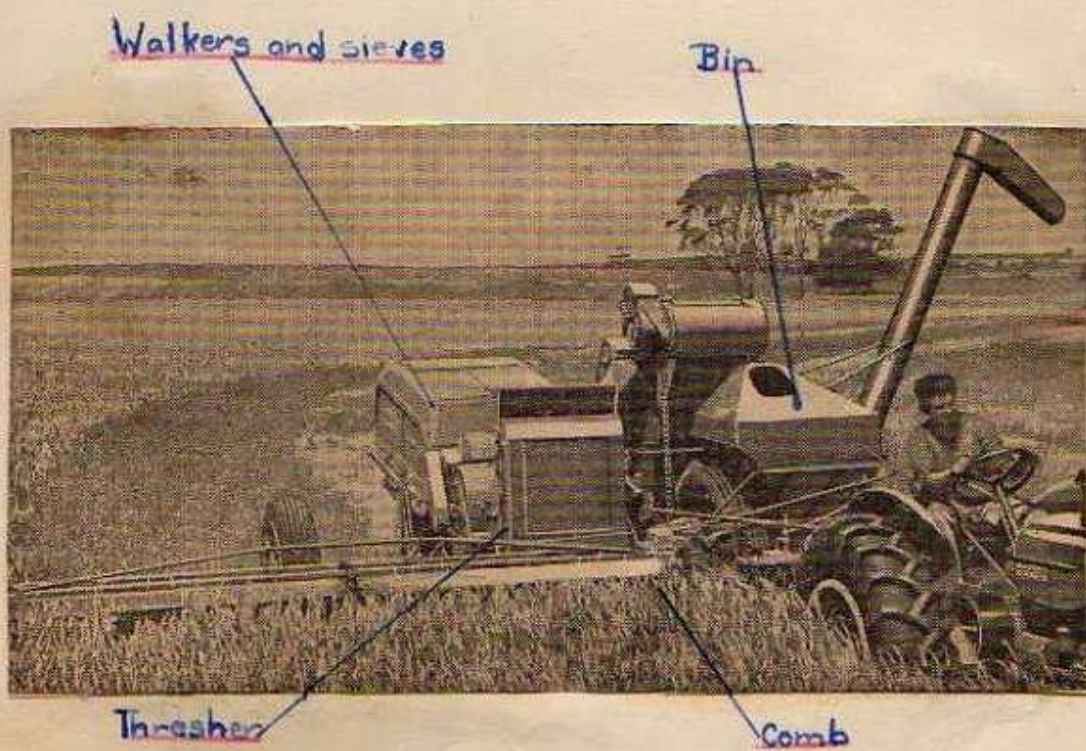
#### (d) Podder

We have a binder which cuts the crop off





The combine



A Typical Harvester





The hay-rake



The young crop, 3-4 in. high,



near the base and ties it into sheaves of hay. It is not practicable to buy a baler, so when we want baled hay, we engage a baler to do it for us.

We have a hay-rake which is used to rake up the stubble after harvesting, for use on sheds, etc.

### Wheat.

Wheat is Australia's most important crop. During March and April the ground is worked up after there has been a rain of about 10 points. Seeding usually takes place in April, May or June, but there has to be a good soaking rain before-hand.

The crop needs several heavy rains during the time it is growing (10 inches is the minimum requirement per annum). It ripens around November and December, and there then should be no rain. The most suitable weather for reaping is a hot dry day.

There are several characteristics which make a wheat suitable for South Australian farms.

- (1) Ability to Yield - This, of course, is of first importance. Although they may differ in other respects, all the leading varieties have the ability to produce high grain yields in a wide range of rainfall and soil type. This



adaptability to different districts has a lot to do with the popularity of varieties and their wider use.

(2) Resistance to Drought and Disease - Drought resistance and ability to finish well are specially important in the marginal rainfall country.

Flog smut and stem and leaf rust have lowered yields in the past. The resistance bred into many of our present day varieties has reduced the effects of these diseases appreciably.

(3) Quick Early Growth - This enables the wheat plant to compete well with weeds.

(4) Good Straw Strength - Good straw enables the crop to resist wind damage. Varieties which twist and tangle in the wind are not only difficult to harvest but grain damage and loss are greater.

(5) Good Grain-holding - In the leading varieties grain is held well in the head without much loss by shedding before harvest. At the same time they possess reasonable ease of harvesting.

(6) Suitable length of Growing Season - Length of growing season must be suitable for the climate in which the variety is grown. The leading varieties provide a range of early, early mid-season, and mid-season wheats.





Young crop-background, follow foreground





Wheaten hay-stack.



10 Good Baking Quality - Baking quality has become much more important in recent years. It is inherent in most of our leading varieties.

The following statistics will give some idea of wheat growing on the farm.

Artificial manures } On wheat for grain, but Acres  
used during 1953 } Hay, and green fodder 100 125

Wheat 1953 season.	Total Yield	Acres
For grain	810 bags	110
For hay	20 tons	14

Varieties of Wheat sown in 1953 for grain, hay and green fodder.	Acres
Link	61
Saline	30
Sword	28
<b>Total</b>	<b>125</b>

As can be seen from these statistics, there are three main wheat varieties grown.

Link 48 is a Ford x Dundee cross made by E. J. Breakwell at Roseworthy Agricultural College, backcrossed to Gals by Waite Agricultural Research Institute to introduce rust resistance.

It is an early maturing variety, with good straw characteristics and excellent flour strength, which has shown high yielding capacity in the heavier mallee soils of the better rainfall districts. It has been the outstanding variety.



in recent years in the State Wheat Crop Championships, and has done well in the Central, Lower and Mid North, Yorke Peninsula and Upper Eyre Peninsula districts.

It is two or three days later in maturity than Gyabo and should be sown earlier than this variety, because it appears to need more time to develop its straw growth. In the early stages it does not compete well against weeds.

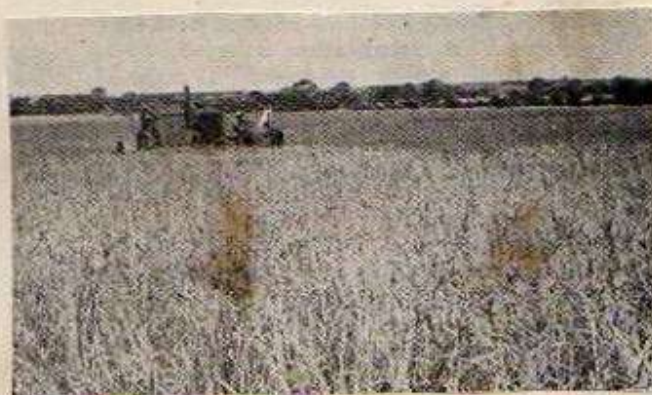
It has good resistance to stem rust but is susceptible to leaf rust and flag smut. Also, it has a medium strong straw which stands well, a smooth, white, tapering, curved, partly bearded head with a white, angular, translucent, large grain.

Salus is a cross between Gyabo (Kabarua x Dan x Dundee) and (Dundee x Kenya C6042) made at Roseworthy Agricultural College.

It is a midseason variety which has yielded well in the moderate to good rainfall districts. When sown early it has done well in the Murray Mallee, Southern Murray Plains and Yorke Peninsula districts and at some places on Eyre Peninsula. It does not appear to finish well on the heavier soils or when sown late in the season.

It has good resistance to stem rust and flag smut, and the vitreous grain yields a flour





The large loaves of good texture reflect the good quality of Gabo wheat. The smaller, darker ones were made from flour of Insignia, a variety which has poor quality protein.





Crop of rye.



of strong baking quality.

It competes quite well against weeds and has a medium tall, strong straw and a bold, oblong, creamy coloured ear, which is tip-covered and non-shattering.

Sword is a cross between Sultan and Ford made by R. V. Scott at Roseworthy Agricultural College and named in 1923. It is a mid-season variety of weak flour strength. It is fairly tall with a fine strong straw and a tapering lax, and a white ear with strong tip awns. The grain is large, plump and opaque. It is susceptible to flag smut but moderately resistant to stem rust.

A good hay variety which yields well in favourable conditions, it has declined in popularity since 1936.

### Barley

Although malting barley and wheat are grown similarly, they are used in vastly different ways, so it is not surprising that quite different things are looked for in quality barley. One of the chief requirements is for a high starch content, not a high protein content. Malsters look for a plump well filled grain with a thin skin. Grain which is high in protein - hard or "steely" grain - not only contains



less starch for malt production but has other disadvantages for malting and brewing. Barley quality in this respect, therefore, is the reverse of that in wheat.

The other most important property of malting barley is the ability to germinate quickly and evenly. Slow irregular germination in the malt-house gives the maltster a lot of trouble.

Any mechanical damage to the barley grain will affect its behaviour in the malt-house. Broken grains are, of course, of no use for malting - they do not germinate. They also develop mould, and this spoils the flavour and colour of the malt. Damage to the growing point or germ of the grain frequently prevents germination. Even when damaged grain does germinate it does so in an erratic manner, and frequently the germinating seed dies and is attacked by mould. Thinning, which appears to the inexperienced eye to be of no concern at all, is also unsatisfactory to the maltster.

Dryness of grain is another important point. Good colour, freedom from impurities such as straw and weed seeds, and evenness of size are also looked for by maltsters.

Climate and soil also play a part in

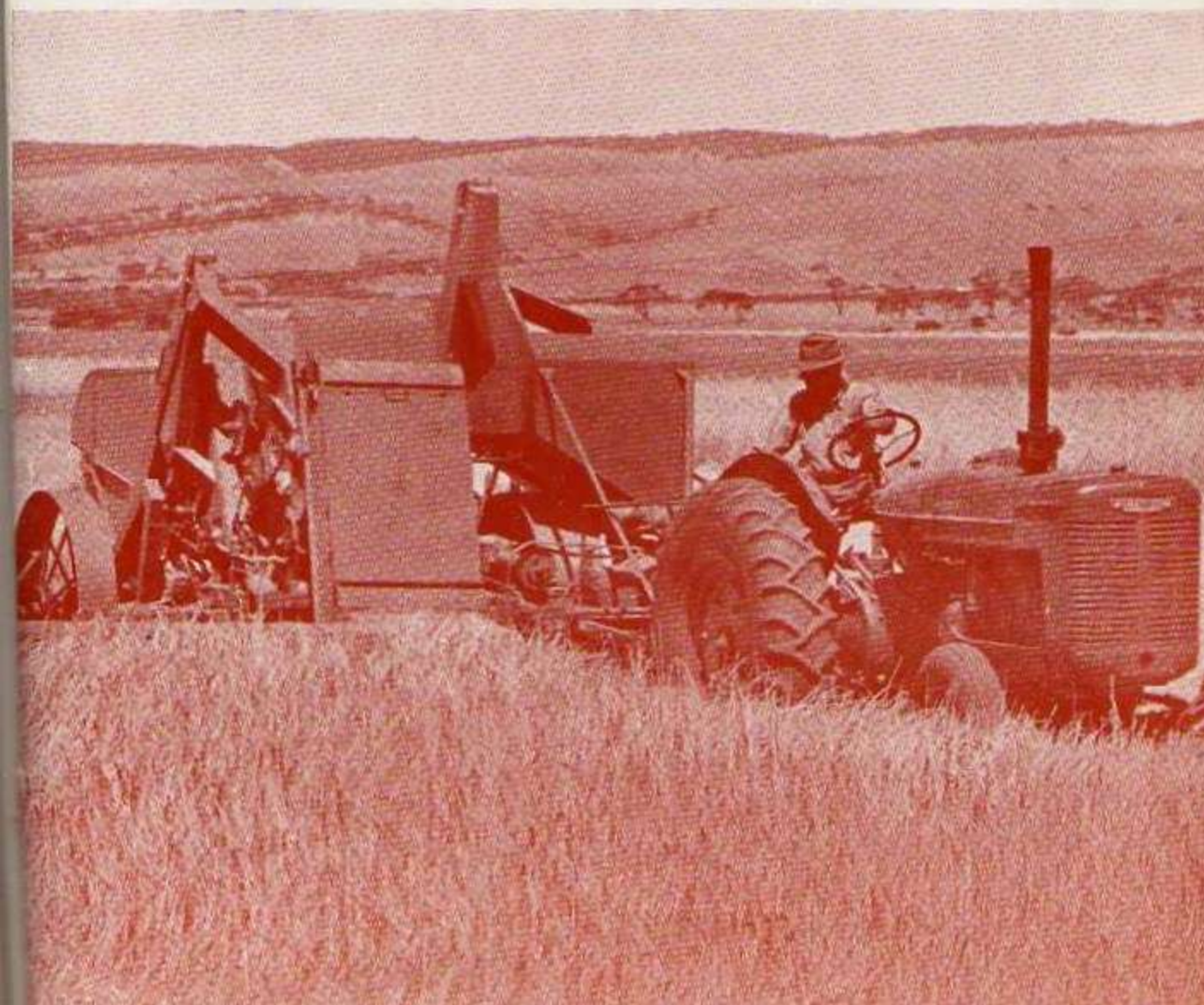


DEPARTMENT OF AGRICULTURE, SOUTH AUSTRALIA—BULLETIN No. 435

# BARLEY

IN

# SOUTH AUSTRALIA





Bulletin No. 435

September, 1954

BARLEY PRODUCTION  
*in*  
SOUTH AUSTRALIA

By L. J. Cook, R.D.A.,  
Chief Agricultural Adviser

*Reprinted from "Journal of Agriculture," South Australia, April-July, 1954*

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Issued by Department of Agriculture, South Australia



# Barley Production in South Australia

By **L. J. COOK**, R.D.A., Chief Agricultural Advisor.

AGRICULTURALLY the State of South Australia has been built upon wool and wheat, mainly by wool in the earlier years of settlement, but later by wheat to a greater extent than wool. Although formerly a crop of comparatively minor importance, barley has been grown for many years, and certain districts have proved most adaptable for the production of really good quality barley for malting purposes, so much so that South Australia has become the main State for growing the crop in Australia and is at present producing 75 per cent of the barley grain of the Commonwealth. Since World War II. barley growing has increased greatly, and to such an extent that it is at the moment approaching rivalry with wheat production.

**M**AIN uses for barley grain are—

1. Malting for beer, distillation and extracts.
2. Livestock feeding.
3. Processing for use as human food.
4. Distillation (whisky and gin).
5. Vinegar.
6. Yeast, etc., etc.

Until recent years, practically all of our barley grain was used in Australia by the maltsters,

and feeders of livestock, but latterly an extensive export market has developed, and besides that sold for livestock feeding, considerable amounts have been exported, mainly for milling purposes, to certain countries who use it as a supplement to grain, such as wheat and rice.

Statistical figures show the average annual production of barley grain in the State since 1879 for various periods compared with that of wheat, as follows:—

TABLE I.

