

**DETERMINED TO IMPROVE THE LAND:
A HISTORY OF THE DEPARTMENT OF AGRICULTURE**

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AWAKENING

Entire horses

'Whereas great injury is likely to arise to the breed of Horses in this Province by reason of Entire Horses of inferior kinds being allowed to stray and run at large: Be it therefore enacted ...'. So runs the preamble to the first South Australian statute having a direct bearing on Agriculture – Act no. 8, passed in November 1839. In those pioneering days when fences were few, owners of better class horses were afraid their mares would be served by inferior stallions. The Act provided that the owner of a stray stallion could be fined up to £5 (about a month's wage for a farm worker) on complaint of any person and proof before a magistrate or two justices of the peace. Its enforcement did not require any special machinery, relying on existing judicial and administrative processes. In this respect it was characteristic of a good deal of the early legislation affecting agriculture in South Australia. A young colony with a small population could not afford an elaborate public service, even in prosperous times. Sometimes this kind of arrangement worked well enough but some legislation was ineffective because of it.

Government involvement in agricultural matters grew in response to particular needs. Brands, diseases, weeds and vermin became matters of public concern one by one and arrangements to deal with them varied as they assumed greater or lesser importance.

Brands

These attitudes underlay the enactment and administration of *An Act to Regulate the Slaughtering and prevent the Stealing of Cattle*, passed in December 1840. It provided for the licensing of slaughterhouses, appointment of 'Inspectors of slaughter-houses and of brands', the creation of a Cattle Registry Office (to register brands) and the inspection of butchers' shambles to ensure cleanliness. The Cattle Registry Office was established in January 1841 but closed six months later because the Colony was in a severe financial depression. The public health function of the Act continued to be enforced but the brands function was neglected.¹ Both functions were passed over to district councils by the Act of 1852 which provided for their formation.² However, with no central register of brands, pound keepers were at a disadvantage in trying to identify stray stock, while preventing duplication of brands was virtually impossible. This situation continued until 1878, in spite of occasional attempts by owners of stock to get a new Brands Act passed. But, however inauspicious, this was the beginning of one part of the Department of Agriculture.

Sheep scab

Another, and closely related, part of the Department was started by a disease. The sheep scab mite, *Psoroptes communis ovis*, was probably brought to South Australia with the first sheep transported from England. The mite worked its way under the skin, causing irritation, loss of wool and formation of scabs. It was highly contagious, the mites or their ova being able to live for some time apart from their hosts. It was passed on not only by direct contact but by clean sheep camping on ground formerly occupied by an infested flock. It was even believed that a bridge crossed by scabby sheep could infest clean ones passing over it later – presumably as they rubbed against the posts and rails. As it posed a serious economic threat to the Colony, and its eradication was one of our early success stories, it deserves more than passing attention.

¹ SRSA: GRG 24/1/1841/237a, 395a, 572; GRG 24/4/1841 p. 31; 1842 p. 417–8; GRG 24/6/1847/822.

² An Act to appoint District Councils and to define the powers thereof, No. 16 of 1852.

An Act was passed in 1840 and an inspector appointed early in 1841 but retrenched six months later. Another man was appointed in November 1841 but he too was retrenched in December 1842. Meanwhile, Charles Bonney had been appointed Commissioner of Crown Lands in May 1842, and enforcement of the scab legislation devolved on him.³

In 1852 a determined effort was made with the appointment of two inspectors, John Hamilton and W.R. Mortlock, who divided the Colony between them and were allowed to appoint sub-inspectors to deal with an expected rush of activity under revised legislations.⁴ The essential points of the legislation were isolation of infested sheep, marking them with a distinctive brand, and the imposition of quite severe financial penalties on their owners. Infested sheep running loose without a shepherd could be destroyed.⁵ The South Australian government also restricted movement of sheep from the other colonies and they retaliated in kind.

Various treatments were tried, including mercury and sulphur mixed with lard as a paste, or as a fluid, rubbed in by hand. The commonest treatment was tobacco water with spirits of tar and turpentine, rubbed in or used as a dip. One pastoralist claimed to have cured a badly infested flock by dipping in limewater. Hamilton was sent to investigate the claim. He was a busy man and by the time he got to the scene most of the sheep had been sold. However, several neighbours corroborated the story, so Hamilton pronounced the treatment a success – on the basis of a single trial which he had not personally witnessed! A scientist could ruin his reputation by doing that today.⁶

The work of the mid-nineteenth century inspectors was wholly pragmatic and, in the case of scab, effective. By the late 1850s the incidence of scab had been reduced from about half the sheep in the colony to a few isolated flocks in the South East.⁷

An outbreak near Wellington in 1867 caused a great stir with accusations and counter accusations and a parliamentary committee of inquiry.⁸ Wellington was a focal point for stock travelling to and from the South East, along the Murray to and from New South Wales and through the Mount Lofty Ranges to Adelaide and the northern districts. Thus the whole colony was threatened once again. The committee found among other things that Charles Jonas Valentine, who had been appointed Chief Inspector of Sheep in 1865, should have detected the outbreak but mistook it for rash, a disease that resembles scab at a certain stage. The legislation, the inspectors and the stockowners had been so successful that Valentine's mistake arose from a lack of experience with the disease. He lived it down and was widely respected as Chief Inspector. A minor addition to the legislation followed the inquiry but no outbreaks of scab were recorded in South Australia after 1869. The disease continued in Britain and the United States until at least the middle of the twentieth century.⁹

³ An Act for preventing the extension of the infectious disease commonly called Scab in Sheep or Lambs in the Province of South Australia, no. 6 of 1840; SRSA: GRG 24/4/1841 pp. 31, 162, 193, 195–6, 201–02 and 242; 1842(E) p. 779; 1842(F) pp. 31, 198, 228–9 and 302; 1843(F) p. 399. GRG 24/6/1842/926.

⁴ SRSA: GRG 24/4/1852 pp. 1049–51; GRG 24/6/1853/27.

⁵ SRSA: GRG 24/6/1856/2263.

⁶ SRSA: GRG 24/6/1853/229 1/2, 371, 487, 587.

⁷ SAGG 1856, p. 357: Report from H.T. Morris, Chief Inspector of Sheep.

⁸ SAPP101: 1867, 'Report of the Select Committee of the House of Assembly appointed to report on scab in sheep'.

⁹ Smith, W.S., 'The history of sheep scab in South Australia'.

Stock and Brands Department

Controls on intercolonial movement of stock were not limited to scabby sheep. The *Cattle Importation Act, 1861*, applying to horses, horned cattle and sheep, was in part an attempt to prevent contagious bovine pleuro-pneumonia from being introduced from the other colonies. In this respect its failure was inevitable because so much overland transport was by bullock wagon and the insidious nature of the disease allowed an infected but apparently healthy animal to pass unnoticed. Vaccination was practised as early as 1862 but not widely adopted by stockowners. The *Stock Diseases Act, 1888* gave stock inspectors greater powers, including quarantine, compulsory vaccination and the destruction of infected stock. Nevertheless, gaining the upper hand over this disease was a very long and gradual process and it was not until 1974 that Australia was declared free of it. To prevent the introduction of stock diseases from overseas, a cattle quarantine station was built on Torrens Island in 1879.¹⁰

Prolonged attempts to get a new *Brands Act* through Parliament succeeded in 1878. Parts of the 1840 Act, which had become virtually inoperative, were repealed and provisions made for branding horses cattle and sheep. Branding was voluntary but the use of unregistered brands was prohibited. The Chief Inspector of Sheep became the Chief Inspector and Registrar of Brands. Incidental to the main purpose of the Act, owners of travelling stock were required to provide the drovers with waybills specifying the numbers being moved. This was to prevent them from surreptitiously adding to their mobs while crossing other people's leases. The Act was repealed in the following year and replaced by one that was similar but better drafted. These procedures prepared the way for the formation of the Stock and Brands Department, which was first listed under that name in 1881. Valentine became the first head of the new department and continued in that office until he retired in 1905.¹¹

Pest plants

A weed is a plant where you do not want it. When a significant number of people in a community do not want a certain plant on their land, concerted action to get rid of it becomes possible. Weeds were a subject of public debate in the mid-nineteenth century. In its issue of 2 February 1849, the *South Australian* newspaper quoted from the *Hobart Town Advertiser* urging each man to destroy his own thistles. This became the keynote of *An Act for preventing the further spread of Scotch Thistle*, passed in 1851. Various plants were known as Scotch thistle and the Act apparently covered them all. Enforcement of the Act became a local government function, while destruction of the weeds was to be done by the landowners at their own expense. An owner who did not act within seven days of receiving a notice to destroy thistles could be fined up to £10 (several weeks' wages for an unskilled labourer). The Surveyor-General was made responsible for destroying thistles on Crown land.

This Act was replaced by the *Thistle and Bur Act, 1862* which included Bathurst burr (probably introduced by stock travelling from New South Wales and Queensland) and made landowners responsible for weeds out to the centre of roads adjoining their land. In evidence to a select committee of the Legislative Council that considered the Bill before it was passed, the Surveyor-General said he thought the 1851 Act had been effective in preventing the spread of thistles which were mainly confined to the agricultural districts. The Bathurst burr

¹⁰ Smith, W.S., 'Contagious bovine pleuro-pneumonia in South Australia'; *SAPP29*: 1880, 'Report of Public Works Department for 1878/79' and *SAPP29A*: 1880, 'Report of Public Works Department for 1879/80'.

¹¹ *SAPD* 1875, cols 227–397; *SAPD* 1878, cols 432, 525, 565, 933 and 983; *SAPP177*: 1878, 'Report of the Select Committee of the Legislative Council on the Brands Bill 1878'; Act no. 111, 1878; Act no. 152, 1879.

did not seem to have spread much in South Australia at that time but in parts of New South Wales it was very bad, growing up to 3.7 m (12 ft) high.¹²

A Bill for a new Act in 1871 was not passed but a select committee on it gathered some interesting information. The committee considered that the Act then in force had failed to check the spread of Scotch thistle although a considerable sum had been spent. This was partly because of loopholes in the Act. The report accused the government of wasting time with red tape while the thistles seeded, and claimed that the government had allocated too little money to clear all the plants and ‘left the remainder to seed the country’. Bathurst burr was mainly confined to roads and reserves for travelling stock. Aster, or stinkwort, was described by the committee as an annual which grew, to the exclusion of grass, after the crop had been taken off. Neither sheep nor cattle would eat it, ‘but it appears to be of some use as a manure when ploughed in – causing land that before would not grow a crop to produce a fair one’.¹³

A short but significant amending Act in 1887 gave the governor power to proclaim any plant a noxious weed after resolutions to that effect had been passed by both Houses of Parliament, thus eliminating the need for a new Act to deal with each new weed.¹⁴

The Act of 1862 and amendments continued in force until replaced by the *Noxious Weeds Act, 1931*, which introduced the procedure of declaring noxious weeds by regulations under the Act, still further simplifying the legislative process. Administration of the Act continued to be the responsibility mainly of local government councils and the Highways and Local Government Department.

The Department of Agriculture became directly involved when administration of the *Weeds Act, 1956* was committed to the Minister of Agriculture and the Department was given certain responsibilities under it, including the provision of technical advice.¹⁵

Plant pests

Early in 1873 the governor of South Australia received a dispatch from the Colonial Office in London warning of a ‘scourge which has recently attacked the vines in France and Portugal’. This had been given the name *Phylloxera vastatrix*. It was first noticed in 1864 or 1865 in the vineyards of the Rhone and had begun to assume ‘disquieting dimensions’ in 1867. The French government had offered a prize of 20 000 francs for an effective process to combat the disease, but it was spreading. It had been noticed that American vines in the Bordeaux district appeared to have immunity.¹⁶

The dispatch said nothing about where the disease had come from, but it is now known to be an aphid, native of North America. In a complicated life cycle it is capable, in one of its phases, of reproducing very rapidly with devastating effect on vine roots and leaves, and, in another phase, it produces a winged insect capable of flying to other vineyards.¹⁷

¹² SAPP205: 1862.

¹³ SAPP2: 1871.

¹⁴ *Thistle and Bur Act, 1887*.

¹⁵ *Weeds Act, 1956*; SAGG, 20 June 1957, p. 1501.

¹⁶ SAPP35: 1873.

¹⁷ *Everymans Encyclopaedia*, 9.

The South Australian government responded by passing the *Vines Protection Act, 1874*, which authorized the governor to prohibit the introduction of vine cuttings or rooted vines either absolutely or from countries infected with phylloxera or any other disease. This was reinforced by another Act in 1878 which provided for the appointment of inspectors of vineyards, the erection of landmarks to show infected areas and the destruction of infected vineyards. After the destruction of vines infected with phylloxera, no new vines were to be planted in that ground for at least five years. The 1874 Act was extended to include vine leaves.¹⁸

The next major step was to widen the legislation to cover plant diseases generally. The *Vine, Fruit and Vegetable Protection Act, 1885* replaced the two *Vine Acts*. It specified phylloxera, codling moth, round orange scale insect and Colorado beetle,¹⁹ but gave the governor power to bring under the Act any other plant diseases or insects and to prohibit the introduction of trees, plants or anything that might bring in such diseases or insects. It provided for the appointment of inspectors who could enter lands, buildings and ships and remove plants, and, with the approval of the Commissioner of Crown Lands, destroy plants. The substance of the two previous Acts was incorporated in the new one. This remained the basic plant protection legislation for almost a century, being replaced by the *Fruit and Plant Protection Act, 1968*.

Vermin

Rabbits were becoming such a problem in the 1870s that Parliament passed a *Rabbit Destruction Act* in 1875. Under it, district councils could, if they chose, be declared to be rabbit districts, thus acquiring power to compel landowners to destroy rabbits on their properties. Landholders outside district councils could also petition for rabbit districts and in these the Commissioner of Crown Lands and Immigration had the powers of the councils. This was replaced by the *Rabbit Suppression Act, 1879* which was similar but more stringent. The latter Act is remarkable in that the government piously bound itself to action by section 7 which reads ‘The Commissioner [of Crown Lands] shall forthwith after the coming into operation of this Act, destroy all rabbits and fill up their burrows on Crown lands, and the cost and expense of such destruction shall be paid by the Treasurer out of the General Revenue of the said province’. Large sums were spent in an attempt to comply with this section.²⁰

As with plant diseases, the next step was to deal with vermin in general – the *Vermin Destruction Act, 1882*. The definition of vermin included kangaroos, wallabies and other marsupials, dingoes or native dogs, dogs running wild, dogs at large, rabbits, eaglehawks (now known as wedge-tailed eagles) and any other bird or animal which the governor could by proclamation in the *Government Gazette* declare to be vermin for the purposes of the Act. This Act was intended to apply principally to pastoral lands. Amending legislation in 1884 integrated the provisions relating to rabbits and other vermin and gave the Commissioner of Crown Lands power to compel local authorities to enforce the Acts.²¹

¹⁸ An Act for the Prevention and Eradication of Diseases in Vines, no. 114 of 1878.

¹⁹ These pests are identified in the Act as *Phylloxera vastatrix*, *Carrocapsa pomonella*, *Aspidiotus aurantii* and *Doryphera decemlineata*.

²⁰ See annual estimates of expenditure (*SAPP9* each year) and the Auditor-General’s annual reports (*SAPP4* each year) in the later 1880s.

²¹ *Vermin Destruction Amendment Act, 1884*.

Making do

All these activities, from the 1840s onwards, were forced on the government by specific threats to South Australia's primary industry posed by diseases of animals and plants, unwanted animals and plants, or the nefarious deeds of men. After 1856, when South Australia was granted responsible government, the Commissioner of Crown Lands was the minister responsible for the administration of most of this legislation. Money was allocated for the destruction of specific plants and animals and some casual labour was employed, but with the notable exception of the Inspectors of Sheep (forerunners of the Stock and Brands Department) duties under these statutes were carried out by existing staff along with their other work. This is illustrated by the appearance in the official list of public servants for 1900 of the quaintly titled 'Inspector of Leases within Hundreds and Inspector of Rabbits'.

Control of plant diseases became a responsibility of the nebulous Department of Agriculture in the 1890s, but weeds, vermin, stock diseases and brands were not added to its duties till well into the twentieth century.

All these statutes were, in a sense, negative in that they were designed to prevent certain things from happening. A refreshing exception appears in a statute about distillation, passed in 1858. It deals mainly with the licensing of distillers but its ponderous legal language is gilded by the poetry of its title: *An Act to encourage the culture of the Vine in South Australia by permitting Distillation of the Fermented Juice of the Grape*.

GATHERING MOMENTUM

Some official surprises

While laws to control pests were accumulating, some thoughtful agriculturists were turning their attention to improving the quality of farming, urged on by Edward William Andrews, part proprietor of the *South Australian Register* newspaper. In a periodical, *Farm and Garden*, which Andrews founded for this purpose in July 1858, he advocated crop rotation, manuring and diversification of output based on his knowledge of English practice. He also proposed the formation of farmers' clubs on the English model, and one was formed in 1858, but it ceased, as did *Farm and Garden*, in 1863.²² Nevertheless, some of these ideas began to find their way into official documents in the 1860s and 1870s.

In response to a particularly bad season of rust in wheat, the government appointed a Royal Commission on diseases in cereals in December 1867.²³ A printed questionnaire was sent to all district councils for distribution to farmers and other suitable people, who were invited to use it as a guide in supplying information from their own experience. The number of copies distributed is not stated but about 700 replies were received. The commission took verbal evidence from several witnesses and received papers from Charles Todd (Government Meteorologist), Ferdinand von Mueller (Melbourne Botanic Gardens), Richard Schomburgk (Director of the Adelaide Botanic Gardens) and four other local men.

