SOME NOTES ON THE AUSTRALIAN GRAINS INDUSTRY

[By P. N. FYNES-CLINTON]

(Read to the Royal Historical Society of Queensland on 27 June, 1963.)

At the beginning I must warn you that the time available to me this evening will not permit a complete review of all the grains that this isolated continent produces from the wide differentiation of its soils.

Grain in its multiple varieties has been through the ages the foundation of human subsistence.

I have decided in presenting this paper to give major emphasis to what I believe are the basic grains.

By "basic" I mean wheat, maize and barley which are the traditional cereals of human diet as we know them.

As the theme develops I hope to direct your attention to another grain variety which, although almost as ancient as the Pyramids, is an infant in the commercial sense in this country.

That infant is sorghum, but more anon.

In our community wheat is the premier grain because it provides the staff of life. Maize, too, has its place in the human regimen, and the oats retain some popularity as a prime ingredient of breakfast and other cereal foods.

WITH THE FIRST FLEET

Before I take these basic grains in sequence let me say that their Australian origin may with authority be associated with those who arrived with the First Fleet.

As Australians we owe the origin of our grain industry to two men who superficially were complete contrasts of human nature, and yet, in their hidden moods, though complete strangers, were mutual rebels against the system under which they lived.

James Ruse, who apparently arrived as one of Captain Phillips' original convicts in 1788, and Richard Johnson, an unaccredited parson, are Australia's original tillers of the soil. Between them they pioneered those basic grains which I have mentioned.

Ruse, a farmer native of Launceston in Cornwall, was con-

victed as a young man in 1782 at the Bodmin Assizes of an unknown offence. Apparently on the loss of the American War of Independence he was shipped off with the First Fleet, although he had almost atoned for his offence.

Ruse's sentence expired in 1789, but his good behaviour and diligence had impressed the Governor. Phillip placed him on an acre of cleared land at Rose Hill, in the present subsidiary city of Parramatta, with a condition that if he could subsist he would be given 30 acres to farm for his own profit.

Ruse's methods were primitive, but more efficient than those of the Governor's other farmers.

According to the *Australian Encyclopaedia* Ruse's own words were: Having burnt the fallen timber off the ground, I dug in the ashes, and then hoed it, never doing more than eight, or perhaps nine rods a day, by which means it was not like the Government farm, just scratched over, but properly done. Then I clod-moulded it and dug in the grass and weeds; this I think almost equal to ploughing. I then let it lie as long as I could, exposed to air and sun; and just before I sowed my seed I turned it all up afresh.

GOVERNOR KEPT HIS WORD

In May 1790, with seed given him by Governor Phillip, Ruse sowed half an acre of bearded wheat, and in August half an acre of maize. In February, 1791, Ruse reported he was able to fully maintain himself. Governor Phillip kept his promise. The deed of 30 acres, the first land grant ever made, was signed on 22 February, 1792. In 1793 Ruse sold this farm and began to clear another 30 acres near Windsor.

We must leave James Ruse here to record some of the background of a most interesting ecclesiastical gentleman.

Richard Johnson, the first clergyman to arrive in Australia, also landed at Port Jackson on 26 January, 1788. Phillip would not give him recognition as a pastor and his ministerial activities, as he put it, "in the field," are food for another story. At least he did recover £67 which he had expended on the erection of a church on a site which is now approximately on the corner of Castlereagh and Hunter streets, Sydney. The Rev. Samuel Marsden who arrived in 1794 to assist Johnson took over a considerable portion of the chaplain's duties, principally at Parramatta.

We must not let the name of Marsden intrude upon the narrative despite its place in the annals of the colony.

The Rev. Johnson had diverse interests. In the height of his quarrels with the Governor he did in 1788 plant corn and vegetables. By August 1790 he was able to record that

he had cut two crops of wheat, barley and oats, and also Indian corn and potatoes among other vegetables. All this happened on a site which is now portion of Bridge Street, in the heart of Sydney.

The pioneer efforts of Ruse and Johnson were the product of good husbandry under difficult conditions because a century later only three and a half million acres were under wheat in Australia.