Period.	Barley.			Wheat.		
	Average Annual Area.	Average Annual Yield.	Average Annual Yield p.a.	Average Annual Area.	Average Annual Yield.	Average Annual Yield p.a.
1879-1892	Acres.	Bush.	Bush.	Acres.	Bush.	Bush.
1893-1902	14,039	173,077	12-33	1,864,622	11,417,688	6-12
1903-1912	13,053	192,277	14-73	1,694,977	7,700,078	4-54
1913-1922	37,528	648,196	17-27	1,871,286	19,270,387	10-29
1923-1932	131,755	2,265,213	17-19	2,376,174	25,494,412	10-72
1933-1932	242,732	4,196,589	17-29	3,250,367	32,887,383	10-12
1933-1942	394,185	7,035,020	17-84	2,892,983	32,422,668	11-20
1943-1947	425,500	7,019,218	18-61	2,043,157	22,279,780	10-90
1948-1952	784,920	16,850,669	21-46	1,792,682	29,325,954	16-36

The figures indicate that during the last two decades of the 19th century the growing of barley for grain was stable at approximately 13,500 acres per annum, and the production was less than 2 per cent of the amount of wheat grain. During the present century barley pro-

duction has increased at a more or less steady rate; during 1903-1912 decade it trebled in production similarly to wheat, and in the next 10 years period it further trebled in production, whilst wheat increased by 33 per cent.



During 1923-32, barley further increased nearly double, and wheat 30 per cent, whilst during 1933-42 barley extended another 75 per cent, and wheat production reduced slightly. During the five-year period 1943-47, barley production advanced 12 per cent, but wheat production dropped 30 per cent; and now in the last five years, 1948-52, barley has doubled with an average annual production of 16,850,000bush., and wheat increased again to 29,000,000bush., within 4 millions of the highest yields secured during the 1923 to 1942 periods.

It is perhaps significant to note that barley production during the early years of this century was  $3\frac{1}{2}$  per cent of that of wheat, whilst

during the immediate past five years it has averaged 58 per cent, and in its record year of 1952-53, 76 per cent of that of wheat in bushels. The yield per acre has been steady at about 17bush. per acre for the first 40 years of this century, but has improved latterly, assisted by sowing on ley land rather than stubbles, and more and better cultivation given before seeding.

The following table shows the production of barley in detail for the past 21 years, together with the total rainfall and the "Useful" (April to November inclusive) rain for the agricultural districts of the State. Yields are shown as per acre per annum and also as per inch of "useful" rain received.

TABLE 2.  
BARLEY PRODUCTION FOR THE STATE, 1933-53—(21 YEARS).

Season.	Total Rainfall.	Useful Rainfall, April-Nov. (inclusive).	Area.	Total Yield.	Yield per Acre.	Yield per in. useful Rain.
	In.	In.	Acres.	Bush.	Bush.	Bush.
1933-34	14.30	12.15	307,423	5,254,280	17.09	1.41
1934-35	13.70	11.97	316,807	5,682,923	17.94	1.50
1935-36	15.01	12.08	393,741	6,493,983	16.49	1.36
1936-37	13.56	10.00	304,559	4,260,482	13.99	1.40
1937-38	16.33	11.38	411,288	8,647,043	21.02	1.85
1938-39	13.09	10.00	457,039	7,541,090	16.50	1.65
1939-40	16.78	13.41	503,548	9,960,237	19.78	1.47
1940-41	10.51	8.13	471,211	4,775,818	10.14	1.25
1941-42	16.27	11.08	478,256	11,714,002	24.49	2.21
1942-43	18.38	16.11	297,980	6,020,364	20.20	1.25
1943-44	13.19	10.68	261,446	5,057,594	19.34	1.81
1944-45	10.88	8.84	359,813	3,184,831	8.85	1.00
1945-46	13.99	10.74	441,830	7,566,146	17.12	1.60
1946-47	19.86	10.13	502,005	8,424,061	16.78	1.65
1947-48	18.68	13.93	562,405	15,363,461	27.32	1.96
1948-49	13.40	11.73	697,751	12,103,446	17.35	1.48
1949-50	14.55	12.18	693,758	12,725,240	18.34	1.51
1950-51	15.11	11.21	764,862	16,727,030	21.87	1.95
1951-52	17.90	16.10	831,613	16,825,906	20.26	1.26
1952-53	17.69	15.19	936,618	25,871,634	27.62	1.82
1953-54	15.77	12.62	1,142,259	28,397,003	25.36	2.01
21-year average—						
1933-53	15.22	11.89	530,296	10,599,842	19.99	1.68
5-year average—						
1948-53	15.74	13.17	844,477	18,775,063	22.23	1.69

In commenting upon the above table it is to be noted that from a total average rainfall of 15.22, of which 11.89in. have fallen between 1st April and 30th November, over half million acres per annum have yielded 10,599,842bush., or 19.99 bush. per acre, or 1.68bush. per inch of useful rain. This result is highly satisfactory, and indicates the suitability of the crop for our soil and climatic

conditions. In three seasons the yields were poor; in the low rainfall years of 1944 and 1940 only 8.85bush. and 10.14bush. per acre were received, whilst 1936, a year of medium rainfall, yielded the comparatively low amount of 13.99bush. per acre. All other seasons yielded over 16bush., the best being 1952, 1947, 1953 and 1941, with 27.62bush., 27.32bush., 25.36bush. and 24.49bush. per acres respectively.



TABLE 3.

AVERAGE ANNUAL PRODUCTION OF TWO-ROW AND SIX-ROW BARLEYS IN THE STATE, 1933-52 (20 YEARS).

	Area.		Total Production.		Production per acre.
	Acres.	Per cent.	Bush.	Per cent.	Bush.
Two-row	452,869	90.7	8,946,387	92.1	19.75
Six-row	46,829	9.3	763,595	7.9	16.31

Table 3 shows a summary over the 20-year period of the production of the two types of barleys that are grown. The two-row or true malting type has been grown on 91 per cent of the area sown to barley and yielded 92 per cent of the grain with an average production of 19.75bush. per acre. The six-row type, that is commonly known as Cape, has been grown on 9 per cent of the area and yielded 8 per cent of the grain with a yield of 16.31bush. per acre.

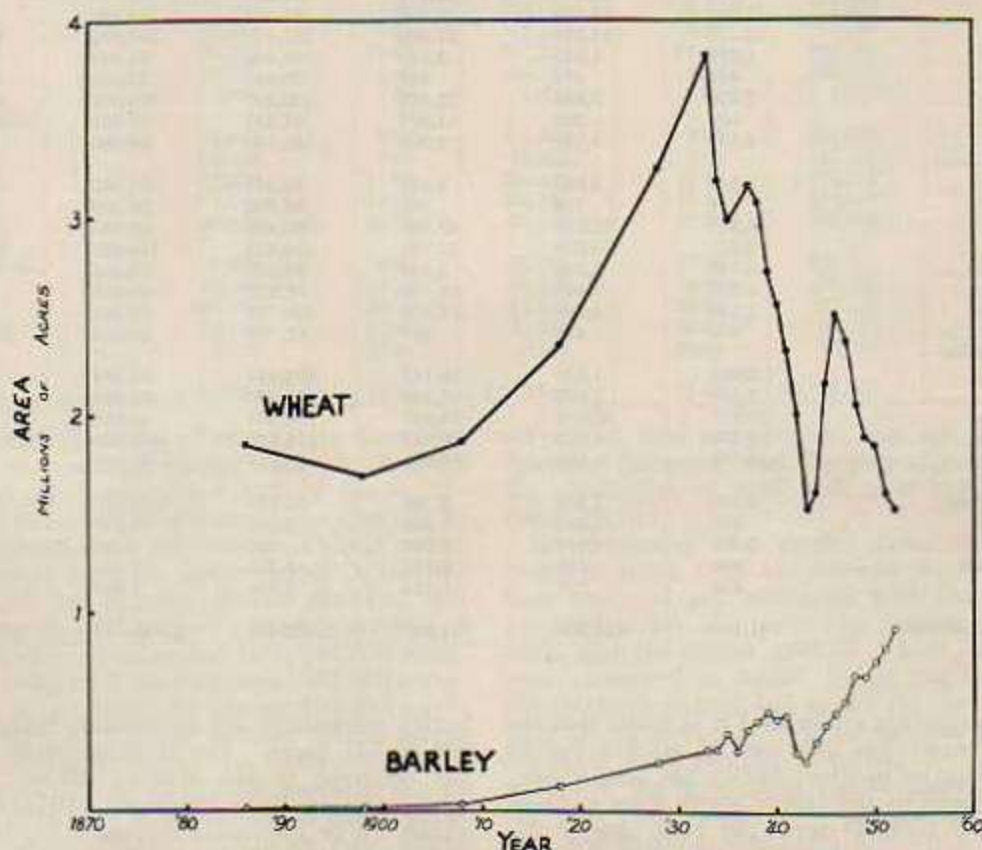
These figures have been included as a matter of interest, but are not comparable as the true

capabilities of the types, because the two-row is always grown under better conditions, whilst the six-row is more often grown under less favourable soil, rainfall and climatic conditions. More detail concerning the districts where types have been grown is given later in this article.

### DISTRICTS IN WHICH BARLEY IS GROWN.

Barley is a quick-growing cereal, hardy, and able to mature on more or less limited rainfall, but to secure good quality grain, suitable for maltsters, it requires a somewhat prolonged ripening period for its grain; that is, cool conditions during the spring. This is provided by our coastal and peninsula districts, which receive the benefit of cool breezes and nights from the southern aspect of our seas. Also our early barley production has been largely for malting purposes, and consequently, its culture has developed more in certain districts of the State.

In order to show where it has been grown, and where increases have taken place in comparison



Areas sown to wheat and barley in South Australia since 1880. The graph shows the marked increase in barley acreage since 1947 and the fall in areas sown to wheat.



with wheat growing, Table 4 depicts mean areas that have been grown in the various counties of the State during the 20 years 1933-52 in three periods 1933-42 (10 years), 1943-47 (five years), and 1948-52 (five years). A map of the hundreds of the State has also been prepared show-

ing the increase in barley areas in each hundred in which barley has been grown Table 5 shows the average total and yield per acre per annum for each period, in the counties, whilst the annual yield per acre for the 20 years has been shown on each hundred of the map.

TABLE 4.  
SHOWING MEAN AREAS 1933-52 (20 SEASONS) STATISTICAL DATA CONCERNING BARLEY AND WHEAT GROWN IN COUNTIES OF THE STATE.

County.	Barley—Average per Annum.			Wheat—Average per Annum.		
	1933-42.	1943-47.	1948-52.	1933-42.	1943-47.	1948-52.
<i>Central—</i>	<i>Acres.</i>	<i>Acres.</i>	<i>Acres.</i>	<i>Acres.</i>	<i>Acres.</i>	<i>Acres.</i>
Adelaide .....	10,480	10,566	10,375	7,786	4,906	6,233
Carnarvon .....	4,260	5,045	7,831	610	457	307
Hindmarsh .....	5,898	8,698	14,129	10,896	7,715	5,767
Sturt .....	5,856	8,465	17,573	54,733	47,147	41,910
<i>Yorke Peninsula—</i>						
Fergusson .....	153,114	123,743	181,496	135,111	161,546	89,216
Daly .....	61,604	67,501	88,821	275,050	204,040	200,890
<i>North—</i>						
Gawler .....	39,004	38,150	53,471	195,327	90,704	86,654
Light .....	11,340	13,520	20,292	81,818	64,026	54,737
Stanley .....	12,311	17,931	31,510	221,123	168,821	153,270
Eyre .....	1,614	1,847	3,170	68,945	48,248	36,062
Burra .....	844	478	511	30,847	22,382	17,280
Victoria .....	7,552	9,936	22,929	180,337	130,052	100,541
Dalhousie .....	606	395	1,697	81,987	55,322	37,625
Frome .....	1,131	1,728	5,001	130,709	99,490	76,414
<i>Eyre Peninsula—</i>						
Buxton .....	1,180	2,645	5,633	79,341	51,032	53,702
Dufferin .....	219	715	598	69,372	36,349	29,603
Flinders .....	13,322	23,979	49,990	60,434	49,937	48,763
Jervois .....	5,201	10,038	33,772	180,626	148,655	171,571
Le Hunte .....	1,749	2,374	5,948	99,627	73,382	70,673
Musgrave .....	5,326	7,442	25,144	52,632	40,279	43,151
Robinson .....	3,218	4,889	13,982	120,729	76,108	63,792
Way .....	386	486	447	82,760	46,084	40,151
<i>Murray Mallee—</i>						
Albert .....	2,062	1,839	10,167	163,444	98,984	70,881
Alfred .....	2,548	3,607	12,950	190,356	138,395	111,533
Bacchus .....	15,917	28,004	78,487	102,801	50,611	30,892
Chandos .....	10,360	16,945	50,712	134,620	100,230	81,680
Russell .....	4,254	5,101	12,959	23,925	25,508	12,404
<i>South-East—</i>						
Buckingham .....	3,870	3,206	6,704	23,115	21,826	17,159
Cardwell .....	900	2,440	7,544	2,406	4,139	2,666
Grey .....	5,282	1,610	2,249	932	436	554
McDonnell .....	949	1,370	3,181	4,323	4,470	4,659
Robe .....	424	579	1,134	2,166	1,995	1,750
<i>State (all Counties)—</i>	<i>394,185</i>	<i>425,500</i>	<i>784,920</i>	<i>2,892,983</i>	<i>2,043,150</i>	<i>1,792,682</i>

In commenting on Table 4 it is noted that the area of barley has increased in all but two of the 31 counties in which barley has been grown. County Grey in the Lower South-East reduced from 5,282 to 2,249 acres per year, due to the swing to improved pasture and grazing in the area, and county Burra, a district in which

barley growing is not important, reduced from 844 to 511 acres. The large increase in areas has occurred in the Murray Mallee (130,000 acres) and on Eyre Peninsula (105,000 acres), whilst Yorke Peninsula increased 55,000, North 64,000, Central 29,000, and South-East 9,000 acres.



TABLE 5.  
SHOWING MEAN PRODUCTION 1933-52 (20 SEASONS) STATISTICAL DATA IN TOTAL GRAIN AND  
YIELD PER ACRE OF BARLEY IN COUNTIES OF THE STATE.

