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## 9. WATER CONSERVATION AND IRRIGATION

**THE FIRST WATER SUPPLY SCHEMES: THE HOME INQUIRY: WATER RIGHTS ACT, 1896: FEDERATION—THE BATTLE OF THE WATERS, 1897-1901: ARTESIAN WELLS ACT: MURRAY RIVER DEVELOPMENT: WATER AND DRAINAGE ACT, 1902: NORTH YANCO AND SIR SAMUEL McCAUGHEY: BURRINJUCK: MURRUMBIDGEE IRRIGATION AREAS: IRRIGATION DISTRICT DEVELOPMENT.**

### THE FIRST WATER SUPPLY SCHEMES

1866-1884.—The pioneer work in connection with water conservation in New South Wales was carried out in 1866, when £2,900 was spent in sinking wells, so as to render practicable the route from the Darling to the Lachlan and the Warrego. Tanks, dams and wells were constructed at various times from 1866 to 1884, the total expenditure in developing the western stock routes being £115,000, of which £1,500 was spent providing water for what were then mining towns.<sup>110</sup>

As agriculture and closer settlement began to push the pastoral system back from the districts of higher rainfall, the provision of permanent water supplies for stock purposes became of paramount importance. Recurrent droughts levied heavy toll on flocks and herds and "the economies of repeated decimations began to be weighed against the cost of water conservation." So also means were being sought to control the "peacocking" by individuals of strategic water supplies and of settling the interminable disputes between neighbouring land holders concerning water rights.

From the earliest days pastoral holdings and Government stock routes had had recourse to tanks and dams to supplement natural supplies, but both were liable to give out when most needed, because of excessive evaporation. In 1879, H. C. Russell, the Government Astronomer in New South Wales, threw a ray of hope into the then prevalent pastoral despondency by suggesting that an unlimited supply of good water would be found underground. Calculations showed that the River Murray catchment discharged twelve times more rainfall than a similar area of the Darling River watershed. Russell argued that the great difference between the rainfall and run-off of the Darling could not wholly be accounted for by evaporation, but that some of the water was sinking into the ground to flow at some lower level. A private bore put down on the Kallara run in the Bourke-Wilcannia area in 1878—the first sunk in New South Wales—soon demonstrated the truth of Russell's theory, and ushered in a new era in pastoral development. In 1879 four shallow bores were put down on Wee Wattah and a similar number at Mallyeo in the Bourke-Wilcannia area, a flow of water being obtained from all of them at a depth of 140 feet. The first station-owner to demonstrate the success of artesian boring on an extensive scale, however, was W. W. Davis of Kerribree (Barrona County). His first bore was sunk at 1,073 feet and the second, even more successful, at 1,340 feet.

<sup>110</sup> *The Cyclopaedia of New South Wales, op. cit., p. 183.*

In 1883, the Department of Mines commenced boring for the purpose of providing water along roads and stock routes, but from 1891 further bore-sinking was done by contract. Public watering places, consisting of dams, wells and artesian bores, were then constructed along all the main stock routes. By the end of 1905 there were 51 flowing bores, costing about £160,000; 17 pumping bores which cost £46,315; and 405 tanks, wells and dams (16 other bores costing £44,129 were failures).<sup>111</sup>

To the pastoral industry the results of artesian boring within the artesian basins of Australia have been almost incalculable. The availability of underground water supplies has opened up country in small holdings which formerly was safe only for graziers operating on a most extensive scale; the carrying capacity of runs was everywhere greatly increased compared to what was before possible under natural conditions; losses were minimised in drought times; runs could be watered by surface drains; stock routes were made trafficable, and living conditions generally in the outback immeasurably improved.

What the bore was able to do for the pastoralists in the north-west of New South Wales and subsequently in Queensland, South Australia, Victoria, West Australia and the Northern Territory, irrigation has done elsewhere for intensive farming development.

Some of the other early developments in the 1890's and early 1900's which have had a profound significance in closer settlement may be here briefly noted:

### PUBLIC WATERING PLACES ACT

1884.—Widespread public attention to the importance of water conservation and irrigation became aroused for the first time in 1884, when, following the appointment of a Royal Commission on Water Supply and Irrigation in Victoria, under Alfred Deakin, similar steps were taken in New South Wales to appoint a Royal Commission under the presidency of Mr. (later Sir) W. J. Lyne. The charge on the Commission was "to make a diligent and full inquiry into the best method of conserving the rainfall, and of searching for and developing the underground reservoirs supposed to exist in the interior of this colony, and also into the practicability, by a general system of water conservation and distribution, of averting the disastrous consequences of the periodical droughts to which this colony is from time to time subject." The Lyne Commission extended its enquiries over a lengthy period of four years, and after thorough investigation finally issued three valuable reports in 1885, 1886 and 1887, in which particular attention was given to (1) the utilisation of the waters of the Murray, and (2) the possibilities of storing water on the Murrumbidgee for distribution on the plains below Narrandera. *Inter alia*:

"One of the most useful recommendations made by the Lyne Royal Commission was that the English law respecting the riparian rights of land-owners should be superseded by an Act vesting the control of water in the Government and permitting it to grant water rights from time to time."<sup>112</sup>

<sup>111</sup> *Ibid.*, pp. 183-186.

<sup>112</sup> G. J. Evatt, *Journ. Institute of Public Administration*, March, 1938, pp. 16-31.

In 1884 also, a Royal Commission under Alfred Deakin had been appointed in Victoria. In 1885, a small mission under Deakin's leadership visited America and due, it is said, to a chance remark by one of Deakin's party, the Canadian Chaffey brothers (George and W.B.) were induced to come to Australia. Deakin and his party examined the irrigation schemes in all the American States in which conservation and irrigation were practised, including California, New Mexico, Colorado, Kansas and Nevada. On Deakin's advice the Victorian government launched a public works irrigation scheme on the Goulburn and fostered a private venture by the Chaffey brothers on 50,000 acres at Mildura (Victoria) and 30,000 acres at Renmark (South Australia). Both schemes involved the pumping of water from the Murray into irrigation channels from which farms were watered by gravitation. The Chaffey experiments at Mildura provided a mine of experience for later irrigation schemes. In return for water rights they were to spend £10,000 within twelve months, £35,000 within five years, and £300,000 within 20 years upon their schemes in each colony. Concentrating at once upon Mildura (Renmark was not commenced until 1893), the Chaffey brothers had expended £350,000 by 1893, and over 8,000 acres were under vine and orchard.

Alfred Deakin's famous Irrigation Act while Minister for Water Supply in the Victorian Government, for the first time "made the whole country conscious of the potential value of water conservation". Deakin had declared that "The people are but the nominal and not the real owners of the continent until they can settle the water problem". There was no longer to be any disagreement about the principles of water conservation, but merely about the means to that end, and from about that year can be traced the modern development, in which Victoria and South Australia showed the way to New South Wales.