The commission's report, presented in April 1868, produced a few surprises. Red rust was described as, not an exudation of surplus sap (as believed by some) but 'a vegetable parasite or fungus attacking the plant externally (through its pores) and brought into active operation

²² Aldridge, T.J., 'The Agricultural Bureau of South Australia; its development and contribution to the diffusion of agricultural information', ch. 1.

²³ *SAPP20*: 1868–69.

by certain atmospheric or climatic conditions, the most effective of which last year were heat and humidity'. It had long been recognised by the same name in Europe and attacked flax, lucerne, wild oats, wild barley grass, reeds and many other vegetables. The most fertile areas with the lushest crops were the hardest hit. Thin crops were hardier and better dried by the wind. Schomburgk reported that shrivelled seeds from rusty plants appeared to germinate as well as healthy seeds. (His experiments apparently related to germination only, not to subsequent growth.)

The commission also considered smut and takeall. The latter was not understood (there was even debate as to whether it was animal or vegetable) but it was described as a more serious threat than rust as it spread in all seasons while rust was mainly prevalent in hot humid seasons. Pickling seed was widely done but more experiments were needed to make it more effective.

In introducing their biggest surprise, the commissioners wrote 'The vast tract of country cropped with wheat is being gradually robbed of its phosphates and other constituents essential to the formation of a healthy growth'. They recommended the appointment of an Official Agricultural Chemist to test soils and manures and make 'microscopical and chemical observations' on the growth and diseases of cereals and give advice to farmers. 'In other countries, and in the sister Colony, especial attention is devoted to this branch of agricultural science which, though pre-eminently necessary in South Australia, is neglected with an indifference as reprehensible as it is unaccountable'.

The 'sister Colony' referred to was probably Victoria, which had established an experimental farm in 1857 and a Board of Agriculture to administer it in 1859. However, the example tarnished when the farm was let to a tenant and the Board was abolished in 1870.²⁴

Further stimulus

The seed sown by that Royal Commission lay dormant for some years. On 3 June 1875 Ebenezer Ward was appointed South Australia's first Minister of Agriculture, being also Minister of Education under the premiership of James Penn Boucaut. The agricultural portfolio was dropped in a ministerial reshuffle in March 1876. In the volatile politics of the time, Boucaut's government fell in June 1876 but Ward popped up again as Minister of Agriculture and Education in the succeeding government which continued in office until October 1877. After that there was no designated Minister of Agriculture until the 1890s, responsibility for agricultural matters reverting to the Commissioner of Crown Lands and Immigration.

A month after Ward first took office, a Royal Commission was appointed to inquire into the best means of providing agricultural and technical education. The commission sat intermittently from July to October 1875. It heard nine witnesses, including farmers, horticulturists, the Surveyor-General, the Secretary of the Royal Agricultural and Horticultural Society and a veterinary surgeon. It also sent out 1166 copies of a questionnaire and received 86 replies. The questions were designed to elicit the conclusions stated in the commission's report. These were, in summary:

1. A Department of Agriculture should be established to collect and disseminate information to people in agricultural, pastoral and horticultural pursuits.

²⁴ Black, A.W. & Craig, R.A., 'The agricultural bureau: a sociological study', ch. 1.

2. A Professor of Agriculture, acquainted with analytical chemistry, physiology and other sciences bearing on agriculture, should be attached to the University of Adelaide (which had been established the previous year). He should hold classes for students paying fees, give public lectures and demonstrations, deliver three or four lectures annually at the principal agricultural centres and at any agricultural schools that may be established.
3. A model farm of 500 to 1000 acres (about 202 to 405 ha) should be established near Adelaide to give 'descriptive lessons' on soil, plants, trees, animals, manures and machinery to the pupils attending the classes of the Professor; students should take part in the manual work of the farm.
4. Experimental farms of not less than 500 acres (about 202 ha) should be established in various places, particularly where the government intended opening land for selection.
5. New grains, grasses, fodder plants and manures should be tested on these farms.
6. Special prizes should be awarded by the Department of Agriculture for the best farms in various districts.
7. An annual Congress of Agriculturists should be held at the time of the Royal Agricultural and Horticultural Society Show in Adelaide, at which all the information gathered by the various agencies of the Department of Agriculture during the year should be freely imparted and discussed.
8. A piece of ground should be set apart to train neglected boys as agricultural labourers, or they should be trained on the experimental farms.
9. The Professor should have a laboratory for chemical analysis, a museum, a library and a lecture hall.
10. For a moderate fixed fee, anyone should be able to apply for an analysis of soil and manure and for an examination and report on insect and fungoid life destructive to vegetable growth.
11. Experimental farms should test the capabilities of the soil in various districts and promote practical agricultural education rather than illustrate the most expensive systems of farming that might be adopted.

The commission also received evidence about crop rotation, alternate cropping and grazing, and the use of organic and inorganic fertilizers. One man wrote, 'There is no direct profit in any crop over a wheat crop. But in the rotation of crops as it ought to exist in any well managed farm, the profit consists of the restoration of the soil. The plan here is to take all out of the land that can be, and then abandon it'. Obviously, those who replied to the questionnaire were the most interested but a few of them rejected the whole idea of crop rotation.²⁵

²⁵ SAPP77: 1875.

Experimental farms

This remarkably enlightened document raised, directly or by implication, many of the issues which were to occupy the Department of Agriculture and the Agricultural College for the next century. Two experimental farms were established in the financial year 1876–77 to test widely different types of country. One was on 1280 acres (518 ha) near Manna Hill, 160 km northeast of Jamestown, well beyond the existing wheat zone. South Australia was enjoying a run of good seasons, optimism was unbounded, the theory that ‘rain follows the plough’ was popular, the agricultural frontier was being pushed further and further north, and a few hardy prophets even predicted that the whole colony would eventually be cultivated. The manager at Manna Hill struggled bravely against high temperatures and unpredictable rain until the experiment was terminated by the drought of 1880 which caused many farmers in the Upper North to abandon their blocks and seek new land elsewhere.

The other farm, of 1000 acres (405 ha), was on drained land near Millicent. Pastoralists occupied virtually the whole of the South East, but the push for more farm land was extending south as well as north. While the pastoralist could move his stock from the swamps to the low sandy ranges between them in winter, it was the peaty soil of the swamps that attracted the farmer – provided the government would get rid of the surface water. Thus, an official attempt to grow cereals in this area implied a commitment to the very expensive work of drainage. The South East farm continued into the 1880s but after examining it in January 1882, the newly appointed Professor of Agriculture described it as no better than others in the area and therefore a failure as an experimental farm. This was not the fault of the overseer, who had received no instructions except to do as well as he could. The Manna Hill farm proved a point, albeit a negative one, while the experiment in the South East failed for want of professional oversight.²⁶

PROFESSOR AND COLLEGE

The first professor

John Daniel Custance became South Australia’s first Professor of Agriculture on 1 June 1881. After theoretical and practical training in England, he had spent some years on the staff of the Royal Agricultural College at Cirencester. He was one of five British professors invited to the Imperial College of Agriculture in Japan, where he stayed from 1876 to 1880, before returning to England.²⁷

He came to Adelaide as a public servant, not one of the university staff. To begin with he had no college or classes. After much delay and consideration the government bought Olive Hill Farm, consisting of 728 acres (295 ha) about 10 km northwest of Gawler. This, with some additional land bought later, is the site of Roseworthy Agricultural College. Custance began to live there in March 1882. The farm had been worked without fertilizers for more than 25 years, presenting a challenging opportunity for him to show how land could be regenerated. A report on the soils of the farm was obtained from an analytical chemist and scientific

²⁶ *SAPP9*: 1874 to 1881 Estimates of expenditure for the years 1875–76 to 1881–82; *SAPP145*: 1878 ‘Return of expenditure north-eastern experimental farm’; *SAPP31A*: 1879 ‘Report on Manna Hill experimental farm and surrounding country’; and *SAPP33*: 1883–84 ‘First annual report by J.D. Custance’. The agricultural expansion of the 1860s and 1870s and the retreat of the 1880s are discussed in Love, J., *The measure of the land* (pp. 9–13), Williams, M., *The making of the South Australian landscape*, (chs 2 and 7) and Meinig, D.W., *On the margins of the good earth*.

²⁷ *Australian Dictionary of Biography*, 3.

farming began. The new professor was immediately introduced to some of the hazards of agriculture in this country. The continuing drought delayed the start of sowing, and hot winds in September ruined his English wheats. But he was able to report, after his first year, on experiments with various grasses and crops, including vegetables, and on sowing and pickling wheat and the use of drill, horse-hoe, mower and string binder.

He also reported on two small 'experimental stations', one in the Bundaleer forest reserve near Jamestown, and one on Crown land near Millicent. These followed the Millicent experimental farm into obscurity in 1884 but experiments were conducted on private land at Millicent for many years.

His first annual report also included proposals for an agricultural college, and mentioned addresses to gatherings in country centres. It concluded with some pungent remarks on South Australian farming: 'Regarding farming generally in South Australia, in many districts it presents a great contrast to the practice of farmers in other parts of the world. I am not fault-finding, but merely stating facts necessary to explain the observations I wish to make'. He then described the system of sowing on land ploughed 2 or 3 inches (5–8 cm) deep or not at all, stripping the heads and burning the stubble, continuing till the yield became unprofitable and then moving to other land. This, he said, could be financially successful for the individual but not for the colony because 'the farmer does not settle down on his farm (there are exceptions of course) determined to improve the land for himself and for those who succeed him'. Land that no longer grew a profitable crop of wheat could be used for hay growing for some years but what after that? Custance placed strong emphasis on deep ploughing, crop rotation and the use of manures. He advised the farmer to sow half his farm to wheat and half to 'mustard, rape or some other green crop to be fed off with sheep; this being done alternately would, I believe, enable the land to produce a payable crop of wheat'.

Custance also pointed out that want of capital was partly responsible for keeping farming in a backward state. He offered no reason or solution for this problem but it was, to some extent, a result of legislative developments over the previous two decades which made it easier for small farmers with very little capital to acquire land in competition with the wealthy pastoralists – already the official policy was working too well.

Later annual reports continued these themes and developed some new ones. Within two years Custance had concluded that phosphoric acid was the chief deficiency in South Australia's wheat-growing soils. He was repeatedly told that a better system of treating the land would not pay, and he replied by advocating the use of farmyard manure, ashes and 'night soil' (human excrement) and asserting that land growing lucerne for a few years would produce a better crop of wheat than land resting with no crop. He suggested the production of poultry, pigs and sheep as buffers against bad wheat seasons. He saw the possibilities of the swamps along the lower Murray River, recommending drainage by windmills and cultivation of potatoes, mangel, wheat and other crops.

The Agricultural College

Roseworthy College took in its first 15 students in February 1885, offering a two-year course of lectures, examinations and practical work, with an optional diploma. In a speech at the close of the first half-year session Custance said, 'The object of the College is to make the students, not machines, but men – thinking, intelligent men, good practical farmers – not to

cram the students with facts and figures, but to put them on the right road to attain that education which ceases only when life ends'.²⁸

Development of the farm included an arboretum, for beauty and education, planted under the direction of the Conservator of Forests, and an experimental vineyard of different varieties supplied by Thomas Hardy. The range of experiments was widened and seed wheat was sold to farmers. Contact with the agricultural community was maintained by public lectures, correspondence and visits to the farm.

Fiasco

But Custance soon began to run into difficulties. The Clare newspaper *Northern Argus*, in its issue of 31 August 1883, defended him against criticism from local farmers, concluding 'We feel the Professor has a hard task before him, seeing that some of the very men who should be ready to render him assistance are endeavouring to baffle him at every step'. He did not help his own cause by comparing, in a lecture to the Barossa Farmers Union, the experimental attitude of manufacturers in Manchester, Leeds and Bradford with the conservatism of South Australian farmers!

When the first College diploma examination was due, at the end of 1886, Custance asked the Commissioner of Crown Lands, James Henderson Howe, if the presentation of prizes and diplomas could be made an official ceremony under the auspices of the government. The Commissioner replied that he would be happy to attend and would invite some of his parliamentary colleagues. However, a misunderstanding arose between Custance, Howe and the Commissioner's Secretary over the appointment of external examiners. While Custance had some cause for indignation, he took the incident as a personal insult, accused the secretary of interfering with his responsibility as the Principal of the College, accused Howe of not hearing his case, and tendered his resignation. Howe twice gave him the opportunity of withdrawing his resignation, pointing out that if he ceased to be the Principal he must also cease to be the Professor of Agriculture. Custance became more vitriolic. Neither Howe nor any other Members of Parliament attended the end of year ceremony, at which Custance publicly denounced the secretary and the external examiners. His resignation as the Principal was accepted in January and he was informed that his professorial appointment would cease on 1 July 1887.

Francis Hilton Molesworth, the assistant lecturer, was appointed Acting Principal, while the Professor was to continue managing the farm and giving his normal lectures and practical classes to the students. The formerly cordial relations between the two men rapidly deteriorated. Custance was charged with neglecting his duties and obstructing the college's work and was suspended from office on 28 February.²⁹

Custance had demonstrated the value of a well-run experimental farm, he had established Australia's first agricultural college, and he had instituted the practice of visiting country towns to lecture to groups of farmers. These have been three of the government's main contributions to agriculture ever since: applied research, education for primary producers and what is now known as extension work. A later Principal, A.J. Perkins, described Custance as

²⁸ *SAPP41*: 1886.

²⁹ SRSA: GRG 35/1/1886/2260, 2348, 2359, 2439, 2445; 1887/1, 25, 26, 56, 57, 85, 96, 246, 323, 328, 553a, 684; GRG 35/25/44 letters 1908, 1909, 1921, 1922, 1923, 1986, 2006, 2103, 2119, 2140, 2170.

a very hasty man 'in open warfare with all the farmers of the Colony'.³⁰ This may have been an exaggeration but the good work he had done was partly spoilt by his own social ineptitude.

A successor, H.H. McMinnies, was appointed in April 1887 but before he could begin work he resigned because of ill health. Molesworth carried on as Acting Principal while the office of Professor of Agriculture was, in effect, vacant for a whole year.

THE NEBULOUS PERIOD

The Agricultural Bureau

Undeterred by these disruptions, the Legislative Council and the House of Assembly appointed a joint Select Committee in July 1887 to inquire into measures to encourage farmers and small occupiers of land to generate products specially adapted to the soil and climate of South Australia that would yield greatest profits and promote the most constant employment as well as increase the railway traffic. The Victorian Government had already appointed a Royal Commission on the same subject. A large amount of information was assembled from the small number of people who gave written or verbal evidence.³¹ In its report the committee enthusiastically recommended a great many plants, mainly grapes, other fruits and nuts. Fodder plants, forestry, tobacco and spices were included, with silk worms, bees and ostriches tossed in for good measure. Many of the recommendations were based on local South Australian experience, but there was little attempt to distinguish between the different capabilities of different districts. The committee went so far as to say that the deep roots of the vine were better able to withstand the vagaries of our climate than wheat and that if the whole area devoted to wheat became one vast vineyard, the produce would not make up the deficiency in the wine production of France caused by phylloxera.

What proved to be the committee's most significant recommendation was to adopt Albert Molineux's suggestions for an agricultural bureau. Molineux, son of a farmer and shoemaker, had come to South Australia as a small boy in 1839. He had some practical experience of farm work, but served his apprenticeship as a printer. In 1875, while working as a compositor and journalist, Molineux began publishing *Garden and Field*, a periodical intended to serve the same purpose as *Farm and Garden*. He wanted it to be a medium for exchange of information, but increasingly contributed more and more of his own writings on a wide range of agricultural topics. Although he advocated the formation of farmers' clubs he criticized the political aspects of those that began to appear in the early 1880s.³²

The Select Committee on vegetable products gave him the opportunity to bring his ideas directly to the notice of Parliament. He advocated the formation of a 'Bureau of Agriculture' consisting of honorary members with a paid secretary and some sort of branch structure under it. His ideas and even the terminology he used were drawn from what he had read of a system that operated under the United States Department of Agriculture. Molineux did not want the Bureau to be under the Crown Lands Department, nor did he want a Minister of Agriculture. He wanted the Bureau to be responsible to a Minister in its administrative matters but independent in policy. The Agricultural College should be under the Bureau. How the College Principal and the Professor of Agriculture would fit in this scheme he did not say. Neither did he say how the Bureau should set about its work of eradicating weeds and vermin

³⁰ Daniels, J. (trans. and ed.), *The personal letterbooks of Professor A. J. Perkins*, p. 231.

³¹ SAPP90: 1887.

³² *Australian Dictionary of Biography*, 5. Aldridge, ch. 2.

and preventing the introduction of harmful plants and animals into the colony. Molineux's main preoccupation was with the collection and dissemination of information, to which he added distribution of seeds and plants for experiments by branch members. Molineux was a little vague on administration but single-minded in his desire to improve South Australian farming.

A Central Agricultural Bureau was formed in April 1888, consisting of six honorary members and four public servants (the Director of the Botanic Garden, the Conservator of Forests, the Inspector of Stock and Brands and the newly appointed Professor of Agriculture). Molineux was appointed part-time secretary and allowed to continue his journalistic work. He published the Bureau's reports as a supplement to *Garden and Field*. Later he became a full-time public servant on quite a handsome salary and was required to dispose of his interest in *Garden and Field*. The Central Bureau set to work energetically to carry out its duties, which were more or less as proposed by Molineux, and claimed success in promoting the establishment of co-operative dairies, the use of ensilage pits, the distribution of seeds for experimental cultivation, and the institution of Arbor Day in co-operation with the Minister of Education. It held high hopes for other industries, including the export of frozen and desiccated food.

