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IRRIGATION
IN
AUSTRALIA

External Affairs *James*

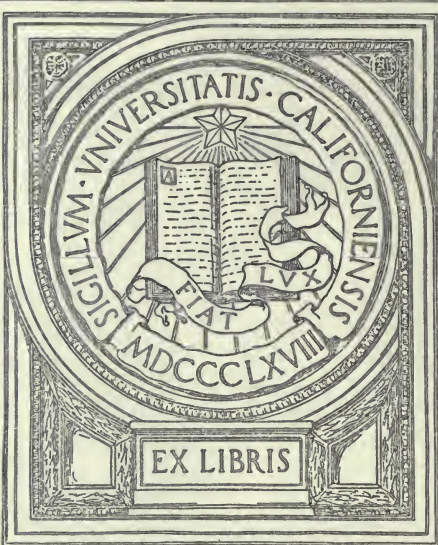
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COMMONWEALTH OF AUSTRALIA.



IRRIGATION FARMING IN AUSTRALIA.

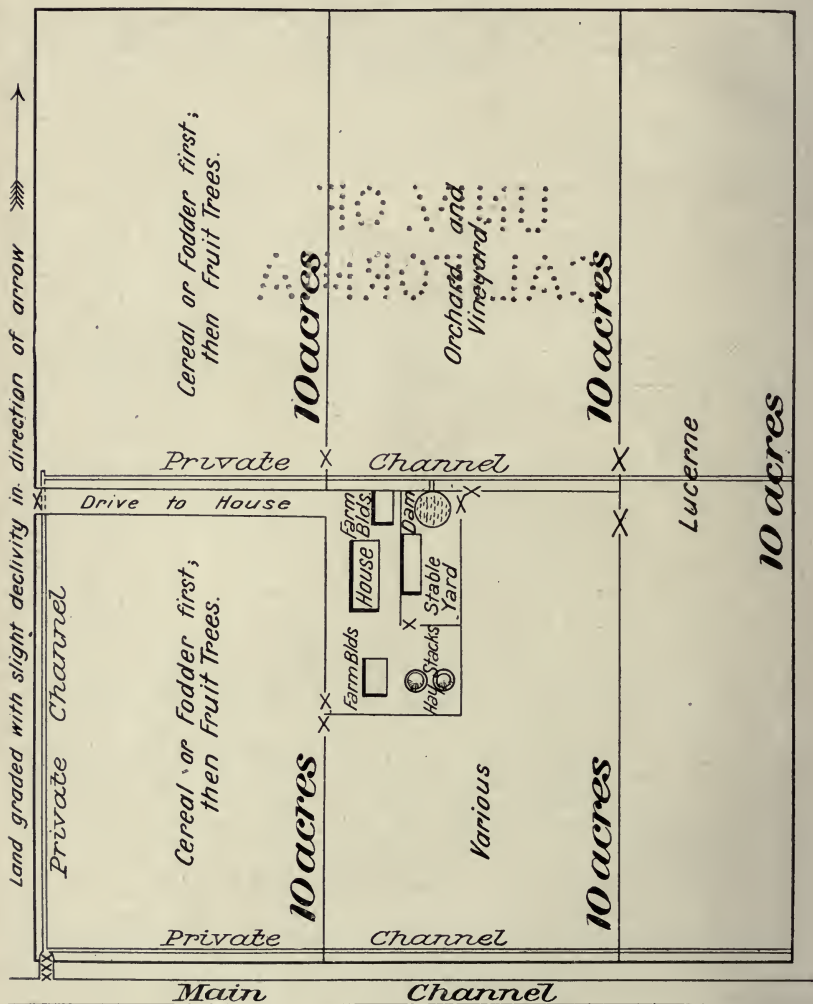
AN ACCOUNT OF
THE IRRIGATION CLOSER SETTLEMENT SCHEMES
IN THE COMMONWEALTH,
SHOWING THE STEPS BY WHICH
THE NEW SETTLER FROM OVERSEA BEGINS.

ISSUED UNDER THE AUTHORITY OF
THE MINISTER OF STATE FOR EXTERNAL AFFAIRS,
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1915

Sketch Showing Sub-Division and Line of Development of 50-Acre Irrigation Farm.



Specimen plan of 50-acre block, measuring 20 chains by 25 chains.

Shown here are about 170 chains of fencing (all of which need not be done at first), and 52 chains channelling.