### THE HOME INQUIRY

1896-1897.—Subsequent to the Royal Commission nothing was done to focus matters until 1897, when Colonel Home, C.S.I. (Royal Engineers, retired), an experienced Indian irrigation expert, visited the colony at the invitation of the Government and was commissioned to report upon the various schemes so far considered and generally upon the prospects of water conservation and irrigation. In the report published 14th October, 1897, the Commissioner recommended Barren Jack in preference to Umaralla River, and "The Gulf" as the site for a dam on the Murrumbidgee, and two irrigation schemes involving the Murray and Murrumbidgee. The recommendations, however, were of too general a character and in consequence were of comparatively little value.<sup>113</sup>

### WATER RIGHTS ACT (1896)

1896.—As recommended by the Royal Commission, this Act, introduced by the Reid-Carruthers Ministry, gave the control of water to the State, and provided for the issue of licences to those who wished to take water, and those who had already taken it from streams for irrigation purposes.

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<sup>113</sup> *Ibid.*

"Then followed some years of inquiry into the applications for licences; the old feuds which existed amongst water users in certain parts of the State were ended and the administration of what might be termed 'private irrigation' placed upon a firm basis. By 1896 private individuals had expended large sums in water conservation works without any legal authority. The Act provided the machinery for legalising their efforts."<sup>114</sup>

### FEDERATION—BATTLE OF THE WATERS

1897-1901.—In the closing years of the century, the later Federal conventions monopolised the time of the various Parliamentary leaders, the matters discussed including Australia's water resources. There were lengthy debates and bitter arguments as to which authority—Federal or State—was to control the waters. South Australia was anxious that the Murray waters should be dedicated more for navigation than irrigation, but New South Wales desired the reverse. Legally, the whole of the Murray was the property of New South Wales, the Victorian border being the southern bank of the river and not the middle thread as is usual. Ultimately agreement was reached and in the drafting of the Federal Constitution the important Section 100 was inserted, safeguarding State rights:—

Section 100. "The Commonwealth shall not, by any law or regulation of trade or commerce, abridge the right of the State or of the residents therein to the reasonable use of the waters of rivers for conservation or irrigation."

The Commonwealth has power under Section 98 in relation to navigation but, while Section 100 stands, the control of irrigation must remain with the States.

### ARTESIAN WELLS ACT

1897.—Under this Act, now repealed, some twelve artesian wells districts were constituted. Trusts are now gazetted under the provisions of the Water Act. They are of two kinds—Bore Water Trusts and Artesian Wells Districts.

The artesian basin in North-west New South Wales covers an area of about 80,000 square miles.<sup>115</sup>

<sup>114</sup> *Ibid.*

<sup>115</sup> The word "Artesian" is derived from the Latin spelling of Artois (i.e., Artesium) in Northern France, where the oldest-known well of this kind in Europe was sunk in 1126.

Sub-surface waters fall into three general classifications—artesian, sub-artesian and ground-water:—

"Artesian" water is usually found in porous sand rocks at considerable depth below the surface. When tapped, hydraulic pressure is sufficient to force it upwards in a bore hole to a height above surface level and it then flows from the bore head.

"Sub-artesian" water is also a "pressure" water which rises above the level at which it is met with in a bore, but not to a sufficient height to flow from the bore head at the surface. It therefore has to be pumped for use.

The term "ground-water" is usually applied to the shallower supplies which are not under pressure, and having no hydraulic head do not rise above the "water table" or level at which it is stored and tapped by a well.

## MURRAY RIVER DEVELOPMENT

### Corowa Conference

1902.—The Royal Commission of 1884-87 had been appointed following a severe drought extending over several years, when the question of water conservation had become a matter of pressing public concern. The report, however, ushered in a cycle of wet years, and in the period 1887-1893 rainfall well above the average was recorded. In consequence, interest in conservation waned. Then came the financial depression of the 1890's with the bank failures, when presumably any large capital investment by the Government in water conservation was out of the question. Victoria, in its Mildura venture, struck temporary trouble also in the 1890's, and this further tended to frighten the other colonies.

The onset of several years of drought reawakened agitation for water conservation and in the Riverina resulted in 1898 in the formation of the Murray River Main Canal League at Berrigan. In 1902 the League invited the Prime Minister of the newly formed Commonwealth, the Premiers of the three States concerned and other representative people to a conference at Corowa. The conference was attended by the Prime Minister, Mr. (later Sir) Edmund Barton, the Premiers of New South

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Shallow boring is considerably less expensive than deep boring.

The total daily flow from artesian bores in New South Wales is about 60 million gallons. The deepest bore, located at Boronga, near Moree, is 4,570 feet.

As at 30th June, 1955, the artesian bores in New South Wales comprised 575 flowing, 437 pumping and 56 abandoned. Of this total, 803 were owned by private landholders; 224 had been sunk by the Government in connection with Public Watering Places or under the provisions of the Water Act or the Artesian Wells Act; 35 were Improvement Lease bores, and 6 country towns' water supply.

As Bore Water Trusts and Artesian Wells Districts there had been constituted:—

Districts				No.	Total Area	Length of Drains	Total Cost
					Acres	Miles	£
Bore Water Trusts	...	...	...	81	4,734,363	3,260	329,000
Artesian Wells	...	...	...	12	314,123	108	22,758

By the 1912 Water Act and subsequent Acts, licences were required only in connection with bores and wells constructed in that part of the State west of direct lines drawn from Albury to Tamworth, Tamworth to Bingara, Bingara to Inverell, Inverell to Bonshaw. Recent legislation now requires all bores and wells in the State to be licensed. Up to 30th June, 1955, the number of licences issued totalled 4,271.

In addition, by 30th June, 1955, the Water Conservation and Irrigation Commission had sunk 4,504 bores with a total depth of 1,369,609 feet and average depth of 304 feet. Of bores constructed, 3,642 had been successful, 384 failures, while 178 did not fulfil requirements as set out in the Regulations.

The greater number of artesian bores in New South Wales have been put down by private individuals; but the right to bore is now restricted in order that there shall be as little waste as possible and the artesian waters conserved.

Wales and Victoria, and the Attorney-General of South Australia representing the Premier of that State. As a direct result of the proceedings, the Royal Interstate Commission on the Murray River question was appointed, consisting of Joseph Davies, Under Secretary for Public Works, New South Wales, president, with Stuart Murray, Chief Engineer for Water Supply in Victoria, and F. H. Burchell, Engineer and Surveyor of South Australia, as members. The report of this Commission was presented 9th December, 1902, but no agreement could be reached as to the utilisation of the Murray River for either irrigation or navigation. There was much interstate jealousy over the Murray waters and South Australia proved very "suspicious". While the findings of the Murray River Commission (1902-1905) lacked uniformity because of the continued disagreement over the relative importance of navigation and irrigation, the report made valuable suggestions as to the allotment of the waters, the method of administration and control. The three Commissioners expressed surprise that the problem which it was their function to investigate still remained unsettled, in view of the fact that the Murray was Australia's greatest waterway.