Eighteen branches were formed in the first year and the number grew quite rapidly. To begin with each branch consisted of not more than 12 members, chosen for their progressiveness and knowledge of the capabilities of their districts, the intention being that these men would give a lead to their neighbours. Branch members were given the opportunity to meet, listen to lectures and discuss matters of common interest in congresses organised by the Central Bureau.

Recovery of the College

Meanwhile, William Lowrie had been appointed the Professor of Agriculture and the Principal of the Agricultural College on 18 November 1887. The son of a Scottish shepherd, he had worked as a farm servant before graduating in Arts and Science at Edinburgh University, and then held a brief appointment lecturing in natural science and agriculture in Aberdeen, before coming to Adelaide, where he arrived early in 1888.³³ College enrolments began to recover after a setback caused by a poor season and the departure of Custance. Lowrie deplored the deficiency in elementary education of some students and contended that two years were barely enough to give an elementary working knowledge of agricultural science. The farm was managed on ordinary commercial principles except for the experimental plots, and the soil was returning to good condition, but the property was too small for its purpose. For example, there was not enough land to keep a breeding flock of sheep for instruction and meat, and students had to use single furrow ploughs to share the work among them so that each would gain practical experience.

Lowrie had a staff of two lecturers, one of whom was also the farm manager, while senior men from other government departments lectured on specific subjects. Arthur James Perkins was added to the staff as Government Viticulturist in 1892. A distinguished graduate of the Ecole Nationale d'Agriculture at Montpellier in France, he had two years' experience managing mixed farms and vineyards in Tunisia (where he had grown up) before taking up his Adelaide appointment at the age of 21. His personal contacts in Mediterranean countries

³³ *Australian Dictionary of Biography*, 10.

and fluency in French, Italian and Arabic enabled him to obtain seeds and literature that would not otherwise have come to South Australia.³⁴

Produce Department

Working harmoniously, Lowrie and Perkins saw some important developments in the 1890s. One of these was the *Butter Bonus Act, 1893*. Following the example of the Victorian Government, South Australia decided to offer butter makers a bonus of 2d/£ for three years for high-quality, well-packed butter exported overseas.³⁵ The government certified the quality of the butter. The necessary administrative machinery was provided in the Produce Export Branch in Adelaide and the Wine and Produce Depot in London, both established in 1894. By combining small individual consignments, the Produce Export Branch was able to pass on to producers the economies of larger scale operations and to negotiate lower freight rates with shipping companies. Thus it boosted the butter trade and started new exports, including eggs, fresh fruit, honey, bees' wax, almonds and frozen meat. In his annual report for 1895–96 the Minister of Agriculture pointed out the folly of butter producers taking advantage of temporarily high prices in the neighbouring colonies instead of maintaining supplies to England: 'once a road to market has been made traffic is necessary to keep it open'.³⁶

The London Wine and Produce Depot was established largely at the instigation of South Australian wine makers. In strongly supporting its establishment Perkins saw it as a means of guaranteeing that the wine was pure and unadulterated but thought the depot should not be responsible for sales.³⁷

Phylloxera Board

Perkins and leading grape growers believed that the legislation relating to phylloxera should be more stringent. The *Phylloxera Act, 1899* created a Phylloxera Board to be elected by the growers and gave the Board power to levy rates on commercial vineyards to form a Phylloxera Fund. It laid down procedures for the inspection of vineyards, placing them under quarantine, the destruction of infected vines, the payment of compensation from the Fund (provided the vineyards were not neglected), and the control or prohibition of the introduction of vines into South Australia. In noting the first election of the Board in his annual report for 1900 Perkins recorded that phylloxera had got a hold in Victoria over the previous 20 years because of lax measures against it and that Victoria had virtually given up attempts at stamping it out. He was fearful about what would happen when customs barriers were broken down under the federal constitution and seemed convinced that the pest would eventually cross the border.

Nevertheless he urged strict application of the Act to protect South Australian vines as long as possible. As South Australia is still free of phylloxera, the Board, with the co-operation of growers and the general public, has made this one of the most successful statutes passed in this State.

Experiments on private land

From 1891 to 1895 Lowrie supervised a series of experiments on private farms conducted on a more formal basis than those of the Agricultural Bureau. Six farms were chosen – at

³⁴ *Australian Encyclopaedia*, vol. 7; Daniels (trans. and ed.).

³⁵ *SAPD* 1893 col. 314, 338, 355, 876.

³⁶ *SAPP129*: 1896.

³⁷ Daniels (trans. and ed.), pp. 88, 177, 255.

Millicent, Eudunda, Clare, Maitland, Gladstone and Black Rock. Under the arrangement, the farmer provided the land, did the work and got all the returns, while the government paid for fencing, supplied seeds and manures and lent what was then considered special equipment such as drills. The experiments, which included wheat, oats, rye, kale, peas, fallow crops and root crops, were of some value in indicating what would grow in each district. Looking back on the project in 1900, Lowrie concluded that ‘much departmental money had been spent in vain attempts to grow a wide variety of crops’. He thought the farmers were too impatient or too busy to do the work with the necessary exactitude and the scheme was very costly in travelling and carting equipment from place to place. Rather than renewing these experiments he recommended buying 1000 acres (405 ha) or more in a higher rainfall area to be developed as a dairy farmland orchard for instruction and experiment. He proposed modification of the Roseworthy College curriculum (which had been extended to three years) to include one-year’s residence at the new place. Some of these new ideas were put into effect at the Turretfield and Coromandel Valley properties, acquired after Lowrie had left.³⁸

In search of identity

During the late nineteenth century, lines of distinction between the College, the Department and the Bureau were not at all clear. Lowrie and Perkins, who both lived at Roseworthy, referred to ‘College work’ and ‘Departmental work’. An example of the latter was the great caterpillar scare of 1892. When public alarm was raised about large green caterpillars in Adelaide vineyards, the Minister of Agriculture asked Perkins to investigate. After reporting on long and almost pointless searches in the western suburbs, he continued ‘I came to town this morning, went to Norwood and after spending the whole morning there succeeded in capturing yet another caterpillar! Four had already been found in this vineyard, mine was therefore the fifth: five caterpillars threatening the existence of over a thousand vines!’.³⁹

More profitable departmental work was done as Perkins and Lowrie, either singly or together, visited individual farms and vineyards and addressed gatherings in country towns. Perkins also examined wines forwarded to the London Depot, and suggested the acquisition of 50 to 100 acres (20 to 40 ha) for a model vineyard in a winegrowing area because Roseworthy was badly placed for vines. (This was not done until 1937.)

The Central Agricultural Bureau kept up a lively flow of recommendations to the Minister on every aspect of primary production, and the government adopted its suggestion of a subsidy on purebred bulls bought by branches for local use. The Assistant Secretary of the Bureau received additional duties as Inspector of Fertilizers under the *Fertilizers Act* in 1898 (to prevent the sale of adulterated fertilizers). The passing of this Act is an indication of the growing recognition by farmers of the need to use superphosphate.

George Quinn was appointed Inspector of Fruit and Inspector under the *Foul Brood in Bees Act* in 1894, becoming also Horticultural Instructor a few years later. In the official lists of public servants of those years he is variously listed as part of the Produce Export Branch, a branch on his own, and one of the Agricultural Bureau staff.

Following the creation of a Dairy Board, comprising Members of Parliament and representatives of the butter factories, to watch the interests of the dairy industry, a Dairy

³⁸ SAPP73: 1900 ‘Report by Prof. Lowrie on experimental blocks’; SAPP74: 1900 ‘Report of Prof. Lowrie on the practicability of conducting a farm in a more favoured district as an extension of the Roseworthy College’.

³⁹ Daniels (trans. and ed.), p. 135.

Instructor was appointed in 1898, beginning a long struggle to improve the quality of dairy produce, particularly butter.

In 1900 the staff under the Minister of Agriculture (not counting his personal secretariat) comprised five under the Central Agricultural Bureau, eight, including Lowrie and Perkins, in the Agricultural College and Experimental Farm, five in the 'Produce Export Department' (including the London and Port Adelaide Depots) and the Dairy Instructor. (Domestic servants and labourers were not listed.) A 'Typical Orchard' had been established at Mylor in 1898 to grow types of the best fruit from all over the world and make scions available for propagation, but this was under the control of the Director of the Botanic Gardens.⁴⁰ In his recommendation for a farm in a higher rainfall area as an extension of Roseworthy College, Lowrie said the Typical Orchard should have been established in conjunction with a commercial orchard so that the latter would help to pay for the former and both could be used for educational purposes: 'It seems a mistake to have what is correctly the work of one department distributed among different bodies of authority'.⁴¹ His words could have been applied to the nebulous organization under his own Minister.

Lowrie did not stay long enough after this to see any changes. He had been conducting a running battle with the Superintendent of Public Buildings, Charles Edward Owen Smyth, about the college buildings. This came to a head in a sequence of official correspondence in which the two men wrote some very impolite things about each other and Lowrie said his position was becoming untenable.⁴²

He resigned in September 1901 to become the Principal of Lincoln Agricultural College in New Zealand. Perkins was made Acting Principal of Roseworthy. Perkins wrote of him 'He found the College a discredited institution ... and he left it what I verily believe to be one of the most popular and efficient institutions of its kind'.⁴³ Contrary to practice in some similar colleges, he concentrated on practical training, including business management. The advocacy of superphosphate, begun by Custance and successfully continued by Lowrie, was the first major step in saving the South Australian wheat zone from becoming a desert. He was also a firm believer in bare fallowing to conserve moisture and control weeds, but the frequent ploughing that was part of this system gradually broke down the soil structure, contributing to the problem of soil erosion which became acute in the 1930s.

THE DEPARTMENT PROPER

A new structure

In 1902 Richard Butler, in his capacity as Minister of Agriculture, effected a major reorganization. Perkins, who, according to Butler, had proved himself an excellent organizer while Acting Principal, was appointed Secretary for Agriculture – that is, head of Department of Agriculture – while continuing as viticulturist. His second-in-charge was Walter Lloyd Summers, who had first entered the Public Service in 1887, had become Clerk and Assistant Secretary to the Agricultural Bureau in 1892 and Inspector of Fertilizers in 1898. Roseworthy continued with its existing staff under its new Principal, Professor James DeLoss Towar, a graduate of Michigan Agricultural College. The Produce Export Department was a separate

⁴⁰ SAPP43: 1903.

⁴¹ SAPP74: 1900.

⁴² SAPP65: 1901.

⁴³ SAPP71: 1902.

little organization with managers in London and Adelaide. The Stock and Brands Department was unaffected, as it came under Butler in his capacity as Commissioner of Crown Lands. The rest of the staff were gathered into a clearly defined department under Perkins. There was now a sharper distinction between the Department of Agriculture and Roseworthy College, although several officers divided their time between the two. This close relationship continued into the twentieth century. In 1974 Roseworthy became a college of advanced education, no longer under direct ministerial control. However, some departmental staff still lecture at Roseworthy.⁴⁴

Butler abolished the Central Agricultural Bureau by asking all of its members to resign. Then he created a Council of Agriculture to replace it, the Dairy Board and the Council of the Agricultural College, which had been formed in 1895. The Council of Agriculture consisted of two representatives elected by the dairy industry, the chairman of the Vinegrowers Association, the president of the Royal Agricultural and Horticultural Society of South Australia and seven others appointed by the government. Butler briefly explained his reasons for this action in his annual report for 1901–02: ‘I have connected with the department an organization representative of all our natural industries in the belief that as an advisory council it should prove of use to the head of the department’.⁴⁵ The operation of the Bureau branches went on as usual.

Butler’s action was criticized in Parliament and the press. Perhaps he might have handled the matter more tactfully but the potential loss of expertise to the agricultural community was not as great as might appear. Of the 16 members of the Central Bureau in 1902, four continued to serve the State as public servants, four were over 70 years old, while four of the remaining eight had attended less than half the meetings in the previous year. Two members of the Central Bureau and one from the Council of the Agricultural College were appointed to the new Council.⁴⁶

Molineux and Friedrich Eduard Heinrich Wulf Krichauff, who had been chairman of the Central Bureau from its beginning and was then 77 years old, were made honorary members of the Council soon after its formation. Reporting on its first year’s work, the new chairman remarked, ‘At the first meetings of the Council the absence of a clearly-defined outline of duty occasioned a certain amount of dissatisfaction’.⁴⁷ However, the Council soon settled into the kind of work the Central Bureau had been doing, with its additional responsibilities involving periodic visits to Roseworthy. It continued the flow of representations to the Minister on agricultural matters, including the College and Experimental Farm. It continued to make information available to Bureau branches and publish reports of their meetings in the *Journal of Agriculture*, the Department’s official organ which had begun in 1897. The Council was renamed the Advisory Board of Agriculture in 1905.

Molineux retired from the Public Service in September 1902, having turned 70 on 11 July of that year. A journalist with little practical experience in farming, he nevertheless was one of the most influential people to have worked in agriculture. He shares with Custance and Lowrie the credit for beginning the conversion of South Australian farmers from exploitation to husbandry of the land, and his legacy is still visible in the Agricultural Bureau system. He

⁴⁴ For a brief administrative history of Roseworthy see Daniels, J. et al., *Roseworthy Agricultural College. a century of service*, ch. 1.

⁴⁵ *SAPP71*: 1902.

⁴⁶ *Journal of Agriculture*, 5, pp. 927, 981; 6, p. 3.

⁴⁷ *SAPP43*: 1903.

injected his ideas into the vacuum that developed between the suspension of Custance and the arrival of Lowrie: but for that vacuum the Department might well have grown along different lines. The Agricultural Bureau provided the Department with a cheap extension medium at a time when it could not afford to have officers stationed in country districts, it provided primary producers in the settled areas with a ready-made scheme for self improvement, and it has continued to serve these two purposes ever since.

Perkins, while criticizing experiments conducted by Bureau branches as being too small and not systematic enough, was optimistic about results that could be obtained from a 'well-considered series of experiments on a fairly large scale, conducted under the direct supervision of the department ... In no way is the department as likely to accomplish so much good work as in connection with this matter'.⁴⁸ At the time, the Bureau was running a series of experiments, mostly concerned with the use of fertilizers, on about 200 plots of 1–2 acres (up to 1 ha) each in widely scattered parts of the State.

The London Depot

Controversy over the London Wine and Produce Depot led to the appointment of a Royal Commission in January 1901. Perkins fiercely defended the Depot both in evidence to the commission and in his annual report for 1901–02 where he wrote, 'There are some who acquire blindness by a judicious exercise of the powers of the will; others are born blind; others again are content to follow the blind ... I assert that, viewing the matter in its broadest aspect, the depot has not only been a success but a magnificent success'.⁴⁹

Agreeing with Perkins, Thomas Hardy and other witnesses, the commission recommended that the government should help the formation of a company to buy and blend wines for export, by granting it a low interest loan on condition that the company take over the Depot 'at a fair valuation'. The government should not blend wines, neither should it sell them or any other produce, but it should continue to issue certificates of quality. In due course the Commonwealth of Australia Wine and Produce Company Ltd took over the Depot, and Edward Burney Young, who had managed it since its establishment, continued as Director and Manager for the Company. To replace Young, the State appointed a commercial agent (later called Trade Commissioner) in London, in addition to the office of Agent-General which had been created many years earlier.

Phenomenal growth

The Minister's annual report for 1902–03 included a general report by Perkins as Secretary for Agriculture concluding:

I have the honour to submit reports from: 1. The Council of Agriculture; 2. The Principal of the Agricultural College; 3. The Inspector of Fertilizers; 4. The Inspector of Fruit; 5. The Dairy Instructor; 6. The Chief Inspector of Stock; 7. The Director of Botanic Gardens; 8. The Manager of the Adelaide Produce Export Department; 9. The Manager of the London Wine and Produce Depot.

These reports follow, all addressed to the Secretary for Agriculture. This looks remarkably like an exercise in empire building. However, the exercise did not last very long. After the resignation of Towar as the Principal of Roseworthy in May 1903, Perkins, who had applied for the position in 1901, was made Principal (as from 1 August 1904). William Angus, a science graduate from Aberdeen with experience in high schools and agricultural colleges in

⁴⁸ SAPP71: 1902.

⁴⁹ SAPP71: 1902.

Scotland and England, was appointed Secretary to the Minister of Agriculture and Professor of Agriculture.⁵⁰ His title was changed to Director and Professor of Agriculture in 1906. The Stock and Brands and Produce Export Departments established independent identities. The report from the Botanic Gardens related only to the Mylor Typical Orchard – the Gardens were never part of the Department of Agriculture.

In contrast to the prolonged drought and depression of the 1890s, the State enjoyed a run of good seasons in the early twentieth century. In these favourable circumstances, the Department of Agriculture achieved a remarkably rapid expansion of its experimental work, acquiring nine new properties in the years from 1905 to 1909.

Kybybolite Experimental Farm, begun in 1905, worked on cereals, fodder and green pasture, sheep and pigs. An orchard was planted in 1908.

Murray Bridge Irrigation Block, begun in 1905, grew potatoes, onions, fodder and cereals. Surprisingly, dairying was not mentioned. (Reclamation of the Murray swamps by the Survey and Crown Lands Department was still in its early stages.)