Some of the fencing—probably two sides of the whole boundary fence—will be shared by adjoining land owners, who contribute half the cost of such fences.

Each settler can, of course, lay out his block as he chooses, but he is advised that of 50 acres at least 10 should be lucerne in every case.

IRRIGATION FARMING IN AUSTRALIA.

A GREAT RIVERS SYSTEM.

Unroll the map of Australia and one striking feature becomes at once obvious—the great river system on the south-eastern side, comprising the Murray and its tributaries. At a distance of 520 miles above its mouth, the Murray system branches out like a fan, the ribs of which run through all the country from Queensland to Victoria. True, the analogy to a fan is more apparent on paper than in fact, for the main body of the river's waters comes from the lower, or southern side of the fan.

The area of the Murray basin is over 414,000 square miles, or about one-seventh of the whole of the Australian continent. The Murray system is the great natural drainage line of South-eastern Australia. The length of the Murray proper is 1400 miles; it marks out nearly the entire boundary between New South Wales and Victoria. The two longest tributaries, the Darling and Murrumbidgee, both in New South Wales, are respectively 1350 and 700 miles long. It should be explained, however, that length is less important in these rivers than flow, and that while the Darling is



GOULBURN RIVER AT SHEPPARTON.

the longest tributary, it is, in the other regard, of much less importance, since its flow is only a little over a third of that of the Murrumbidgee, and a little more than half that of the main Victorian tributary, the Goulburn. Indeed, in point of flow two other small

Victorian tributaries, the Mitta and the Ovens, are nearly equal to the Darling.

The importance of the extended reach of the Murray system attaches not so much to irrigation as to another use of the Murray waters—namely, in the direction of navigation. For the purposes of this present survey, which confines its attention to irrigation development, the area will have to be restricted to the Murray valley proper, and especially the rich Riverina country embraced by the Murrumbidgee, Goulburn, and Loddon valleys. One glance at the map will show how the circle could be drawn. It would take in the whole of the northern area of Victoria, the south-western corner of New South Wales, and the strip along the Murray in South Australia.



HAPPY TILLERS OF THE SOIL.

The main watershed of the system is the Great Dividing Range, which winds from the south of Victoria around and up the greater part of the eastern coast of Australia. The Murray itself begins with the snow-water from the highest points of the Australian Alps. The source of the Murrumbidgee is in the same locality. The Darling is fed entirely by the irregular and torrential rains of the hotter latitudes of the north.

The Murray, especially in its lower course, follows an exceedingly tortuous channel, and its flow is very sluggish. This is a distinct advantage to the farming areas in its valleys; the water they want is not whirled past them to waste at the rapid rate of other of the world's great rivers. The greater part of the Murray Valley lies at an elevation of less than 500 ft. above sea level. The geologists have an explanation of the formation of the Riverina and lower Murray plains, which at once makes an interesting story, and explains the famous fertility of the soil there. Formerly the sea

covered most of the plains—even as far as Menindie, on the Darling—and borings disclose river and lake deposits in this soil down to over 1000 ft. deep. Sands and silts were carried down by the rivers, and gradually filled up a vast lake caused by the rising of the sea floor. The last series of deposits laid down as deltaic formation in this original lake are the rich alluvial soils of the Riverina valleys to-day, which are being turned into wheatfields and orchards.

THE MURRAY VALLEY IRRIGATION AREA.

The area embraced in the Murray system is the heart of producing Australia. In the Murray province flourishes every branch of agriculture and farming—sheep, wheat, dairying, orchards, and vineyards. Australia is aiming at making the river itself—by means of locks—a great commercial highway into the prosperous lands which the river waters, so that the vast annual wealth of wheat and wool and butter and fruit may be floated down the cheapest of freight channels to the markets of Australia and the world outside. That is the grand idea behind the present development schemes. As it is, to-day, without the required locking, the Murray trading steamers serve during six months of the year a long



GOULBURN WEIR, VICTORIA.

line of irrigation settlements from the mouth to the South Australian border and beyond. The growth of farming on the river plains in the last twenty years has been enormous. The irrigation farmer, farming on smaller blocks, is gradually extending over country formerly held solely by wheatgrowers and pastoralists.