There had been much enthusiasm at Corowa, when the decision to appoint a Royal Commission had been hailed as the "First Fruits of Federation" (inaugurated 1901). In this difficult field, however, the results were to be slow.

### **WATER AND DRAINAGE ACT, 1902**

1902.—In this important enactment introduced by the See Government at the end of 1902, expenditure was authorised of £200,000 annually for a period of five years, in order to finance schemes of water supply, water conservation, irrigation and drainage. The Act provided for the construction of works by the Government, and for the constitution of local Trusts to pay for and administer the works. In all, up to the end of 1905 a net sum of £112,000 was expended under this measure in works for water conservation and water diversion—whilst, in addition, another £253,000 was laid out in cuttings, dams, weirs, regulators and similar works under the Public Works Act of 1902. The most important of these undertakings—for stock and ordinary water supply purposes only—were "Tuppall Creek Cutting",  $4\frac{1}{2}$  miles in length; the "Lake Cudgellico" works, and the Booberoi Creek weirs on the Lachlan which backed the water up for a distance of twenty miles.<sup>110</sup>

### **NORTH YANCO AND SIR SAMUEL McCaughey**

Undoubtedly one of the major influences in hastening development in New South Wales and in bringing to a head the Burrinjuck Scheme was the huge private irrigation experiment of Sir Samuel McCaughey on North Yanco Station in the Riverina.

From the time of McCaughey's original purchase of Coonong in 1860, he had developed schemes for conserving water in the creeks and billabongs on the property, an interest which he maintained to the end of a long lifetime. Probably because of an experience gained through the huge

<sup>110</sup> *The Cyclopaedia of New South Wales, op. cit.*

and scattered nature of his pastoral interests, no one saw more clearly than he that in Australia with its immense arid areas subject to frequent drought, some method of conserving and distributing water was a vital need.

In 1860, in conjunction with his uncle, Sir Samuel Wilson, McCaughey constructed for Coonong a cutting ("Wilson Cutting") from the Murrumbidgee to the dry bed of the Yanco Creek, thus opening up an assured water supply to the Yanco Creek, and thence to the Colombo and the Billabong Creeks. In this venture, before the 1896 Act regularised the vexed question of water rights, McCaughey contended that the Yanco and Colombo Creek were not natural watercourses, since before this cutting was made, the Yanco was only a series of dry depressions, except in extraordinary seasons when the Murrumbidgee was in full flood. The success of the "Wilson Cutting" encouraged McCaughey to plan a larger cutting, and due to his efforts the "McKinney Cutting" was constructed in 1896. It was  $1\frac{1}{4}$  miles above the Wilson intake which it superseded—the Government, McCaughey and other landholders sharing in the cost.

In 1897, principally on the grounds of the extent of his original contribution and the further expense which he had met in keeping the McKinney Cutting in repair, McCaughey applied to the Urana Land Board under the Water Rights Act of 1896, for a licence to retain additional water on Coonong by raising the height of the private dams which he had built. However, eight landholders on the Billabong Creek below Coree (also McCaughey-owned) lodged an objection, and evidence was taken at Urana and Narrandera. On McCaughey's behalf, H. G. McKinney, Chief Engineer for Water Supply in New South Wales, reported that the McCaugheys, Samuel and David, had shown good judgment in selecting sites for their dams, with good natural by-washes, and that they had incurred considerable expenses—"Their dams are without exception less open to objection than two at least of the dams owned by the petitioners." In October, 1897, the Urana Land Board recommended that licences for the dams should be given subject to certain reservations. The appeal to the Supreme Court which followed was a famous case. Sir Julian Salomons, Q.C., then undisputed leader of the New South Wales bar, appeared for the plaintiffs, and the Attorney-General, J. H. Want, Q.C., for the McCaugheys. A professional witness for the plaintiffs was John Monash, a Melbourne consulting engineer at the time, and afterwards the A.I.F. Commander-in-Chief, Sir John Monash. The case involved a protracted hearing and finally resulted in a verdict and damages against McCaughey. The Agreement of 1898 between "Robert Officer Blackwood, George Officer Blackwood and Harry Officer Blackwood, Hartwood Station; Robert Landale, Quimong Station; David Aitken, Thomas Millear and Lyle, Melbourne; the Executors of Thomas Millear, late of Wanganella East; Albert Austin, Wanganella Station; John Hutchinson Blackwood, Boabula Station; William Officer, Zara Station; John Dickson and James Dickson, Caroonboon Station; and David Moore, Bundyulumbah Station, of the first part; Samuel McCaughey, Coonong Station, Urana, of the second part, and David McCaughey, Coree Station, Jerilderie, of the third part" is a memorable corner-stone in the first phase of operations of the Water Rights Act of 1896.



As a result of this case an association was formed, known as the Riverina Creeks Committee, of which McCaughey was a valued member. This body later became the Riverina Creeks Preservation League, and took part in the direct negotiations with the government.

In 1899 Samuel McCaughey purchased "North Yanco", and it was here that he made his most important contribution to the development of irrigation in New South Wales by the strikingly successful results which he obtained, and which directly led to the Government undertaking the Burrinjuck Reservoir and Northern Murrumbidgee Canal Scheme in 1906-7.

When he bought North Yanco, McCaughey determined to make it an object lesson of what could be achieved with water conservation. It was to be a demonstration of the possibilities of closer settlement and intensive cultivation in dry areas, and irrigation was also to be used to increase the station's capacity to carry sheep. It was McCaughey's intention that in due course North Yanco would be sub-divided and employees and others settled on irrigated farms. This was the ambitious long-range plan which McCaughey embarked upon in 1899. He knew that he could not live to see its full fruition (he was 64 years of age when it was started), but that future generations of Australians would reap the benefit. And having lived for forty years at Coonong, he yet decided to make North Yanco his home, for "there was so much of importance to be done, and he wanted to be on the spot to supervise it. . . . He plunged into it with all the zest of a young man."

Already by 1902, the year of the disastrous drought, McCaughey had 60 miles of supply channels on North Yanco and was irrigating 750 acres of lucerne and 250 acres of sorghum, the latter 6 to 10 feet high. On these crops he fed 16,000 sheep for three months. In addition, fifteen hundred acres of lucerne, which were not watered for twelve months, grazed 15 sheep to the acre for two months. McCaughey was able to send truck-loads of lucerne by rail and **thence by road to feed** his sheep travelling to the hills. In these years immediately following 1899, the "thirstiest that New South Wales had ever known", McCaughey, like everybody, suffered enormous losses, but at least in the Riverina he was better fitted than most to meet them. In an article in *Smith's Weekly* H. M. Somers wrote:—

"Any man who owned a bit of favoured country in those lean years which saw the decimation of our flocks by the million could stock up with the best of McCaughey's merinos. He had only to feed the ewes, keep all the mothers that survived and return the lambs to Samuel McCaughey. His agents arranged the deal in many parts of the high country where there was some feed."