Parafield Experimental Station, begun in 1905, produced and tested varieties of wheat and supplied seed wheat for the Turretfield, Loxton and Kybybolite farms, as well as selling it to a few private farmers.

Turretfield, a property straddling the North Para River near Gawler, begun in 1908, was developed as a dairy and stud farm.

Loxton and Veitch (about 25 km south of Loxton) and a farm in the Hundred of Shannon (about 80 km north of Port Lincoln) were begun in 1908 to 1909 as the Murray Mallee and Eyre Peninsula were being opened up for farming.

The Adelaide Demonstration Orchard, begun in 1908 on land that is now in the process of changing from a bus depot to part of the Botanic Gardens, was used by George Quinn in connection with his lectures at the School of Mines.

The Coromandel Valley Experimental Orchard (also referred to as the Blackwood Orchard) was begun in 1908.

In addition, poultry stations were established at Roseworthy, Murray Bridge and Kybybolite and small stations run by local residents were set up at Orroroo and Goolwa.

Interest in dry farming as a subject of scientific study had been growing in the United States and elsewhere. Angus was obviously aware of developments.⁵¹ He wrote in his report for 1908–09, ‘Realising the possibilities of this system of farming in the drier areas of the State, the Department established experimental centres at Hammond, Oladdie, Dawson and Carrieton, to test its adaptability to South Australian conditions’.⁵² These places are in the marginal agricultural area between Peterborough and Quorn. The stations were on private farms.

⁵⁰ *Australian Dictionary of Biography*, 7.

⁵¹ *Encyclopedia Americana*.

⁵² *SAPP43*: 1909.

The Department also acquired a small mill for testing wheat grown at Parafield, and conducted baking tests with the wheat so milled.

The government established a butter factory in 1906 as part of the Produce Export Department at the request of dairymen who were dissatisfied with commercial factories and wanted 'a fair and honest check to compare butter contents and quality of their cream'.⁵³ The Dairy Expert was careful to point out that the factory did not tout for business but was making a profit. Export butter was graded by departmental staff to maintain quality standards. After 1907 this was done, still by the Department, under the Commonwealth *Commerce Act*.⁵⁴

Quinn and his staff had responsibilities under the *Commerce Act* for inspecting export fruit. They also inspected orchards and apiaries and interstate movement of fruit and plants under State legislation as well as giving horticultural advice to people whose properties they inspected.

Arnold Edwin Victor Richardson, a graduate of Roseworthy and the University of Adelaide, entered the Public Service in 1902. He filled the new position of Assistant Director of Experiments in 1908, to the delight of Angus who wrote 'his appointment has made it possible for the department to undertake important branches of work which hitherto had to be left undone'.⁵⁵

For about a year – in 1907 – the name of the Department was Agriculture and Intelligence. There is no direct evidence to prove that the mental capacity of the Department was superior to the rest of the Public Service. Actually, this was another example of public servants being Jacks of several trades. The 'intelligence' (that is 'information') function was transferred to the Secretary to the Commissioner of Crown Lands and Immigration in 1908 and to the newly created Intelligence and Tourist Bureau in 1910. It appears to have been an early attempt at setting up an official information service.

Angus resigned in October 1910 and Richardson acted as Director until March 1911 when Lowrie came back to South Australia as the Director of Agriculture. Perkins continued at Roseworthy. Richardson resigned a few months later to become the Superintendent of Agriculture in Victoria. Lowrie stayed barely three years before leaving the Department again.

Lowrie, in his earlier term of office, saw the need for expanding the Department's experimental work, but in the 1890s when he was advocating it, the government was more interested in retrenchment, and it fell to Angus to steer the Department through what must have been one of its most exciting periods of development. The people working on these experimental properties in various parts of the State became in effect the Department's first district representatives. Lowrie's second term of office was a period of rationalizing and consolidating the experimental work begun by Angus.

THE PERKINS ERA

Consolidation

⁵³ SAPP43: 1909.

⁵⁴ SAPP43: 1909.

⁵⁵ SAPP43: 1909.

Perkins succeeded Lowrie as Director of Agriculture on 1 July 1914 and continued in that office for 22 years. He inherited a department covering all the research, advisory and inspectorial functions with a staff of about 30, while the Office of the Minister, which formerly had included some of the inspectors, consisted of the Secretary to the Minister (W.L. Summers) the clerical staff, the Secretary to the Advisory Board of Agriculture and the editor of the *Journal of Agriculture*, about 25 all told. The Minister's Office, or Minister of Agriculture Department as it was later called, grew a little and then in about 1920 was reduced to a small secretariat with a staff remaining at 10 or fewer until it was formally absorbed into the Department of Agriculture in 1976.

Walter John Spafford, who had joined the Public Service in 1905, was made the Superintendent of Experimental Work on 1 July 1914. Lowrie had concentrated the experimental work outside Roseworthy into four farms (with another about to begin), two orchards and one poultry station. All poultry work, including birds and buildings, was moved to Parafield, and horticultural work was mainly limited to the Adelaide and Blackwood Orchards. Turretfield was growing seed wheat and experimenting with cereals, peas, lucerne and a kerosene traction engine, with less emphasis on dairying. Kybybolite and Veitch remained much the same as before. A property at Booborowie, in high country about 150 km north of Adelaide, was a former sheep station in the process of being converted for experiments with fat lambs and wheat. It had also been intended as a school for city boys from poor families to give them a vocation and a taste for country life but not many boys were interested. The Minnipa Farm, which was just beginning, concentrated on wheat and made an attempt at olive growing. The other farms had been discontinued.

The Department supervised experimental plots on six or seven private farms – the location varied from time to time. In addition, the Agricultural Bureau continued to sponsor experiments by members.

Perkins announced that he intended to devote much attention to the experimental farms. Their main function should be to improve local farming practice, and they should also sell seed wheat and good breeding stock. The experimental farm staff should supervise experimental plots throughout their districts. He was at pains to point out that experimental farms, by their very nature, could not make a profit. Custance, Lowrie and Angus had found it necessary to make the same point. Perkins also wanted the experimental farms to take farm apprentices who could qualify for certificates of competence, the best of them being awarded scholarships to Roseworthy, but this idea was not taken up.

Perkins believed that experimental plots sponsored by the Agricultural Bureau would be valuable if the Department properly supervised them. They would not only guide local practice but also teach the Department's technical officers about local conditions, enabling them to give better advice. The branches should choose the sites, the government should provide fencing and other improvements, seed, manures and special implements and should guarantee to the owner a return at least equal to a fair rental value for his land. The Department would thus gain a wider variety of experience at much less cost than additional experimental farms. This proposal, which resembled the scheme supervised by Lowrie in the 1890s, was more feasible now that the Department had resident country officers but was not fully implemented.

The Women's Agricultural Bureau

In June 1916 a deputation of the Advisory Board of Agriculture waited on the Minister of Agriculture to advocate the training of women who wanted to go on the land. This was prompted by 'the withdrawal of a large proportion of the male population for military purposes'. Possible occupations for women were bee keeping, dairying, poultry raising and fruit growing. The Minister said the government was already considering ways of doing this. Agricultural education for women was not a new idea. Lowrie in 1900 had included in his scheme for an annex to Roseworthy College a proposal that young women could receive short courses in dairying during the vacations when the men were not in residence, and the Council of Agriculture had mentioned the subject in a general way in its first annual report.

Four months later the Advisory Board received a resolution from the Hartley Branch for the formation of women's country clubs to give women instruction in 'sanitation, home architecture, first aid, dietetics, hygiene, etc, in addition to poultry keeping, dairying, horticulture, etc'. In 1917 the Naracoorte and Sherlock Branches recommended the admission of women to Agricultural Bureau branches. The Advisory Board did not approve this but appointed a committee to look at the Hartley proposal. It recommended women's branches of the Agricultural Bureau. Membership was to be limited to women, although joint meetings with men's branches could be held by mutual consent. They were to be governed by the same rules as men's branches and participate in the same privileges. When enough women's branches had been formed, the *Journal of Agriculture*, which was sent to all branch members, should include matters of domestic economy and other subjects in which women were especially interested. The first women's branch was formed in October 1917.⁵⁶

Soldier settlement

The return of men from war service placed extra work on the Department. The Mount Remarkable Estate, which had been acquired by the government under closer settlement legislation, was placed under the Department of Agriculture in August 1916 to be used as a training farm for discharged soldiers who wanted to settle on the land. At this stage Perkins was responsible for soldier settlement generally (except for irrigated blocks which were supervised by the Irrigation and Reclamation Department) and also had to report on land offered for sale to the government for soldier settlement. The advisers on dairying, horticulture and poultry were also involved in soldier settlement work. This involvement, and responsibility for the Mount Remarkable Training Farm, remained with the Department of Agriculture after the establishment of a separate Soldiers Settlement Department in March 1918.

The Berri Experimental Orchard, which had been planted by the Irrigation and Reclamation Department at the suggestion of George Quinn, was transferred to the Department of Agriculture in 1917, concentrating horticultural research in the latter department and administrative aspects of Murray River irrigation in the former.

The Dairy Cattle Improvement Act

For some years, the Dairy Expert, Peter Hampden Suter, had been exhorting butter makers and dairy keepers to pay more attention to quality. Common faults pointed out by him were badly constructed cow yards and sheds, faulty drainage, indifference to cleanliness and a failure to take proper care of cream before delivery to the factories. Suter urged more frequent deliveries, although this was difficult in areas where dairy cows were a subsidiary to wheat and sheep farming, and delivery runs were consequently long. In 1914 about half of

⁵⁶ *Journal of Agriculture*, 19, p. 1016; 20, pp. 213, 649, 723; 21, p. 416.

the butter was made on the farms and was generally poor. This meant long hours and low returns for farmers' wives. While applauding the tendency of butter factories to go in for pasteurization, he criticized incompetent work such as streakiness in the butter. He urged factories to grade cream more rigidly – this would ensure that the best cream was not spoilt by the worst, and would also reward the better dairymen.

Suter advocated production testing of dairy cows and himself supervised a pilot test in 1913–14.⁵⁷ Five herd testing associations were formed in 1920. By recording the production of each cow it was possible to select the best for breeding and thus gradually improve the whole herd. The Agricultural Bureau had been working for years to lift the quality of bulls. Suter also stressed the need for the conservation of fodder by ensilage so that dairy stock could be adequately fed throughout the year: 'I am confident that production of dairy products could be easily trebled without keeping an extra hoof if the farmers would test, feed, and weed'.⁵⁸

The *Dairy Cattle Improvement Act*, which came into operation on 1 July 1922, created a fund to improve the dairy industry. The fund was built up from fees for the registration of bulls. It was administered by an Advisory Committee for the Improvement of Dairying, appointed in 1922 and comprising the Director of Agriculture, the Principal of Roseworthy College, the Dairy Expert and representatives of the Advisory Board of Agriculture and of the Royal Agricultural and Horticultural Society. The money was used to subsidize purchase by dairymen of purebred bulls and also to assist herd testing associations. Because of the difficulties inherent in an industry that was so thinly spread over the country, butter quality continued to be a problem for a long time.

The Department in review

In the mid 1920s Perkins again thought it necessary to defend his Department against charges of excessive expenditure. He published in his annual report for 1924–25 a statement of total expenditure, total revenue and net cost, showing that revenue amounted to 41% of the total expenditure. He then listed the services rendered by the Department in 14 short paragraphs which may be summarised as follows:

1. General educational work, including lectures, demonstrations, visits and correspondence.
2. Maintenance of the Agricultural Bureau system – 239 branches with 6500 members.
3. Distribution of the *Journal of Agriculture* free to Bureau members and at nominal cost to others.
4. Supply to the government of technical advice and reports.
5. Technical advice to other government departments free of charge.
6. Supervision of farmers' experimental plots to improve existing practices and test new ones.
7. Establishment and supervision of herd testing associations.
8. Official testing of pure bred herds of dairy breeds of cattle.

⁵⁷ Dairy Branch (comp.), 'A history of herd recording in South Australia'.

⁵⁸ *SAPP43*: 1919.

9. Management of five farms, three orchards and one poultry station run mainly on experimental lines.
10. Organization and control of farm competitions and other tests of skill.
11. Production and sale to farmers of specially selected and graded cereal seeds.
12. Sale to farmers at moderate prices of breeding livestock.
13. Administration of legislation:
 - a. *Dairy Cattle Improvement Act, 1921*
 - b. *Vine, Fruit and Vegetable Protection Acts, 1885, 1910*
 - c. *Sale of Fruit Acts, 1915, 1921*
 - d. *Chaff and Hay Act, 1922*
 - e. *Insecticides Act, 1919*
 - f. *Fertilizers Act, 1919*
 - g. *Victorian Poultry Tick Act*
 - h. *Federal Commerce Act*
 - i. *Federal Quarantine Act*
 - j. *Federal Customs Act*
14. General administrative and technical work, including attendance of officers on special government committees, judging at shows, assisting at exhibitions, etc.

The *Sale of Fruit Act* dealt only with standard sizes of fruit cases. The Acts about chaff, hay, insecticides and fertilizers were to protect buyers from fraudulent dealers. The *Commerce Act* related to quality of exports. The *Quarantine* and *Customs Acts* controlled imports.

Perkins went on to claim that, in view of the State's vital interests in rural production, greater expenditure would be justified, particularly an experimental dairy farm on a reclaimed swamp. He did not get his way on the latter point.

The Royal Commission on Rural Settlement

A Royal Commission on Rural Settlement was appointed in 1925 to look at the possibility of further rural development in South Australia. The commissioners were Walter John Colebatch (Principal of Roseworthy College), Walter John Spafford (by then Chief Agricultural Instructor in the Department of Agriculture) and John Alan Fraser (a member of the Land and Pastoral Boards, which were administered by the Lands and Survey Department). The commission's work continued for two years, necessitating some temporary reorganization in the Department of Agriculture and Roseworthy College.

Its first progress report dealt with a strip of land along the north side of the Murray in Counties Hamley and Young, including some good soil and some very light sand ridges. Annual rainfall was reported to be only 10.28 inches (261.1 mm), but most of it fell during the wheat-growing months. Underground water was too saline even for stock and surface runoff was not enough. The commissioners dealt at length with methods of reticulating water from the Murray, taking as a model an apparently successful scheme in the Millewa district of Victoria. They concluded that there were probably 500 000 acres (about 202 000 ha) that would be suitable for wheat and sheep if given an adequate supply of good stock water and a

railway, and that 500 or more farmers could be settled on blocks of 1000–1500 acres (405–607 ha). In his work at Roseworthy, Colebatch had set out to stimulate interest in mixed wheat and sheep farming. This had been advocated by Custance but the successful use of superphosphate had tended to divert attention from it. Later, mixed farming became normal for South Australia, particularly in the kind of marginal country dealt with in this commission's report.

The next three progress reports dealt with land suitable for closer settlement in the South East, virtually all privately owned and a significant portion of it needing drainage before more intensive use was possible. The principal uses proposed were grazing for meat, dairying and forestry.

The fifth, sixth and seventh reports dealt with some large estates in the Mid North that could be cut up for family farms. The final report dealt with the legislative aspects of closer settlement. The whole work of the Royal Commission upheld the policy, which had been pursued by every South Australian government since colonization, of getting as many people as possible settled on the land. The commissioners were blithely optimistic that a farm of 346 acres (140 ha) in the Mid North could support a family, and that rain would obligingly continue to fall at exactly the right time on the marginal country north of the Murray.⁵⁹

Perkins shared their optimism. Estimating the total area suitable for wheat growing in South Australia, he came up with a figure of 13 500 000 acres (546 326 ha) based on information supplied by the farmers, to which he added 1 500 000 acres (607 029 ha) in Eyre Peninsula and the Murray Mallee still unoccupied, to produce a total of 15 million acres (6 070 290 ha). Of course this does not mean that 15 million acres would be sown each year. For the lower rainfall areas he envisaged wheat and sheep with about a quarter of the area sown to wheat each year.

Perkins predicted that in the better watered areas, diversification of crops would reduce the amount of wheat. Barley production had increased but damage to the grain by harvesting machinery was limiting its value for overseas buyers. This problem was overcome by the agricultural implement industry. Although the Department of Agriculture has tested the effects of implements on crops and soil, it has not attempted to design commercial farm machinery.

Modest growth

The formation of the Waite Agricultural Research Institute as part of the University of Adelaide in 1925 indirectly augmented the research work of the Department. The Institute provided an advisory service in plant pathology, entomology and systematic botany. The Council for Scientific and Industrial Research (CSIR), founded in 1926 and known since 1949 as the Commonwealth Scientific and industrial Research Organization (CSIRO), worked in close association with the Waite Institute, particularly on soil composition. Their discoveries of trace element deficiencies in soils led to the cure of some plant and animal diseases, and, in the 1940s, to the development of pasture on previously infertile land in the Upper South East. In general, these two organizations have done basic research while the Department has tested the results in the field.

⁵⁹ SAPP70 and 71: 1925; SAPP55, 60, 61, 64 and 64A: 1926.

The later 1920s saw a modest increase in departmental staff. One of these was a 'Field Officer' who advised commercial tobacco growers – an industry that never really flourished in South Australia. Of much greater significance was the appearance of district agricultural instructors stationed at Mount Gambier, Jamestown, Murray Bridge, Riverton, Streaky Bay and Port Lincoln, district dairy instructors at some of these places and horticultural instructors and inspectors at Mount Gambier, Gawler, Waikerie and Berri. These people greatly improved personal contact between the Department and its clients.