The unsuitability of the inhabited coastal area led to expansion to Tasmania which exported surplus wheat to the mainland up to the middle of the nineteenth century.

SPREAD OF WHEAT

In the sixties the sandy soils of South Australia had attracted others who were anxious to cultivate farm lots. Towards the end of the century improved transport and legislation which facilitated closer settlement saw rapid increases in acreages in Victoria, notably in the Mallee, and later in New South Wales. At the turn of the present century West Australia had started its run to the top of Australia's wheat producing States.

It may be said that the production of most grains took a spurt once agriculture had tempered the prejudice of the squatters who were the first occupants of the fertile plains beyond the main range. Until 1813 when cropping extended west of the Blue Mountains the agricultural efforts of the early settlers were confined to the areas of the Parramatta and Hawkesbury Rivers.

Governor Hunter's records for 1797 gave the following crop acreages for that year: Wheat 3,361 acres; maize 1527; barley 26. By 1808 wheat had doubled to 6874 acres, maize to 3389, barley had made a big leap from 26 to 544 acres, and oats were shown at 92 acres.

By the year 1850 the area under crops had increased to 491,000 acres, of which 198,000 acres were cultivated in what is now the State of New South Wales, and 169,000 acres in Tasmania. At the end of 1850 the area under cultivation in Victoria, which was then the Port Phillip District of New South Wales, was 52,190 acres.

Those brief statistics are accurate. They were extracted from the Commonwealth Year Book.

A few more figures will serve to bring the story nearer home. Of the Australian total of 1,174,000 acres under crops in 1860-61, Queensland recorded a mere 4,000 acres. In 1900-01 our quota was 458,000 acres of a total of 8,814,000 acres. In 1960-61 Queensland's crop acreage

was 3,057,000 and the national total was 29,576,000, with wheat still being by far the dominant crop.

AUSTRALIA MAJOR EXPORTER

Australia ranks only tenth among the world's wheat producing countries, but it is one of the largest exporters. Grain production has expanded rapidly since the advance of modern techniques in mechanisation. As a nation we produce far more wheat than we can consume ourselves, both as cereal and feed grain.

However, local consumption is steadily increasing and the export outlet has become more hopeful in the last few years. New outlets in the Asian sphere have created additional markets and the grain industry seems to have entered upon its most stable era.

A TIMID BEGINNING

Some interesting observations on the early attempts to produce wheat in Queensland are to be found in a Bulletin written in 1892 by E. M. Shelton, who was then the Department of Agriculture's instructor in agriculture.

His general introductory remarks are worthy of repetition here.

Shelton had this to say: "The progress of general farming in the Colony has from the first been timid and hesitating. The early settlers and their successors have for the most part been men possessed of small means, and deficient knowledge and experience of agriculture. Old world agriculturists again found in the strange conditions of soil and climate prevailing in the new world of Queensland obstacles which previous knowledge did not help much to overcome.

"Under such unusual circumstances every cultivator becomes perforce an experimentor, but the result of his endeavours has been chiefly a harvest of facts, often conflicting and inconclusive. Moreover, agriculture has been, and is now to some extent, looked upon as an avocation to be taken up only as leisure from other callings permitted. The occupations which have attracted men and capital to the Colony have for the most part been squatting, mining, and the various commercial enterprises connected therewith."

The difficulties of the early settlers in Queensland were no different to those in the southern States.

The wheats of the world are classed as spring and winter wheats. The spring varieties are planted in spring and harvested in late summer. In Europe and America autumn wheats are planted in the autumn and lie dormant through the winter, very often with a cover of snow. During the

following spring and summer they begin to grow and mature in late summer.

The early agriculturists in Australia were some time in realising the position is in reverse in this country. Because of the relative mildness of our winters in Australia we grow wheats which are botanically spring wheats. They are planted in autumn, grow through the winter and mature in late summer.

STEADY GROWTH

Nevertheless Shelton found that despite these problems there had been almost from the first a steady growth in the annual wheat yield. In 1870 the total yield for the year footed up to 39,787 bushels, and this was increased to 81,161 bushels in 1873, while in 1891 the yield was 392,309 bushels. On the other hand, in 1886 only 21,221 bushels were reaped in the entire colony (we had long since become an autonomous State). In 1888 there were cut for grain only 499 acres which gave a yield of 8265 bushels of grain.