Eventually over 200 miles of channels were constructed on North Yanco and 40,000 acres could be irrigated. McCaughey flooded 10,000 acres of grass land and grew 5,000 acres of lucerne and watered it, making five or six cuts a year. Wheat was sown. Oats and potatoes soon followed, all this providing an object lesson of the capabilities of the country with irrigation.

North Yanco was so advanced by 1903 that when the Farmers and Settlers' annual conference was held in Narrandera that year, the delegates were invited to spend a day inspecting it. There is this unforgettable picture of the occasion as it was afterwards described by H. M. Somers:—

"The Wool Lord of North Yanco invited the delegates to this conference to see his useful irrigation schemes, irrigation at that time being more in the air than on dry land. Accompanied by Ministers of the Crown and some Members of Parliament, they arrived at the North Yanco homestead at 12.30 and sat down to enormous fat bronze turkeys, champagne and accessories at 1 o'clock; viewed the pumping plant at the river, the channels and the lucerne, and all the great buildings, finished with something from a distillery in the North of Ireland, and returned to Narrandera for a good sleep before the conference resumed at 7.30."

And already by this time McCaughey had in mind an even vaster project for storing the Murrumbidgee waters—an enormous dam at Burrinjuck which would require resources far beyond those of the individual and bring the State into the field of irrigation.

(Patricia McCaughey, *Samuel McCaughey—a Biography* [Ure Smith, Sydney, 1955];<sup>117</sup> A Crowley, "The Life and Work of Sir Samuel McCaughey", *Journ. and Proc., R.A.H.S.*, Vol. XI, Part VI, pp. 293-316.)

### BARREN JACK DAM AND MURRUMBIDGEE CANALS CONSTITUTION ACT, 1906

In 1903, and again in 1905, Mr. Robert Gibson, backed by two Victorians—the Hon. W. Cam, M.L.C. and Sir Malcolm McEachern—approached the New South Wales Parliament as the promoter of the Northern Water Supply and Irrigation Bill, a scheme to establish a system of irrigation and water supply in the district lying between the Murrumbidgee and the Lachlan by constructing a storage reservoir by means of a dam across the Barren Jack Mountain; to construct a weir across the Murrumbidgee River at a point about nineteen miles from Narrandera and to construct a canal leaving the Murrumbidgee near Narrandera and running in a north-westerly direction for a distance of about 100 miles.<sup>118</sup> Although it was not publicly stated, it was known that Sir Samuel McCaughey was also behind the Bill. The private scheme was to cost at least £300,000 and "there was only

<sup>117</sup> cf. also L. Walker, "Irrigation in New South Wales", *Journ. R.A.H.S.* (1941), Part III, pp. 181-232.

<sup>118</sup> In the *Riverina Grazier*, Hay, of July 24, 1903, the following notice had appeared:—

"Notice is hereby given that it is the intention of Robert Gibson, of Hay, to apply to the Parliament of New South Wales in the present session thereof to establish a system of irrigation and water supply in the district which lies between the Murray and the Lachlan rivers; to construct a storage reservoir by means of a dam near Barren Jack (Burren Jack) Mountain in the parishes of West Goodradigbee and Childowla, in the counties of Baccleuch and Harden respectively; to construct a canal and subsidiary works on the northern side of the Murrumbidgee River near Narrandera; to construct a canal and subsidiary work on the northern side of the Murrumbidgee River at a point as shown from the said weir for the purpose of diverting and utilizing water from the said river; and for above purposes to enter upon adjoining land and to acquire lands for

one man who combined the necessary zeal for irrigation with the financial strength to back it." The project was referred to a Select Committee in regard to certain technical aspects and at the end of 1905 came before the Parliamentary Standing Committee on Public Works which in the following year (31 October, 1906) recommended that the entire work should be carried out by the Government according to the scheme put forward by the Department of Public Works with additions recommended by Mr. Stuart Murray (Victoria) and approved by Mr. L. A. B. Wade, at the time Principal Engineer for Rivers, Water Supply and Drainage. The approved estimated cost, exclusive of land resumptions, was not to exceed £1,574,000. The enabling bill was passed on the 23rd December, 1906, preliminary work on the dam commencing in the following year.

By this time New South Wales had spent twenty years collecting data, but it still required, after all the years of waiting, argument, commissions and conferences, the combined effects of a long drought and the statesmanship of Sir Joseph Carruthers to finally convince Parliament that endless discussion should at last give way to action. Whereas Victoria and South Australia had already done so much, the irrigation works in New South Wales at this time comprised only the small Wentworth Irrigation (Curlwaa) Scheme and the Hay and Balranald Irrigation Trusts.

### MURRUMBIDGEE IRRIGATION AREAS<sup>119</sup>

1907-1912.—The engineering work involved in the Murrumbidgee Scheme comprised in the main the building of:—

(a) Burrinjuck Dam and incidental works;

and in connection with such several purposes; to sell, let and supply the water thereby diverted for irrigation and other purposes; and to do all things connected with and incidental to the beneficial use of the water to be supplied by means of the said canal and proposed works. And for the other purposes and with the powers and authorities in the Bill more particularly set out.

Bowman and Mackenzie, Solicitors for the Bill, 279 George Street, Sydney."

<sup>119</sup> The Scheme for the M.I.A. as finally adopted differed materially from that originally agreed to by the Public Works Committee in 1906. This had been to use the water made available from the Burrinjuck storage partly on the northern, partly on the southern side of the Murrumbidgee, and for watering portion of each holding only, on the lines adopted and then carried out in Victoria. Two canals were to be constructed, one to serve the land on the northern side, and one on the southern side of the river—considered to be the proper policy at the time. These proposals were later modified on the recommendations of an American irrigation expert, Mr. Elwood Mead, who had come to Victoria under engagement to its Government as Chairman of the Victorian State Rivers and Water Supply Commission. In his report (30th May, 1911), Mead dealt generally with matters bearing upon the settlement of the irrigable lands under the M.I.A. project.

The Irrigation Trust accepted the recommendations of Mr. Mead and planned for the concentration of irrigation within the area of first-class lands, a proportion of the second-class lands only being provided with water. This tied in with the results of the further investigations, necessitating an enlargement of the Main Canal to double its original capacity so as to be able to water all the

- (b) Berembled Diversion Weir, Main Canal, and Main Branch Canals;
- (c) Supply and Drainage Channels, Roads and other works necessary for the development of the irrigated farms.

lands from Berembled Weir to Griffith township, a distance of about 90 miles. The work of enlargement commenced under contract in March, 1920, and was completed in 1923, at a total cost of £371,557.

The Barren Jack Dam (afterwards changed to Burrinjuck) and Murrumbidgee Canals Construction Act (1906) provided for the construction of the necessary works. The work of building Burrinjuck was commenced and carried out by the Public Works Department until taken over by the W.C. & I.C. at the beginning of 1913.

The M.I.A. Scheme starts at Burrinjuck, where there is now (1957), a storage capacity of 837,000 acre-feet. After producing electricity, water as required is released 240 miles by the river to Berembled Weir and then diverted to the irrigation areas by a main channel of over 100 miles in length, from which hundreds of distributory channels deliver water to the farms.