The Great Depression

The 1929–30 season was very poor, but Perkins used the wheat yield statistics to highlight the success of years of educational work among farmers:

Today we look on a mean State yield of wheat of 6.40 bush. [bushels/acre] as very disappointing; but we are apt to forget that for the 30-year period which ended in 1906, the mean State yield was 5.84 bush. That in an exceedingly unfavourable season such as 1929/30, in which one-fifth of the area sown was not harvested, we should have secured a 6.40-bush. harvest, is a clear indication of what improved farming methods have done for this State.⁶⁰

The average for the five years from 1924 to 1929 was 10.31 bushels/acre.⁶¹

The farming outlook generally was not very cheerful. Cattle and dairy cow numbers had declined by more than half in the previous seven years and South Australia was importing butter from other States. Sheep numbers had increased because of good wool prices to 1927–28 but then declined because of drought. Although South Australia should, in the opinion of Perkins, have been able to compete with Canada and the United States of America in pig exports to the United Kingdom, pig numbers had remained more or less static in South Australia over the previous 10 years because of limited local demand.

It is well known that life for the primary producer became worse and worse as Australia sank into the general world depression of the early 1930s. Commonwealth and State subsidy and debt adjustment schemes enabled most farmers to stay on their land. In South Australia these schemes were managed by the Farmers Assistance Board and the State Bank.⁶² The depression also gave birth to the Australian Agricultural Council and the Standing Committee on Agriculture, both formed in 1934. The former, consisting of Commonwealth and State Ministers of Agriculture or Industry, was to promote the marketing of agricultural products and to co-ordinate policy and financial assistance for the industry. The latter, consisting of departmental heads and some other senior officers, was to provide technical advice to the Australian Agricultural Council and a forum for the exchange of information.

The Department of Agriculture could not solve the world's economic problems. It continued routine administration of the statutes listed earlier by Perkins, to which had been added the *Apiaries Act* (to ensure the prompt eradication of diseases in beehives) and the *Fruit and Vegetable (Prevention of Injury) Act* under which inspectors supervised loading in markets, railway yards and ships' holds to prevent damage by careless handling. After trying for about five years, it succeeded in getting the *Insecticides Act* amended to make it more acceptable to manufacturers, while retaining protection for consumers. Under the *Quarantine Act*, it continued to control the importation of seeds to prevent the introduction of weeds, while

⁶⁰ SAPP43: 1930.

⁶¹ The metric equivalents are: 6.4 bushels/acres = 0.44 t/ha; 5.84 bushels/acre = 0.4 t/ha; 10.31 bushels/acre = 0.7 t/ha.

⁶² SRSA: GRG 6; Wadham, S., *Australian farming 1788–1965*, ch. 6; *Australian Encyclopaedia*, 1.

under the *Vine, Fruit and Vegetable Protection Act* particular attention was paid to the Murray irrigation areas to prevent the entry of unfumigated nursery stock and second-hand packing cases (which were destroyed). The *Tobacco Industry Protection Act*, to control diseases in tobacco, was passed in 1934. The *Sale of Fruit Act* fell into abeyance because of loopholes and an amendment was rejected by Parliament in 1935. Extension work was maintained through the district officers, the *Journal of Agriculture* and the Agricultural Bureau. The Poultry Expert was busier, because poultry was the most important line of production in land settlement schemes sponsored by the Employment Promotion Council, a State agency created to find work for the unemployed.⁶³

Experimental work continued on a reduced scale. Kybybolite did a wide range of work, principally on cattle, sheep, pigs, fodder, oats, wheat, barley, rye and peas. From 1932 Turretfield was devoted almost entirely to growing seed wheat for sale to farmers. The Minnipa Farm was leased to its manager on a share-farming basis. The farms at Booborowie and Veitch were discontinued. Experimental plots on private farms continued unabated – in 1935 there were about 100 of them under departmental supervision. The experimental orchards at Blackwood, Adelaide and Berri were maintained and a small orchard in the Adelaide suburb of Netherby, commonly but wrongly called the Fullarton Orchard, came under the Department's control.

In 1934 George Quinn was relieved of administrative duties so that he could spend the last few months of his public service preparing for the publication the records of the Blackwood Experimental Orchard. He retired on 29 October 1935 after nearly 48 years of service to the State. He was succeeded as Chief Horticultural Instructor and Chief Inspector of Fruit by Arthur Geoffrey Strickland.

A change of mind

In his last annual report, June 1935, Perkins made some startling remarks about the economics of wheat growing. After giving an estimate of the minimum return needed to recover production costs, he stated that over seven successive seasons, 1928–29 to 1934–35, about half the farmers in the State recovered little more than a quarter of that minimum. They had stayed on their farms by postponing indefinitely maintenance and replacement of depreciating assets and accepting remuneration that would be rejected by the average unskilled labourer. This poverty was caused partly by the low price of wheat during the depression, but also by the persistence in growing wheat in unsuitable areas where harvests had been less than 4½ bushels/acre (0.31 t/ha). He went on to draw a comparison with twelve good seasons, 1915–16 to 1926–27, when the mean yield for the State was 12½ bushels/acre (0.85 t/ha). Even in those good seasons, a significant number of Hundreds returned less than 8 bushels/acre (0.54 t/ha) and these, he reasoned, were unsuitable for wheat growing. While acknowledging that in earlier times it was inevitable that these lands should have been tested, it had become obvious that they could not be depended on for economically adequate wheat crops. His conclusion was characteristically forthright:

What then is to be done with such farms? Declare them unsuitable and assist the owners to become sheep farmers, not station owners: the returns from 600 good merino ewes and a few cows would prove far more profitable and less onerous than the hundreds of acres of useless wheat that are at an present being laboriously grown on these unsuitable lands.

⁶³ SRSA: GRG 35/65.

On the subject of livestock, Perkins stated that ever since 1875 the number of sheep in South Australia had oscillated between 6 000 000 and 7 000 000. He predicted that as unsuitable wheat land was converted to sheep, the population of the latter would rise to 10 000 000. It did within five or six years. In publicly announcing this retreat from his optimism of 10 years earlier, when he had envisaged expansion of the wheat zone, Perkins helped prepare the way for the joint Commonwealth–State marginal lands scheme of the 1940s.

Perkins retired on 10 May 1936. He had come to South Australia as a very young man on a three-year contract renewable for a further three years. Towards the end of the second period he entered into negotiations with the Adelaide firm of Elder, Smith about managing a wine company, but when these negotiations broke down he continued in the service of the government, driving the hardest bargain he could in the terms of his employment. He did not always get his own way with his employer, but his ability was recognised and rewarded. His lively mind and forceful self-expression were balanced by an ability to adapt himself to local conditions and meet South Australian farmers on their own terms.

CONSERVATION AND WAR

The Barossa Viticultural Station

Walter John Spafford became Director of Agriculture on 11 May 1936. The country's gradual emergence from the Great Depression was reflected in the opening of the Barossa Viticultural Station in 1937. This was on land that the Department had just acquired, and preparation for vine growing began immediately. The experimental stations at Blackwood, Fullarton and Berri continued, while horticultural staff also did some experimental work in privately owned orchards throughout the State.

Soil conservation – defining the problem

The most significant agricultural advance in the 1930s was the growing interest in soil conservation. This had taken a long time to develop. As early as 1901 the Central Agricultural Bureau had drawn attention to sand drifts, mainly in coastal areas, where grazing stock were destroying native vegetation.⁶⁴ The *Sand Drift Acts* of 1923 and 1927 gave the responsible Minister and local government councils the powers to require landowners to prevent sand from drifting over roads, railways and other public works, and to prohibit clearing of scrub from land that was likely to drift. The authorities were given power to take remedial action themselves and to recover costs from owners who failed to comply with the relevant notices. Private owners of land threatened by drift sand could also take action under the Act, but this provision was restricted to certain proclaimed areas in the Murray Mallee, Eyre Peninsula and Upper Yorke Peninsula. It was a piecemeal approach to the problem, depending on complaints about particular instances.

Francis N. Ratcliffe, an English scientist, came to Australia in 1935 to work with the CSIR. A.E.V. Richardson, who was then Director of the Waite Institute and a member of the executive committee of the CSIR, arranged for him to study drift erosion in South Australia's pastoral country. In addition to his official work, Ratcliffe wrote a more personal account of his experiences in his book *Flying Fox and Drifting Sand*, published in 1938, helping to draw public attention to the problem.

⁶⁴ SAPP43: 1901.

A conference of Commonwealth and State Ministers in Adelaide in August 1936 recommended that each State form a committee on soil erosion and conservation in co-operation with the CSIR. A South Australian committee was formed in the following April, comprising Spafford as chairman, Richardson, J.N. McGilp (a member of the Pastoral Board), G.J. Roger (Conservator of Forests) and C.G.F. Johnson (Engineer for Water Supply). It reported in September 1938.⁶⁵ The Soil Conservation Committee toured the South East, the Upper North and the northeast, including Broken Hill (to look at conservation work being done by the mining companies). Individual members visited other places and reports were received from district officers of the Agriculture, Lands, Forests and Engineering & Water Supply Departments. The committee identified causes of soil erosion as over-grazing in pastoral areas leading to accidental denudation, and, in agricultural areas, deliberate clearing of vegetation followed by over-cropping whereas the approach to the *Sand Drift Acts* had been mainly from an engineering point of view, this committee recognised that the problem is essentially biological: 'For any given climate, soil, aspect and slope, there is a certain minimum of vegetative cover needed'. The report pointed out that denudation and erosion had been a consequence of human activity throughout history, that it was still serious in some parts of the world, and that warnings from other countries had reached Australia in time to prevent the situation from becoming disastrous here.

A statement from the Pastoral Board indicated that 15 stations, covering about 19 000 km² (7336 miles²), had no permanent stock carrying capacity, and capacity had been severely reduced on another 52 000 km² (20 077 miles²). Financiers demanding repayment of loans and insisting on restocking too soon after drought caused some of the overstocking. Tree cutting for stock feed, fencing and mining contributed to erosion: the committee proposed that the practice of issuing licences for the removal of timber from pastoral leases should be curtailed. Rabbits were found to breed in the north where there was no practicable way of controlling them, and move south. Experiments with myxomatosis were then being carried out on Wardang Island, but it was not until the 1950s that this virus became effective in reducing rabbit numbers.⁶⁶

The committee ventured into a controversial area by declaring that on over-stocked runs, grazing domestic animals, by breaking up the soil with their hard hoofs, did more damage than rabbits, although rabbits, by competing for grass, forced domestic animals to eat perennial plants sooner than they would otherwise have done. More research was needed by South Australian agencies in co-operation with the CSIR to determine permissible stocking levels and means of regeneration. The work then being done by the Waite Agricultural Research Institute under the provisions of the Ranson Mortlock Trust was directly relevant.

Drift in the agricultural areas was deemed to be not as serious as in the outback, but there were bad patches in the Murray Mallee and northern Eyre Peninsula. The committee noted that some uncleared land in these areas 'is so very sandy that it is hoped that the Government will never be tempted to open it for selection, but will retain the areas as fauna and flora reserves'. The areas in question were proclaimed as conservation parks within three decades. The most successful farmers on sandy soils were concentrating more on stock than wheat, but in opening new country, wheat was the only payable product to begin with and farmers had tended to continue with it to the exclusion of stock.

⁶⁵ *SAPP40*: 1938.

⁶⁶ *Australian Encyclopaedia*, 1 (p. 146a) and 7 (p. 347a).

There are some careful farmers in every drift-labile district of the agricultural areas who have succeeded in supporting themselves without undue loss of soil and without becoming menaces to their neighbours. So successful are such men that it seems certain that their methods can be followed with perfect safety.

A substantial part of the report deals with water erosion in the hill country from Gawler to the North Flinders Ranges. The principal cause was seen to be removal of trees and undergrowth from the ridges and steeper slopes, thus increasing the runoff of rain. In some circumstances the top soil was cut by water and then blown away by wind, leaving sheets of bare rock or subsoil. In others, the water scoured jagged channels that can still be seen here and there. Whole paddocks were rendered unfit for cultivation in this way.

The report offered some specific information on plants and fertilizers to combat wind and water erosion in the different rainfall belts, and proposed that the Woods & Forests Department should not only experiment with suitable trees but also give practical advice to landholders. Flora reserves would be necessary to protect some towns threatened by drift, while small fenced off areas on pastoral properties would provide reserves from which the surrounding land would be seeded.

First among the committee's recommendations was an ambitious scheme (possibly inspired by the Tennessee Valley Authority which had been created in 1933) for a conservation service under a competent director working in close co-operation with the Lands, Agriculture, Woods & Forests, and Engineering & Water Supply Departments, charged with the responsibility of preserving soil resources for present and future use. More realistically, the main recommendation was for a cheaper interim measure involving the appointment in the Department of Agriculture of two technical advisers on drift erosion (one in the pastoral areas and one in the agricultural areas) and one adviser on water erosion for the whole State. These should form the nucleus of a staff who would co-operate with the other relevant departments. Sixteen secondary recommendations dealt with specific issues raised in the report.

Soil conservation – action

The *Soil Conservation Act, 1939* created an Advisory Committee on Soil Conservation with powers to enter and inspect any land. It gave the government the power to acquire land or to resume parts of Crown leases for soil conservation reserves and to protect flora. It gave the government the power to prohibit the destruction of flora on any land if that was necessary for conservation purposes or to permit the destruction of flora provided that trees etc. were replaced (thus allowing proper management of timber and fire wood resources). It gave the government the power to make fences, contour banks, dams and channels and to plant trees and other vegetation as soil conservation measures, and to grant loans to any person or corporate body for these purposes. At first the government of Thomas (later Sir Thomas) Playford decided that the Act could be put into effect by the existing district officers in the Lands and Agriculture Departments, but after a strong representation from the Advisory Committee on Soil Conservation, Robert Irvine Herriot was appointed Soil Conservator in March 1941.⁶⁷ Herriot came from the Soils Division of the CSIR and worked closely with that organization in his new position. From the beginning he was hampered by the wartime shortage of labour and materials. As news of his appointment spread, he was unable to keep up with requests for advice. By 1946 the Soil Conservation Branch had a staff of eight and had begun all the kinds of activities envisaged in the committee report of 1938, including

⁶⁷ Matheson, W.E., 'Soil loss made South Australia come down to earth', p. 2.

stabilizing sand ridges, declaring and fencing flora reserves, contour banking, experimenting with suitable plants and making a detailed study of permanent soil cover in pastoral areas. Two badly eroded farms in the Murray Mallee were surrendered to the Crown as conservation reserves and one of these, at Wanbi, became a permanent research station. The Department admitted that its Turretfield seed wheat farm was water eroded and would be used for experimental control work.⁶⁸

Drastic changes were introduced in the *Soil Conservation Act Amendment Act, 1945*, which provided for the creation of district soil conservation boards on petition from the local landholders. Each board would consist of one person elected by all the district councils in the area and up to six members nominated by the Advisory Committee on Soil Conservation. It was anticipated that members would be farmers within the district plus one representative of the Department of Agriculture. A district board could establish local area committees as it saw fit. The board was to be responsible for organizing all conservation work within its district and inducing farmers to work together for the common good.

To cope with landowners who were a menace to their neighbours, the amendment provided for soil conservation orders, but four stages were involved in issuing one: first the complainant had to discuss the matter with the alleged offender, then with a departmental soil conservation officer and then with the district board which, if it considered the order justified, would refer it to the Advisory Committee on Soil Conservation. The amendment also required that the Soil Conservator be given three months notice of intention to clear scrub land, that is land on which the whole or substantially the whole of the native vegetation remained.

The first soil conservation districts covered areas where no petition was required because they had been proclaimed as sand drift areas under the *Sand Drift Act*. By 1986 eight boards had been formed out of the 13 which the Advisory Committee originally wanted to cover the agricultural areas. These eight covered the worst affected areas and they have contributed a great deal to reversing the process of degradation that had been going on for many years. Not many soil conservation orders have been issued, coercion being a last resort when persuasion has failed. The *Marginal Lands Act, 1940* tackled the administrative and land tenure problems in those areas that had been described earlier by Perkins as unsuitable for wheat farming. This Act was committed to the Minister of Lands and officers of that department worked with Agriculture Department personnel in the field to make both Acts effective.

Wartime arrangements and controls

Agricultural production was disturbed by the Second World War. Because of the shortage of superphosphate and labour, the area sown to wheat was severely reduced, but the quantity and prices of livestock products rose. Export of some goods became impossible, while local authorities had difficulty in securing shipping space even for products urgently needed overseas.

Officers in the Government Produce Department received additional duties exercising Commonwealth government control over the marketing of meat, apples and pears. Department of Agriculture staff were involved in administering the Wheat Industry Stabilization Scheme as well as Commonwealth regulations relating to the production of vegetables, dried fruit and eggs. Each district agricultural adviser became the chairman of a

⁶⁸ SAPP62: 1944; SAPP62: 1946.

district war agricultural committee, assessing the need for labour, fertilizers and machines, which were also subject to official control, and encouraging growth of crops which were most in demand under wartime conditions. The most notable new crop was flax. The area devoted to flax rose to 9884 acres (4000 ha) in 1944 but dwindled quickly after the war.

One of the horticultural advisers was seconded to the Army to take charge of vegetable growing at the Loveday Internment Camp, where prisoners of war and civilians of enemy countries were held.⁶⁹ Although the intention was originally to supply food for the camp, production increased and included linseed for seed and poppies to supply the Army with morphine. Gayule was grown as a rubber substitute, but the production phase was not reached in Australia.