County.	1933-42—Bushels per Annum.		1943-47—Bushels per Annum.		1948-52—Bushels per Annum.	
	Total.	Per Acre.	Total.	Per Acre.	Total.	Per Acre.
<i>Central—</i>						
Adelaide .....	253,674	24.21	303,895	28.76	440,935	26.93
Carnarvon .....	100,904	23.64	138,759	27.50	171,627	21.92
Hindmarsh .....	104,925	17.79	183,159	21.06	307,484	21.76
Sturt .....	93,469	15.96	139,447	16.47	329,578	18.75
<i>Yorke Peninsula—</i>						
Fergusson .....	3,150,717	20.58	2,783,744	22.50	4,653,553	25.64
Daly .....	1,034,860	16.80	1,171,206	17.35	2,095,936	23.60
<i>North—</i>						
Gawler .....	628,692	16.12	749,883	19.66	1,178,389	22.06
Light .....	221,712	19.55	287,845	21.29	444,844	21.92
Stanley .....	196,538	15.96	278,301	15.52	687,687	21.82
Eyre .....	22,835	14.15	21,059	11.40	57,390	18.10
Burra .....	11,814	14.00	7,004	14.65	9,045	17.70
Victoria .....	113,623	15.05	140,280	14.12	518,887	22.63
Dalhousie .....	5,911	9.75	4,039	10.23	40,409	23.81
Frome .....	16,262	14.38	22,642	13.10	96,160	19.23
<i>Eyre Peninsula—</i>						
Buxton .....	11,257	9.47	21,718	8.21	72,798	12.92
Dufferin .....	1,232	5.63	1,861	2.60	6,184	10.34
Flinders .....	233,262	17.50	548,589	22.91	1,197,423	23.95
Jervois .....	69,653	13.39	166,786	16.61	571,020	16.89
Le Hunte .....	12,802	7.31	15,381	6.48	76,526	12.86
Musgrave .....	105,541	19.81	181,337	24.36	566,102	22.61
Robinson .....	27,052	8.40	40,748	8.49	203,039	14.62
Way .....	2,821	7.31	1,420	2.92	4,518	10.10
<i>Murray Mallee—</i>						
Albert .....	13,944	6.76	9,682	5.26	126,565	12.61
Alfred .....	19,920	7.81	19,023	5.27	148,033	11.43
Buccleuch .....	175,366	11.02	350,270	13.58	1,271,273	16.19
Chandos .....	111,788	10.79	194,106	11.45	916,669	18.07
Russell .....	44,474	10.45	62,193	12.19	185,864	14.34
<i>South-East—</i>						
Buckingham .....	71,098	18.37	57,602	17.97	158,490	23.64
Cardwell .....	10,088	10.10	30,212	12.38	133,035	17.63
Grey .....	138,175	26.16	41,839	25.99	67,150	29.86
McDonnell .....	19,370	20.41	31,301	22.85	86,187	27.09
Robe .....	9,108	21.48	9,839	16.99	23,591	20.80
<i>State—</i>	7,035,020	17.84	7,919,218	18.61	16,850,569	21.46

Conversely the areas of wheat have decreased in all of the counties except those of Cardwell and Macdonnell, which are both in the South-East and where wheat growing only amounts to a few thousand acres per season. A great reduction of wheat acreages has occurred in the five counties of the Murray Mallee division, and amounts to 308,000 acres. In eight counties of the North the reduction has been 346,000 acres; seven counties of Eyre Peninsula, 181,000 acres; two counties of Yorke Peninsula, 120,000 acres; four counties of Central district, 20,000 acres; and five counties of South-East, 6,000 acres. This is a total reduction of 981,000 acres in the 31 counties, whilst the total increase in barley areas has been 392,000 acres. It can be seen, therefore, that between 500,000 acres and 600,000

acres more land per year has been left out from cropping for grain, and the area of pasture for the production of wool and meat has been so much greater.

In discussing the results from individual districts, those from the various counties have been compiled and compared with the average production for the past five seasons 1948 to 1952, and the season 1952-53. They have also been compared in bushel yields per acre with rainfall both annual and useful for the 20 years 1933-52. The quality of barley grades has been available from samples classified by the committee of the Australian Barley Board during the past two seasons 1951-52 and 1952-53, so that percentages mentioned are for these two seasons only.



### County Fergusson.

The yields of barley on Table 5 show that county Fergusson, which comprises central and southern Yorke Peninsula, produces by far the greatest proportion of barley, actually 4,653,553bush. per year, or 27.6 per cent of the State's barley harvest for the past five years; and for the season, 1952-53, it produced 6,640,347bush. The yield per acre has been 22.47bush., on an average annual rainfall of 16.09in., 13.00in. of which fell from April to November inclusive. Ninety-nine per cent of the barley grown has been of the two-row type, and of recent years its quality has been 25 per cent malting and 74 per cent milling, based on samples classified by the committee of the Australian Barley Board. Within the county the higher producing hundreds are as follows:—

Fergusson—

	1952 Total Yield.	Average Yield (20 years).
	Bush.	Bush. per acre.
Maitland .....	696,555	25-55
Melville .....	596,119	21-57
Mulooowurtie .....	580,051	25-39
Curramulka .....	540,872	24-71
Wauralteo .....	515,858	22-12
Dalrymple .....	510,722	21-76
Cunningham .....	503,390	20-06
Minlacowie .....	497,993	21-21

Seven of the 16 hundreds in the county reached the half million bushel mark in 1952, and in fact with the exception of the undeveloped areas of the south and south-west of the Peninsula, the yields have been good and consistent.

### County Daly.

County Daly, which consists of northern Yorke Peninsula, is second in quantity of barley production with an annual yield of 2,095,936bush., amounting to 12.4 per cent of the State's total. The two counties of Yorke Peninsula, therefore, account for 40 per cent of our State's barley grain. The average production has been 19.09bush. per acre from a rainfall of 14.94in. (11.63 useful) and its yield reached 3,330,000bush. in the season 1952. Ninety-five per cent of the barley grown has been the two-row type and of recent years its quality of grain has been classified 37 per cent malting, 61½ per cent milling. Within the county the following hundreds are the most productive:—

Daly—

	1952 Total Yield.	Average Yield (20 years).
	Bush.	Bush. per acre.
Tiparra .....	854,588	22-64
Kadina .....	349,893	18-63
Clinton .....	329,533	18-29
Kulpara .....	317,729	18-34
Ninnes .....	272,909	19-14

It is significant that these hundreds are close to the coast.

### County Buckleuch.

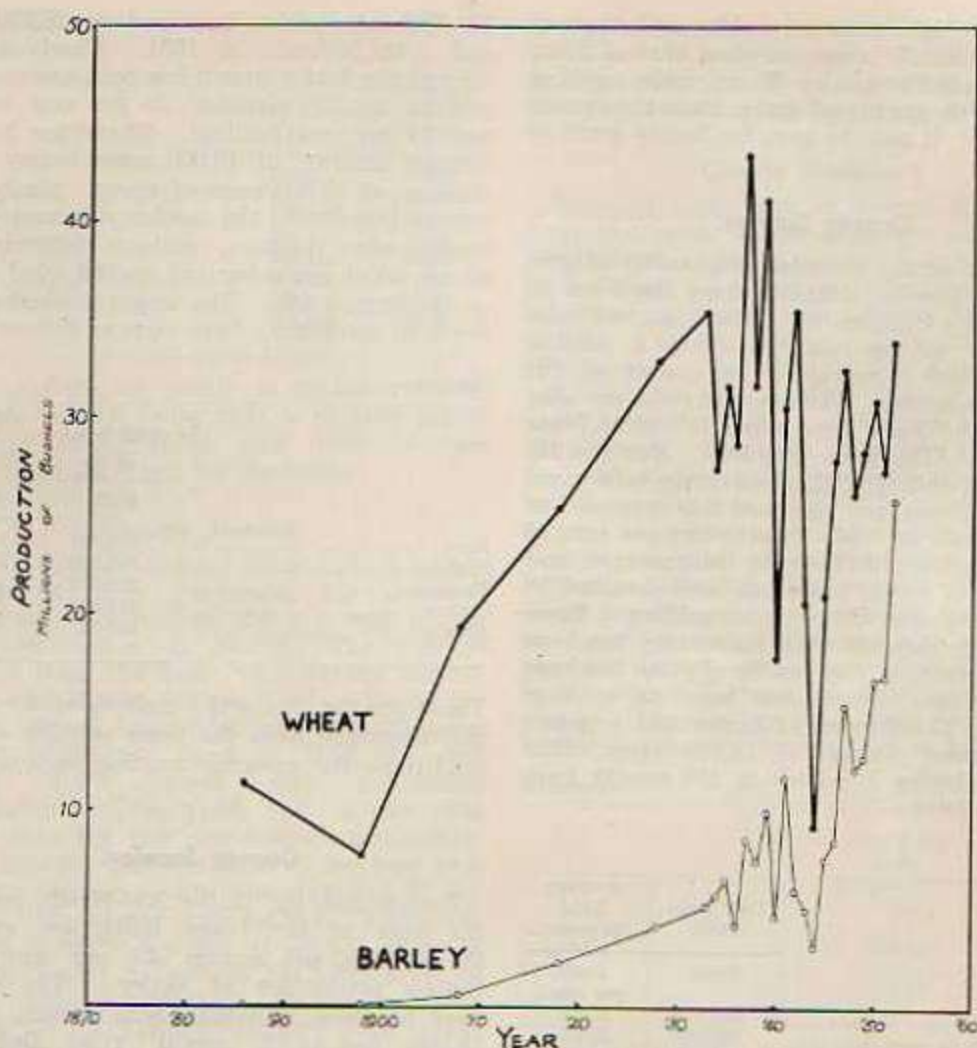
County Buckleuch, situated in the Lower Murray lands and Upper South East, is at present third in total productivity of barley for the State, with an annual yield of 1,271,273bush., which is 7½ per cent of the State's total. Proportionally, this is the county that has made the greatest advancement in barley production. For the 10-year period ending 1942 the yearly acreage averaged 15,917 acres, and production 175,000bush., which has increased to 88,771 acres and 1,818,500bush. in the 1952 season. This has been very largely due to a change from wheat growing to barley growing, which is undoubtedly better suited to the soil and climatic conditions. The yield has been 14.25bush. per acre from a rainfall of 14.80in., of which 11.11in. have been "useful." Eighty-nine per cent of the barley grown has been the two-row type and its quality of recent years has been classified 36 per cent malting, 63.9 per cent milling. The principal producing hundreds in the county are as follows:—

Buckleuch—

	1952 Total Yield.	Average Yield (20 years).
	Bush.	Bush. per acre.
Roby .....	278,308	19-30
Hooper .....	248,000	12-18
Price .....	246,798	14-19
Peake .....	199,047	15-57
Coneybeer .....	112,375	20-44
Livingston .....	111,123	15-45

Some barley is produced in all of the 17 hundreds in the county, but the main amount has been from the southern and western hundreds; which received greater effect from the coastal weather conditions. It can be expected that with the gradual improvement of soils by pasture, the production of barley in this county and adjoining ones will increase in the future, because the lighter soils lend themselves to the growing of the cereal without fallowing.





Total yearly production of barley and wheat in South Australia since 1880. The graph shows how barley production in recent seasons has closely approached the total production of wheat.

#### County Flinders.

County Flinders, which is the southernmost county on Eyre Peninsula, is fourth in total productivity, with an annual yield of 1,197,423 bush.; 7.1 per cent of the State's total barley grain. The average yield per acre has been 21.11 bush. from a rainfall of 17.73 in., of which 15.11 in. was "useful." For the 10-year period ending 1942 the average total yield was 233,262 bush. per year, and this increased to 1,560,014 bush. in 1952. Ninety-seven per cent of the barley grown has been the two-row type and its quality of recent years has been classified 52 per cent malting, 47 per cent milling. This district is proving one of the best for producing high quality grain. There has been

an average increase of 36,000 acres of barley and a reduction of 12,000 acres wheat. The larger producing hundreds in the county have been as follows:—

#### Flinders—

	1952 Total Yield.	Average Yield (20 years).
	Bush.	Bush. per acre.
Cummins .....	426,362	25.92
Stokes .....	193,929	21.22
Mortlock .....	170,689	20.39
Yaranyacka .....	149,543	21.25
Hutchison .....	132,754	22.19



These are high average yields, and that of Cummins (25.92) is greater than that of Maitland on Yorke Peninsula. These yields, together with the high quality of grain, show the county to be one of, if not the best, for barley grain at present.

### County Gawler.

The fifth county in order of quantity of production is Gawler, situated along the coast of St. Vincent's Gulf, north of the county of Adelaide, and it has also exceeded a million (1,178,389bush.) average, 7 per cent of the State's production. The average yield per acre has been 18.17bush. from a rainfall of 16.70in., of which 13.11in. were "useful." For the 10-year period ending 1942, the average total yield was 628,692bush. per year and this increased to 2,020,938bush. in 1952. Ninety-two per cent of the barley grown has been the two-row type, and its quality of recent years has been classified 18 per cent malting, 81 per cent milling. These figures show that although the county has been high in production, the quality of grain has been below average. There has been an average increase of 14,000 acres of barley and a reduction in wheat acreage of 19,000 acres. The larger producing hundreds in the county have been as follows:—

Gawler—

	1952 Total Yield.	Average Yield (20 years).
	Bush.	Bush. per acre.
Grace.....	416,575	17-13
Mudla Wirra.....	330,099	20-05
Alma.....	316,664	24-29
Dalkey.....	253,977	18-00

These are good yields for the districts, with the higher ones being secured from Alma (situated on the rising slopes), whilst yields from the plain areas have been less.

### County Chandos.

County Chandos consists of the eastern Lower Murray Mallee division, including Pinnaroo and Lameroo, and ranks sixth in production of the State with an average of 916,669bush., 5.4 per cent of the State's yield. The average yield per acre has been 15.10bush. from a rainfall of 13.38in., of which 9.98in. were "useful." For the 10 years ending 1942, the annual acreage was 10,360 and yield

111,788bush., which increased to 68,500 acres and 1,516,269bush. in 1952. Ninety-one per cent of the barley grown has been two-row type and its quality classified 28 per cent malting and 71 per cent milling. There has been an average increase of 40,000 acres barley and a decrease of 53,000 acres of wheat. Similarly to county Buechele, the tendency is now to sow barley after pasture, without following for wheat, which is a safeguard against wind erosion on the lighter soils. The larger producing hundreds in the county have been as follows:—

Chandos—

	1952 Total Yield.	Average Yield (20 years).
	Bush.	Bush. per acre.
Bews.....	384,009	16-37
Parilla.....	336,502	11-34
Pinnaroo.....	326,074	16-22
Cotton.....	319,607	17-93
Allenby.....	103,747	16-61

These are the southern hundreds of the county and naturally have the more suitable climatic conditions for growing malting barley.

### County Stanley.

County Stanley, in the Mid-North, including the bulk of the Clare Hills, has averaged 687,687bush. per annum, 4.1 per cent of the State's production of barley. The average yield has been 18.35bush. with annual rainfall 18.75in. and 14.83 "useful" rain. Before the war, the annual area to barley was 12,311 acres producing 196,538bush., and the high area of 38,608 acres produced 1,289,262bush. in 1952. This latter yield was double that received in any previous season. Only 82 per cent of the barley grown was two-row type and its quality was classified 30 per cent malting, 68 per cent milling. There has been an average increase of 19,000 acres barley and a decrease of 68,000 acres of wheat, which indicates that in this district there has been a change from wheat to pasture, and only a slight change from wheat to barley growing. In considering the soil and climatic conditions of the county it cannot be expected that the high production of barley reached in 1952 will be maintained, and wheat areas should increase in the future. The higher producing hundreds of barley in the county



have been as follows:—  
Stanley—

	1952 Total Yield.	Average Yield (20 years).
	Bush.	Bush. per acre.
Koolunga .....	177,245	21-20
Blyth .....	167,149	17-38
Hall .....	166,136	19-19
Boucaut .....	144,952	17-25
Hart .....	123,057	22-59
Stow .....	103,026	15-37

These hundreds are mostly on the western side, adjoining county Daly, have a western aspect from the Clare Hills, and their averages approximate the mean for the State.

#### County Jervois.

County Jervois, situated north-east of county Flinders on Eyre Peninsula, has averaged 571,020bush. per annum, 3.4 per cent of the State's production of barley. The average yield has been 16.17bush. with annual rainfall 13.54in. and 10.69in. "useful" rain. Before the war the annual area of barley was 5,201 acres yielding 69,653bush., and in 1952 the area reached 47,393 acres and production 1,048,011bush. This yield was 75 per cent greater than any previous season's production. Ninety-four per cent of the barley has been two-row type and its quality was classified 27 per cent malting, 72 per cent milling. There has been an average increase of 28,500 acres of barley and only a decrease of 9,000 acres of wheat. This is somewhat similar to other counties on Eyre Peninsula and shows that wheat areas have not been materially reduced in favour of barley growing. The higher producing hundreds of barley in the county have been as follows:—

Jervois—

	1952 Total Yield.	Average Yield (20 years).
	Bush.	Bush. per acre.
Brooker .....	164,040	20-13
Butler .....	149,451	17-96
Moody .....	134,034	18-41
Dixon .....	104,393	12-54

These four hundreds are the southern ones across the county, and undoubtedly more suitable for growing malting barley than the rest of the county. It is to be noted that the propor-

tion of malting grade is much less than that produced in the counties west of this area, and doubtless the climatic conditions are not as suitable for producing quality.