The original estimate of costs as prepared in 1906 provided for an expenditure of £1,674,008, made up of £1,574,008 for the works and £100,000 for land. By 30th June, 1933, total expenditure had reached £8,128,921, including the following principal items:—

	£
Burrinjuck Reservoir .....	1,734,130
Main Canal and its later enlargement and weir at Berembled ..	1,120,408
Acquisition of land .....	788,409
Channels construction, etc. ....	1,766,289
Roads, streets, etc. ....	320,963
Canning factories .....	233,649
Electric power stations .....	301,980
Advances to provide working capital and stocks .....	155,000
(Other Items) .....	1,708,093
	<u>£8,128,921</u>

As at 30th June, 1955, the number of holdings in the M.I.A. were as follows:—

*M.I.A. Irrigation Areas*

Type of Holding	Yanco	Mirrool	Irrigation Districts	Total
Horticultural Farms ... ..	281	633	...	914
Large Area Farms ... ..	232	157	105	494
Dual Purpose Farms ... ..	23	8	...	31
Residential Farms ... ..	259	436	...	695
Non-irrigable Holdings ... ..	102	218	...	320
Town Blocks ... ..	1,223	1,934	...	3,157
	<u>2,120</u>	<u>3,386</u>	<u>105</u>	<u>5,611</u>

Estimated population 24,200. Total value of production for the year ended 30th June, 1955—£8,634,556, of which production of large-area farms was valued at £5,743,933 (average gross income £11,627 per farm), and horticultural farms £2,218,000 (average gross income £2,427 per farm.)

As from 1st January, 1955, under the provisions of the Murrumbidgee Electricity Undertaking Transfer Act, the electricity undertakings of the W.C. and I.C. in the Areas were transferred to the Murrumbidgee County Council, operating within the shires of Leeton, Wade and Murrumbidgee.

[*Note.*—The further references in this summary, as in the case of the reference above, are the Annual Reports of the Commission and the Reports of the Committees of Inquiry. *By courtesy of the Water Conservation and Irrigation Commission.*]

In connection with land resumptions for the Murrumbidgee Irrigation Areas, 1,210 acres were resumed from Sir Samuel McCaughey, in small lots and principally for canals, between 29th April, 1908 and 17th August, 1910. On 20th September, 1911, 67,986 acres of North Yanco Estate were purchased from Sir Samuel McCaughey at the agreed figure of £3 10s. od. per acre. A portion of North Yanco Estate, east of the Main Canal and about 23,450 acres in area, was sold by Sir Samuel to a syndicate in 1910. Later this same land was resumed for the M.I.A. in order to provide dry areas, i.e., lands to be worked conjointly with the irrigation blocks. Subsequently an area of about 52,496 acres was resumed in the Brobenah and Mirrool Creek districts, from various owners, and Gogeldrie Holding, comprising in all about 77,875 acres purchased from Messrs. Waugh, Stanbridge and Waugh at £2 10s. od. per acre. This together with the purchase of Mann's Holding of 1,920 acres, brought the total area in the district purchased and resumed to 30th June, 1912, to about 229,659 acres, at an estimated cost of about £680,000.

McCaughey, who had backed Gibson, fully understood the Government's motives in deciding that the scheme which had been proposed was too costly for an individual or group of individuals to undertake. This decision suited his purposes admirably in that the hand of the Government had been forced and an assured supply of water would be available for his schemes. Robert Gibson, however, was deeply disappointed at the decision. Gibson was a man of "outstanding capacity and character" who had devoted much energy and zeal to preparing the plans. However, McCaughey was subsequently very critical of Government methods which he considered wasteful. (Patricia McCaughey, *op. cit.*)

The first work undertaken was the construction of the dam, a site for which had already been tentatively located. Tenders were invited and on 23rd January, 1909, a contract let to Lane and Peters "at schedule rates," this contract providing that "all cement, outlet pipes, sluices and other ironwork will be delivered to the contractor free of charge at the works; the cableways, cranes, power house, concrete-mixers, and other plant, material and stores to be hauled for the contractor at 2½d. per ton, the site to be maintained and worked by the Government: and firewood, plant, material and stores to be hauled for the contractor at 2½d. per ton mile; and all employees to reside in 'Burrunjuck' city, where barracks had been provided for single men; a charge of one shilling and three-pence per week to be made from each employee's wages to cover cost of accommodation, water supply, sanitation and medical expenses."

By 1912, work had progressed sufficiently on the channels to enable the first settlers to take up their blocks. Already by the end of 1912, more than 300 farms had been applied for and granted, of which a large proportion were occupied. The opening ceremony, by Mr. Arthur Griffith, Minister for Works, involving the turning on of the first water supply for the M.I.A., took place on 13th July, 1912.<sup>120</sup>

<sup>120</sup> Leeton is named after Mr. C. A. Lee, Minister for Works and Chairman of the 1905 Conference; Griffith after Mr. Arthur Griffith, also Minister for Public Works and Chairman of the Irrigation Trust in 1912 when the area was officially opened by him.

In June, 1917 it was reported:

"Up to the present, channel and road works have been completed to serve about 74,000 acres on the Murrumbidgee Areas, of which about 40,000 acres have been taken up as farm blocks, with water rights attaching to about 30,000 acres. The total area watered will probably be eventually about 200,000 acres, to which must be added the dry areas attached to the farms . . . . The tenure is perpetual leasehold. Rents vary from 7s. to £1 5s. od. per acre . . . . In determining the rental, account is taken (inter alia) of the costs of works of development, which average from £6 to £9 per acre, exclusive of headworks. The headworks include principally Burrinjuck Dam, Berembid Weir and the Main Canal, and the cost of these is a charge against the water rate, which is 5s. per acre foot. Assuming the water used to be from 24 in. to 30 in., the water rate will be from 10s. to 12s. 6d. per irrigable acre per annum."<sup>121</sup>

The Barren Jack Dam and Murrumbidgee Canals Construction Act of 1906 and the Murrumbidgee Irrigation Act of 1910 provided for the construction of all works in connection with the scheme and the handing over and vesting of those works, when completed, in the Murrumbidgee Irrigation Trust for administration and the collection of revenue. The Trust was to comprise the Secretary for Lands, the Secretary for Public Works and the Minister for Agriculture. The first Chairman of the Trust was the Hon. Arthur Griffith, Secretary for Public Works.

The Trust was designed to facilitate the preliminary work of construction, resumption and disposal of lands and "the laying of the foundation of agricultural instruction and development in the area."<sup>122</sup>

In the original subdivision of 50 acre blocks by the Trust, the lowest valued were those deemed suitable for the production of fodder crops such as sorghum, lucerne and hay. Higher in value were blocks suitable for fodder crops and, in addition, the growing of vines. Still higher in value were those blocks suitable for the growing of stone fruits. And the best were those which in addition to other capabilities were considered suitable for citrus.

