

stages of growth. More than 200 large pots have been planted with wheat, barley, oats, rye, peas, lucerne, subterranean clover, and various native grasses.

Records are regularly taken of the rate at which water is required by these crops at varying stages of growth. The intake of mineral nutrients in comparison with transpiration and the building up of dry matter in the crop are being determined.

The most important limiting factor in South Australian agriculture is rainfall. From these investigations it is hoped to determine the possibilities of economising the water supply of a crop by varying the variety, the time of sowing, and the water and fertiliser supply to the crop.

Research work involves the patient and painstaking examination of problems. Its processes are necessarily

slow, and time must elapse before the effect of what is done today in agricultural research is reflected in increased production.

Another important section of the work of the institute deals with plant disease. It is under the direction of Mr. Samuel. It is just as necessary for agriculture to investigate the diseases of plants as it is for human society to investigate the diseases of man. Indeed, many of the principles which apply to the one apply also to the other.

For instance, Australia is free from many of the worst diseases of man owing to its isolation and the strict medical quarantine and inspection which is maintained. Many people do not realise, however, that it is also free from many of the worst plant diseases owing to a similar quarantine over plants imported into the country. That there are some bad plant diseases in Australia now is largely a result of the fact that we did not realise this sufficiently early.

The plant disease laboratory, therefore, must be able to advise about the danger of importing new diseases from other countries, and also conduct investigations into the diseases which already trouble the farmers here.

Research is now being undertaken at Urrbrae dealing with three of the most important of these diseases, namely, bunt or stinking smut of wheat, take-all, and the oat disease prevalent at Mount Gambier.

With regard to bunt, tests are being made of the value of dry copper carbonate compared with the old methods of wet pickling with bluestone or formalin. Although this method was discovered by an Australian—Dr. Darnell-Smith, of Sydney, it has been taken up and tested in America, and is now used for millions of acres of wheat there, whereas in Australia farmers are slow in adopting it, although it offers several important advantages over the old methods. The seed may be treated at any convenient time, and will keep without deterioration, while the germination is not reduced, as is the case when bluestone and formalin are used. At present the plots treated with copper carbonate are much better looking than the others. It remains to compare the amount of smut in each at harvest time.

Field tests with take-all deal with consolidation of the seed-bed and the possibility of finding a resistant variety.

Discovering Parasites

Much of the work, however, deals with discovering the parasites which cause disease and working out their life histories in the laboratory and field. Thus the oat disease at Mount Gambier, which has been present for the last 20 years or more, but the cause of which was unknown, has been discovered to be due to a bacterium, and tests are being made dealing with its whole life-history.

The losses from plant diseases in South Australia amount to tens of thousands of pounds in value each year, and it is to be hoped that the investigations now proceeding in the laboratory of plant pathology will lead to the discovery of methods of reducing this huge loss.

The scope for agricultural investigation work in a new country like Australia is vast and is limited only by the personnel and funds available for the work. At present we are largely dependent on the scientific basis of our agriculture, and the principles established under climatic conditions entirely different from those of our own country.

On no form of expenditure would there be such a sure and a permanent return as that devoted to agricultural research. Dr. Richardson and those associated with him have set out to prove the fact, and already valuable work has been accomplished. The Waite Institute is one of the finest—if not actually the finest—of its kind in Australia, due to the wide knowledge of every phase of agriculture possessed by Dr. Richardson and the practical manner in which he is applying it at the institute.

Valuable experimental and research work has been conducted at the experimental farms throughout the State. There are five in number:—Turretfield, Booborowie, Veitch, Kybybolite, and Minnipa, and are under the direct control of Professor A. Perkins (Director of Agriculture).

The most important of these is the demonstration farm which



VIEW OF PART OF THE ESTATE—EACH PLOT CONTAINS A GRASS OF A DIFFERENT VARIETY

consists approximately of 1,262 acres of arable land and 327 acres of rough grazing land, while 15 acres are covered by buildings, plantations, and so on.

The farm has been run on a purely financial basis since July, 1921, when it was taken over by the Department of Agriculture. At that time the capital value of the land and the floating capital amounted to £17,590. Rent has been assessed at 5 per cent. on the value of

a three year period. The profit has the land and improvements, and annually £711 11/ is paid into Government revenue in this connection. Interest is paid yearly on the value of the stock, plant, and overdraft. The net earnings of the farm during the three and three-quarter years since it was taken over by the department has averaged 8.2 per cent. a year on the capital. The net earnings for 1924-25 amounted to 11.4 per cent., being well above the average.

The farm has cost the Government nothing since it has been administered by the department. On the other hand it has paid into Government revenue £2,383 in rent and interest. The net profits for 1924-25 were £1,153 17/10, while the accumulated net profits at March 31 last were £2,272 9/. The sum of £1,000 has been repaid to the Government in respect of stock and plant out of that amount.

Turretfield is being utilised for analysing costs of various farm operations. Experiments conducted throughout three seasons have shown that the average cost of bringing an acre of wheat into production on the heavier lands of the central and lower north districts, of which Turretfield is a type, valued at £11 6/8 an acre is as follows:—Seeding operations (wheat), £1 4/4 an acre; hay, £1 4/10; harvesting operations, 13/10 and £1 4/3; incidental expenses, 10/ and 11/6; rent (18 months), 16/10 and 16/5; mean cost an acre—wheat £1 0/6, hay £4 10/7. The extra labor required for handling hay accounts for the difference in the figures.