#### County Musgrave.

Situated north-west of county Flinders on Eyre Peninsula, county Musgrave has averaged 566,102bush. of barley annually, or 3.3 per cent of the State's production. The average yield has been 22.18bush. with rainfall 15.84in. and 13.61in. "useful" rain. Before the war the annual area of barley was 5,326 acres yielding 105,541bush. per annum, and in 1952 the area reached 31,003 acres and production 790,626bush. Similarly to county Jervois, 94 per cent of the barley has been two-row type, but its quality was classified 58 per cent malting, 41.8 per cent milling, which shows the highest percentage of malting barley, 6 per cent better than that of Flinders with 52 per cent. These are the only two counties whose barley has classified over 50 per cent malting. There has been an average increase of 20,000 acres of barley and a decrease of only 9,500 acres of wheat. The higher producing hundreds of barley in the county have been as follows:—

Musgrave—

	1952 Total Yield.	Average Yield (20 years).
	Bush.	Bush. per acre.
Shannon .....	292,795	25-46
Mitchell .....	137,020	20-89
Colton .....	101,131	19-54

The first two above are situated on the southern boundary, adjoining county Flinders, and are the most suitable for quality barley. The yield per acre of Shannon is particularly high and on Eyre Peninsula has only been surpassed by the hundred of Cummins.

#### County Victoria.

County Victoria in the Mid-North, above county Stanley, averaged 518,887bush., which is 3.1 per cent of the State's production of barley, and the average yield has been 18.42bush. per acre. The annual rainfall has been 16.54in. of which 12.65in. were "useful." Before the war the area of barley averaged 7,552 acres and produced 113,623bush. per annum, and in the year, 1952, 31,970 acres produced 960,815 bushels, which was nearly twice as much as secured in any previous season.



Only 73 per cent of the barley grown has been two-row type and its quality has been classified 32 per cent malting, 67½ per cent milling grade. There has been an average increase of 15,000 acres of barley, and a decrease of 80,000 acres of wheat, which like other northern counties, indicates a big change from wheat to pasture, and only a small change from wheat to barley growing. The higher producing hundreds of barley in the county have been as follows:—

Victoria—

	1952 Total Yield.	Average Yield (20 years).
	Bush.	Bush. per acre.
Crystal Brook .....	167,741	17-24
Bundaleer .....	137,774	22-92
Narridy .....	96,717	21-27
Yangya .....	94,902	21-28

These hundreds are situated on the higher lands with a western aspect and somewhat inland from the few lower coastal hundreds. The yields are a little above the State's average, but the quality would on the whole be lower.

#### County Light.

County Light in the Lower North, east of county Gawler, has averaged 444,844bush., 2.7 per cent of the State's production of barley. The averages have been, yield 20.82bush. per acre, total rainfall 19.96in. and "useful" rainfall 16.01in. Before the war the area of barley averaged 11,340 acres and produced 221,712bush. per annum, and in the year, 1952, 23,650 acres yielded 599,511bush. Only 69 per cent of the barley grown has been two-row type and its quality has been classified 11 per cent malting, 88 per cent milling grade. There has been an average increase of 9,000 acres of barley and a decrease of 27,000 acres of wheat, a similar trend in agriculture as shown for other northern inland counties. The higher producing hundreds of barley in the county have been as follows:—

Light—

	1952 Total Yield.	Average Yield (20 years).
	Bush.	Bush. per acre.
Light .....	134,636	20-76
Nuriootpa .....	134,083	21-58
Gilbert .....	133,913	21-87

Again these hundreds are on the western side of the county and yields are above the State's average, but quality of barley is much below the mean of the State.

#### County Adelaide.

County Adelaide in the Central district, with an average yield of 440,935bush. produced 2.6 per cent of the State's barley. Averages have been—yield 26.14bush. per acre, total rainfall 26.99in. and "useful" rain 22.27in. During 1933-1942 the area of barley averaged 10,480 acres and produced 253,674bush. per annum, and in 1952, 16,887 acres yielded 489,280bush. Eighty-three per cent of the barley grown has been two-row type and its quality has been classified 29 per cent malting, 71 per cent milling grade. There has been an average increase of 1,500 acres of barley and a decrease of 1,100 acres of wheat, but a greater area of barley than wheat for grain has been grown in each of the 20 years under review. The higher producing districts of barley in the county have been as follows:—

Adelaide—District Councils—

	1952 Total Yield.	Average Yield (20 years).
	Bush.	Bush. per acre.
Willunga .....	153,815	28-38
Noarlunga .....	151,766	29-10
Salisbury .....	71,554	15-79
Munno Para East .....	54,814	18-08
Marion .....	25,268	31-12

The statistics for county Adelaide have been collected from district council areas, and cereals have been almost entirely grown on the plains and western lower slopes of the Mount Lofty Ranges. South of Adelaide the highest yields of barley for the State have been grown, Marion with 31.12bush. being the highest for any district.

#### Counties Sturt and Hindmarsh.

The 12 counties which have been most productive have been discussed in detail individually, and of the other 19, two, namely Sturt and Hindmarsh—southern counties of Central district—have provided useful yields averaging over 300,000bush. and acre yields of 16.56bush. and 20.23bush. respectively. In these, barley areas have increased by 20,000 acres and wheat has been reduced by 18,000 acres. Eighty-eight per cent has been two-row type and classified



23 per cent and 30 per cent malting grade respectively. The principal barley producing hundreds of these counties have been:—

**Hindmarsh—**

	1952 Total Yield.	Average Yield (20 years).
	Bush.	Bush. per acre.
Bremer .....	191,914	21.19
Strathalbyn .....	77,351	29.03
Start—		
Freeling .....	108,546	17.02
Brinkley .....	101,349	16.55
Monarto .....	80,594	21.04
Mobilong .....	78,994	16.47

These hundreds lie along the eastern slopes of the Mount Lofty and Barker Ranges and have proved successful for barley growing.

**Other Counties of Fair Production.**

*County Robinson* on the West Coast, surrounding Streaky Bay, has averaged 203,000bush. and increased its acreage from 3,000 to 14,000 since the war. Its most productive hundreds have been Ripon, Witera, Scott and Rounsevell, all close to the coast. *County Russell* adjoining and east of the Coorong and lower Murray, has averaged 186,000bush. and increased its area of barley from 4,000 acres to 13,000 acres and offers possibilities for increased areas in the future as the land becomes cleared and improved by pastures and livestock. *County Carnarvon*, which comprises Kangaroo Island, well-known for good quality barley, has averaged 171,000bush. per annum and has doubled its pre-war acreage of 4,000 acres with a 20-year average of 25bush. per acre. With its ideal climate for the cereal and the large areas being developed with pastures, much increase in barley production can be expected from the county in the future. In the Upper South-East, counties of *Buckingham* and *Cardwell* will also lend themselves to much greater areas of barley. The former has more than doubled its production since the war and the latter has advanced from an average annual production of 10,000bush. to 133,000bush. with 33 per cent being classified malting grade. In the Lower South-East barley production has not increased. Reduced areas have been grown in county *Grey*, but areas have increased in the counties of *MacDonnell* and *Robe*.

To indicate the hundreds which have proved the most productive per acre for the past 20 years the map has been coloured. Those that have—

- (1) averaged 20 or more bushels have been tinted blue;
- (2) averaged 10-19bush. have been tinted yellow;
- (3) averaged less than 10bush. have not been tinted.

Table 6 shows the average yields of malting barley (two-row type) with other barley (six-row type) produced in the various counties during the 20 seasons, 1933-52. Total yield in bushels per annum, per centage and the yield per acre are given according to the statistical returns of the State, and their correctness, therefore, depends upon the completeness of the returns sent forward by farmers. It is possible that some farmers who sell six-row barley for malting may have included it as malting barley on their returns. However, from the figures available it is noted that counties Eyre, Burra and Frome in the north and Albert and Alfred in the Murray Mallee have produced approximately a similar amount of six-row as two-row type. Counties Light, Victoria, Dalhousie in north, Buxton, Dufferin and Way in western, and MacDonnell, Robe in the south-east have produced approximately 30 per cent of six-row type, whilst counties that are most suitable for producing malting quality, such as Fergusson, Flinders, Daly, Musgrave, Carnarvon, have produced only from 1 per cent to 6 per cent of six-row type.

In 96 hundreds the yield per acre of six-row has exceeded that of two-row, and in 195 hundreds the yield per acre of two-row has exceeded that of six-row.

The greatest amount of six-row has been grown in county Light with approximately 90,000bush. per year, whilst other counties that have produced more than 50,000bush. per year are Daly, Victoria, Stanley, Gawler, Adelaide and Buecleuch.

The quality of six-row barley averaged over the past two seasons has been shown by the classifications to have been 17 per cent malting, 79 per cent milling. The majority of malting six-row has come from Murray Mallee and northern counties.



TABLE 6.

## AVERAGE YIELDS OF MALTING BARLEY AND OTHER BARLEY IN COUNTIES, 1933-52.

County.	Malting Barley.			Other Barley.		
	Total Yield per Annum.	Per Cent.	Yield per Acre.	Total Yield per Annum.	Per Cent.	Yield per Acre.
<i>Central—</i>	Bush.		Bush.	Bush.		Bush.
Adelaide .....	258,576	83	26.34	54,468	17	25.22
Carnarvon .....	123,508	96.5	25.52	4,541	3.5	17.24
Hindmarsh .....	152,619	87	20.21	22,505	13	20.39
Sturt .....	146,116	89	16.64	17,874	11	15.95
<i>Yorke Peninsula—</i>						
Fergusson .....	3,395,596	99	22.50	39,086	1	19.96
Daly .....	1,271,671	95	19.18	62,545	5	17.47
<i>North—</i>						
Gawler .....	710,700	92	17.99	60,719	8	20.50
Light .....	204,125	69	20.65	89,903	31	21.20
Stanley .....	278,862	82	18.28	60,903	18	18.69
Eyre .....	17,132	55	14.87	13,898	45	15.30
Burra .....	4,123	42	14.44	5,796	58	15.10
Victoria .....	186,214	73	19.25	61,410	27	16.51
Dalhousie .....	10,301	73	20.42	3,766	27	11.71
Frome .....	19,150	50	17.97	19,172	50	16.22
<i>Eyre Peninsula—</i>						
Buxton .....	18,243	62	11.85	11,015	38	9.80
Dufferin .....	1,985	76	6.22	642	24	5.40
Flinders .....	535,037	96.7	22.29	18,097	3.3	15.78
Jervois .....	206,560	94	16.54	12,717	6	11.96
LeHunte .....	22,876	78	10.36	6,502	22	8.42
Musgrave .....	225,356	94	22.60	14,275	6	17.09
Robinson .....	64,126	86	12.11	10,348	14	10.01
Way .....	2,079	72	6.93	816	28	6.48
<i>Murray Mallee—</i>						
Albert .....	19,681	48	9.48	21,353	52	10.90
Alfred .....	25,691	50	9.50	26,033	50	9.61
Buccleuch .....	440,377	89	14.45	52,693	11	12.86
Chandos .....	304,589	91	15.18	28,993	9	14.33
Russell .....	74,499	88	12.81	9,753	12	11.80
<i>South-East—</i>						
Buckingham .....	77,121	86	20.60	12,452	14	18.65
Cardwell .....	43,654	95	15.64	2,202	5	10.75
Grey .....	93,105	96.7	26.94	3,229	3.3	21.66
McDonnell .....	25,929	66	23.81	13,128	34	25.07
Robe .....	8,853	69	20.07	4,058	31	20.35
State .....	8,946,387	92	19.75	763,595	8	16.31

## PRICE OF BARLEY.

Table 7 shows the prices and gross value for each season's production of barley to the farmer for the 20 seasons, and shows a general steady increase in value of the crop since 1933. The drop in 1940 was due to the low rainfall received, as was also the case in 1943 and 1944. Despite the loss of grain in some districts in 1946, due to bad hot winds at harvest time, the yield secured was comparatively good, and the total value increased considerably above the previous year, due to higher price. The good

season and yields of 1947 resulted in particularly high value of over £11 million for the crop. The price and yields receded somewhat in 1948 and 1949, but in recent years they have increased considerably. Full information on the value for 1952 barley is not yet available, but figures quoted are those paid by the Barley Board up to date. The average value of approximately £10½ million per season for the past five seasons is very satisfactory and indicates the great value of the crop to the State at present.



# BARLEY PRICES, 1933-52.

Value to the Farmer.

Season.	Total Yield.	Net Value Country Centres.	Averages.	Amount per Bush.
	Bush.	£		s. d.
1933...	5,254,280	640,107	£1,084,835	2 5-2
1934...	5,682,923	776,717		2 8-7
1935...	6,493,983	728,724		2 2-9
1936...	4,260,462	883,218		4 1-7
1937...	8,647,043	1,520,238		3 6-1
1938...	7,541,090	1,022,842	£3,684,432	2 8-5
1939...	9,960,237	1,332,182		2 8-1
1940...	4,775,818	919,345		3 10-2
1941...	11,714,002	1,693,649		2 10-7
1942...	6,020,364	1,131,327		3 9-1
1943...	5,057,594	889,294	£10,290,445	3 6-2
1944...	3,184,831	749,762		4 8-5
1945...	7,566,146	2,090,148		5 6-3
1946...	8,424,061	3,323,994		7 10-7
1947...	15,363,461	11,368,961		14 9-6
1948...	12,103,446	4,649,740	£10,290,445	7 8-2
1949...	12,725,240	6,171,741		9 8-4
1950...	16,727,030	9,004,718		10 9-2
1951...	16,825,996	12,696,616		15 1-1
1952...	26,871,634	18,929,412		15 4-6

## SOILS.

The fact that barley has been grown economically in practically all agricultural districts of the State indicates that our soils are mostly suitable for the crop, but the soil type on which the barley is grown affects the quality of the grain produced. It has naturally yielded highest on the richer soils, such as the heavy alluvial soils of the southern Adelaide plains, the heavier red mallee soils of Yorke and Eyre Peninsulas, and the well drained black plain soils of the South-East. However, very good yields are received from the loams and sandy loams of the mallee soils of the State, as well as from brown earths of the north and the podsoils of the gum lands and fringes, when they are maintained in good fertility.