It was the Trust, also, which engaged Mr. W. Burley Griffin, the designer of the Federal Capital site, Canberra, to lay out the townships of Leeton and Griffith "on modern town planning lines."

### IRRIGATION ACT, 1912

Following the recommendation by the Murrumbidgee Irrigation Trust, the Irrigation Act, 1912, made provision for the appointment of a Commissioner for Water Conservation and Irrigation, with power of control over all the water conservation and irrigation works within the State. Mr. L. A. B. Wade was appointed to the position of Commissioner as from 1st January, 1913, and held this position until his death on 12th January, 1915.<sup>123</sup>

<sup>121</sup> H. H. Dare, *The Engineering Work of the Murrumbidgee Irrigation Scheme*, 1917, Mitchell Library.

<sup>122</sup> Mr. L. A. B. Wade, Chief Engineer for Irrigation and Drainage, Dept. of Public Works, was the first Executive Officer and Secretary of the Trust, being later the first Commissioner. Mr. W. J. Allen, Fruit Expert to the Department of Agriculture, was appointed to the temporary position of Irrigation Expert to the Trust at its first meeting.

<sup>123</sup> By the Irrigation (Amendment) Act, 1916, the Water Conservation and Irrigation Commission of three members was constituted in place of the single Commissioner, the Minister for Agriculture being the ex-officio Chairman of the Commission with two Commissioners to be appointed for five years. The first

### **WATER ACT, 1912**

Section 13 (1) (Part VI) of the Water Act, 1912-1936, provides for the establishment of districts for the supply to agricultural and pastoral holdings of water for domestic and stock water supply and limited irrigation. Part III of the same Act enables Water Trust Districts to be constituted.

### **IRRIGATION DISTRICTS DEVELOPMENT**

#### **River Murray Waters Act, 1915**

In 1913 an interstate conference of engineers which was held to consider the Murray River question furnished a valuable report on the Murray Waters in compliance with directions issued from the Premiers who had conferred in 1911. The basis of agreement amongst the States was differently reported on. The New South Wales and Victorian representatives stressed again the importance of irrigation, whilst the South Australian representative emphasized the need of a complete system of locks and weirs to safeguard navigation requirements.

Within a few months of the submission of the report of the interstate Engineers, the Commonwealth and the three States conferred in Melbourne, and on 7th April, 1914, carried resolutions as a basis for the formation of the River Murray Commission and for the allocation of the waters and the costs, satisfying the claims both for irrigation and navigation, the agreement being signed on 9th September, 1914. The agreement was ratified by the various States, and the Commonwealth Parliament passed the River Murray Waters Act in 1915, which came into force on 31st January, 1917. By this Act the administration of the River Murray Works was vested in a body, consisting of a representative from the Commonwealth and one from each of the three States concerned, called the "River Murray Commission". Even though the first sod was turned for the construction of the Hume Dam on 28th November, 1919, the dam was not opened until 21st November, 1926.

The main provisions of the River Murray Waters Act, 1915, were for the construction of storages on the Upper Murray. Originally the Commonwealth was to contribute only £1-million towards the total cost of the Murray works. However, by the Act of 1923, the Federal

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Commission consisted of Mr. W. C. Grahame, Minister for Agriculture, as Chairman, and Messrs. H. H. Dare, previously Acting Commissioner, and W. N. Sendall, formerly Chairman of the No. 1 Closer Settlement Advisory Board. This Act also transferred to the Minister for Agriculture certain powers in connection with irrigation leases, provided for the delegation of authority to the Commissioner resident on an Irrigation Area, and gave power to the Commission under certain conditions to make advances to settlers, to suspend payment of rent and water rates, and to consolidate the debts of the settlers. The Minister for Agriculture and Forests continued as Chairman of the Commission until 1944, when the separate portfolio of Conservation was constituted. The Minister for Conservation then continued as Chairman of the Commission until 1949. The Conservation Authority of New South Wales Act, 1949, amended the Irrigation Act, 1912-1936, to provide for the constitution of a Commission of three Commissioners appointed by the Governor, with one of these Commissioners as Chairman.

Government agreed to pay one-fourth of the total cost, thus sharing equally with the three States concerned. The New South Wales share of the River Murray waters is made available through Irrigation Districts.<sup>124</sup>

<sup>124</sup> The constitution of these districts, either for domestic and stock water supply only, or domestic and stock water and limited irrigation, is governed by Part VI of the Water Act, 1912-1936. New South Wales decided not to make any large diversions from the Murray until there were adequate storage facilities, preferring to continue the development of the Murrumbidgee with Burrinjuck behind it. In any case, the money available was not sufficient to branch out into any large-scale development on the Murray, other than to pay the share of the storage cost. Coomealla, a small but prosperous area near Wentworth, was undertaken in 1924, and 150 settlers provided for, but beyond the M.I.A., Curlwaa, and Coomealla, further horticultural development was not highly regarded because of the unfavourable market prospects. The alternative preferred was therefore to take water to existing holdings in the sheep and wheat industries. Legislation was passed to form irrigation districts, the works being constructed at the cost of the Crown, and a charge made to cover (a) stock and domestic supply, and (b) water for irrigation. Each holding is allotted water rights for irrigation proportionate to the size of the property, in most cases about one water right, or one acre-foot, to 10 acres, thus partially irrigating the property.

Trusts also can be constituted under Part III of the Water Act, 1912-1936, for the purpose of generally facilitating the diversion of water from the streams of the State, and for the more equitable distribution of the water so directed to the separate holdings within any trust district. Water rights, however, are not attached to holdings under the constitution of a trust district, since the supply of water must necessarily be of an intermittent nature. Trust works usually consist of headwork structures such as regulators, whilst the balance of the works are adapted substantially to the natural creeks or waterways within the district.

The trusts so constituted include water conservation schemes of two classes, viz.:—

1. Schemes principally for domestic and stock supply, in which the works are constructed by the State, the cost to be repaid over a number of years, and
2. Schemes, for irrigation or domestic stock supply, in which the works are wholly or partially completed by the landowners interested.

Particulars of these districts and trusts are as follows:—

*Irrigation Districts as at 30th June, 1955*

	Proposal for Provisional District Gazetted	Constituted	Supplied from—
Benerembah ... ..	6th May, 1932 ...	23rd October, 1936 ...	Murrumbidgee River
Wakool ... ..	17th June, 1932 ...	4th July, 1941 ...	Murray River
Tabbita ... ..	1st September, 1933	16th August, 1935 ...	Murrumbidgee River
Berriquin ... ..	22nd September, 1933	9th March, 1934 ...	Murray River
Jernargo ... ..	17th February, 1939	18th April, 1941 ...	Murray River
Jemalong ... ..	15th June, 1934 ...	25th June, 1943 ...	Lachlan River
Wylde Plains ... ..	28th June, 1935 ...	20th July, 1945 ...	Lachlan River
Deniboota ... ..	1st April, 1938 ...	16th December, 1938, Lawson Siphons opened 27th April, 1955.	Murray River
Wah Wah ... ..	9th September, 1938	11th January, 1946...	Murrumbidgee River
Lowbidgee ... ..	17th March, 1944 ...	9th February, 1945	Murrumbidgee River
Denimein ... ..	13th July, 1945 ...	11th January, 1946...	Murray River
Medgun ... ..	16th November, 1945	1st March, 1946 ...	Gwydir River
Gumly ... ..	13th December, 1946	15th August, 1947...	Murrumbidgee River

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### Carmichael Royal Commission, 1915

Very early in the administration of the M.I.A., difficult problems arose in connection with establishment. Conditions in the Areas were generally unsettled and there was a scarcity of new settlers. Mr. A. C. Carmichael was appointed Royal Commissioner on 17th June, 1915, his final report being dated 14th October, 1915.