The queen bee project

This little known venture began during the war. Ligurian bees had been introduced to Kangaroo Island in 1885 and an Act passed in that year prohibiting the introduction of other bee strains to the island. The strain remained pure for over 50 years, more by good luck than by systematic enforcement of the Act. In 1939 John Masterman, an apiaries inspector, while making a routine inspection on the island, was impressed with the purity and gentleness of these bees and suggested making better use of them. The Department established a queen bee breeding station in 1944 in Flinders Chase, at the western end of the Island, by collecting wild colonies. Queen bees were sold to apiarists in all Australian States and some overseas countries. Following a bad bushfire in 1958, the hives were moved to Parndana and the sale of queen bees was suspended. Some problems with fecundity, caused by inbreeding, had appeared. A geneticist could have solved these by systematic cross breeding with bees from other parts of the island. However, the whole scheme was closed in 1960 and the hives were leased to private apiarists. The department is still keeping up its inspectorial and advisory work, and Kangaroo Island is still a sanctuary for Ligurian bees.⁷⁰

POST-WAR PROSPERITY

Livestock Division

In January 1945, when the end of the war was in sight, the Stock and Brands Department became part of the Department of Agriculture. This might have happened earlier but its departmental head, Charles Arthur Loxton, had continued in office after passing the age of 65 because of the acute staff shortage during the war. Loxton had spent 37 years in his department, 22 of them as Chief Inspector of Stock. The merger was a change of administration, not of function, and the internal working of the new branch continued much as before, including regulatory and veterinary work, attendance at Agricultural Bureau meetings and administering animal quarantine laws on behalf of the Commonwealth government.

Post-war reconstruction

The district war agricultural committees were disbanded but some senior staff were involved in advisory committees of the War Service Land Settlement Scheme, and in the Rural Training Scheme under which applicants for land were placed with competent farmers to gain

⁶⁹ Botham, J.R., 'History of Horticulture Branch and former staff'.

⁷⁰ Winn, R.A., Masterman, J. & Mitchell, E.R., 'Ligurian bees on Kangaroo Island', *Proceedings of the 26th International Congress of Apiculture*.

experience. All the newly settled servicemen were invited to join the Agricultural Bureau and most of them did.

To meet the difficulty of obtaining new staff, the Department began a system of cadetships by which undergraduates received financial help during their studies on the condition that they remained with the Department for a number of years after graduation. The Roseworthy diploma had been the normal qualification for both advisory and experimental staff but over the next two decades growing numbers of university graduates joined the Department. This created the potential for friction between new people with academic backgrounds and the older members of the staff whose strength was their years of practical experience. A young researcher, eager to share his knowledge, might be seen by the district adviser as trying to bypass the normal means of communication between the Department and its clients. However, this influx of graduates brought new strength to the Department, providing the human resources needed for the expansion of research work described later in this section.

Administrative change

Allan Robert Callaghan succeeded Spafford as Director of Agriculture in 1949. A graduate of Sydney and Oxford Universities, he had spent a few years in the New South Wales Department of Agriculture before becoming the Principal of Roseworthy College in 1932. While continuing as Principal he had been the chairman of the State's Crown Lands Development Committee from 1941 to 1945 and of its successor, the Lands Development Executive. By the time he was relieved of the latter duty in 1951, he had established and successfully defended the methods of preparing land and allotting it to soldier settlers in South Australia.

In December 1954 he reorganized the Department, which had consisted of a number of more or less independent branches and sections, into three divisions. The Division of Plant Industry included the Agriculture, Horticulture and Soil Conservation Branches. The Division of Animal Industry included the Animal Husbandry, Dairy and Animal Health Branches. (The third of these was the descendant of the former Stock and Brands Department.) The Division of Extension Services and Information was set up to direct and co-ordinate the educational and publicity work of the Department, including the *Journal of Agriculture* and other publications, press releases, radio broadcasts, the departmental library and work with the Agricultural Bureau, the Women's Agricultural Bureau and the Rural Youth Movement. Rural Youth had begun as the Junior Agricultural Bureau in 1939 and assumed its present name in 1952. Branch heads in the industry divisions were to be responsible to the chief of the Extension Services Division for their branch extension programs. Because of the growing complexity of agriculture, staff were becoming more specialized and the Extension and Information Services Division was seen as a way of co-ordinating a team approach to the farmer.

Success

Reviewing important agricultural trends since 1900 in his annual report for 1949–50 Callaghan noted the expansion of the area sown to wheat from 1 821 000 acres in 1899–1900 to a peak of 4 181 000 acres in 1930–31 followed by a falling off caused by the depression and realization that expansion had gone beyond the safe limits of rainfall, to stabilize at about 2 000 000 acres.⁷¹ In contrast was the large and continuing expansion of sown pasture in the higher rainfall districts where wheat had proved unsatisfactory. The pasture area had doubled

⁷¹ The metric equivalents are about 737 000 ha, 1 692 000 ha and 809 000 ha respectively.

in the decade to 1950. Barley production had also increased spectacularly, helped by high prices since the war. Callaghan claimed that South Australian barley was better for malting than any grown elsewhere in Australia. Further pasture development was envisaged as more land in the Upper South East and Kangaroo Island was brought into production.

Side by side with this was the 'strong and desirable trend' towards mixed wheat and sheep farming with less frequent cropping, wider rotations and the use of leguminous pastures, increasing the fertility of soil that previously was being degraded.

Callaghan attributed these changes to the Department of Agriculture and related organizations:

The concerted efforts of the Department of Agriculture, the Waite Research Institute, the CSIRO officers in this State, and the Roseworthy Agricultural College have made the farmers of South Australia more and more conscious of their duties as guardians of the soil ... More wheat can be grown on fewer acres at less cost, and with no risk of soil deterioration.⁷²

However, he also noted that the price of wool was, in the short term, the most telling factor in inducing farmers to keep more sheep. When the Department began advocating mixed farming, many farmers could not afford the fences, dams and other improvements necessary for running sheep, even if they wanted to. In the immediate post-war years, wheat prices were high and wool prices even higher, providing both the incentive and the means to make the change.

Five years later Callaghan triumphantly proclaimed, 'A land use peculiar to and suitable to our South Australian conditions has been not only developed but accepted almost universally by the farming community'. The old exploitative system had given way to a permanent system, 'a system which safeguards the future and sets the foundation for greatly intensified production. This is the next phase of development and it calls for closer examination of the farm as a unit with increasing attention being devoted to the managerial and economic aspects of farming'.⁷³ He stressed the need for quality, quantity and efficiency to increase South Australia's agricultural production in response to growing local and overseas requirements, but defended the primary producer's right to fair prices. For example, there was a demand for high quality wheat overseas, yet, for want of financial incentive, the area sown to hard varieties had declined in favour of higher yielding soft varieties, in spite of the Department's efforts to promote the hard varieties. But even in those prosperous times he pointed out that world markets were becoming more competitive, prices were falling and production costs were rising. He might as well have been referring to the 1980s.

Callaghan resigned in 1959 to become the Commercial Counsellor in the Australian Embassy in Washington. His remarks about improved farming methods were borne out by a severe drought in the season 1959–60. The rain that fell during the wheat growing months was actually less than in the corresponding period of the record drought in 1914. Wheat production fell but there was enough for local needs. Sheep numbers also fell but few died on farms, most being sold for slaughter or to interstate buyers. Good stocks of fodder had been conserved and transport facilities were adequate to move stock to agistment. An incidental effect of the mechanization of farm work was noticed: the great reduction in the number of

⁷² SAPP43: 1950. For a table of annual wheat yields 1839–40 to 1966–67 see Williams, M., *The making of the South Australian landscape*, p. 271.

⁷³ SAPP43: 1955.

horses left more feed for other stock. These observations parallel those of Perkins 30 years earlier. The hardest test of good farming comes in a drought.

More about controls

The normal regulatory functions of the Department continued much as before, with some notable successes in controlling diseases and pests. Fruit fly first appeared in Adelaide in 1947. Initial control measures were not subtle but effective. An area of 1 mile (1.6 km) radius round the centre of each outbreak was quarantined and all susceptible fruit in the area stripped and either burnt or dumped at sea in weighted bags. Many home gardeners lost whole crops in this way, but were paid compensation by the government. These drastic measures were seen as preferable to the permanent prospect of having fruit ruined each year by putrid masses of maggots.⁷⁴ Spray baiting and trapping have largely replaced stripping as a cheaper and more effective method of dealing with fruit fly. Inspection of road traffic into the State from east and west, with the co-operation of the general public, has so far ensured that South Australia is virtually free of this pest.

Footrot in sheep was creating havoc in the wet regions. Seeing the success of controls then under way in Western Australia, the South Australian government appointed extra staff in the Animal Industry Division to begin a determined effort in 1955. The standard treatment was to pare the hooves and treat them with formalin footbaths – an expensive process. The South Australian farmers were favoured by two coincidental circumstances: the organism that causes the rot cannot live long away from its host, and Victoria had not yet begun to impose controls. Some South Australians adopted the simple expedient of selling their infected sheep across the border, waiting a few weeks and then buying clean stock. Controlled sale of stock for slaughter in Adelaide was another option. In 1955 about 1700 properties were infected. By 1966 the number was down to about 30 and has remained low ever since.⁷⁵

Biological control of pests was becoming increasingly important. A notable example was the introduction of a rapidly spreading fungus that attacked one species of skeleton weed. The use of a new parasite must be preceded by long and exacting research to determine that it will only affect the plant or animal intended. A successful parasite, while not eliminating its host, is cheaper than spraying in reducing a pest to more tolerable numbers.

Some more new things

Arthur Geoffrey Strickland had graduated in Agricultural Science from the University of Melbourne and had nine years in the Victorian Department of Agriculture before becoming Chief Horticulturist in South Australia in 1934, Chief of the Division of Plant Industry in 1954, and Director of Agriculture in 1959.⁷⁶ One of his early administrative successes was to create a position of Deputy Director, to which Bob Herriot was appointed in 1960 (in addition to his duties as Chief of the Division of Extension Services). To improve efficiency in the Department senior staff were encouraged to attend management training courses at academic institutions. Some officers were able to go on overseas study tours financed by the State or Commonwealth governments or by scholarships, and some went overseas to give advice under the auspices of the United Nations Food and Agriculture Organization and the South-East Asia Treaty Organization.

⁷⁴ *Journal of Agriculture*, 50, p. 404; SAPP4: 1949 and 1950, Auditor-General's annual report.

⁷⁵ Smith, W.S., 'The control of footrot in South Australia'.

⁷⁶ *Who's Who in Australia 1968*.

A team based at Jamestown began giving advice on farm management and its economic background, including location of the farm, types of soils, patterns of production, capital investment, other economic factors and the personal preferences of the farmer and his family. This was a new field into which the Department was feeling its way cautiously.

About 1960 the Department began pilot schemes for the artificial insemination of dairy cows. Artificial insemination later became important in developing the Department's dairy herd at the Northfield Research Centre.

The 1960s saw a further multiplication of committees, affecting agricultural administration no less than other aspects of society. This trend has continued, for better or for worse. A 1984 directory of boards, councils, committees and sub-committees, at the internal, State and Federal levels, lists nearly 200 organizations in which the Department of Agriculture has a direct or indirect interest (not counting the Agricultural Bureau branches).⁷⁷

The decade was an active one for the Agricultural Bureau. Although the number of branches had begun to decline, this reflected the tendency towards larger individual holdings and a consequent decline in the rural population. One farmer in three was a member of a branch. The Agricultural Bureau, the Women's Agricultural Bureau and the Rural Youth Movement between them organized a total of 6000 meetings a year, or 115 a week, making this the biggest adult education system in the State.

Strickland reported in 1965 that the dairy industry was static or even beginning to decline. Although 65% of South Australian cheese was exported, 30% of the butter eaten here was imported from Victoria, the principal dairying State. The Commonwealth government had introduced a stabilization policy under which it paid a bounty on milk supplied for butter and cheese making. Government interest in stabilizing metropolitan milk supplies had begun as early as 1943. However, although the number of cows in South Australia was falling, the yield per cow was rising. Total milk production increased slightly in the 1960s before falling in the next decade. (It began to rise again in the 1980s.) The Department's Dairy Expert, Peter Suter, had claimed in 1919 that the milk yield per cow could be trebled. It took about 60 years for this claim to be vindicated for the whole State.

Expansion of research work

In the period of national prosperity that followed the Second World War, expansion of research work was possible on a scale comparable with that which took place at the beginning of the century. The number of public servants employed in the Department increased by about 400% between 1950 and 1975. The Minnipa and Turretfield farms were developed to demonstrate good planning and soil conservation practice and experiments were resumed, while production of seed wheat continued. The Kybybolite farm concentrated on lamb, beef and pasture research. An outstation of Kybybolite was begun on the Struan Estate between Naracoorte and Penola. It worked in co-operation with the Social Welfare Department's boys farm there to do experiments suitable to the black soil of the locality. After the boys farm was closed in 1969 the whole property was made a research centre in its own right under the Department of Agriculture. The Wanbi farm was largely preoccupied with controlling sand drift and the related question of developing pastures suitable to the area. By 1965 some of the smaller sand hills had been stabilized to the point where limited cropping was possible.

⁷⁷ Department of Agriculture, 'Directory of committees, 1984'.

The Australian Dairy Board Pasture Improvement Committee and the Dairy Industry Extension Grant boosted research and demonstration work, particularly on an irrigated pasture station at Milang. The Commonwealth Extension Services Grant was used to buy educational equipment and to pay salaries for many purposes, including demonstrations of fruit handling and canning, a beef cattle survey in the pastoral areas and advice on the use of trace elements in the newly opened land of the Upper South East. The basic research on trace elements was done by the CSIRO and the Waite Institute. Substantial field trials were then run by the Department of Agriculture and the Lands Development Executive, the body set up by the State government to prepare land for allotment to discharged servicemen. A lot of this development occurred under the Commonwealth-funded War Service Land Settlement Scheme, some under the State's closer settlement program, and a lot was done by private enterprise under specially enacted State legislation. It significantly expanded the area of sown pasture land in South Australia.

An experimental block on the central plateau of Kangaroo Island had been established by the Crown Lands Development Committee in 1939 as part of its program of testing the potential of virgin land. That committee was succeeded by the Lands Development Executive, which continued the work and opened up a large area for soldier settlement on the island. In the early 1950s the experimental block was developed by the Agriculture Department into the Kangaroo Island Research Centre. Its main function was selecting pastures for the newly settled land and increasing stock carrying capacity.⁷⁸

In the later 1960s the orchards at Berri and Blackwood were phased out and replaced by horticultural research centres at Loxton and Lenswood. The little orchard at Netherby was wound down in the 1950s, while the Barossa Viticultural Research Centre was further developed.

The Parafield Poultry Station continued. Some land there that formerly had been used to grow poultry feed was converted into the Parafield Plant Introduction Centre. Seeds, particularly medics, were collected from many parts of the world. After release from quarantine, the plants were tested and classified at Parafield with a view to selecting those most suitable to South Australia. The Plant Introduction Centre now has a collection of about 10 000 varieties of medicago. Packets of seed are exported to other countries, including some from which original seeds were obtained!

The climax of experimental development in the post-war period was the establishment of the Northfield Research Centre on what used to be the Northfield Mental Hospital farm. After a long period of negotiation, planning and preparation, research staff of the Agronomy, Soils, Dairy and Horticulture Branches moved into the new laboratories there in 1964. A quarantine station for the receipt of new plants introduced into South Australia – initially potatoes and vines – was built in 1966 and expanded in 1978. A research piggery, built on semi-commercial lines, began to work in 1970. In 1975 a cool store complex was built for post-harvest handling research. When the farm was taken over, it was run down, and virtually all the machinery and animals had to be replaced. Much of the equipment needed for research has been designed and built by departmental staff, examples being specialized tillage,

⁷⁸ Nunn, J., *Soldier Settlers War Service Land Settlement Kangaroo Island; SAPP10: 1944*, 'Department of Lands annual report 1943–44'.

seeding, thrashing and small seed harvesting units, a mobile rainfall simulator and experimental pig feeding equipment.⁷⁹

Strickland died two days before he was due to retire in January 1970, having supervised much of the expansion in research work mentioned here.

YEARS OF CHALLENGE

Production controls

Marshall Roland Irving had gained a diploma from the Hawkesbury Agricultural College and a degree in Veterinary Science from the University of Sydney. He had worked in Toowoomba and Darwin before coming to South Australia in 1953.⁸⁰ He became the Chief of the Division of Animal Industry in 1954, Deputy Director when Bob Herriot became the Principal of Roseworthy College in 1964 and Director in 1970. In his first annual report he wrote 'The year 1969/70 may be regarded as a turning point in Australian agriculture'. After referring to declining prices abroad and rising costs at home making it more difficult to export produce he continued:

In such a climate the wheat industry resigned itself to production quotas as a long term necessity. The dairy industry accepted the inevitability of submitting to some form of production controls and welcomed the Commonwealth scheme for farm reconstruction and rehabilitation. The egg industry clamoured for a statutory control scheme and the wool industry forsook its traditional independence and sought financial aid from the Government.⁸¹

To meet these problems the Department slanted its technical advice more towards efficiency and productivity: better varieties of plants, alternative crops, more economic use of fertilizers, better breeds of livestock, and control of stock diseases and of pesticide residues in foods to ensure that goods would not be disqualified from export markets. With an increased allocation of funds from industry and the Commonwealth government, the regional applied research and extension work of the Department was intensified. The *Journal of Agriculture* was given a more attractive appearance and was reduced to four issues a year and more emphasis was placed on publication of bulletins on specific subjects.

