

The following table gives particulars relating to bores along the Bordertown railway. In all these bores water was found in porous beds of Eocene (Tertiary) age.

SOUTH AUSTRALIA.—PARTICULARS OF BORES ALONG BORDERTOWN RAILWAY, 1910.

Bore.	Elevation of Surface above Sea-level.	Depth of Water.	Depth of Water-level from Surface.	Quality: Salts and Matter per Gallon.	Supply per diem.	Remarks.
	Ft.	Ft.	Ft.		Gallons.	
Cooke's Plains	17	15	...	Salt	...	Bottomed granite. 218 feet.
Ki Ki ...	68	{ 73 361 }	68	Brackish	{ 16,800 16,800 }	Bottomed decomposed slates, 450 ft.
Tintinnarra ...	62	251	(Rises to surface).	Fresh (81 grs.)	4,300	...
Emu Flat ...	100	{ 52 166 }	28	Fresh (98 grs.)	8,500	At 60 ft. from surface 312,000 gals. per diem.
Keith ...		{ 264 }				

(ii.) *Bores along and near Pinnaroo Railway Line.* The subjoined table gives particulars of some of the principal bores in the Pinnaroo country. In 1904 the first bore was sunk in this district at Cotton; numerous successful bores have since been put down by the Public Works Department, and subsequently by the residents of the district. Several wells, ranging in depth from 55 ft. to 221 ft., have also been sunk in this district.

SOUTH AUSTRALIA.—PARTICULARS OF PRINCIPAL BORES NEAR PINNAROO RAILWAY LINE, 1910.

Bore.	Elevation of Surface above Sea Level.	Depth of Water.	Depth of Water Level from Surface.	Quality.	Salts per Gallon.	Supply per diem where ascertained.
	Feet.	Feet.	Feet.		Grains.	Gallons.
Sherlock ...	53	270	15	Fresh	196.24	...
Geranium ...	240	140	140	"	96.05	14,400
Cotton ...	300	190 and 800	170	"	81.16	30,000*
Parilla ...	340	207 and 250	207	"
Bews ...	350	227	193	"	...	10,800
Clay Pan ...	340	225	203	"	...	13,440
Kow Plains...	344	140 and 210	167	"	73.79	...
Fuller ...	100	72 and 340	43 and 29	{ Brackish Fresh }	101	...
Gosden ...	100	327	27			

* Bottomed on granite at 839 feet.

The latest Government bore is situated $7\frac{1}{2}$ miles south of Brown's well, near the terminus of the proposed railway from Tailm Bend. The depth of this bore is 220 ft., and the water, which is in large supply, rises to within 52 ft. of the surface. The water is fresh, containing $\frac{1}{4}$ oz. salts and other solid matter per gallon.

6. Western Australia.—(i.) *The Goldfields Water Supply of Western Australia.* The scheme by which the Government of Western Australia undertook to provide a permanent supply of water for the population on the eastern goldfields of that State comes properly under the heading of "Water Supply Works."

The Act under which the works were constructed was introduced in Parliament by Sir John Forrest, G.C.M.G., then Premier of Western Australia, in September, 1896, and provided for an expenditure of £2,500,000 and a daily supply of 5,000,000 gallons. The works, designed by the late Mr. C. Y. O'Connor, Engineer-in-Chief of the State, were originally known as the "Coolgardie Water Scheme," but are now officially called the "Goldfields Water Supply." The first construction work in connection with the scheme was commenced early in 1898, and the water was delivered in Kalgoorlie in January, 1903. The source of supply is the Helena River, in the Darling Ranges, where, at about 18 miles from Perth, an impounding reservoir, 760 acres in extent, with a catchment area of 569 square miles, has been constructed. From the impounding reservoir the water is pumped through a steel main of the locking-bar type, 30 inches in internal diameter, by a series of eight pumping stations located at intervals along the main. Each pumping station, except No. 1, which draws direct from the reservoir, is provided with a suction tank which receives the water pumped by the preceding station. The last pumping station delivers the water into a main service reservoir of 12 million gallons capacity, situated at Bulla Bulling at a height of 1290 feet above the lowest off-take from the Helena Reservoir, and distant $307\frac{1}{2}$ miles therefrom. From the main service reservoir the water flows by gravity to Kalgoorlie, a further distance of 44 miles; the total length of the 30 in. main being $351\frac{1}{2}$ miles. The water is distributed to the various townships and to the mining centres from service reservoirs, and a considerable area of agricultural country is also supplied by branch pipe lines from the main conduit. The area of operations embraces 16,000 square miles, the total length of the water area being approximately 380 miles. The cost of the original works, including expenses of raising loans, was £2,866,454, and of supplementary works £386,247, making a total of £3,252,701. The Mundaring reservoir cost £249,000. Its capacity is 4600 million gallons, and its surface area at full supply level 672 acres. The height of the wall above the river bed is 100 ft.; length of wall, 757 ft.; width of wall at bottom, 85 ft.; at top, 11 ft.; and when the reservoir is full the water runs back for a distance of seven miles. During the financial year 1911-12 the total consumption amounted to 1,135,000,000 gallons, an increase on the previous year of 86,100,000 gallons. The gross revenue was £243,000, and the gross expenditure £270,000. Complete information regarding the financial position of the Goldfields Water Supply was not available at the time of going to press, and will be found in the Appendix.