Shelton regarded these fluctuations as little less than remarkable. He wrote:

Taken by themselves they seem to indicate that at times wheat-raising is liable to extraordinary fatality. In actual fact the peculiar circumstances of the colony, as much certainly as seasonal variations, furnish the explanation of the anomalies of the annual wheat returns. For years past the mines, the northern plantations and the rapidly growing towns of the colony, to say nothing of railways and other public works in progress, created a demand for hay, maize and provender generally that Queensland farmers have only recently been able to supply. It may be said in strict truth that, outside of the sugar plantations and the small fruit-growing districts along the coast, the great end of Queensland farming has been the production of horse-feed.

Actually, many of the early farmers, after planting wheat, found it infested with stem rust or famished by drought and either cut it for hay or left it for grazing.

Shelton himself records that squatters had told him of wheat crops divided by a single track showing heavy rust on one side and clean stalks on the other.

Well, the horse-feed market has dried up, and we are managing in Queensland to produce some of the highest protein wheats in Australia.

THE FIGHT AGAINST RUST

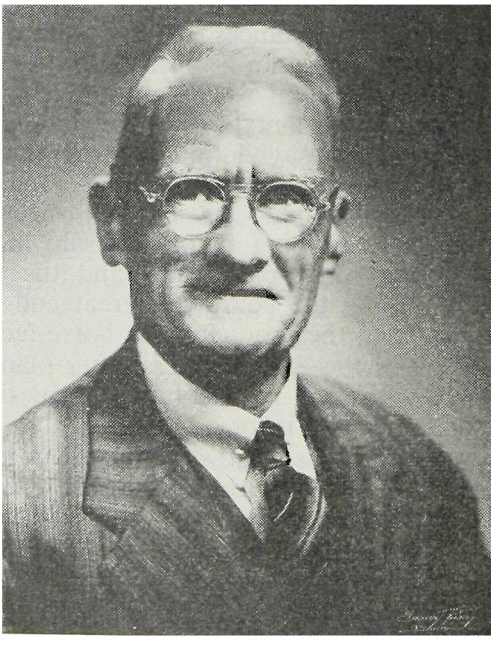
Long years of research have produced varieties which continue to improve in yield, but wheat's sensitivity to rust is

still the major headache for both the agricultural scientist and the farmer.

The breeding of rust-resistant and early maturing rust-escaping varieties of wheat for Queensland conditions has been successfully carried on since the closing years of the last century. The pioneer wheat breeder was Richard E. Soutter, who began his work at the Roma State Farm just before the turn of the century. When he retired in 1948 Soutter left a record of outstanding success covering fifty years of dedicated effort. This branch of wheat research is now continuing under the leadership of David Rosser at The Hermitage Experimental Station, Warwick.

In Queensland breeding is based mainly on varieties from India and Africa because of the proximity of those countries to the tropics. Some thirteen varieties have been evolved which have maintained the high yields of recent years, but they fluctuate according to their resistance to rust. This year the most favoured varieties are Spica, Menjavi, Kenora, Festival and Gala. In the previous growing season Festival was at the top.

As one agricultural scientist put it to me, the rust is too



RICHARD E. SOUTTER
Wheat Breeder
Department of Agriculture
1907-1947

clever. Each breed will show clear resistance, and then is struck by a new form of rust.

Queensland last year produced 18,000,000 bushels of wheat from a total sowing of 831,000 acres. Since 1949 because of improved yields we have joined the other States as an exporter.

QUEENSLAND PREMIER WHEATS

Queensland is well behind the southern States and Western Australia in wheat production, but with the near northern New South Wales growing area, produces the highest protein wheats in the Commonwealth. These are wheats for which cereal manufacturers and millers in the south are prepared to pay premium prices so as to blend them with the lower protein grain of the South. In Queensland these premium wheats are grown on the Darling Downs and brigalow country.