This agricultural development has proceeded along lines natural in a vast and sparsely-populated continent, which the natives had never attempted to cultivate. Originally the white man had to begin Australia at the very beginning. So he ranged his sheep and cattle over whole provinces, which he could almost call his own; he sowed wheat roughly and broadcast over fields as big as a town. As settlements increased, these old squatters have had to resign in favour of smaller farmers, who used the country to the advantage of bigger communities. Mildura irrigation settlement in Victoria to-day, for instance, contains a population of 5000 or 6000 people, and produces over \$1,440,000.0 worth of fruit a year, where in its natural state the district could not support five people. The Goulburn irrigation districts in Victoria and the Murrumbidgee plains in New South Wales are similar and bigger examples springing up to-day of the wonderful results of irrigation. The State Govern-



THE FARMER'S CHILDREN ENJOY A DIP IN THE CHANNEL.

ments have simply stepped in, bought out many of the old squatters, laid irrigation canals through the country, and are throwing open the holdings, subdivided into small blocks, for intense cultivation.

Irrigation in Australia is an art learnt from America. The first two irrigation settlements were established along the River Murray in South Australia and Victoria by the American company of Chaffey Bros. in the later eighties of the last century. These settlements, Mildura and Renmark, are to-day flourishing communities, producing almost every sort of fruit to the value of over half a million annually. The Chaffey's had been irrigationists in California, and were the first men to realise the rich opportunities which the Murray valley offered. They secured large grants of land from the Victorian and South

Australian Governments, and, after constructing initial works, resold farming blocks of virgin country to immigrant settlers, attracted by their advertisements from all over the world, but mainly from England.

These two settlements of Mildura and Renmark to-day hold about 8000 people—prosperous fruitgrowers and their families—and their vines produce far more raisins and currants than the whole of Australia can consume. The people there lead a healthy and happy life, the freest and, now that they have passed the early years of struggle and development, the most charming and comfortable life imaginable. They have shared early difficulties and discomforts together till they are more like one big family than a community of an ordinary town. The apricot and peach season of December and January, the grape season of February and March, the orange season of June and July, afford happy pictures of an independent country life. Great numbers of University students and others in the cities prefer to spend their holidays at work in the fruit season on the Murray.

The example shown by the Chaffey's at Mildura and Renmark spread slowly at first, but once the practical success of small farming and fruitgrowing by irrigation was revealed, the idea quickly spread. For the last fifteen years the State of Victoria especially has led all the Australian States in this branch of farming, and to Victorian efforts mainly is due the encouragement of irrigation in the other States as well. The chief apostle of the new farming in Victoria is an American, Mr. Elwood Mead, who is chairman of the Victorian State Irrigation Commission, and whose name and work are widely known and respected in Australia. During the last six years he has performed a lasting service to more than his own State in reviving and expanding the whole conception in Australia of closer farming settlement. Mr. Mead has said himself:—

“The original conception was to make irrigation an adjunct of dry farming, in which a little water would be used to grow cheap fodder crops scattered over wide areas. Under the old practice it made little difference whether the irrigated land was poor or good, but with the changed practice the water and crops are both too valuable to allow of the use of anything but the best types of soil. Furthermore, it is becoming increasingly apparent that the Murray valley is to be one of the chief fruit-producing districts for the Northern Hemisphere, having the great advantage of being able to supply these markets at a season of the year when they would otherwise be empty. We are now shipping apples and pears successfully to Europe, and there is no doubt that stone fruits can be as successfully shipped to North America.”

The newer Victorian and New South Wales irrigation settlements show improvement, too, in practical engineering on the first efforts. The Chaffey's pumped water direct from the river to their orchards. The new scheme is to dam back tributaries at higher levels, and gravitate the water thus conserved through diversion canals down to the lower plains.

THE MAN-MADE RIVERS OF VICTORIA.

The principal irrigation under the Victorian Government's closer settlement scheme is on the Goulburn. The Victorian tributaries of the Murray—chief of which are the Goulburn, Campaspe, and Loddon—are the most constant and reliable of all that flow in the parent river. The Goulburn and the Campaspe in their early course wind through some lower spurs of the Great Dividing Range—country undulating and well-timbered, and growing all sorts of fruits, especially apples—under the natural rainfall. The green



THE MAN-MADE RIVERS
IN IRRIGATION AREAS.

lanes and villages here remind one of the countryside in England. From this district the observer journeys gradually down to the plains, where the rainfall is less, which lead finally to the Murray bank. These lower plains are unrelieved by any hill or rising ground, and are but sparsely covered naturally with timber (so that the clearing for farms is not heavy), facts which make them a happy hunting ground for the irrigation engineer, but also, it must be admitted, for the occasional duststorm.