(ii.) *The Mines Water Supply Branch.*—Prior to the commencement of the Goldfields Water Supply Scheme, works of different kinds were carried out by the Government in order to afford temporary relief to the population on the goldfields. These works comprised shallow and artesian boring, conservation and protection of water in natural and artificial reservoirs, sinking of wells, erection of condensers, etc. About 2000 shallow bores have found fresh water, and a few hundred, salt water, which, however, is serviceable for battery purposes. Administratively, the goldfields area is divided into three water supply districts—Coolgardie, Murchison, and Pilbara. It has been the policy of the department charged with the supervision of water supply works, viz., the Mines Department, to lease watering stations wherever that could be done to advantage, and from twenty to thirty leases are generally executed in the course of a year. The tanks which have been constructed by the department vary in size from 200,000 gallons to 37,500,000 gallons (at Niagara).

At the end of the year 1911 the total number of Government bores west of the Darling Range was 59, and there were 32 private bores recorded in addition. This record is, however, incomplete, and the following particulars refer to Government bores only. The total depth bored is given as 68,965 feet. The total cost of construction of State bores at the end of the year 1911 was about £109,400, of which amount £19,400 was spent in 1911. The total daily flow of the Government bores is stated as 19,676,400

gallons. The maximum and minimum depths of State bores were 2275 feet and 39 feet respectively, and the maximum and minimum temperatures 140° and 60° Fahrenheit. The maximum outflow, 1,167,000 gallons per day, is said to be obtained from a well at Guildford.

As already stated, no artesian water has been found east of the Darling Ranges, although a large number of shallow bores yield either fresh or salt water.

§ 3. Irrigation Plants.

1. **General.**—Various causes have combined to keep proposals for irrigation works on a large scale before the Parliaments of several of the States for a number of years without any very tangible results, except in the case of New South Wales, Victoria, and South Australia. The absence of the example of any country which has constructed such works under similar climatic and labour conditions, the very partial success of some of the smaller works undertaken in Australia, and the abundant supply of artesian water obtained during the last twenty years in parts of the continent most liable to droughts, have all tended to delay the undertaking of large works.

2. **New South Wales.**—(i.) *Irrigation Trusts.* The first action by the Government of this State for the establishment of irrigation settlements was taken under Acts of Parliament which authorised the formation of irrigation trusts in the vicinity of Wentworth in 1890, Hay in 1892, and Balranald in 1893. The Wentworth Trust controlled an area of 10,600 acres, but has been dissolved and its powers assumed by Government. A pumping plant has been provided and channels laid out for the irrigation of an area of 1500 acres, of which 1000 acres are at the present time under successful occupation, largely for the production of horticultural crops and a small amount of lucerne. The original area under the Hay Trust was 12,847 acres, but in 1896 this was reduced to 3000 acres. The pumping plant and channels provide for the irrigation of 900 acres, which are under occupation, principally in connection with the growth of fodder crops for dairying, a small area being under horticultural crops. No works for the supply of water have yet been carried out by the Balranald Trust, which controls an area of 1000 acres. It is improbable that any irrigation will be provided in this area in the near future.

(ii.) *Private Irrigation.* Irrigation by private individuals is almost entirely carried out by pumping plants licensed under the provisions of the Water Rights Act. The largest plants draw their supplies from the River Murray for irrigating areas of from 600 to 700 acres of lucerne grown for stock feeding purposes.

(iii.) *The Murrumbidgee Northern Irrigation Scheme.* This scheme provides for the utilisation of a large proportion of the waters flowing from the Murrumbidgee catchment area in normal seasons. The works which are necessary to provide for the conservation of these waters consist in the first place of a large storage reservoir in which the water is to be retained by a weir known as the "Burinjuck Dam." This dam is being constructed across the channel of the Murrumbidgee River, about three miles below the confluence of the Goodradigbee River. The catchment area above this point is 5000 square miles.

The retaining wall will have a total height of 240 feet from its crest to the deepest foundation level; the total length will be 784 feet curved in plan to a radius of 1200 feet; the thickness at the crest will be 18 feet and at the base 170 feet. The maximum