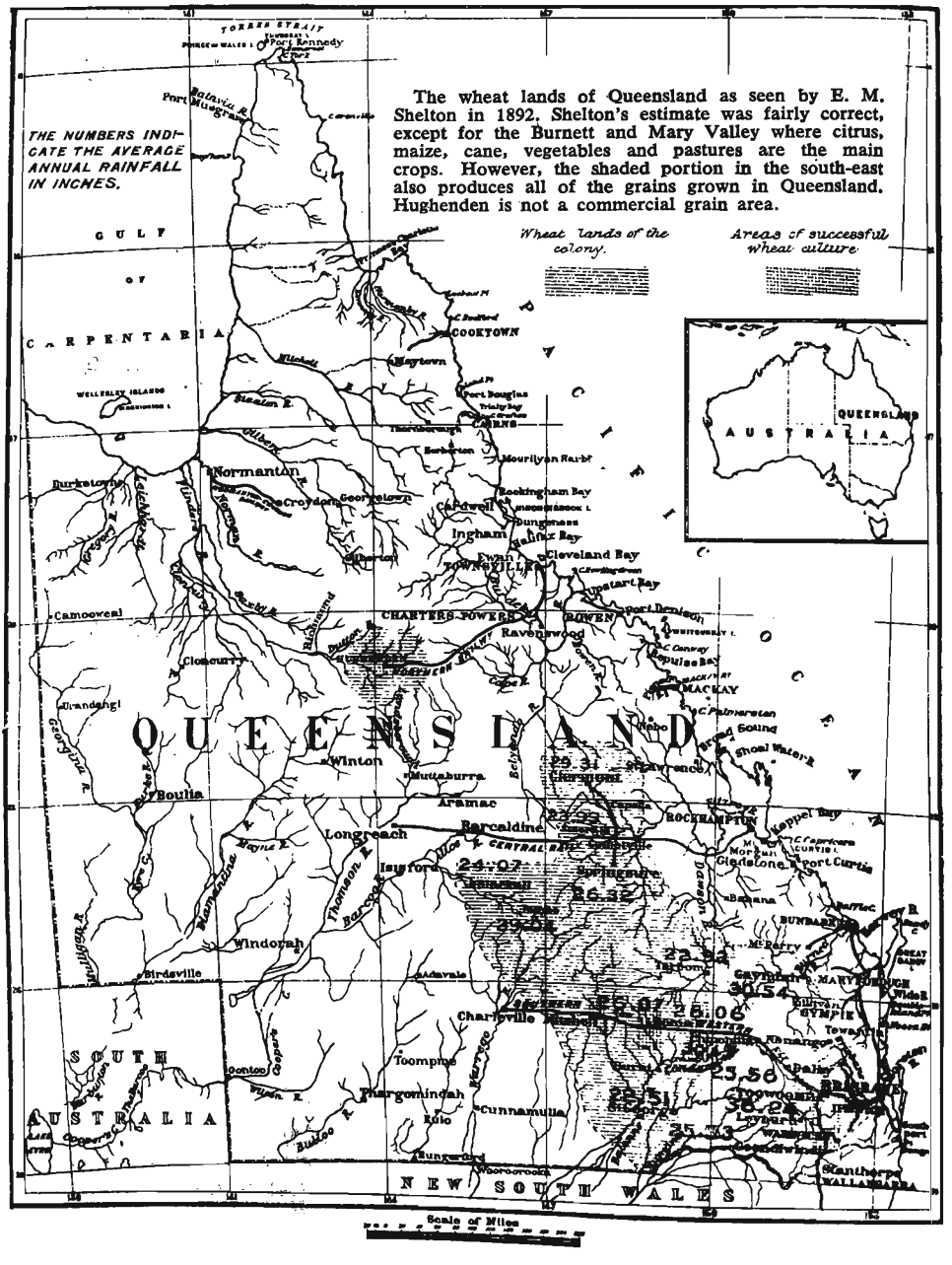
In a map accompanying his 1892 report E. M. Shelton shaded in the areas which he considered would be the State's main producing areas. His etching extends from the southern border, taking in the Downs and extending northward on a line from Charleville to Blackall and then north-eastwards to Clermont and including the Central Highlands.