Irving's vision

In 1972 Irving was asked to write a report for the government on the future role of the Department. Here are the priorities as he saw them. Regulatory activities were essential to protect the agricultural industry from pests and diseases. (This had been one of the government's earliest functions in relation to primary production administered by the Department of Lands before the Department of Agriculture existed.) Diseases increase production costs and can lose markets. For example, foot and mouth disease would cause the United Kingdom and United States to reject Australian meat. Irving suggested transferring to the Department of Agriculture the inspection services of the Government Produce Department. (Inspection of exports was at the time divided between the two departments.) He wanted the transfer of the Vermin Branch from the Department of Lands in order to relate vermin control with production aspects of land use. He also proposed that the Veterinary Division be transferred from the Institute of Medical and Veterinary Science in order to integrate pathological and diagnostic services with other veterinary work. These three proposals were carried out one by one over the next decade.

⁷⁹ Radcliffe, J.C., 'The development of the Northfield Laboratories and Research Centre'.

⁸⁰ *Who's Who in Australia, 1974.*

⁸¹ *SAPP43: 1971-72.*

Another priority was in the area of economics and marketing. The Department should give advice to the government and primary producers on production efficiency, market research, market grades and standards, and product handling. Irving proposed the formation of an Economics and Marketing Branch and the appointment of departmental representatives to appropriate marketing boards.

Extension and research were still needed because of continuing technological and scientific advances and the need to change production in response to changing demands. These activities should be structured more on a regional basis within the existing departmental framework. He had already formed a Research Policy Committee to determine research priorities and a Research Liaison Committee to see that the policy decisions were put into effect.

Liaison between industry and government was necessary to provide information on local needs and to implement national programs and policies. He pointed out that several departments, including Education, Lands, Environment and Industrial Development, were using information gathered by his Department and claimed:

The Department of Agriculture, as at present constituted, contains the largest resources of experience and scientific knowledge within the State required to investigate and advise on problems of range management, the reclamation and rehabilitation of marginal lands, drought mitigation, and land use mapping and planning.

Part of this claim might have been challenged by the Department of Lands which was responsible for pastoral leases (range management) and the *Marginal Lands Act* as well as making maps!

Irving believed that the Department of Agriculture already had the basic requirements to do all this but would need some additional funding, personnel and specialized training and a minor reorganization of departmental structure. The three divisions under his administration were Research and Extension, including supervision of all the research centres; Technical and Industry, including the district advisers and inspectors; and Administration and Finance; each under an Assistant Director.

Callaghan's vision

The government did not immediately act on Irving's report but commissioned a review by Sir Allan Callaghan (he had been knighted in 1972). He included Irving's report as an appendix to his own, which was presented in December 1973, and went on to propose more radical changes.⁸² The administrative structure should be elaborated from three to seven divisions, each divisional head being on the level of the three existing assistant director positions, and each being responsible directly to the departmental head, who should be known as Director-General. The departmental head was too involved in day-to-day administration: there should be a Deputy Director-General to relieve his work load and leave him more time for the Australian Agricultural Council, the Standing Committee on Agriculture and other relevant contacts outside the Department. The regional structure (which had been gradually developing since the 1920s) should be strengthened and formalized. Sir Allan envisaged five regions under regional directors who would report to one of the divisional heads but would have a fair measure of local autonomy. This was to provide better service more in touch with

⁸² SAPP93: 1974-75.

local needs and allow more staff to gain promotion without having to move from the country to head office. The seven proposed divisions were: regional; economics, marketing and farm management; information and public relations; plant and animal industry; research; policy co-ordination and development; staff development and management services. The research, advisory and inspectorial services were to be organized regionally instead of centrally. The branches which comprised the existing Technical Industry Division were to be reduced in size to concentrate on policy and co-ordination in their respective areas of expertise. The new research division was to have a similar role in relation to country research centres. The policy co-ordination and development division was to provide a support service to the Director-General, keeping up with the latest developments and giving advice accordingly.

Visions in practice

While one person may write a report, its implementation depends on many people with various points of view, and the result inevitably differs from the model proposed. This particular case was complicated by long delays. Irving was sick for most of 1974 and retired in February 1975. His successor was not appointed until August 1976. As with any major restructuring, not everyone was pleased. In addition to natural reluctance to change, there was genuine concern by some branch heads that decentralized administration would make it necessary for them to go through longer processes to get the information they needed and they would be impeded in fulfilling their responsibilities. In the absence of a permanent head little progress was possible. To make matters worse, a long period of uncertainty following proposals for drastic change is detrimental to staff morale. This was a difficult period for the Department.

The new Director was James Carvel McColl, a University of Melbourne graduate with experience in the Victorian Department of Agriculture, in private consultancy as J.C. McColl & Associates, and on the academic staff of the University of Melbourne. He entered his new position with a ministerial directive to get on with the regional plan and after that the matter went forward. Funds for new staff were becoming harder to get as the post-war boom subsided, and the scheme was affected accordingly. The five regions – South East, Murray Lands, Central, Eyre and Northern – were set up from 1977 to 1979.

The degree of autonomy that could be granted to the regions depended on the nature of the activities. The greatest level of autonomy was possible in extension services which are directed at the immediate needs of the local people. Regional control of the country research centres had to be developed in cognizance of the State's need for coordinated planning. In administration, a balance between central and delegated authority was necessary. Regulatory activities comprised the area with the greatest limitation on regional control, because of the need for uniform application of State and Commonwealth laws. Of course, all these activities were to some extent predetermined by the hard realities of departmental budgeting.⁸³

After a period of flux, the former branches emerged in groupings of Animal Industries, Plant Industries and Administrative Services. Further developments in the early 1980s produced a Policy and Planning Unit specializing in major policy issues, agricultural economics and research priorities.

⁸³ Wilson, D.J., 'Review the extent SAGRIC has regionalised its extension services'.

While Callaghan was reviewing the Agriculture Department, a committee chaired by Dr David Corbett was reviewing the whole State Public Service.⁸⁴ Its report, presented in 1975, led to some additions to the Department during the interregnum between Irving and McColl. The Corbett Committee, pursuing its belief that large departments are better than small ones, recommended the creation of a Primary Industries Department to consist of the Agriculture, Minister of Agriculture, and Woods & Forests Departments and some functions from the Department of Lands. It recommended amalgamating the Fisheries Department with the Department of Environment and Conservation on the grounds that the former was more related to conservation than to primary production. The government took a different view and in October 1975 amalgamated Fisheries with the Agriculture Department, against opposition from some staff in both departments. The Public Service Board's annual report for 1975–76 explained briefly that one of the reasons was 'to integrate and co-ordinate primary industry research activities and industry assistance programme'.⁸⁵

The Produce Department was abolished in January 1976.⁸⁶ As a means of promoting exports of South Australian produce it had served its purpose. The food inspectors were transferred to the Agriculture Department and the other staff to other departments. The Minister of Agriculture Department was formally amalgamated with the Department in June 1976.⁸⁷ This was more a change in name than in function as the Minister's Office continues as a distinct unit within the Department.

McColl's full title on appointment was Director of Agriculture and Fisheries. The 'Primary Industries Department' was never born but two branches of the Department of Lands – Vertebrate Pest Control and Rural Industries Assistance were transferred to Agriculture in 1977.⁸⁸ The flirtation with Fisheries did not last long enough to show definite results. Following a change of government, the Fisheries Department was re-established as a separate entity in September 1979 in fulfilment of an election campaign promise.⁸⁹ At the same time the head of the Department of Agriculture received the title Director-General, making it possible to call divisional heads directors. In 1982 the veterinary sciences part of the Institute of Medical and Veterinary Science was placed under the Department of Agriculture, thus completing action on three amalgamations proposed by Irving 10 years earlier.

The Department had been responsible for weed control since 1957. This was exercised through the Pest Plants Commission, created in 1976. Pest plant and vertebrate pest control were integrated under the Animal and Plant Control Commission, created by new legislation with the resplendent title of the *Animal and Plant Control (Agricultural Protection and Other Purposes) Act, 1986*. The new Commission, which owes its origins to those unconnected nineteenth century attempts to deal with thistles and rabbits, is seen today as bringing together closely related aspects of good land management.

Revision of law is a continual process which can easily lead to greater and greater complexity. Since 1980 governments of both major political persuasions have taken action towards 'deregulation' – simplifying the statutes and regulations by which the various industries of the State are bound. All the Acts committed to the Minister of Agriculture were

⁸⁴ Corbett, D.C., *Report of the Committee of Inquiry into the Public Service of South Australia*.

⁸⁵ SAGG 2 October 1975, p. 1819; SAPP17: 1976–77.

⁸⁶ SAGG 22 January 1976, p. 262.

⁸⁷ SAGG 3 June 1976, p. 2880.

⁸⁸ SAGG 30 June 1977, p. 1884; 8 September 1977, p. 648.

⁸⁹ SAGG 20 September 1979, p. 771.

reviewed. Some were found which had become obsolete but had never been formally repealed. Some were revised or consolidated. Current government policy is that regulations – which spell out the details of how Acts are to be put into effect – will lapse seven years after their adoption unless renewed within that time. Thus every department will be forced to review its regulations regularly.

Sagric International

Following a visit to Australia by a senior Libyan government executive, South Australia was invited to set up a farm to demonstrate mixed cereal and sheep production. It began in 1974 on 1000 ha in the middle of an area which was being redeveloped by the Libyan government. A team of practical farmers and technical experts worked with some of the indigenous people demonstrating the dry farming techniques that had evolved from nearly a century of South Australian research and experience.⁹⁰ Initially the South Australian government did not aim to make money directly out of the scheme but it was hoped that, as new methods were adopted overseas, increased trade, particularly in farm implements, would boost the State's economy. In inducing the local farmers to adopt new ways, the team faced some difficulties, not the least being the change from donkeys and camels to complex machinery! The scheme ended in 1980 but by then it had made its point by increasing wheat yields from about ½ t/ha to 1½ t/ha, a figure which the more progressive farmers maintained and even improved on.

The demonstration farm was visited by people from other parts of the world and became the forerunner of other projects in developing countries in North Africa, the Middle East, South and South East Asia. To run a range management project in Algeria, the government set up its own company, Salger Pty Ltd, in 1979. A name so specifically linked with Algeria was inappropriate for work in other countries so Salger was replaced in 1981 by Sagric International Pty Ltd, still wholly owned by the South Australian government. Sagric International has diversified into a wide variety of undertakings including land administration, cadastral systems and technical and further education. While the company works with relevant State departments, it is run on commercial lines in competition with similar agencies in other Australian States and overseas.⁹¹

Now

McCull left the Department in August 1985 to become a commissioner in the Commonwealth Industries Assistance Commission. Dr John Clive Radcliffe, a graduate of the University of Adelaide and Oregon State University, who had visited agricultural research institutions in the United States and Canada as a Rockefeller Foundation student, succeeded him in October. Radcliffe has made the Department of Agriculture his career, beginning in dairy research, attending the Australian Graduate School of Management of the University of New South Wales, serving as Acting Chief of the Veterinary Sciences Division following its transfer from the Institute of Medical and Veterinary Science, and as Director, Policy and Planning.

Radcliffe took up his new duties in one of the least auspicious but most challenging periods in the Department's history. The financial stringency which began to affect the Public Service

⁹⁰ For an outline of common practice in South Australia in the 1970s see Webber, G.D., et al., *Farming systems in South Australia*.

⁹¹ Department of Agriculture and Fisheries, *The Libyan Story*; Department of Agriculture, *Sagric 83: planning Department of Agriculture services for South Australians over the next decade*; Doolette, J.B., 'The Australian ley farming system in North Africa and the Middle East'.

in the later 1970s has continued and, like other State agencies, the Department of Agriculture has had to reduce staff.

After being criticized at various times in the past for spending too much money, the Department found itself criticized for not spending enough. It is necessary to respond to changing times in the agricultural community, but any new undertaking, or any shift in emphasis, must be at the expense of something already being done or must wait in the queue for staff and funds. While periods of financial stringency tend to prompt a search for greater efficiency, there is no escaping the reality that with less money less can be done. We may learn from periods of economic depression but the great forward movements in the Department have taken place in times of prosperity. The Department was conceived in the optimism of the 1870s. The fact that it survived the drought of the early 1880s reflects credit on the lawmakers of that time. The main phases of expansion were in the first decade of this century and in the years following the two world wars. During the depressions of the 1890s and the 1930s, survival was counted as success.

However, research work will continue in spite of the economic downturn. The Commonwealth government's *Rural Industries Research Act, 1985* provides for levies to be collected from growers at the request of their representative organizations. The levies are matched by Commonwealth money to fund work on specified subjects. Thus primary producers contribute directly to research and have a strong say in deciding what work should be undertaken. A significant portion of the research done by the Agriculture Department is funded in this way.

The need to make the best use of limited funds has prompted a review of all the Department's research work in the light of current priorities. The research centre, but not the district office, on Kangaroo Island was closed in 1985. Sale of part of the valuable suburban land at Northfield made it possible to transfer the experimental dairy to Flaxley, a higher rainfall district in the Mount Lofty Ranges. Research on sheep for wool will be concentrated at Turretfield and on sheep for meat at Kybybolite. Struan will be devoted to cattle research. Pig research continues at Northfield and poultry research at Parafield. The Minnipa and Wanbi Research Centres will continue with work directly relevant to their regions. A Field Crop Improvement Centre at Northfield will bring together relevant staff to work on plant breeding and testing in all major field crops in South Australia. One of the most significant recent developments in crop and pasture research is the quest for varieties that are resistant to pests, as an alternative to chemical pest control. Horticultural research continues at Northfield, Loxton, Nuriootpa and Lenswood. While most of the effort is still directed towards the main produce – grapes, wine, citrus and dried tree fruit – a research officer has been appointed to work on alternative horticultural crops at the Loxton Research Centre and another to work on ornamental crops at Northfield. Canning fruit research has been scaled down in proportion to a decline in that industry in South Australia.

The Department must continue its regulatory work including on-property control of plant and animal diseases, monitoring the sale, use and potential dangers of agricultural chemicals, control over interstate movement of specified plants and animals and inspection of food to maintain minimum health requirements. The Department co-operates with the Commonwealth government in the enforcement of export standards and the quarantine of plant and animal imports. Although the Produce Department is virtually forgotten, the Department of Agriculture is helping to develop new markets at home and abroad for new and established products.

Educational work continues through the regional structure, the Advisory Board of Agriculture and Agricultural Bureau branches, the Women's Agricultural Bureau, the Rural Youth Movement, the extension services in Adelaide, the home gardens advisory service and support for relevant Department of Technical and Further Education courses. Some Agriculture Department staff give occasional lectures at Roseworthy College and the University of Adelaide. To improve communication between the Minister and country people, the South Australian Rural Advisory Council was formed in 1984. It consists of representatives of the Advisory Board of Agriculture, the Women's Agricultural Bureau, the Rural Youth Movement and the Department.

The Rural Assistance Branch has grown in importance as more and more primary producers have been affected by the recent and continuing economic difficulties. Low interest loans are made to suitable applicants who might otherwise be forced off their land. The amount lent in 1984–85 was about \$6 000 000. The total for 1986–87 was nearly \$38 000 000. The Branch also administers Commonwealth funds in the form of household support payments to country people in special need. In addition, the Branch has provided money for some special projects such as an investigation of water supplies on the Far West Coast and the vine pull scheme, which was designed to rationalize the grape growing industry.

Under the *State Disaster Act, 1980*, the Agriculture Department is part of the State Disaster Organization, with specific responsibility for 'Agriculture and Animal Services'. State disasters could include outbreaks of exotic animal diseases, bushfires and floods that are too big for local services to cope with. Counter measures could include diagnosing and destroying infected stock, preventing the spread of disease, providing relief stock food and other materials and financial assistance to victims as provided for in the *Primary Producers Emergency Assistance Act*.

Unseen by most people, but essential to all the Department's work, are the supporting services – the policy and planning unit, mathematics and computing services to experimental as well as administrative staff, accounting, personnel, records management and other administration, and the departmental library which serves the regional staff as well as head office and is available for public use.⁹²

Times of financial stringency for the government are the times when government assistance is most needed. Newspaper headlines in February and March 1987 drew public attention to a rural crisis caused mainly by falling wheat prices overseas and high interest rates at home. Governments, banks, finance houses and farm implement makers all came in for criticism from country people faced with the possibility of losing their land, their possessions and their way of life.⁹³ The Department formed a Rural Crisis Task Force in February to accelerate the flow of information both from and to rural communities, to advise the Director-General and the Minister and to plan, implement and evaluate ways of making the best use of relevant departmental expertise and the funds available through the Rural Assistance Branch.⁹⁴

⁹² For a more detailed account of the present activities and future intentions of the Department, see Department of Agriculture, *Directions in South Australian Agriculture 1987–89*.

⁹³ *Advertiser*, 26 February 1987, pp. 1, 2; 27 February 1987, pp. 1, 5; 4 March 1987, p. 5; 5 March 1987, p. 20; 6 March 1987, p. 2; 16 March 1987, p. 4.

⁹⁴ *Sagric Gazette*, 5:11, 30 March 1987.