In former days these plains were mostly old squatters' stations. Where hundreds of families are now living in Shepparton, Rochester, Bamawm, Kyabram, Tongala, there were formerly a few

big holdings, mostly under sheep. Here and there, as at Shepparton, there was some country under wheat, as much of the rich Goulburn valley still is. But the day of the sheep squatter in these richer plains is over. One man cannot now be permitted, in the national

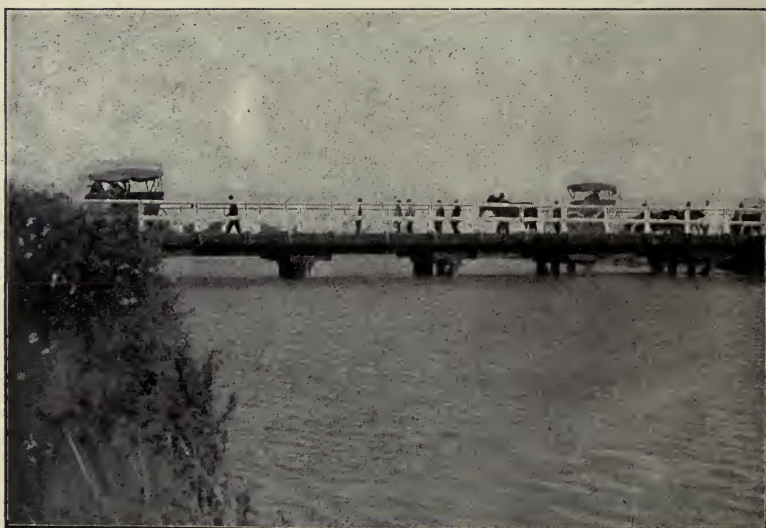
AUSTRALIAN MERINO
STUD SHEEP.



interest, to hold so much fertile country untilled, for his sheep will thrive and breed farther out where the irrigation farmer cannot go. So the older squatter has been bought out or taxed out of his original holding, and the big scrub-dotted plains, which bore no external indication of the richness they held, were cut up into small farming blocks, and the irrigation canals run through them. Shepparton, to-day, with irrigation farming, is carrying three times as many sheep as it did in the days when sheep were its only produce. The old-timers' selections in Rodney, west of Shepparton and east of Rochester, and again on the other side of Rochester, have disappeared. Here are now all small holdings, changing the entire character of the country. In place of a mustering yard and a sheep paddock is a thriving township, with butter and canning factories to handle the newer and economically wealthier produce. Man has conquered Nature by making his own rivers to run where and as he wants.

Water is diverted from the Goulburn River, not southwards in the stream's own direction, but north-westerly in accordance with a slighter landfall. About 110 miles before the Goulburn reaches the Murray a weir is thrown across the tributary stream near the town of Murchison. This weir holds up the water to a height of 40 ft., backs up the river for 16 miles, and impounds 900 million cubic feet. The view looking down stream from the top of the weir is attractive and inspiring. To the right branches off a diversion channel, which runs for 33 miles to Shepparton area; in the centre in the deep river bed is the foaming torrent of the river, which has just fallen over the weir; and on the left-hand runs the big and brimming Waranga Channel. This channel is itself as big as a river; it is 131 ft. wide at the top, 110 ft. at the bottom, 7 ft. deep, and runs for 23 miles to Waranga Basin.

Waranga Basin is the main storage, and holds ten times the amount of water contained behind the Goulburn Weir. Formerly it was a natural depression, the site of many early settlers' homes. But these homes had to go. The depression was wanted for water storage for the new farming, so they scraped the basin a little deeper, and built a heavy stone embankment around its weak north end, and flooded the Goulburn water into it. To-day it is a lake of over 19 square miles. From the storage westwards the Waranga main channel runs out for 100 miles through the new areas, crosses the Campaspe through three great stone syphons at Rochester, and so to Bamawm and finally to the Serpentine Creek, through which some of it drains into the Murray. Ultimately this canal may be carried even further west to the Loddon River. Near Waranga is a large channel branching out from the main Goulburn canal. It waters the Rodney districts lying immediately to the north. The Goulburn-Waranga storage channels supply eight irrigation districts—Shepparton, Rodney, Deakin, Tongala, Koyuga, Rochester, Dingee, and Tragowel Plains. There is 96,800 acres here actually irrigated under irrigation, or more than treble the area of three years ago. At present the chief use to which the ground is put is the growing of cereal and fodder crops for dairying and sheep and pig raising. This procedure is generally necessary with the new settlers, because returns are thus quicker. While the orchards are being planted and the trees are growing to bearing size, the ground



AMERICAN LANDSEEKERS INSPECTING WARANGA (VICTORIA) CHANNEL.

will also grow lucerne and sorghum for the milking herd. For lucerne there is a fine market, apart from the local consumption in dairying. Creameries and butter factories are already established, and, in the near future, canneries for fruit and vegetables will follow.