The trend of farming has of recent years been towards the development and maintenance of soil fertility by the proper use of pastures, especially those including legume species, and this will mean that actual soil type will become



In ploughing stubble land for barley—or, indeed, for any cereal crop—the aim is to avoid burying plant refuse and to leave as much of it as possible on the surface. Provided the soil has adequate organic nitrogen and the seedbed is compacted, the above technique is good.



less a governing factor on cereal production than rainfall and climatic conditions. This applies to barley as much as to any other of the cereal grains, better fertility encouraging quicker and more luxuriant growth. Some attention must be given to the degree of fertility available to plants, and steps taken to avoid unbalanced plant food ingredients if grain of good quality is to be obtained. Rankness of growth due to excess available nitrogen will be detrimental to grain quality, as well as will poorness of health of plants due to insufficient available nitrogen. The former can be overcome to some extent by later sowing, and the latter by growing more legumes on the land between cropping seasons.

spring rain dominance, combined with mild temperatures and good sunshine, without undue rough winds and only occasional storms, is generally very suitable for barley growing. This is shown by the fact that for the immediate past 21 seasons all the barley grown has yielded on the average 1.68 bush, (84 lb. grain) for each inch of rain that has fallen during the growing period from 1st April to the 30th November.

Barley is the quickest growing cereal under our conditions. It can be sown late, after other cereal crops have been sown, during late autumn or winter, and will ripen quickly in the spring, enabling it to be harvested before wheat crops mature. Under some conditions, on good



Preparing the soil for the autumn sown barley crop involves several cultivations, the aim being to obtain a seedbed that is firm and clean.

Unfortunately, there is no easy or quick method available for measuring organic fertility of soils and no precise knowledge concerning the true fertility needed to produce the correct quality of grain. Consequently it has to be determined by the practical experience of farmers, who should watch the texture of the soils of their farms and individual fields.

#### CLIMATE.

The climate, which includes rainfall and its incidence, temperature, frosts, winds, storms, etc., has a more important bearing on growing barley than actual soil type. Soil condition is nevertheless important and greatly aids the climate in growing satisfactory crops. The South Australian climate with its winter and

fertile soils in the better cereal-growing districts of the State, it can be sown as late as August, or even early September, and be harvested within four months.

There is one important fact that governs quality in barley grain, and that is the weather conditions existing whilst the crop is maturing. Hot and dry conditions occurring early in the spring induce a quick ripening of crops, and this often causes a poor finish, resulting in thin grains with somewhat coarse skin coverings. For malting purposes a nice plump mellow grain with fine skin coverings is most desirable. This is greatly assisted when the ripening period is somewhat prolonged by cool conditions, without much high temperature or drying



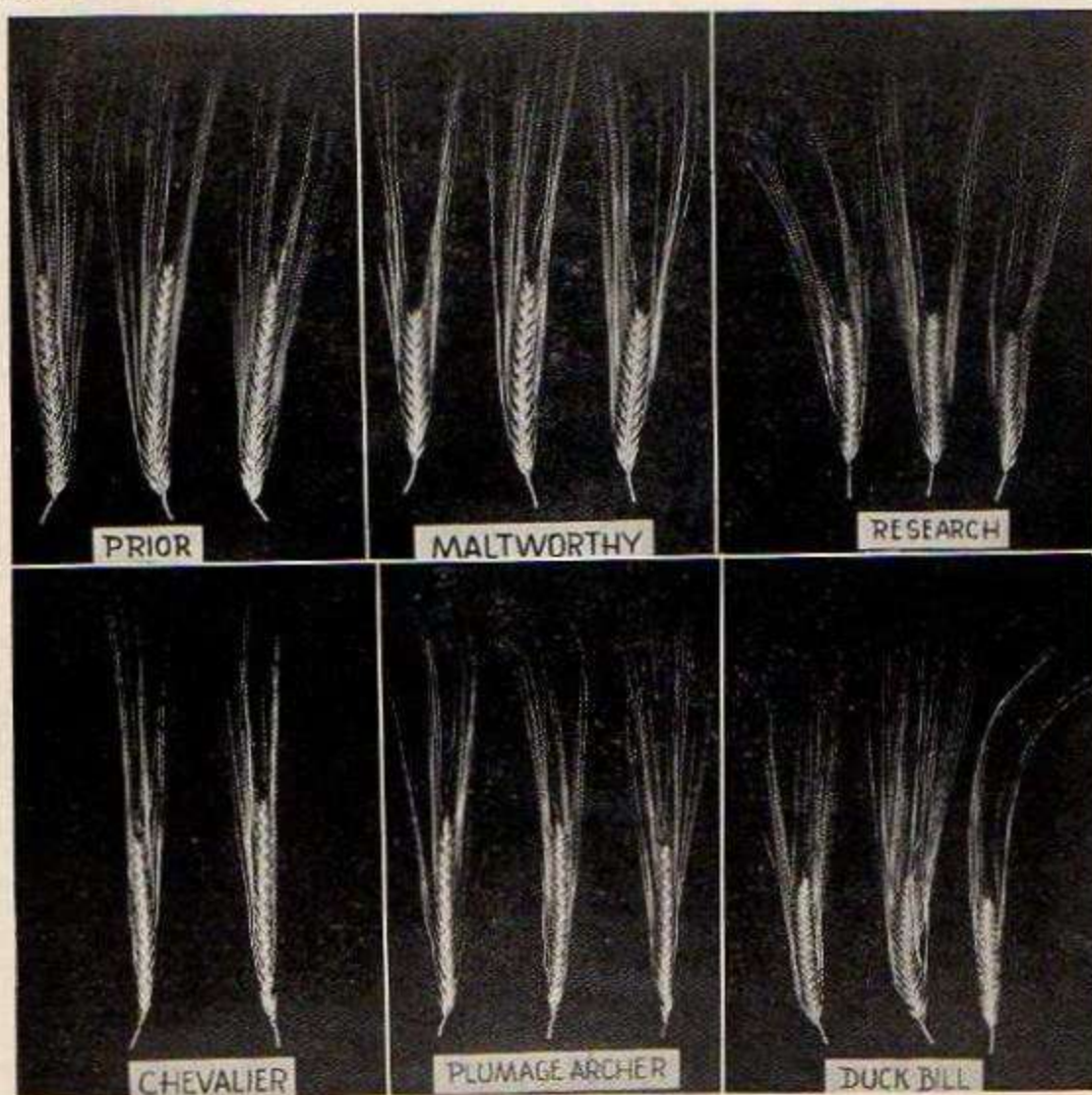
winds. The situation in this State in the latter regard is not satisfactory in our inland and northern agricultural areas, but the Peninsula, Kangaroo Island, and coastal fringes of the mainland receive somewhat milder weather conditions, especially during the nights, and these conditions aid in securing good malting grain. Hot or strong winds are at times detrimental to yields of barley, causing severe losses if they occur at the critical time when barley is ripe or on the verge of maturity. This is most severe on varieties that are weak in the straw, especially immediately below the head, much

grain being lost through heads breaking off above the top node so that they cannot be picked from the ground by machinery.

#### PLACE IN THE ROTATION.

For many years barley growing in most districts followed on the stubbles of wheat, but of recent decades the importance of pasture in the rotation has been realized and a change has taken place.

Reports from Agricultural Advisers in the principal barley districts now indicate that in the Yorke Peninsula and Lower North areas the



Malting (two-row) varieties of barley. Those shown in the upper row are the varieties most commonly grown. Chevalier, Plumage Archer, and Duckbill are older varieties which are now of little importance to the barley industry in this State.

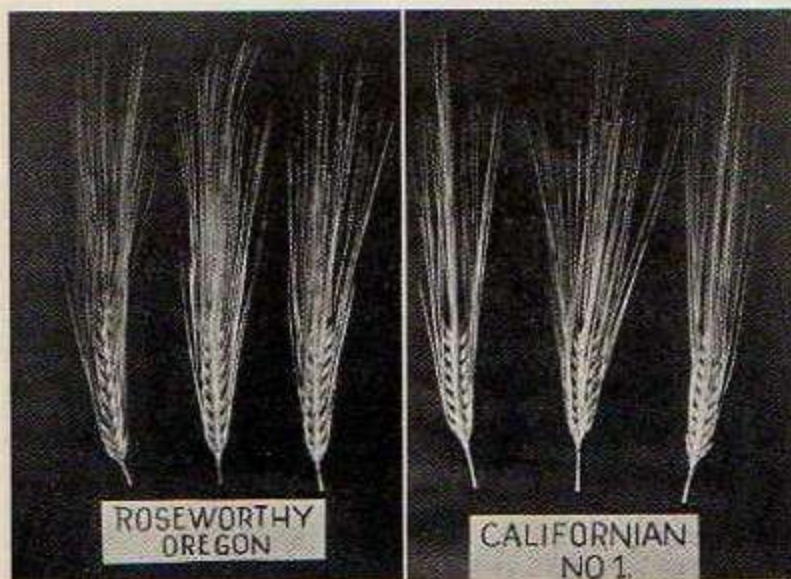


proportion of barley sown on stubbles approximates 15 per cent and that sown on grassland 84½ per cent. On Eyre Peninsula the proportions are 30 per cent and 70 per cent respectively; whilst in the Murray Mallee practically no malting barley is sown on wheat stubbles. Sowing on grassland is the popular method, with about 12 per cent sown on short (3 to 4 months) fallow prepared during the autumn. On the lighter soils barley follows one, two, three or more years of pasture, according to development. The use of annual legumes in the pasture is advancing, and to maintain them

In certain districts where soils have carried heavy growths of clover pasture it will often be necessary to remove a hay cut of grass or cereal hay (oats) before growing a crop of barley, in order to secure better quality grain. To some small extent peas are grown in rotation between wheat and barley, especially on some of the smaller holdings in the more closely settled areas of the Lower North, but today few farmers continue to grow cereals without at least one season of good pasture on the land between crops, and most lands need two or more pasture seasons.

#### SOIL PREPARATION.

Preparation of the soil for an annual crop of grain is essential, whether it be for barley, wheat or other cereals; and a short fallow of two, three, to four months is usually the best for an autumn sown crop of barley following pasture. The pasture should be well grazed back during the late spring and summer but sufficient growth left to hold the soil against erosion. Following a satisfactory summer or early autumn rain to germinate the bulk of weeds, the land is worked either with plough or cultivator according to the texture of the soil, working it evenly and not



Six-row ("Cape") barley varieties. Besides Californian No. 1 (also known as "Californian Cape") and Roseworthy Oregon, two other six-row varieties (Atlas and Club Mariout) are grown in South Australia.

growing well, cropping with a cereal every three or four seasons is essential. Barley lends itself very well for this purpose of handling and controlling the lighter soils in our mallee districts, with good soil preparation, without a long fallow. On the heavier soils where at least two years of pasture and sometimes three are needed in order to develop the annual legumes satisfactorily, two cereal crops can be grown in succession, and will usually lend themselves to wheat and barley grain crops in succession after a bare fallow.

It is difficult to lay down a definite system of rotation. The length of pasture period should vary with the condition and texture of the soil, and the land should be cropped when it is in such a condition that it will grow a satisfactory cereal crop without becoming depleted to a stage of causing an erosion hazard.

more than 3in. deep. This is followed by cultivations or harrowings several times, when conditions are suitable, in order to prepare a satisfactory clean, but not too fine a seed bed. Care should be taken to avoid burying much plant refuse, especially in the case of cereal stubbles, and the land worked so as to leave this refuse on the surface. If machinery is not available for the purpose, recourse to fire will be needed, but if at all possible burning should be avoided, especially on soils that are low in organic matter and have not been built in fertility with the aid of good pasture and clover growths.

In the heavier rainfall districts where good pastures are grown, early spring sowing of barley is profitable, and in preparation for the crop the pastures should be kept well grazed through the winter months. Land can then be



well ploughed during August, harrowed down and immediately sown.

### SEEDING.

#### Time of Sowing.

Being the quickest growing cereal, barley required for greenfeed should be sown immediately following the first good autumn rain. For grain crops it can be sown late, and is usually sown after all oat, wheat and pea crops. The actual time of sowing varies with districts and extends from late May to July for the bulk of the crop, with August sowings in the later districts where soil fertility is good. On

a good variety of one type should be used. Like most cereals, best results can be secured when sown 1½ in. to 2 in. deep on a firm, moist seed bed, to enable quick germination and early growth.

A most useful system of grading and pickling by a contractor is now available to barley growers throughout this and other States.

### VARIETIES OF BARLEY.

Only a small number of varieties of barley are grown in the State, the main two-row types being Prior, Maltworthy, and Chevalier; and the six-row types chiefly of Californian Cape, Atlas, and Roseworthy Oregon.



Selection plots of Prior variety of malting barley at Urania on Yorke Peninsula, where the Department of Agriculture, in co-operation with the Australian Barley Board, is working on the production of true to type seed for eventual distribution to growers.

[Photo. by courtesy Aust. Barley Board.]

the more fertile soils later sowing tends to shorten the growing period, reduce rankness and height of growth, and to improve grain.

#### Rate of Seeding.

One bushel (50 lb.) per acre is the general rate of sowing barley, using graded and pickled seed. Lighter sowings on clean weed-free land are conducive to better quality grain.

#### Treatment of Seed.

For the control of "covered smut" and "leaf stripe" diseases of barley it is necessary to pickle all seed before sowing, and the treatment recommended is to mix the seed thoroughly with 1½ oz. per bushel of organic mercurial dust, such as Ceresan or Agrosan. Graded seed of

#### Two-row Types.

*Prior* is the most popular and has been for many years. During the three seasons 1950 to 1952 65 per cent of the barley grown was of this variety, which was originally grown in this State by Mr. S. Prior, of Brighton, and is greatly valued by maltsters. It suits the soils and climatic conditions of our chief barley growing districts, and so far as is known its only weakness is in the straw, which causes the ears to break off rather easily above the top node after ripening. Severe winds between ripening and harvesting have caused considerable loss of grain at times. Plant breeders are endeavouring to select or breed a type of equal value but with stronger straw.

It is an outstanding variety for producing quality barley and has the important character-

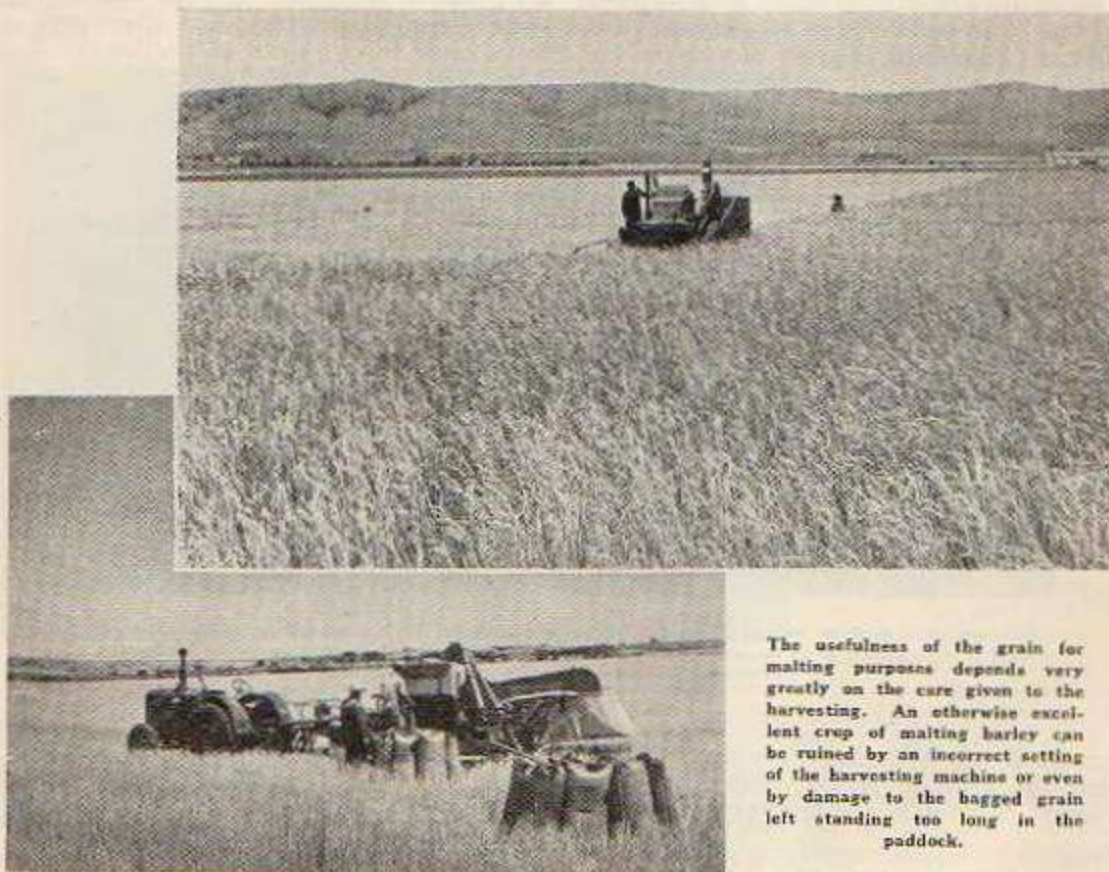


istic that most of the grains produced in a crop are of about the same size; and so the losses on the screens of the maltsters' cleaning plants are very low, a fact which cannot be claimed by any other two-rowed variety ever grown at all extensively in Australia.