### Bevan Royal Commission, 1915-1917

Later, in furtherance of a promise made by the Premier (Hon. W. A. Holman), Judge Bevan was appointed a Royal Commissioner to inquire into and to submit recommendations in the cases of settlers who could prove that they came to the Areas to grow lucerne but were not granted suitable lands. This Commission commenced its hearings in July, 1916, the final report being presented in February, 1917.

Thus in the short space of two years there were two Royal Commissions into conditions in the Areas.

### Returned Soldiers' Settlement, 1919-1923<sup>125</sup>

An ambitious scheme of settlement in the M.I.A. for returned soldiers in the immediate post-war years was designed by the Commission. This provided for the reservation for returned soldier settlers exclusively of a large area of country which was subdivided into farms for horticulture or dairying. The planning of the Commission envisaged an ultimate settlement of 1,500 discharged soldiers, 1,000 farms to become

#### *Water Trusts as at 30th June, 1955*

	No.	Acres
Trusts for domestic and stock supplies	13	2,912,524
Trusts for irrigation, etc. ....	7	13,912
Trusts for town water supplies ....	1	117
Trusts for flood prevention ....	1	2,190

*Domestic and Stock Water Supply and Irrigation Districts.*—Initially a proposal for a provisional district is notified in the *Government Gazette* and time is given for objections, if any, to be lodged. If within eight weeks of the notification a petition objecting to the proposal is received, the proposal is referred to a Board of Inquiry for report. If no such petition is received, or if a Board of Inquiry reports in favour of the proposal, the Governor may constitute a Provisional District by notification in the *Gazette*, and thereupon the Commission may carry out, acquire or utilise the necessary works. Upon completion of the works, a proposal for a District, as distinct from a Provisional District, is notified, time again being allowed for objections and, if necessary, for inquiry by a Board. If no petition is received, or when the Board has reported on the proposal, the District is constituted by notification in the *Gazette*.

Works to supply water to holdings in irrigation districts are costly. The State is not recouped for a major part of such expenditure, the landholder being, up to date, supplied with water at less than cost. Extensive irrigation within districts does not and cannot ensure maximum production and the fullest utilisation of the acreage of irrigable land which is commandable by water. Such can only be provided by subdivision in small farm blocks, and intensive development under irrigation within an area.

<sup>125</sup> Depending upon their experience, discharged soldiers were required to undergo either a period of three months' probation in a Soldiers' Camp on the Irrigation Areas or a period of training at a Government Experiment Farm. On satisfactory fulfilment of these conditions, a discharged soldier became eligible to apply for a farm. The Soldiers' Camp was established near Griffith and was designed to accommodate 100 men. Whilst at the camp, these men were engaged in the preliminary work of development of the farms reserved exclusively for discharged soldiers and were paid award rates, the minimum being 12s. 8d

available by 30th June, 1920. However, shortages in the supply of materials, particularly cement, required for the construction of irrigation channels and ditches, caused some slowing up of the settlement scheme.

At the end of June, 1921, 421 soldiers had taken up land (22,807 acres). By June, 1922, the number had increased to 802 (60,836 acres) of whom 564 had been placed on horticultural farms, 238 on dairy farms. In cases where there was failure on the part of individual settlers to make a reasonable effort to farm satisfactorily, the farms became forfeited under the provisions of the Crown Lands Act. By June, 1923, the work of placing soldiers on irrigation farms had been almost completed, and generally, "in the class of soldier settler obtained for the irrigated farms, the Commission had been well served." By then, 911 soldier settlers held farms on the various Government irrigation schemes. At the end of June, 1924, only 97 out of 1,076 soldiers who had been granted blocks had failed—a satisfactory result considering the conditions of settlement. But, on the other hand, there was little success in persuading civilians to take up land, owing to the depressed market outlook for fruit. In its 1923-24 Report, the Commission expressed the view that "the difficulties of marketing the various classes of fruits produced on the Irrigation Areas are admittedly great and will remain so unless the assistance sought by Australia to enable it to satisfactorily compete on the British market is forthcoming".<sup>128</sup> (It had become

per day. Whilst in camp undergoing their qualifying period, the discharged soldiers were employed at "clearing and grubbing, cutting and stacking firewood at the homestead sites, splitting fence posts, cutting straining posts and building poles, ploughing, ditching, grading and tank-sinking. Subsoiling by means of steam ploughing engines was carried on simultaneously". The cost of all work on individual farms was kept and became a charge upon the farms.

Advances up to £625 were made under the Returned Soldiers' Settlement Act, for the general improvement of a block, the provision of buildings and the purchase of stock seed, implements, etc. However, "irrespective of this amount of £625, the Commission (made) advances, out of its own funds, of such sums as . . . found necessary to bring (a) farm to a proper stage of productiveness". The basis of settlement assumed that it would take a fruit farm five years to become productive and a dairy farm two years. Sustenance was allowed to settlers by the Commonwealth Department of Repatriation, supplemented by the Commission in the form of cash advances against the value of the settler's labour on his farm.

On a farm coming into production, all payments due for rent and water rates and repayments for any advances whatsoever, exclusive of sustenance, were consolidated into one debt, and became repayable to the Commission in forty equalised semi-annual instalments, covering principal and interest.

In 1921 the system of "Probationary Gangs" was abolished. It had proved valuable in "trying out" the soldier settlers, but on the other hand had turned out far too expensive, "the soldiers demanding full union rates for their labour, whereas in the majority of cases . . . they were not able to actually earn by their labour the amount of money which they received. As the money so expended had to be eventually paid by the soldier for his improvements, the total advances (became) excessive".

Since under these conditions almost the whole of the cost of development of the farms had to be found by the Governments—Commonwealth and State—the soldier settlers had themselves very little at stake and there were failures.