His predictions have been almost fulfilled with the exception of a small pocket around Hughenden which was then the terminus of the Great Northern Railway. The area being sown to wheat in the Central Highlands is steadily increasing and wheat cultivation has also been firmly established in the Callide and Dawson valleys.

I think I have occupied sufficient time to stress the importance of wheat in both the national and the State economies. We are, as I have said, a long way behind the sister States in productive capacity, but at least Queensland has established its ability to produce the more marketable wheats and it has the potential to expand as markets improve.

CENTRAL AREA POTENTIAL

We may look for this future expansion in the brigalow lands of the Central region. Agriculturists are convinced of the partial suitability of the brigalow country and also of its ability to maintain the high protein quality. It is considered that wheat growing in this area should be on the lay farming system. That is, it should carry pasture for a time and be sown alternately to grains. I will leave the matter there because in a few moments I propose to project this Central area as a coming grain bowl with the capacity to produce quite a variety of grains.



SHELTON'S WHEAT LANDS MAP OF 1892

While it holds a minor position compared to other mainland States in relation to winter crops, Queensland dominates the Australian grain production in the summer. Our wet season is in summer and the principal summer crops are maize and sorghum. Canary seed is one successful winter crop in which Queensland produces most of Australia's consumption.

Canary seed, however, is planted according to the overseas demand. Sometimes when the traditional producers, Spain and Morocco, fail there is a great export demand for Australian canary seed. When these shortfalls occur the canary seed crop has returned between £2 million and £3 million in a single season. Normally growers on the Darling Downs plant sufficient canary seed to meet local requirements with a little surplus as reserve grazing feed. However, they are able to reap any reward from export sales if they catch the sign of a deficiency among the traditional world suppliers.

SORGHUM A HARDY GROWER

Sorghum is the exciting grain of the moment. It is well adapted to Queensland because it can be grown in most areas where maize will grow, and also in marginal areas which are too dry for maize.

You will recall that at the beginning I said sorghum was a crop of great antiquity. It is claimed to have been grown by the Chinese earlier than 2000 B.C. It was also grown in Egypt in biblical times. The main centres from which it has spread into modern civilisation are Southern Asia, Asia Minor and North and South Africa. In most of these countries it has provided a staple cereal for human food, in addition to both grain and fodder for animals.

According to the Queensland Agricultural and Pastoral Handbook the genus sorghum includes a wide variety of grain-bearing plants ranging in type from tall, tussocky grasses to thick juicy-stemmed sweet sorghums. The main members of the genus which have been cultivated throughout the world are grain sorghums, chiefly for grain, sweet or fodder sorghums for green feed or silage, Sudan grass for grazing, hay and silage, broom millet for brooms and brushware and, more recently, Columbus grass, principally for grazing.

Queensland produces all or most of these varieties in varying degrees, but future expansion seems to be centred on the grain and fodder varieties. It has become a popular feed grain for livestock, and is used quite a lot in Queensland for feeding cattle as well as pigs and poultry. Australians have not taken to it as a form of human diet as in the countries of

origin, but perhaps we are a little too spoiled by the quality of our wheat, oats and other food crops.

Until about twenty years ago sorghum was regarded more with curiosity than as a potential feed grain. The little of it used in the early days brought its cultivators into ridicule among their neighbours.

SKY THE LIMIT

But the main sorghums are a succulent and nourishing stock feed and they have come to stay and to enlarge their stature in the grain picture. So far as Queensland is concerned the sky is the limit, depending on market availability. The present crop is expected to harvest around 7,000,000 bushels. If the economics were favourable—that is available markets—farmers could readily plant additional areas and increase that figure by millions of bushels. In the United States, particularly in the Middle West, grain sorghum is used for lot-feeding of cattle on the farms. Its popularity in this regard is mounting in all beef fattening areas of Australia.

PEAK DOWNS, THE SPARK

In Queensland it has been given a great start in the Peak Downs area and adjacent lands. The spark for this was the British Food Corporation's experiment at Peak Downs to produce sorghum and fatten pigs to supplement Britain's acute food shortage in the immediate post-war years. That the project was eventually abandoned suggested failure.