Barley grown as a stubble crop as averaged over three years has cost 4/5 an acre, and peas grown as a stubble crop have averaged 69/6 an acre. A fat lamb flock of about 600 ewes has yielded a net mean profit a year of £472 1/3 over been acquired by a mean expenditure per 100 sheep of £81 5/1, returning a gross revenue of £161 6/3, or a net profit of 16/ a sheep.

The Booborowie farm is situated in one of the best wheat districts of the State at an altitude of from 1,200 to 2,000 ft. It comprises 1,484 acres of land suitable for cereal growing, lucerne growing without irrigation, and some first-class grazing land. It is a purely experimental farm, and the work done consists of growing specially selected seed wheat, and conducting a series of definite experiments on wheat and other farm crops in relation chiefly to the following points:—Influence and action of various manures; influence and action of various methods of tillage; and influence and action of various forms of crop rotation.

Experiments in Mallee

In addition the farm carries a flock of sheep, and a herd of milking Short-horn cattle. It is used as a centre of inspection, middle north farmers paying frequent visits to ascertain the results of experimental work.

There are two farms in the mallee—one at Veitch, near Loxton, at which work of a similar nature to that at Booborowie is carried out, although, of course, under a vastly different environment and the other at Minnipa, on Eyre Peninsula.

The same class of work is also conducted at the latter farm. A unique feature of operations at Minnipa, however, is the fact that farmers from surrounding localities up to 200 miles distant make it their meeting place in connection with the yearly congress of Eyre Peninsula branches of the Agricultural Bureau. This they have done for five or six years past, pitching their tents, like the pioneers, in the scrub, and holding "conference" in a huge barn. Evening sessions are conducted with the aid of stable lanterns, delegates reclining on bags of chaff and other such farm impediments. As many as 100 attend. Veitch consists of about 2,900 and Minnipa of 3,041 acres.

Kybybolite Farm

Kybybolite is situated in the South-East, and contains about 1,000 acres of land surrounding the old Kybybolite sheep station. Work is concentrated on the improvement of pastures, forage crops, and the handling of a Ayrshire herd of cattle. Experimental work in irrigation is also carried out with a view to testing the effectiveness of summer-grown irrigated crops. In this connection maize (for grain) and mangolds

have proved profitable. A small orchard is also attached to the farm.

In addition there is a poultry station at Parafield at which tests are conducted, with laying strains of fowls, and poultry methods generally demonstrated.

There is a typical orchard at Blackwood under the control of Mr. G. Quinn (Horticultural Expert), where complete experiments with manures, different varieties of fruit, various cultural operations, and methods of controlling disease are undertaken.

Valuable Work at Berri

Valuable results have been obtained at the Berri orchard on the Murray, where experiments with manures, irrigation, cultural operations, and handling of dried fruit are conducted. The most successful and important experiment was the growing of Smyrna figs. It has been proved that a dried fig equal to the finest quality Smyrna fig can be produced. This is most important to settlers along the Murray.

Another piece of valuable work was in connection with salt-impregnated land, which was purified by a system of under-drainage. About five or six acres of fruit trees had gradually died off owing to the presence of salt, and the area of affected land became larger year by year. The under drainage was tried three years ago, and almost immediately the spread of the salt ceased. Last autumn the whole of the area was sown with barley, and at present, instead of the land being bare as was the case formerly, the whole of it is covered with a green crop. It is now proposed to replant the land with trees.

Roseworthy College

There remains the Roseworthy Agricultural College, which was opened in 1885, for the training of young men in agricultural pursuits. At the institution they undergo a course of training in general agriculture, stock raising, fruit culture, vine growing, and associated sciences, including botany, chemistry, and physiology. The bulk of the farm work is done by students, and much of it is of an experimental and research nature.

The improvement of the existing varieties of cereals by means of selection and crossbreeding is an important branch of operations. A small irrigation scheme

serves to show how crops may be grown under irrigation. A good deal of work has also been done with a view to ascertaining the best type of fat lamb for export purposes.

Nov. 9-9-25

THE FEDERAL TARIFF.

SUPPORT FROM THE "TIMES."

LONDON, September 8.

The "Times" in a leading article remarks that, although the primary object of the Australian tariff is to protect local industries, the Commonwealth in its new proposals has not lost sight of the second object of the Australian fiscal policy, which is based on a sincere desire to give the British exporter a real advantage against foreign competitors. Australia is such a large producer of wool that it is only natural that she should desire to work up her material locally. Britain already has a large share of her imports of woollen goods. There is reason to hope that further protection given to Australian mills will tend to reduce foreign, rather than British, imports. The new tariff marks for Britain is that the most highly specialised industries have less to fear from tariff-aided competition than those calling for less skill, experience, and capital.

Nov. 9-9-25

ELDER CONSERVATORIUM.

In the Elder Hall on Monday next, in the presence of His Excellency the Administrator and Mrs. Poole, the University choral class, with full orchestra, conducted by Mr. Frederick Bevan, will give its annual concert. The works to be performed are Handel's serenata "Acis and Galatea" and Mendelssohn's setting of Racine's tragedy "Athalie." The soloists will be Misses Thelma Martin, Elsie Cook, Sylvia Thomas, Alice Meegan, Jean Sinclair, and Mabel Siegel, together with Messrs. Walter Wood, John Ardill, and Arnold Matters. Professor Daxley Naylor will act as reader in the second production. Special notice is drawn to the fact that this concert will not be broadcast. Place at S. Marshall & Sons', Gawler-place.