The variety is strongly recommended for most of our districts, and farmers should see that they sow only true to type seed of Prior,

malting purposes. Of recent seasons it has been sown on approximately 14 per cent of the area sown to barley. It has improved somewhat in popularity amongst farmers, but cannot be recommended to replace Prior.

*Chevalier* was a good old type but is not much grown today. It occupies only about 7 per cent of the area sown to barley and has been superseded by Prior or Maltworthy.



The usefulness of the grain for malting purposes depends very greatly on the care given to the harvesting. An otherwise excellent crop of malting barley can be ruined by an incorrect setting of the harvesting machine or even by damage to the bagged grain left standing too long in the paddock.

so that their product will be uniform and command top prices for malting purposes.

Selection of this barley has been in progress during the past two years by the Department of Agriculture in co-operation with the Australian Barley Board, and it is anticipated that by 1955 it will be possible to maintain an annual supply of true to type seed for growers.

*Maltworthy*, developed at Roseworthy College, is next best for our conditions. It is somewhat stronger in the straw but not so good for

*Research.*—A barley bred at Werribee Research Institute in Victoria, and recommended by the breeder, Mr. A. R. Raw, as suitable for districts with 20in. or more annual rainfall. Research has been grown a little in this State lately, but very few of our districts are suitable for it. No doubt it can be grown successfully in our lower South-Eastern district, but it is not recommended for our wheat districts. In Victoria its popularity has increased in recent years, and it now provides



30 per cent of the two-row barley grown in that State. The variety is, we understand, appreciated by Victorian maltsters, it being particularly suited for the manufacture of "malt" foods.

*Duckbill and Plumage Archer.*—These two old varieties of two-row type have been grown mainly in the South-East in the past, and a few growers are still using them. Comparatively, the amount grown is very small, and the quality of the grain today does not warrant continuation with them. Growers in the Lower



Anything which damages barley grain, no matter how good the quality of the grain when on the straw, affects the percentage germination, the regularity of germination and the evenness of root and acrospire development, and as a consequence lowers the quality of the malt made from such grain. The grain shown in this illustration is the result of careful harvesting with a correctly adjusted machine. With such a sample 100 per cent germination of strong, vigorous growth can be expected and good quality malt manufactured therefrom for a certainty.

South-East are recommended to change to Research, from which better grain is obtained, and for which there is a demand, we understand, by Victorian maltsters.

#### Six-row Types.

No official record is kept of the areas of individual varieties of "Cape" (or six-row) barleys now grown in the State, but it is known that the following varieties are grown by farmers:—

Atlas.  
Californian Cape.  
Club Mariout.  
Roseworthy Oregon.

The two first-named varieties have proved very suitable for our conditions, as also did Roseworthy Oregon in past years.

Since the beginning of this century some interest has been shown in improving the barley varieties by selection, breeding and introductions from other countries. The late Professor A. J. Perkins, when Principal of Roseworthy College, inaugurated the selection of six-row barleys, and with Mr. W. J. Spafford, first developed Square-head and Short-head varieties, which were soon followed by Roseworthy Oregon. The two former varieties were derived from heads found in a field of Algerian oats, and are understood to have originated in North Africa. The Roseworthy Oregon was selected from Oregon, a barley that was received with some samples from U.S.A. Professor Perkins was influenced in developing these by two facts; firstly, the North African climate is closely akin to our own, and secondly, the need to produce cheap grain for feeding to pigs and advancing the swine industry. The barleys proved very useful, especially the latter two, Short-head being prominent for at least 25 years, whilst some Roseworthy Oregon is still grown in a few districts in the State.

The aim was to secure quick growing, early maturing varieties, reasonably strong in the straw. During 1918-25, five or six further varieties imported from Tunis in North Africa were tested on Government farms. None of these proved as hardy, or a better yielder, than the previous ones that had been developed. Again, during 1937-39, three or four more secured from Algeria and Tunis were under trial but did not prove suitable. Atlas and Californian Cape were also introduced during the 1930's from U.S.A., and these proved equal to, or better than Roseworthy Oregon, and have remained with us.



The need for six-row barley is not great now, but should changes occur and the pig industry advance with an export market, these barleys will again come into favour. Work carried out from 1937 to 1942 showed that when grown in the inland mallee districts, in comparison and under equal conditions with two-row barley and wheat, six-row barley produced 89 lb. grain per inch of rainfall, whilst two-row barley yielded 78 lb., and wheat 68 lb. These tests were carried out in low rainfall areas averaging 12.52in. per annum—districts that are not generally suitable for growing malting barley.

In those districts where two-row barley grows quality grain, farmers should not grow six-row barley, because the two types should not be mixed together. Malsters require very uniform, even grain, and for best markets, farmers should supply only one type—in fact, one variety only of barley grain. Care should be taken to sow seed true to variety and certainly never to use mixed seeds of varieties.

### FERTILIZER.

As with other cereals, the essential fertilizer used is superphosphate, and although the amount applied by farmers varies from as low as 40 lb. up to 140 or 150 lb. per acre, the general average is about 90 lb. per acre. There is a tendency amongst farmers to apply a higher amount to barley sown on pasture ley land than to that sown on wheat stubbles. The amount to use should depend upon the rainfall, the past fertilizing and production of the area and the use to be made of the land immediately following the crop. Generally, responses by plants are greater from heavier than lighter rainfall; and under South Australian conditions land receiving 16 to 17in. annual rainfall will produce sufficient to warrant 90 lb. to 1 cwt. superphosphate per annum, whilst that receiving 24

to 25in. will warrant 180 to 200 lb., and that receiving only 12in. will do with less, 60 to 80 lb. per annum. In cases where ample superphosphate has been used in the past and good clover pastures have been grown during the grazing seasons there can be some reduction in the superphosphate for the barley crop. Where the land is intended to return to pasture immediately following the barley crop, it is the practice of some growers to apply extra superphosphate with the crop, because it has a



The sample of barley here illustrated has obviously been harvested with a machine previously used for harvesting wheat and then worked in the barley crop without adjustment.

As can be clearly seen, besides broken grains and skinned grains, practically every grain has been over-harvested and the great majority of them are more or less damaged. The over-harvesting is so severe that it is difficult to realize that the grain was originally of a manufacturing grade of very fair quality, for the rough treatment meted out to the crop has reduced the sample to "feed" quality, worth considerably less than would have been received if reasonable care had been shown in adjusting the harvesting machine for barley harvesting purposes.

beneficial effect on the following pasture. This no doubt is economical in saving topdressing work, but there is a call for investigation into the true requirements of fertilizer for barley grain, especially the effect on the quality of grain for malting purposes.

Besides superphosphate, minor elements are required on certain deficient soils, but these do not comprise a very large area of our barley districts. The chief one of these is manganese, which is required for the soils on southern areas of Yorke Peninsula, and possibly some on Eyre Peninsula, and needs to be applied with

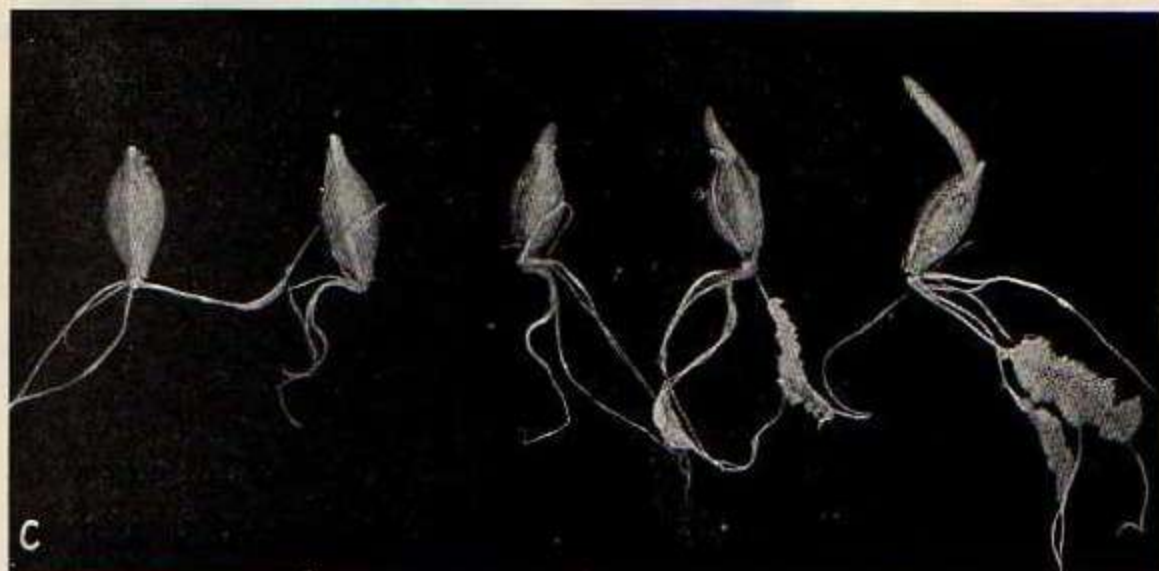


the barley crop at the rate of approximately 20 lb. manganese sulphate per acre.

Other trace elements, such as copper and zinc, are necessary on certain soils, but these elements are best applied to pasture growths, and it is not necessary to apply them with the crop.

Sulphate of ammonia has been used by a few barley growers in the past, mainly on stubble sown crops. During 1936 and 1937

turnips, mustard, etc., affect the crops and are a nuisance at harvest time, and consequently treatment with weedicide spraying is being done, and its use of recent years has increased. As with wheat, it is necessary to be careful to spray at the correct time, after all tillering of plants has been made and before the heads begin to form. In light soils where it is more difficult to kill weeds by cultivation, the spraying is proving particularly useful and



The normal germination of barley grains so essential for the very best results being obtained by maltsters is only possible if the husk of all the grains remains intact after harvesting.

Without this normal germination, with its strong rootlet development and the acrospire travelling from the embryo the full length of the grain inside the husk and emerging at the tail end, irregularity of malting always occurs with resultant reduction of quality.

many tests were carried out with variable results but insufficient gain to warrant the cost of the fertilizer. Nowadays more attention is given to the growing of legumes in the pastures and a greater length of pasture period in the rotation between crops; consequently there is no need for artificial nitrogen fertilizer, and its use is not recommended.

#### TREATMENT OF CROPS DURING GROWTH.

Barley crops require little or no treatment during growth. Being a strong surface feeder, barley is a better competitor against weeds than other cereals, and consequently less weedicide spraying is carried out on them than on wheat crops. Certain tall growing weeds such as

economical. Applied at the wrong time modern weedicides affect the health and production of cereals, but applied at the right time the growth of weeds is stopped, allowing more moisture to be available for the cereals whilst growing to maturity.

#### HARVESTING.

The harvesting of barley is most important, and no matter how well and good a crop of barley is grown, its value can be greatly depreciated by incorrect or careless harvesting, because its quality for malting is spoiled. Firstly, the crop must be thoroughly ripe before harvesting; that is, the sap must have finished flowing to the grain in the head and the grain must have hardened and not contain more than

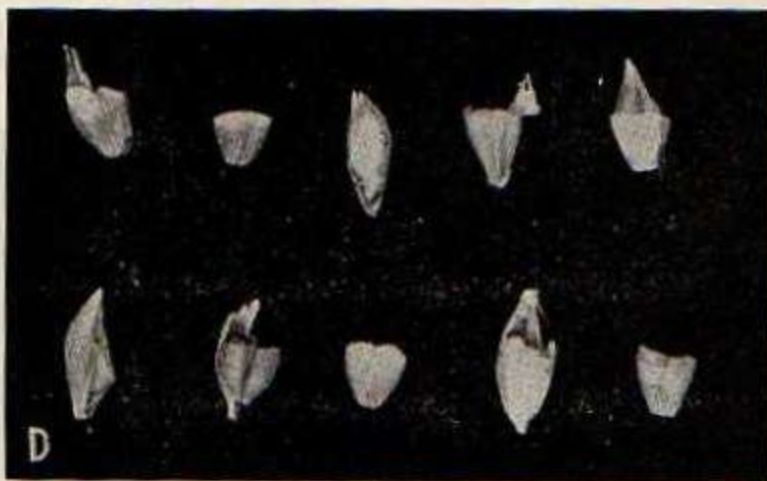


approximately 10-11 per cent of moisture. Secondly, the harvesting must be done without damaging the grain by cracking or skinning. Thirdly, bags of harvested grain should not be allowed to stand on damp ground or be left unprotected in the field for too long a period.

Sweated barley is the result of harvesting and stacking barley containing too much moisture, or leaving bagged barley standing on damp ground or out in the open exposed to heavy rains. Very little sweated barley will germinate, and so is valueless to maltsters. In our recognized barley-growing districts barley allowed to ripen fully before harvesting is commenced does not contain sufficient moisture to develop the heat which leads to sweating. For best results then it is essential to delay harvesting operations until all barley plants are dry-ripe. Any barley that is harvested before it reaches this stage, or which is damaged in the straw

prior to reaching it, will be impaired in quality.

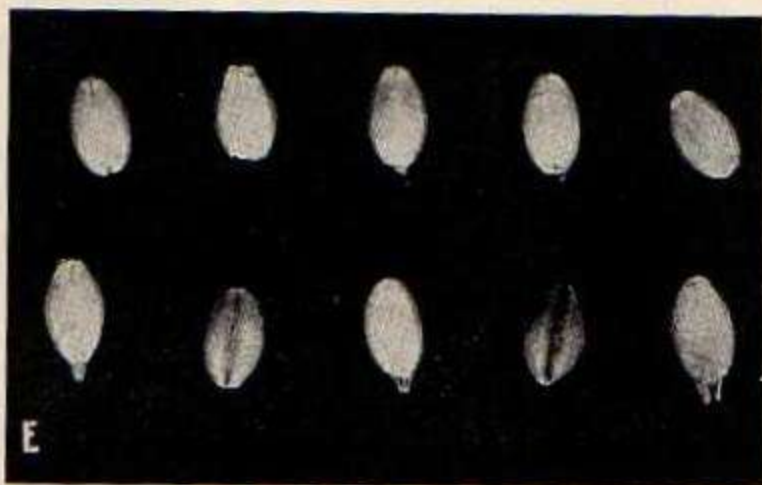
The accompanying illustrations show clearly the need for care in harvesting, and demonstrate that high quality barley may be ruined for malting purposes by improper adjustment



Not only will broken pieces of barley grains not germinate when mixed with barley being malted, but they quickly develop moulds, spoiling both the colour and the flavour of the malt.