But while the project failed to attain its objective, keen judges put the cause down to the immense area placed under cultivation under a system of control which became unwieldy. The correctness of this view was confirmed when the land was thrown open for grazing farm selection. Blocks were snapped up by eager farmer-graziers and almost the whole area of the Central Highlands, extending from Clermont, through Capella to Emerald and Springsure is under intensive grain and pasture cultivation.

One of the outstanding achievements in this modern closer settlement development has been the immense suitability of sorghum to the comparatively shallow, but fertile soils of the Central region. I believe that it is the sensational success of this particular venture that has attracted the whole of Australia to the tremendous potential of grain growing in association with beef production.

We are fortunate in Queensland that when this sudden transformation began the research teams of both State and

Commonwealth instrumentalities were ready to provide the basic needs of good seed and cultivation guidance.

Plant breeding in sorghum was pioneered in this State by Dr. L. G. Miles, now Director of Agriculture in Queensland. This work is now being carried on by Mr. R. F. Moore at The Hermitage.

HYBRIDS INCREASE YIELDS

The introduction of hybrid strains of both sorghum and maize has resulted in appreciable increases in yields of grain, but whereas investigations into hybrid maize varieties have been proceeding at the Queensland Agricultural College at Gatton for 35 years, sorghum hybrid breeding is a mere five years old. Nevertheless, the Department of Agriculture already has released three high yielding hybrids which will have a major impact on future grain sorghum development in this State. In many cases yields per acre are from 20 to 30 per cent higher.

VALUE OF SWEET SORGHUMS

Farmers are still growing sorghum on an increasing scale and its future as a feed grain seems assured. There is, too, great scope for sweet sorghum as a fodder.

Grain sorghum is bred to grow no higher than four or five feet so that the grain can be mechanically harvested. The sweet or fodder variety will grow to any height, and its great advantage is its bulk of plant material. Stalks, leaves and heads are all highly palatable. It can be cut and stored as silage if desired. Stubble for grazing is a secondary consideration with grain sorghum. It is only in recent years that cattlemen have come to appreciate the value of sweet sorghum for grazing.

Sweet sorghum may be planted early in the year, in January or February, and allowed to stand over until winter. Frost may cause some deterioration, but it remains succulent and is a very useful fodder when natural grasses have little or no nutriment. The Department of Agriculture has also initiated a programme to breed hybrid fodder sorghums with the idea of producing a greater bulk than is available from Sudan grass and the present sweet sorghum varieties.

Hybrid seed production is a specialised industry with some growers. Producers with good husbandry methods are specially selected and certified as seed producers. They have to plant alternate blocks of male parent and female types. Pollen of the male crop is blown on to the female blocks. Fertilisation occurs and this makes the cross in the field. Then the growers harvest the seed from the female blocks and this is in fact hybrid seed.

MAIZE STILL POPULAR

Maize is also an important summer crop and has long established itself as a grain producer and fodder crop. In recent years it has met strong competition from the newer grain sorghum.

In the early years of settlement when great difficulty was experienced in growing wheat in the areas of poor soil around Sydney, maize was the colony's most important crop, and considerable quantities of maize flour had to be incorporated in the bread. By 1800 the area under wheat superseded maize and the latter lost popularity in the southern States or colony districts.

However, as a summer grain, it is still grown fairly extensively in Queensland. This year's harvest will approximate 3,600,000 bushels, and may reach 4,000,000 bushels, the highest for some time.

Queensland's largest maize producing area is the South Burnett, a large proportion being absorbed by processors of breakfast foods.

The Atherton Tableland is another major maize producing area, but northern consumption cannot absorb the nominal volume of production. As a consequence large quantities are exported through Cairns to Europe and the United Kingdom, as well as to southern processors.

The first crop improvement work on maize was carried out by C. J. McKeon. The development of hybrid maize varieties began in the 1920's under the supervision of J. R. A. McMillan, now Professor of Agriculture at Sydney University. He was succeeded by W. W. Bryan, and the work is now being carried on under the supervision of P W. Grogan.

BARLEY—ITS UPS AND DOWNS

Barley, like wheat, leaves Queensland in a minor position as a winter grain in comparison with other States. In the last decade it has experienced a period of ups and downs with harvests ranging from little more than a million bushels to a mean peak of around four million bushels.