In dairying, the rule is for the farmers to sell their cream to the butter factories, keeping the skim milk to feed the pigs. A settler on a 40 to 50 acre block, with 20 acres under lucerne, can feed a milking herd of thirty cows, and the returns for cream and from the



TOWNSHIP IN AN IRRIGATION AREA.

skim milk should easily bring in a revenue of \$48.0 a cow per annum. As showing the value of co-operative factories to the farmers, it may be mentioned that the latest-erected co-operative factory at Rochester in five weeks paid the same prices for cream as big proprietary factories were paying, and in addition made a profit of \$825.0, which it returned to the farmers, its shareholders.

The thickest settlement of small farmers at present is in the Shepparton and Rochester districts. Men with \$1440.0 or \$1920.0 capital from all parts of the world, but chiefly from the British Isles and United States, are settling on the 30, 40, 50 or 60 acre irrigation blocks into which the Victorian authorities have subdivided the big estates. The total irrigable area of these Goulburn district settlements is 374,000 acres, of which about 140,000 acres are at present being farmed.

Other irrigation areas in Northern Victoria are situated on the Murray below the Goulburn Junction, at Kow Swamp, Cohuna, Nyah, and at Merbein, near Mildura. These are not so far advanced, however, as the Goulburn district works. Kow Swamp holds nearly 2000 million cubic feet of water available for summer use, chiefly by pastoralists. At Cohuna water is procured from the Murray by pumping; about 20,000 acres there is watered, 5000 for lucerne and other green fodder crops, and the remainder for cereals and pasture.

In the south at Werribee, 17 miles from Melbourne, a smaller area of 7000 acres is ready for settlers. It is watered by a reservoir on Pyke's Creek, and the fact of its being close to the capital city offers an excellent market for fruit and vegetables. The Government has established an experimental farm here of 1200 acres, to grow rotation crops for research work only. Farmers consult the manager for guidance in their own seeding, especially with lucerne.

A DAM TO RIVAL ASSUAN.

The biggest irrigation scheme Australia can show in one district is on the Murrumbidgee in New South Wales. The Murrumbidgee is the chief New South Wales tributary in the Murray system, and



A GREAT ENGINEERING PROJECT—BURRINJUCK DAM, NEW SOUTH WALES.

the New South Wales irrigation authorities are just completing storage works on this river nearly equal in volume to those at Assuan, on the Nile.

The Murrumbidgee is a long, narrow, well-fed river, that rises in rugged granite mountains near the site of the new Federal capital city. For quite one-third of its course it flows in deep gorges among the almost impenetrable fastnesses of the Murrumbidgee Ranges. These are round solid granite knobs, 3000 or 4000 ft. above sea level, and their summits are often hundreds of feet above the bed of the river. These valleys hold some of the finest scenery in Australia. Near Gundagai it leaves the mountains, and after passing through the lovely orchard country of the Wagga and Tumut district, reaches finally the broad open plains of the Riverina. Crossing these plains, it reaches the irregular stream of the Lachlar

River, flowing from the north-east, and 60 miles later the united waters flow into the Murray.

The Riverina plains between the mountains and the Lachlan Junction is the area now being settled by hundreds of small farmers on irrigation blocks similar to those already described in Victoria. The shorter name for the Murrumbidgee irrigation area is Yanco. The Yanco Estate was formerly the huge sheep run of one of the biggest squatters in Australia, Sir Samuel McCaughey. Sir Samuel still lives in a beautiful country house on part of his estate, but he has sold the greater portion of it to the New South Wales Government for closer settlement.