Unpleasant flavours developed in malt are transferred to malt products; and so very strong objection is taken by maltsters to the presence of broken grains in samples submitted to them.

Cracking of grain is prevented by correct adjustment of harvesting machines and by regulating the pace at which machines are operated according to the weather conditions at the time of harvesting.



Although many skinned barley grains will germinate, they are most erratic in their behaviour. If a lot are present in a sample taken to a malt-house, the malting process is delayed; and as mould develops on a high proportion of these damaged grains, the quality of the malt is lowered considerably.

The skinning of barley grains is generally the result of using wheat harvesting machinery without adjustment after being used in wheat crops.

of harvesting machines or by careless operation of these machines. To obtain best financial returns from barley crops by careful harvesting these points should be attended to:—

1. Avoid cracking or skinning by keeping cylinder speed as low as possible. Reduce speed during hot dry weather and avoid speeding up when cylinder is lightly loaded.

2. End-play in cylinder bearings must be prevented, particularly with machines equipped with spike-tooth cylinders.

3. With spike-tooth threshers open up the concaves and use only one



or two rows of concave teeth, and with rubber cylinders lower the concaves after the machine has been harvesting wheat.

4. Adjust sieves to ensure the least possible return of tailings to cylinders, and do not let barley beards clog the sieves.

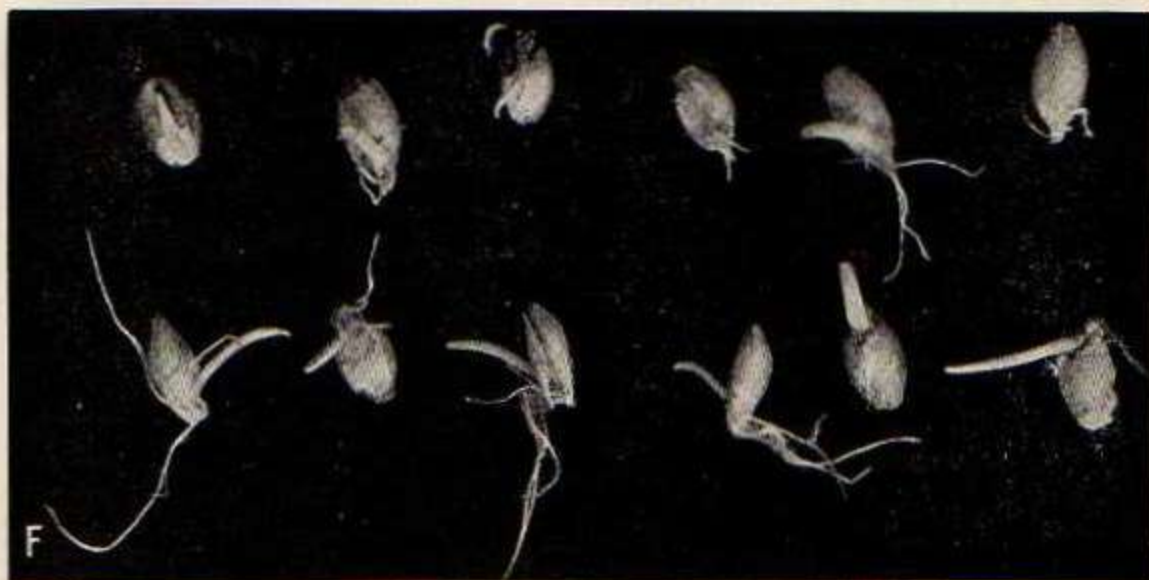
5. Keep sufficient wind blast on front of sieves to keep openings free of chaff and other material.

6. Sieves should be nearly level with the rear end up for side-shake machines, and should be level or a little lower at rear end for fore-and-aft-shake machines.

machines have adjustments that should be used, and it can be expected that the price of quality barley will be much higher than other grades in the future. Consequently, farmers should, both in their own interests and those of the industry, use their machines to the best advantage.

#### DISEASES OF BARLEY.

Diseases of barley, such as smuts, rust, stripe, mildew, are well known, and provided that the seed is procured from clean crops and is properly pickled, it is only under exceptional



Practically all damaged grains of barley included in a batch being malted behave differently than do normal grains undamaged in harvesting, some not germinating at all, others producing roots but no shoot, others again producing a shoot but no roots, all that germinate at all producing weaker shoots and roots than normal grains. Eventually they all die before their starch is converted into malt and then decompose and carry moulds deleteriously affecting the quality of the malt.

All phases of erratic and abnormal germination are to be seen in this illustration, including strong mould growth on the last grain to the right in the bottom row.

7. Have sufficient clearance in all conveyors, and do not allow elevator chains to get loose and sloppy.

8. When the weather is hot and dry it is essential to adjust the harvesting machine to avoid cracking.

9. Do not stack damp barley, as it will be damaged by developing heat in storage.

Agricultural Advisers report that all types of harvesting machines are being used, but that the header harvester is by far the most popular, and there is an indication that the new "Combine" headers, and "All Crop" harvesters appear to harvest barley with less damage. All

conditions that they cause any economic loss. Heavy dockages are made on "smutty" barley that is offered for sale, therefore it is essential to "pickle" all seed.

Over the past years, however, some loss has occurred in cereals through "no growth" and "poor" growth in patches, which have been worse in oats and wheat crops, but have also affected barley crops. The trouble is a root affection due in some cases to eelworm and also to a disease called "Rhizoctonia" by the plant pathologists, who at present are investigating the disease for an economic and effective treatment. It appears to be worse in cases of



debilitated soils and crop growths, so that the remedy at present is to improve and maintain fertility of soils with consequent healthy crops more able to withstand attacks of fungi, etc.

#### INADVERTENT LOSSES.

Barley grain losses have been high in certain seasons when hail storms or strong winds have occurred at critical times. This is worst when crops are ripe or nearing maturity, for although modern machinery will pick up very badly lodged crops, the mature heads of barley, particularly those of our best variety, Prior, are liable to snap off at the first node below the head, and it is impossible for machines to pick up fallen heads. Bad conditions do not occur every year, but since they are apt to occur suddenly, farmers have learnt to hasten the harvesting, and there is a tendency to commence before the barley is quite ripe. Recently some attempt to check the possible loss has been made by rolling the crop more or less flat prior to harvesting, in order to prevent the winds causing severe breaking off of heads. The operation, however, cannot be recommended at present. More investigation is needed to show whether loss of grain, in quality as well as quantity, by the operation itself is not as great or greater than that caused by winds that might occur.

Selectors and breeders of barleys have the matter in mind, and it is hoped that a more sturdy type of Prior barley can be produced that will yield as well as the present strain and at the same time produce grain of equal quality. This appears to be the best way in which to safeguard somewhat against loss of grain by wind.

In conclusion, I wish to record appreciation of the valued assistance given by Mr. W. J. Spafford, C.B.E., I.S.O., Chairman of the Barley Board, in providing material for the article and in checking its preparation.

Thanks are due to Agricultural Advisers F. C. Gross, W. C. Johnston and W. H. Brownrigg for collecting and collating data from farmers in their districts; to Project Officer F. W. Osborne and other staff officers in collating production figures, and to Acting Editor of *Journal*, H. C. P. Trumble, in preparing graphs and arranging maps, etc.

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Crop of barley



the production of plump, starchy barley grains. A long mild ripening period is ideal for producing good malting barley. A quick finish to the season results in thin or pinched grain. For this reason some areas of the State regularly produce better samples than others. Time of sowing is also relevant. Sowing too early will affect quality, but if sowing is delayed too long, however, there is less likelihood of the crop finishing off under conditions which favour the production of good quality barley.

These are our barley statistics for 1959:

Barley crop	for grain	Total Yield	Acres
1959	6-row	575 bags	70
	2-row	600 "	65

Varieties of barley		Acres
1959	6-row Cape	70
	2-row Maltworthy	65

### Oats

During 1951-56 the area sown to oats in South Australia increased by 100,000 acres. Because the grain is a good supplementary feed for stock and green oats readily provide useful early winter grazing, there is likely to be a steady increase in acreage in the future.



Oats provide a useful rotation crop, because they are not susceptible to the "takeall" disease which affects wheat. They can be sown more safely early in the year, and in more quickly prepared seedbeds, than the other cereals, and this helps to spread the work at seeding time.

Oats also do well on worked up stubble for early feed. Sown in covered fallows they guard against erosion and provide useful feed on the lighter mallee soils of the lower rainfall districts.

With the growing numbers and importance of livestock, the value of oats becomes greater every year.

Many farmers now require a multi-purpose variety - one which will provide a bulk of early grazing and which will recover after one or more grazings to produce good hay or grain yields.

Each variety varies in its capabilities for grazing, hay or grain, and these qualities are affected to a certain extent by soil type and climate.

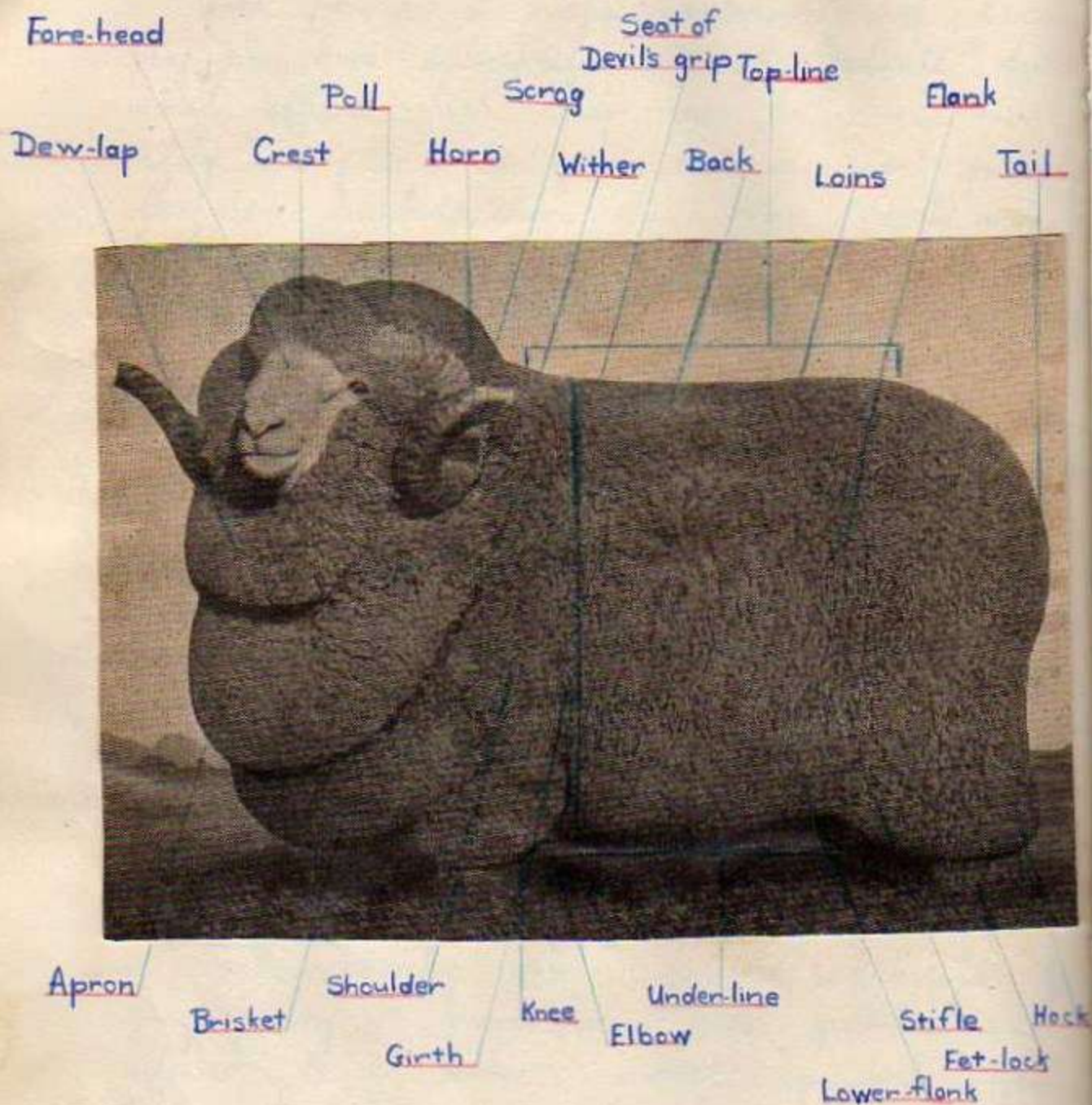
Some varieties produce good early growth but do not recover well. Others start slowly and produce good late winter feed. Others, again,





Oats background fallow foreground





A Point Chart of a Stud Ram



provide good early grazing and recover in suitable seasons to yield economic quantities of hay or grain.

A variety for grazing should be able to make vigorous early leaf growth, stool well, and remain in the leaf stage for a relatively long period.

Fine stemmed, strong strawed varieties resistant to rust make good hay, while the miller demands a plump, even-sized grain with an easily removed, thin husk.

We use Algerian, which was imported from Algeria, and was for many years the standard variety in South Australia for early seeding. It is declining in acreage, mainly because it is a poor winter grazer and does not produce as much bulk of feed as the early-maturing varieties.

It is more suited to the higher rainfall districts, and there it is a very good finisher and a reliable grain and hay producer.

It is of medium height with a fine, strong straw, and there is little trouble from lodging or shedding of grain. It recovers well from grazing and the grain is long, but plump, and suitable for milling. Algerian is susceptible to



smut and stem rust, but has moderate resistance to leaf rust.

After reaping much of our oats is used for cow feed, being mixed with their chaff.

Below are the remainder of the cereal statistics for 1959

Oats 1959		Total Yield	Acres
	For grain	440 bags	90
	" hay	10 tons	8
Varieties of Oats 1959			Acres
for grain, hay or green fodder		Algerian	98
Other Crops Type		Total Yield	Acres
		10 bags	30
Hay made on farm			Tons
			30

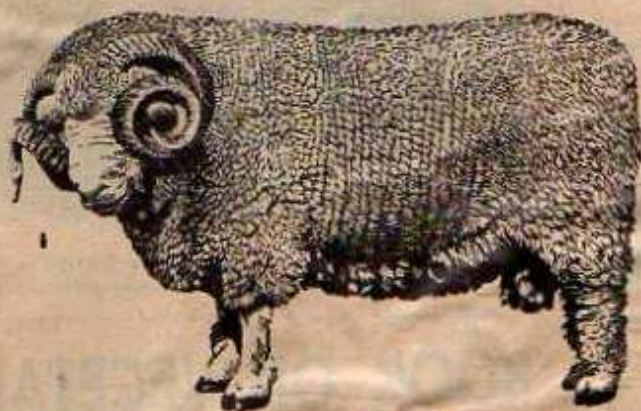
Products used on farm 1959	For seed		For stock, poultry	
	Wheat	62 bags	30 bags	
	Barley	65 "	40 "	
	Oats	38 "	50 "	

### Sheep

The number of sheep that are kept varies considerably, according to seasonal conditions.