The exception was the 1958-59 growing season when Australian production spiralled in response to a buying spree by Japan for malting barley.

Queensland in that season harvested 8,000,000 bushels. Unfortunately the Japanese buying ceased as suddenly as it began, and production in the 1959-60 season dropped to 6,650,000 bushels. It fell away to 4,393,000 bushels in the following season and the estimate for the current crop is 3,500,000 bushels from 208,000 acres.

The Japanese feint at the Australian market was followed by a price recession.

The advent of the wheat stabilisation policy influenced growers to sheer off barley in favour of wheat. This would explain the forecast of a million acres under wheat this season.

However, Korea has evinced some interest in Australian barley and a small shipment of Queensland barley has gone to that country this year. This new source could be quickly exploited if Korean interest is maintained.

OATS

Oats as a grain crop has not yet assumed major importance in Queensland, but research activity is being directed to improved plant breeding.

Most of the State's oat grain production comes from dual purpose sowings. Up to 300,000 acres have been sown annually to oats, but in some years up to 40,000 acres of this has been retained for grain. Approximately half of this annual grain production is required for sowing the State crop in the following year.

Only small quantities of grain are produced for milling, but some popular varieties are acceptable to millers. For grazing oats give succulent green feed at a time when native pastures are at their worst; that is, in the winter and early spring.

Wheat, oats, barley and canary seed and some winter legumes provide good winter grazing for cows and other livestock, but oats has always been the favourite.

Oats production for grain has declined since 1958-59 when it had increased to 831,990 bushels from just under 200,000 bushels in 1953-54. The estimate for this year is 520,000 bushels from about 30,000 acres retained for grain.

To sum up one might say that Queensland, while not in the top rank of wheat-producing States, can outmatch those States, with the exception of northern New South Wales, in producing the prime wheats which command premium values as food grains. It is therefore less reliant than the other States on the values received for export grain.

FITZROY BASIN POTENTIAL

It is estimated that the 1962-63 wheat crop of one million acres will harvest a good deal more than the eighteen million bushels realised last year. Marketing authorities say that this yield will be fully cleared. Reverting to what I have said about the increased penetration of wheat into the brigalow country there would seem to be an admirable opening for

wheat growing in the land now being cleared in the Fitzroy Basin. The success of sorghum on the adjacent Central Highlands has already made the relationship of grain to beef quite evident. So far as wheat is concerned the availability of land in the brigalow belt makes rotational cropping quite feasible, and wheat production could be maintained at an increasing level.

It seems, therefore, that Queensland is well poised to exploit any favourable fluctuation in the world market for wheat. It is important, too, to bear in mind the increased interest of Asian countries in our primary products.

Who knows that the sugar bonanza may not some day accrue to our grains, both winter and summer varieties. Sugar has attracted world attention because the Australian product is of the highest quality. A continuation of the improved management techniques now being applied to agriculture generally should attract increased attention to what is produced from the land in this State.

If you hearken back to the experience of James Ruse which I mentioned at the beginning you will realise what a little extra effort means to the production of a crop.

Ruse's sod-moulded and green manuring methods, crude as they were, allowed his field to lie in fallow without risk of disintegration by wind or storm.

SOIL CONSERVATION AWARENESS

In these enlightened days it is encouraging to see that farmers are showing an awareness of the need to protect their cultivations. Conservation of arable soil is one phase of land management in which Queensland is setting an example. More than 3200 Queensland farms are beating soil erosion at present. The farmers concerned are pursuing conservation programmes with technical guidance from the Agriculture Department. Recognition of the need to intensify soil conservation work in the valuable, irrigated areas of Mareeba-Dimbulah has resulted in the appointment of three additional soil conservation officers in the North. Services have also been extended by the opening of new centres at Roma, Mareeba, Millmerran, Wondai and Yarraman.

In the last year landholders have applied conservation measures to more than 55,000 acres of the State's exposed cultivated lands, making the total area now protected more than 230,000 acres.

So long as farmers give ear to the technical men whose daily task is to lighten the burden of crop management and animal husbandry, and to increase rural production, I think our future is secure.