The Department's work in the past 10 years or so has been characterized by an increasing preoccupation with agricultural economics, including attempts to predict future market trends, giving management advice to primary producers and involvement in shaping federal agricultural policy. The outcome of the present period of economic illness will be a subject for future historical study. In the past our community has shown an ability to recover from adversity.

THE FUTURE

A special relationship

Through the Agriculture Department the government maintains a special relationship with primary industry. The government has not set up basic research and field trials in the manufacture of motor vehicles or clothes or the conduct of retail trades. Most of its direct involvement in building has been for its own purposes. In providing transport and communications it has adapted technology from overseas. Only recently has it tried to do more than regulate entertainment and sport. One of the few activities comparable with the work of the Agriculture Department is research into fisheries – another primary industry. Even now the Department of State Development is concerned with facilitating development, not with doing it.

Individual farmers cannot afford laboratories or costly experiments. Primary producers are not organized in ways that lead to co-operative experimental foundations, although co-operative buying, processing and selling have been practised to some extent. While direct contributions by primary industry to research have increased, they are still generally made through levies under Commonwealth or State legislation.

In setting up departments of agriculture, the Australian colonies followed British, European and American examples. As Sir Allan Callaghan pointed out in his 1973 report on the Department:

Governments in all advanced countries of the world provide such services to develop, improve and guide agricultural production, and to protect its economic viability including the welfare of its farmers. That this should be so has never been validly challenged, because a continuance of such services is essential to the efficiency and prosperity of rural production and the maintenance of balance in economic development.⁹⁵

Agricultural extension work done by the States provided the model for the National Industry Extension Service established jointly by the Commonwealth, State and Territory governments in 1986 to ensure that secondary industries receive the information they need to compete in world markets.⁹⁶

The nature of agriculture

In the same 1973 report Callaghan made some general remarks about agriculture, many of which are just as valid today as they were then. The following selection sums up some of the points that emerge from this history.

⁹⁵ SAPP99: 1974–75.

⁹⁶ NIES, *National Industry Extension Service Achieving World Status for Australian Enterprises*.

The rural industries are sources of food and fibre at all times essential to the community, and their capacity to supply these needs is a vital insurance in times of national emergency. Consequently, their continued well-being is a matter paramount national importance.

Agriculture uses the most important national resource of all – the soil. Farmers are the trustees of this resource. Its exploitation has spelt ruin to former regions of high production and to civilizations that depend on them ...

For the most part, agricultural goods are produced in large seasonal quantities rather than continuously, and most are either bulky or perishable, requiring storage, processing or immediate sale. Their levels of production and prices are not very predictable. To ensure basic levels of production and stability of supply to markets at all times, surplus production from time to time is an inevitable consequence ...

In marketing, rural products go through a long procedure of handling, transport, aggregation, storage and distribution from the farm to the consumer – a procedure which, in highly developed economies, is more costly than the initial costs of producing the raw material.

Rural producers depend on their own skills and management. These are conditioned by their capacity to interpret and adapt to their own particular circumstances, advances in knowledge and other aids to production. Consequently, a prerequisite to improvement in their skills and managerial ability lies in the ready availability of technical and economic advice.

Unless improved production techniques are constantly sought by research, and farmers are led and encouraged to apply them, rising costs of production will prevent the possibility of food remaining relatively cheap, with a significant bearing on the cost structure of the community as a whole. Agricultural research, advice and biological protection thus have implications extending far beyond their direct application.

There exists a built-in resilience, backed as a rule by great human fortitude, to the fluctuating fortunes of farming. As a way of life it offers challenge, it is satisfying, essentially independent, steady, and more durable in the face of temporary misfortunes than is the case with most other occupations. This makes change to other occupations uninviting and even frightening.

Many advocated changes posed by economic principles such as the application of the economy of scale, lead the producer into unaccustomed problems of finance and financial management ...

A nation neglecting its agriculture can only do so at its peril. In a country still so dependent on its agricultural industries for overseas income as is Australia, and as is South Australia in particular, agriculture is even of more transcending importance ...

For these reasons, the need for agricultural services is not a relic of the past. It is a concept as vital today as it has been in the past: a justifiable charge to be met by the community as a whole.

The Department as regulator

Most of the Department's work has been unspectacular, much of it routine and some of it unpopular with some of its clients. A significant proportion of departmental resources has been devoted to ensuring that rules and regulations are complied with. Plant and animal diseases, vermin, weeds, quality and quantity of produce, methods of marketing – all have been the subject of government control in relation to one product or another at some time or other. The controls have been imposed at the request of producers. Perkins was not the only one who wanted a Phylloxera Board. A recent proposal to abolish the Egg Board met with strong opposition from the industry. As Irving pointed out in 1970, producers tend to look for government intervention in times of crisis. It is normal for regulating bodies to include representatives of those who are regulated. Few, if any, of the regulations would be effective without the co-operation of most of the people affected, including, in some cases, the general public. Every statute that limits people's actions has to include penal provisions, but prosecution is the worst possible way to ensure that people comply with a statute. Some officers of the Department have found difficulty in having to act as inspectors and advisers at the same time. Nevertheless, if the majority of people affected by a particular piece of legislation will not accept advice on how to make it work, it will fail. This is a fundamental principal of democracy. Dictatorships live on the fear of prosecution.

Leaders and followers

The Department has both led and followed its clients. In the campaign against scab, legislation required sheep owners to clean their flocks, the owners experimented with various treatments and the inspectors took the view that any information about possible cures was worth passing on. Custance, Lowrie and Perkins, professionally qualified men, assumed a position of leadership and found it heavy going. Writing to his mother a few months after taking up his duties in South Australia, Perkins described how, on his country visits, local men would pose tricky questions which he took to indicate veiled hostility or at least a determination to test him. After being accustomed to issuing instructions – in Arabic presumably – to hired servants, he found his new audience questioning everything he said.⁹⁷ Of course they tested him. For some of them no doubt it was a kind of sport. Whether it meant hostility or not, Perkins and his colleagues had to use all their tact and resourcefulness to demonstrate their relevance to the people they set out to influence.

There were practical reasons, as well as conservative attitudes, that retarded the adoption of professional advice. It was one thing to prove the value of superphosphate and seed drills on an experimental farm. It was another thing to buy the fertilizer and the machines at reasonable prices. Demand and supply had to influence each other in a gradually rising spiral before the new methods could be widely adopted. There is no predicting how long it will take for a new idea to turn into conventional wisdom because so many variable circumstances are involved.

It would seem that psychological and economic factors have mingled in shaping responses to departmental advice. Sheep scab was obvious, ugly and a direct drain on income. Success in dealing with it was complete. A protracted campaign to eradicate sheep lice in the 1960s

⁹⁷ Daniels (trans. and ed.), p. 231.

failed. Obviously, sheep are better without lice, but the condition is not fatal, it does not drastically reduce wool production and, unless you hunt for them, the lice are out of sight.⁹⁸

Not all the new ideas came from the Department. One of the most potent influences in the general acceptance of superphosphate began in the 1890s when a Yorke Peninsula farmer started putting the fertilizer in small quantities through the drill with the seed, instead of laboriously and wastefully broadcasting both.⁹⁹

Amos William Howard, who farmed near Mount Barker early this century, is now well known for his part in promoting the use of subterranean clover, an important component of sown pasture in higher rainfall areas.¹⁰⁰

The Soil Conservation Committee of 1937–38 acknowledged the success of individual farmers here and there in preventing sand drift on their properties and recommended that their methods be followed.

As the Department grew, leadership in research and its application became a corporate responsibility, and as it has become more diversified, individual producers have tended, not unreasonably, to judge the Department by its usefulness to them. In this context, district advisers have found that they and the more thoughtful of their clients are valuable to each other.

Positives and negatives

Many of the great agricultural attainments have brought consequential problems. A few examples from the Department's experience will suffice to illustrate the point. The barrages across the mouth of Lake Alexandrina reduced the salinity of the lakes, enabling the development of irrigated pastures round their shores. Grassy banks running down into fresh water provide a habitat for the water snail, *Limnea subacuatalis*, formerly kept in check by the brackish water. This particular snail is the vector of the liver fluke, *Fasciola hepatica*, which, at a later phase in its life cycle, becomes an internal parasite of many grazing mammals, particularly sheep, causing loss of condition and, in extreme cases, death.¹⁰¹

There is a constant threat that irrigated horticulture along the Murray River could become self destructive because of mounting salinity in the water and in the soil being irrigated.

Charles Darwin's theory of evolution could not have been better demonstrated than by the emergence of rabbits resistant to myxomatosis and codling moth resistant to DDT. While myxomatosis is believed to affect only rabbits, many weed and insect poisons are capable of passing into food and threatening human health. Growing public awareness of these dangers, finding expression in official health regulations, is forcing manufacturers to do more precautionary research before new products are released on the market. The precautions might add to the cost of the product but must lower the cost of maintaining a healthy community.

The Department, working with related organizations, has achieved some outstanding successes, such as the eradication of sheep scab and contagious bovine pleuro-pneumonia, the

⁹⁸ Smith, W.S., 'The history of sheep scab in South Australia'.

⁹⁹ Williams, M., pp. 283–84

¹⁰⁰ *Australian Dictionary of Biography*, 9; Williams, M., pp. 313–14.

¹⁰¹ *Australian Encyclopaedia*, 4; SAPP43: 1950.

development of new wheat strains and leguminous pastures suitable for the drier farming districts, and keeping the State free of phylloxera.

The Department has also made serious mistakes. Perhaps the worst was its indiscriminate advocacy of bare fallowing which became one of the causes of soil erosion. Another problem that arose in various parts of Australia was infertility in sheep caused by some varieties of subterranean clover. When this became apparent, a national search began for harmless alternatives that would grow just as well. After a long process of experimenting and testing, success was achieved by the National Sub-clover Improvement Programme operating in Western Australia. Then followed the building up of seed stocks for commercial distribution. In this the Kangaroo Island Research Centre worked in collaboration with some of the local farmers. Detecting and correcting mistakes is a necessary part of the Department's work.

By the rigorous application of quarantine laws, helped along by good luck, epidemics of foot and mouth disease and rabies have been kept out of Australia, but the comparatively harmless European millipede and the potentially lethal European wasp became established here before they were noticed. The increasing mobility of people and goods could make effective inspection and quarantine services prohibitively expensive. We might be forced out of our comfortable isolation into a realization that economically important pests and diseases are international problems.

The ultimate challenge

Of all the Department's many and various activities, the story of cereal farming best exemplifies its relationship with primary producers. Over hundreds of years, British farmers had evolved a system of using their land and conserving its resources so that it would go on producing indefinitely. The first colonists brought this knowledge with them but immediately ran into difficulties in trying to apply it here. The more educated among them expected in theory to find a 'Mediterranean' climate but few would have experienced it. Local practice very soon began to differ from British practice. Within 30 years of the foundation of the colony, pastoralists were running sheep and cattle on large areas leased from the Crown and most farmers were growing wheat and little else on fairly small freehold blocks. The division between farming and grazing was formalized in separate laws relating to land sales and pastoral leases. After the passing of the *Scrub Lands Act* in 1866, and later acts in the same vein, purchase of land by deferred payment made it possible for people with little capital to set up as farmers.¹⁰² They needed income quickly. Wheat grew well – at first – it generally sold well and mechanical harvesters reduced labour costs. Far-sighted men could see the danger of continuous cropping without putting anything back into the soil. Their views were borne out by official statistics of declining yields. However, the rapid expansion of farmlands in the 1870s ensured that total wheat production increased, and as long as individual farmers could buy more land on credit their methods appeared to be profitable. Revised legislation to cope with the drought of the early 1880s made it easier for farmers to forfeit their blocks to the Crown and try again somewhere else – well meaning but almost encouraging irresponsibility.

Technicalities of poor farming, facilitated by the law, were reinforced and perpetuated by social conditions. While many pastoralists could afford to send their sons to Adelaide or even England for secondary education,¹⁰³ the sons of small farmers left school as soon as they

¹⁰² Love, pp. 9–10.

¹⁰³ Williams, E., *A way of life. The pastoral families of the central hill country of South Australia*, chs 9 and 11.

could to help on the family property. It was a very determined young person who broke with tradition and sought further education or business opportunities. Thus, for most farmers their academic and practical education and the shaping of habits and values were confined within the local community. The cohesion that gave the community its strength also locked most of its members into a system of farming that ultimately could only lead them into poverty. Now and again one of the more adventurous farmers would try something new. There is no knowing how much local experimenting went on because nobody wants to hear about failures, but if farmers could see direct practical gain from an innovation it would be reported in country newspapers throughout the colony and spread quite rapidly.

Into this context came the first Professor of Agriculture, brought from the other side of the world to change entrenched attitudes. Custance immediately began to recommend mixed farming, alternating wheat with pasture to be fed off with sheep, and within a couple of years he was urging the use of phosphates. Lowrie took up the same themes but the success of superphosphate tended to promote single crop farming at the expense of pastures. Lowrie's experiments with pasture and fodder crops in the lean seasons of the 1890s left him rather more sympathetic towards the farmer who grew nothing but wheat. Attention turned instead to bare fallow. This practice might have had some effect in conserving moisture and it might have allowed resting soil to recuperate, but its beneficial effect was probably due mainly to the manurial value of the stubble and weeds that were ploughed in and to the reduction of diseases by breaking their life cycles.

The parliamentary select committee that considered the Weeds Bill of 1871 made passing reference to the beneficial effects of stinkwort when ploughed in. The questionnaire sent out by the Royal Commission on agricultural education in 1875 elicited answers about using green or root crops for grazing and ploughing in and the use of inorganic fertilizers such as sulphate of ammonia. Custance pointed out the restorative value of lucerne. It was a long time before any of these seminal ideas took root. Pasture research was done at Roseworthy, Kybybolite and Booborowie – all in comparatively well-watered districts. In the drier areas, the whole idea of mixing sheep and wheat was hindered by the paucity of pastures, and negated in parts of Eyre Peninsula by the extreme shortage of water for stock.

The soil conservation movement that began in the later 1930s stimulated pasture research in the dry areas, yet in 1939 Spafford was still wholeheartedly preaching bare fallow for all South Australian farms. He reported that the proportion of wheat sown on fallowed land for the whole State had risen from 57% in 1929–30 to 76% in 1938–39.¹⁰⁴ However, the emphasis gradually shifted towards mixed farming.

By 1955 Callaghan was able to report better land use through greater use of livestock and leguminous pastures, less frequent cropping, reduction in tillage and regular use of fertilizer. The development of leguminous pastures and crops suitable to the different soils and climatic conditions of the State has had its problems and setbacks. Nevertheless this development has been one of the biggest factors in enabling the change from single crop farming, with all its dangers and vulnerability, to a balanced system that not only preserves but also improves the productivity of the land.

¹⁰⁴ *SAPP43*: 1939.

Most recently there has been a trend back to continuous cropping using inorganic nitrogenous fertilizer, minimal disturbance of the soil and control of weeds by spraying. It remains to be seen whether this increased pressure on the land will create problems for later generations.

This is a story of interaction between experimentalists and practical farmers, of successes and mistakes, of traditions and habits growing and changing, sometimes quite rapidly, more often slowly and with difficulty. We understand our environment better than did any of our predecessors, but the need for research is as great as it has ever been. We have increased the productivity of the soil immensely but our requirements continue to grow. The basic problem is the same as it has always been: to get as much from the land as possible, in the most economical way, using natural resources to their utmost, without destroying those resources.

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NOTES

Abbreviations

The following abbreviations are used in the footnotes and bibliography:

n.d. no date

SRSA State Records (South Australia)

SAGG *South Australian Government Gazette*

SAPD *South Australian Parliamentary Debates*

SAPP *South Australian Parliamentary Paper*

Statistics

Agricultural statistics have been recorded in South Australia since 1841, although the years 1851–53, 1855 and 1887 were missed. Those for 1841 to 1858 appear in annual statistical returns forwarded to the Colonial Office in London (SRSA: GRG 44/79). Since 1859 they were published as a *Parliamentary Paper*. The methods of compilation may not have been consistent throughout the period. Annual statistical surveys of rural industries in South Australia have been included in the *South Australian Yearbook*, published by the Australian Bureau of Statistics since 1966.

The yearbook also includes statistical summaries back to the 1840s. The summaries include estimates for the years when statistics were not recorded.

Conversion

The imperial figures for weights and measurements – such as 1000 acres or 60 bushels – have been converted to their metric equivalent (405 ha and 2114 L) and rounded as appropriate.

The imperial currency of pounds, shillings and pence (£-s-d) has not been converted to their decimal equivalent, as a direct conversion is rather meaningless: \$2 in 2006 is of much less value than \$2 in 1966 and of far less value than its imperial equivalent of £1 in 1836

APPENDIX: DEPARTMENTAL HEADS

The title of the head of the Department was:

1881–1901	Professor of Agriculture
1902–1906	Secretary of Agriculture
1906–1975	Director of Agriculture
1976–1979	Director of Agriculture and Fisheries
1979–	Director-General of Agriculture
1881–1887	John Daniel Custance
1887	H.H. McMinnies (unable to begin duties because of illness)
1887–1901	William Lowrie
1902–1904	Arthur James Perkins
1904–1910	William Angus
1910–v1911	Arnold Edwin Victor Richardson (acting)
1911–1914	William Lowrie
1914–1936	Arthur James Perkins
1936–1949	Walter John Spafford
1949–1959	Allan Robert Callaghan
1959–1970	Arthur Geoffrey Strickland
1970–1975	Marshall Roland Irving
1976–1985	James Carvel McColl
1985–	John Clive Radcliffe

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