<sup>128</sup> High prices prevailed for dried fruits, canned fruits and wine in 1919-20, and irrigation settlement proceeded under these influences. Prices, however, declined sharply about 1923-24 just when the settlers' trees were beginning to

obvious that the farms of soldier settlers were over-capitalised and that adjustment of debt and in some cases of areas, would be necessary in order to give the settlers a fair chance of making a success of their properties.) The question of indebtedness was finally referred in 1924 to an Investigation Committee, comprising Robert McDonald (late Under Secretary for Lands and Chairman of the Special Land Board for the M.I.A.) as Chairman, C. E. Beilby, Settlers' Representative, and F. H. Brewster, Chief Executive Officer, Murrumbidgee Irrigation Areas. This Committee submitted its report on 14th February, 1925, but there

bear. Owing to some defects in the 1924 Leeton canned fruit pack, the reputation of the brands handled by the Commission received a temporary setback. This was followed by an abnormal production season in 1925 when all records were surpassed. This heavy production, allied with the slowness of sales, caused a carry-over of £220,495 worth of fruit at June, 1925.

In 1924 Imperial tariff preferences granted certain concessions with respect to canned fruits and dried fruits. These may be summarised as follows:—

*Canned Fruits:*

British Dominions, Duty .....	1.78d. per doz.
Foreign, Duty .....	2.82d. per doz.
As against previous rate of:	
British Dominions, Duty .....	2.3d. per doz.
Foreign, Duty .....	2.82d. per doz.

*Dried Fruits:*

Currants, foreign, £2 per ton; British Dominions, free.  
Sultanas and Lexias, foreign, £7 per ton; British Dominions, free.

In 1924, also, the Export Guarantee Act, the Dried Fruits Advances Act and the Dried Fruits Control Export Act were introduced into the Commonwealth Parliament, the Dried Fruits Control Board commencing operations in February, 1925. This was followed by the Canned Fruits Bounty Act, the Canned Fruits Export Control Act of 1926, and the Wine Overseas Marketing Act of 1929.

*Ricegrowing in the M.I.A.*—Until the early 1920's, all attempts at commercial ricegrowing in New South Wales had proved unsuccessful. In 1892 the New South Wales Department of Agriculture had first attempted to grow rice, using the dry land varieties then available, that is, upland varieties grown without irrigation under natural rainfall conditions. After trial, this early experimental work was abandoned, but was resumed in 1911 with further dry land varieties from India which were put under test at Grafton Experiment Farm. In 1912, unsuccessful trials were carried out in close proximity to suitable bores. Meanwhile, at Swan Hill in Victoria, some other experimental plantings were being made by a Japanese resident, Mr. Takasuka, who had brought back an improved strain from Japan in 1906. He was able by 1915 to report that he had grown crops yielding one ton to the acre. The lead thus shown was followed up in New South Wales, where the variety he used was given the name Takasuka and grown under irrigation at Yanco Farm in 1916 and 1917. Uniform failure, however, attended all these early attempts to produce rice on "pocket handkerchief plots," and understandably the crop at this time and for these reasons had been virtually disregarded.

In 1920 the Irrigation Commission sent its M.I.A. cannery manager, Mr. John Brady, to California to inquire into the canning industry there and other matters relative to the Commission's activities. Brady observed that rice was growing on land in California that seemed strikingly similar to the heavy third-class soils in the M.I.A., a view confirmed by Dr. Elwood Mead, an American who had previously been in Australia as an irrigation expert and was thus familiar with M.I.A. soils. Approval was obtained for the purchase of seed, and about 100 lb. each of the three selected varieties—Wataribune, Caloro and Colusa—were procured for experimental purposes. In the season 1922-23, the 300 lb. of imported seed was planted out under irrigation and, escaping the threat of early disaster, eventually yielded about seventy bushels to the acre. In 1923-24, an area of seven acres on experimental plots at Leeton gave yields

was disagreement in the matter of its findings. Negotiations followed with the Government in April, 1925, as a result of which concessions were granted, providing, *inter alia*, for—

- (a) Reduction of maximum interest charges to  $5\frac{1}{2}$  per cent;
- (b) Determination by the Commission "on the basis of the productive capacity of the farm in each case" of the proportion of the debt of discharged soldiers to be repaid and the balance to be written off with interest.

In the light of its experiences the Commission reported in 1924:—

"It would have been possible to increase (the number of settlers) if settlers without capital had been taken, as has been the case with soldier settlers for some years past. It was, however, considered inadvisable to continue this method, in view of the heavy burden thrown on the State, and also of the difficulty experienced by unfinancial settlers to make good. The Commission holds the view that rather than continue the taking of settlers without capital (which as a matter of fact was always against its policy and was only undertaken to comply with national requirements, the State having an obligation to settle discharged soldiers), it is better to allow further development on a large scale to be suspended for the time being, and to assist wherever possible in consolidating the interests of those settlers already holding irrigation farms. This of course does not apply to settlers who are able largely to finance their own undertakings. These are still welcome and there are ample farms to meet their requirements . . . . Prior to the advent of Soldier Settlement . . . . it was the practice to insist on all settlers possessing a reasonable amount of capital before they were accepted as eligible applicants for land on irrigation areas. The Commission is of the opinion that it is of the greatest importance that its policy in this respect should be adhered to in connection with all future settlement, particularly in the case of oversea settlers."

As at 30th June, 1933, the balance-sheet of the M.I.A. showed the accumulated losses and advances, interest and Crown dues connected with soldier settlement to be £2,458,540. Towards such losses the contribution of the Commonwealth Government had been £256,940.

producing up to 119 bushels, the imported Caloro, Colusa and Wataribune varieties giving the best yields compared with Queensland, Java and other varieties, and proving conclusively the value of the crop.

Experimental work was therefore temporarily discontinued, and in 1924 arrangements were made for the purchase of 20 tons of selected seed. This was required for commercial tests on individual farms of settlers throughout the area. Contracts were concluded between the Commission and six growers—Miss L. Grant, Messrs. M. Duffy, H. Tooth, S. Marchinton, J. Spicer and G. Blencowe, in Leeton, Yanco and Yenda, to grow the first commercial crops—the acreages ranging from five to eighty acres. In all, 157 acres were planted. The harvest yielded 222 tons of paddy rice or 1.41 tons per acre. With the exception of rice utilised for milling tests, the Commission purchased all the grain harvested for distribution to growers the following season.

In 1925-26 the acreage had increased to 1,987 acres, producing 1,798 tons of paddy or 0.9 tons per acre. In 1926-27 the area sown was 4,772 acres, increasing in the 1927-28 season to 12,080 acres, producing 17,363 tons of paddy rice or an average of 1.44 tons per acre, individual crops realising as high as  $3\frac{1}{2}$  tons per acre. By 1928-29 when 14,058 acres produced 24,288 tons of paddy rice, the whole of Australia's requirements were in reach of being supplied, and a valuable new industry had been firmly established.

In 1930-31 the acreage had further increased to 20,256, so that it became necessary for the Commission to reduce the maximum areas which might be sown by individuals. For the season 1931-32 the maximum area permitted by the Commission, in consultation with the Rice Marketing Board, was 90 acres, compared to 100 acres in the 1930-31 season.

(*cf.* *Rice Growing on M.I.A.*—Report by I.R.E.C. [1957]; L. Walker, "Irrigation in New South Wales," *Journ. and Proc., R.A.H.S.*, Vol. XXVII, Part III [1941].)