We have Merino ewes and Dorset-horn rams. The crossbred lambs have a good carcass for meat and a medium quality wool.





THE DORSET HORN RAM



head: muzzle 1 moderately fine; eyes bright and full; ears of medium length and fine texture. Neck: strongly set on shoulders; throat clean cut. Chest: wide, full and deep. Shoulders: broad and of moderate length. Front legs: straight, strong and wide apart. Body: deep and wide; ribs long and well sprung with plenty of heart room. Flanks: deep and full. Back: broad and level throughout the whole of its length and firmly covered. Loin 2: long, level and well covered. Hindquarters: wide, long and filled with flesh. Rump 3: wide and level. Tail: broad and set well up. Hind legs: straight and strong, set wide apart, each showing a full leg of mutton, meat coming down to the hocks 4. Fleece: moderately short of close clean fibre, on a fine supple pink skin and covering the belly. General: active and of noble appearance, showing masculine character with absence of coarseness; standing on legs of medium length, with flat clean bone of good quality; straight topline.



Points the Judges look for.





Sheep waiting to be shorn



The fleece on the table

Dad



The sheep require a lot of attention. They are very susceptible to blow fly strike, and thus they have to be kept clean. When they are put on fresh green grass they become very dirty (called "scavenging"). The blow flies are worst during the warm weather, and the sheep need to be attended to daily. To help control the blow-fly pest the sheep are crutched (the wool around the tail is shorn off).

During the lambing season the sheep must also be watched closely, and any ewes that are down helped up. At this time especially foxes and crows are also menaces, and have to be kept away.

To enable the easy handling of the sheep, sheep yards are a necessity. We have one large yard, a drafting race, and two smaller pens.

One of the most important parts of sheep farming is shearing. The sheep are shedded up the night before as wet sheep cannot be shorn. A small, sheltered pen is used to hold a number of sheep handy for the shearers. We have our own two stand shearing plant, and two contract shearers do the job. At the completion of the shearing.



each sheep, which usually takes about  $3\frac{1}{2}$  minutes, they are turned out into another small pen for branding. Each farmer has his own brand and there are no two brands alike (ours is black II on the near-side front shoulder)

The floor is swept while the shearer gets another sheep. The fleece is picked up, thrown on a table, and skirted - that means that all wool that tends to destroy the "character" of the fleece, such as short, lumpy, or dirty wool from around the edges, is pulled off. The wool is rolled into a ball and placed in a bale for each variety such as ewes, wethers, hoggies etc., while bellies and pieces go in separate bales.

The bales measure 4 feet 6 inches by 2 feet 3 inches, and into them is pressed at least 250 lbs of merino fleece wool, or 225 lbs of other fleece wool, except lambs wool, which has to be at least 200 lbs. Once the bale has been pressed and fastened, it is ready for branding.

A few weeks after shearing the sheep are sprayed. They are driven through a race in the sheep yards, where they are sprayed with a special solution which kills pests such as lice and keds. It is a regulation





The sheep feeding



Three Dorset-horn rams





that sheep must not be sold to another farmer without having been sprayed or dipped. The advantage of this precaution is obvious.

The following are the sheep statistics.

Sheep 1959 :	Rams 1yr and over	4
	Breeding ewes	340
	Lambs and hoggets	60
		404

Breeds :	Merino	340
	Crossbreds	60
	Dorset horn	4
		404

Wool production	250 sheep	2,231 lbs
	60 lambs	261 lbs
	total 310	2,498 lbs

The following list may help to clarify what is meant by the names given to sheep.

Ram: A male sheep used for breeding purposes.

Ewe: A female sheep.

Lamb: A young sheep from birth to 6 months old.

Weaner: A young sheep from 6 months to 10 months old that has been weaned from its mother.

Hogget: An unshorn sheep of 12-15 months old.

Wether: A male sheep, castrated when a lamb.



A two tooth : A twelve months old sheep  
A four tooth : A two year old sheep  
A six tooth : A three year old sheep  
An eight tooth or full mouth : a four year  
old or more.

### Cows

In our herd we have a mixture of Australian Illawarra Shorthorns, Jerseys, and Friesians, totalling eight cows.

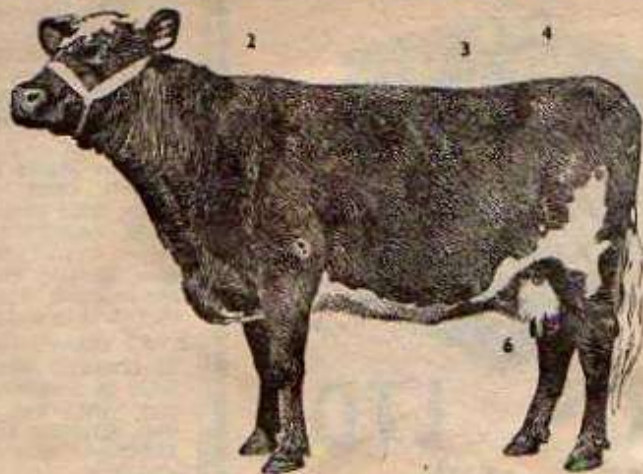
For most of the year they are milked night and morning by a two-stand milking machine, in a specially constructed shed. While being milked they eat a mixture of chaff and oats. Often during part of the summer they are milked only in the morning. A belt from the milking machine engine drives the cream separator. Cleanliness is of utmost importance, as we sell our cream to be made into butter. Cold water is passed through the machine before milking, and boiling water after.

The cows teats are washed before the suction cups are placed on. Milking is usually completed in about five minutes, when the cups are removed and the remainder of the milk is removed by "stripping" by hand. The



# POINTS THE JUDGE LOOKS FOR

No. 3 of a series in the preparation of which leading stock breeders and agricultural authorities kindly assisted.



THE DAIRY SHORTHORN



Head: kind, yet vigorous and alert, showing feminine character; muzzle 1 open flexible nostrils; eyes large and bright; horns fine. Throat: clearly defined with absence of coarseness. Neck: cleanly cut, well set on and without crest. Chest: deep and broad with large heart-girth. Shoulders: fine, flat and gently sloping. Withers 2: not too wide. Body: deep, long, well balanced and standing on short legs of flat bone. Back: broad and level, wedge shaped from hips 3 to shoulders. Ribs: well sprung. Hips 4 and pins 5: wide apart. Hindquarters: level, broad, long from hips to pins, evenly fleshed, wide and deep from behind. Udder 6: capacious, silky, wide and running well forward, with no defined division between the quarters. Tests: soft, of even form, medium size, set well apart. Milk veins 7: well developed, carried well forward, ending in large milk wells. Rear udder 8: carried well up behind, wide throughout. Hind legs: strong, straight, with good width between the hocks 9. Tail: fine and neatly set in, without coarseness at the tailhead. Skin: fairly thin and very supple.



The dairy herd.



Mum & Dad

"Stripping," after

the cups are removed

The calves having  
a drink



Foreground: Tamworth sow

Background: Large White sow



milk passes through a pipe into the other part of the shed, where it is collected in a large bowl. When the tap in this is switched on, the milk runs into the bowl of the cream separator.

### Pigs

The separated milk is fed to the pigs. We have a large White sow, a Tamworth sow and a large White boar. Soaked barley or wheat and waste food from the house is also given to the pigs. A litter usually ranges between half a dozen to a dozen piglets, which grow very quickly. They are sold at varying ages and sizes, depending on the demand and the price.

### Poultry

We have quite a large number of fowls, which have the run of the farm. They are "barnyards" (a mixture of many breeds). We throw them some wheat twice a day. The eggs are collected in the afternoon, and any in surplus of our needs are sold to the local store.

We have three geese and three ganders. The first lot of goslings are usually hatched in September and the second sitting in late October or early November. The



first selling matures in time to be sold for Christmas and New Year's Day needs, the second lot are sold at Easter time.

Rotation

A	B
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There is a four year crop rotation system. In the first year wheat is sown in A, and barley in B. In the next year the whole lot may be sown with oats, directly into the wheat or barley stubble. Then in the third year the whole paddock will be left as grassland, and the stock will graze on it. In the fourth year A will be sown with barley and B with wheat.

This scheme gives the land a change of three different crops, with a rest of one year out of every four.

Carrying Capacity.

Care must be taken against overstocking, for in a dry year stock may be lost, or they may have to be sold at reduced prices. The risk of erosion is also increased because vegetation is reduced.

The farm is generally capable of carrying three hundred ewes plus lambs, and ten cattle. This averages about one sheep to two acres of land.





Feeding sow and piglets

Myself aged c. 6 yrs, holding  
pet magpie

Pigs and dog about 1930



Feed-time for the fowls  
and geese





Before starting to milk wash the udder thoroughly with clean, soapy water.



The newly-born calf should be left with its mother long enough for her to lick it dry and give it its first feed. It is usual to take the calf away about 12 hours after it is dropped.



Teaching a calf to drink from a bucket requires a lot of patience. To the young calf it is a strange and possibly frightening experience to drink with its head lowered into a bucket, as the natural way of drinking is with the head up, suckling its mother.



Even when on a milk diet, calves require plenty of clean, fresh water to drink. Too often their need for water is overlooked.



### Marketing of Produce

The success of a farmer often depends on his ability to buy and sell at the best markets, and this requires quite a deal of skill.

The wheat is taken from the farm by contract carriers to the bulk handling depot at Wallaroo port. The barley is taken in bags to Mona siding (near Bute), where it is stacked and later railed to Wallaroo. The oats is sold in bags at Wallaroo, and the rye-corn is sold in bags at Bute, where it is stacked and later sent to Adelaide.

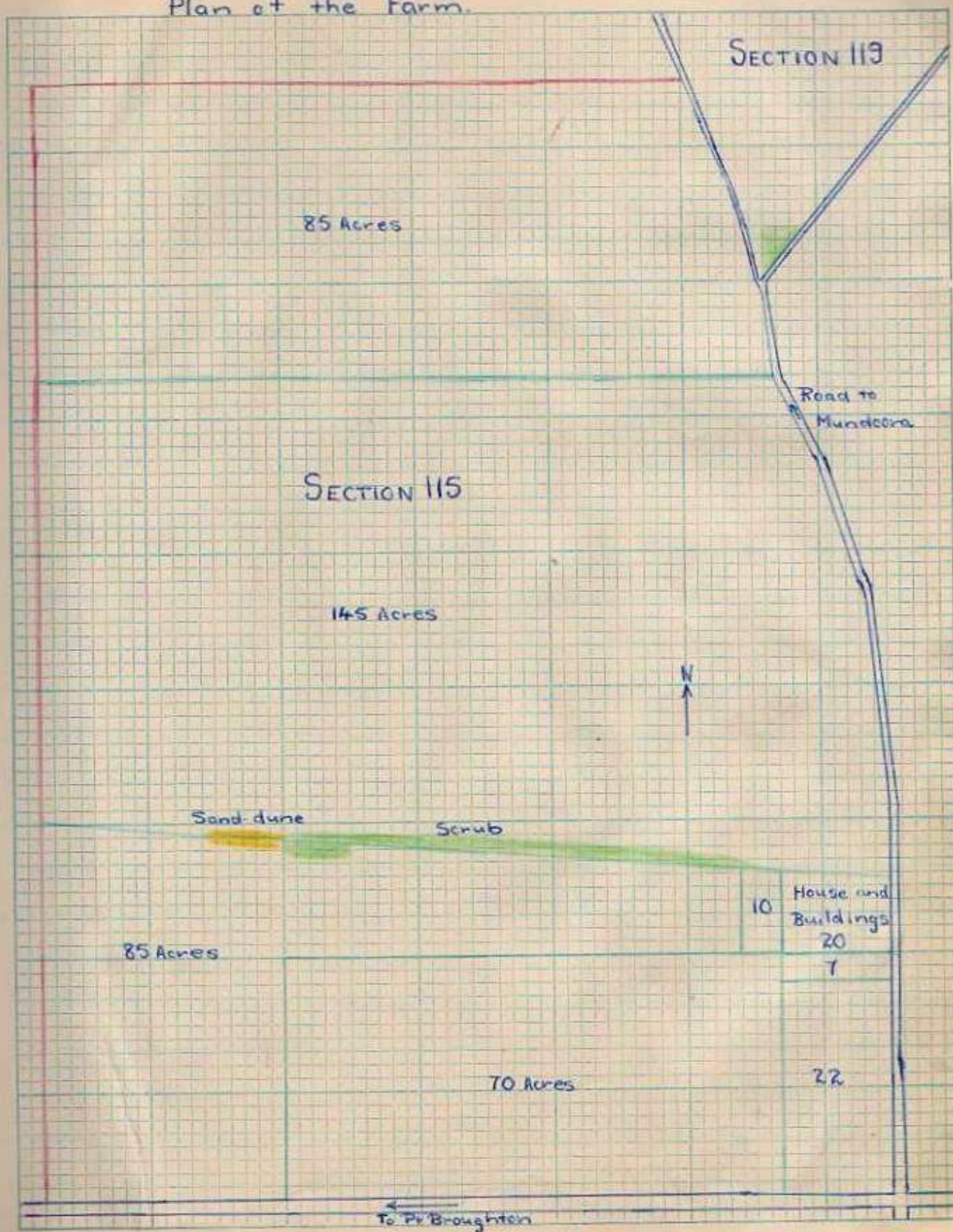
The wool is taken by truck to Adelaide, where it is sold in the wool sales. Lambs are taken to the Port Pirie or Adelaide abattoirs. Calves and pigs are sold at the local markets or railed to the Adelaide abattoirs from Inauntown. The cream is collected by an "Amical" truck on Monday and Thursday mornings, taken to the depot at Kadina and then sent to Adelaide.

### Water supply

There is a ten-inch main past the property from Beetaloo reservoir, and water passes through the meter and is distributed by  $3\frac{1}{4}$ " pipes.



# Plan of the Farm.





## SECTION 119





100 ACRES

10 ACRES

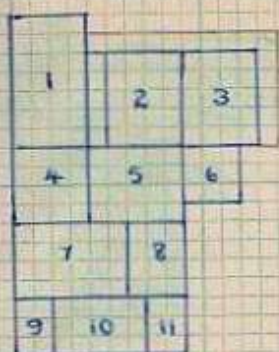
80 ACRES

## SECTION 115

5

-  External boundaries
-  Internal fences
-  Roads
-  Scrub





1 Lounge  
2, 3, 4 Bedrooms  
5 Dining room  
6 Sleepout  
7 Kitchen

8 Pantry  
9 Laundry  
10 Lobby  
11 Bathroom  
12 32v engine

12

Trough

Garage

Dairy

Barns

Shearing  
Shed

Hay  
Stacks

Harness  
house

Old  
Horse  
Stable

Sheep  
Yards

Implements

Pig sty

Bull  
Yard

Pig sty

Chalk-stone

Ramp

Straw-roof

Iron roof

1<sup>st</sup> Class fence

2<sup>nd</sup> Class fence

N ←

Plan of House and Outbuildings