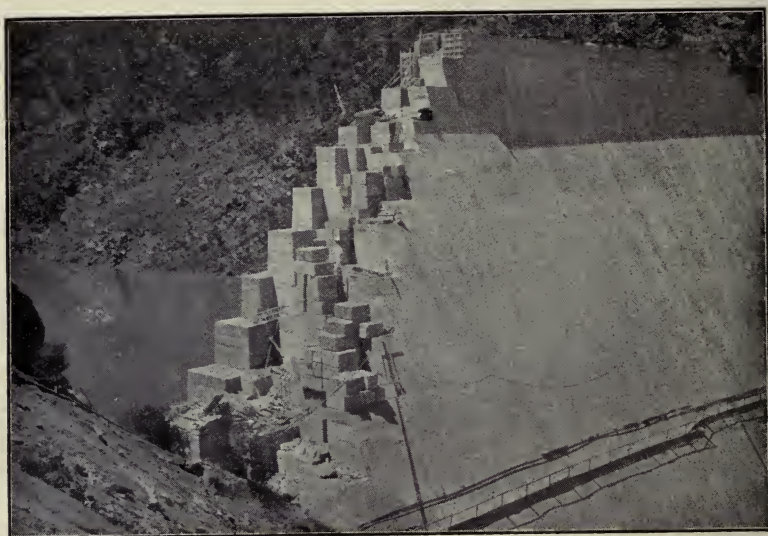
The engineering scheme is on a mighty plan, but really simple enough. It is to dam off the river up in the mountains, and regulate the flow down its bed to the diversion weir in the plains below. The dam has been building for over four years, and is now nearly finished; nearly two years ago its construction was sufficiently advanced to begin irrigation. The site of the dam—Burrinjuck—might almost have been designed by Nature for this very purpose. Two great granite hills at this spot force the river through a deep and narrow gorge between them; their names are Black Andrew and Barren Jack, and Barren Jack is the English corruption of the original native name of Burrinjuck (or Burrinyuck), which has been restored to the dam itself. It makes a striking landmark in the



VIEW OF BURRINJUCK, NEW SOUTH WALES

distance—the solid, white, and comparatively puny wall between the two towering brown rocks which Nature put in for gateposts. Yet the Burrinjuck Dam can hardly be called puny. It is 240 ft. high, and its width is 160 ft. at the river bed and 18 ft. at the crest.

The wall is curved in plan to a radius of 1200 ft., and its actual length at the top, with the spillways—between hillside and hillside—is 780 ft.



VIEW OF WALL OF BURRINJUCK DAM.

The Burrinjuck Dam will ultimately impound over 33,000 million cubic feet of water in the rocky gorges of the upper riverbed behind it—an inland sea bigger than Sydney Harbour, and nearly as big as the reservoir behind the great Assuan Dam in Egypt. The stored water will cover 13,000 acres, in the beds of the Murrumbidgee River (backed up for 41 miles from the dam), the Goodradigbee River (for 15 miles), and the Yass River (for 25 miles). These two other rivers join the Murrumbidgee just before it reaches the Burrinjuck gorge. The storage waters are gradually spreading over the lower fringe of green meadow flat abutting on the river, and rising up the rocky sides of the hills which hedge the valley in; and when the lake has reached the full size planned, it should be one of the favourite resorts for the sportsman of the gun and the rod. Wild duck are already numerous there. An American authority on angling, writing recently on the Burrinjuck lake as a fishing resort, estimated that, if it were stocked, 11,000 tons of fish could be drawn annually from its waters.

Water is not diverted on to the land from the dam itself. From Burrinjuck the flow is regulated down the river bed for 200 miles to Berembed, near Narandera, at the beginning of the Riverina plains. At Berembed a diversion weir has been built, and the spot was favourable to engineers, for here a spur of granite from a neighbouring small rise crosses the river bed, and provides the required foundation.

From Berembed a diversion canal takes off from a natural creek north and north-west towards Gunbar. The rolling wheat downs from Junee to Narandera have given place to a level fertile floor, with only the suggestion of a rise in it here and there. This is the Yanco area, and the Gunbar canal runs through it. The extent of country ultimately irrigated at Yanco will probably be about 250,000 acres of first-class land. There is enough water available to turn these vast plains into a glorious garden. And in a few years that garden will begin to appear. Already from the top of the Leeton water tower one can see stretching out on every side neat squares of green, strict rows of young trees, and small white houses irregularly dotted about them, the whole scheme held together by long bright glancing canals which run right across the picture.

As in the Victorian settlements, and indeed all along the Murray valley, so here, too, the climate is unsurpassed from both an agricultural and a health point of view. The summer heat is dry, and has no enervating effect, and a man can work throughout the hottest days without bodily discomfort. Plant growth continues throughout the whole year. There are no stock diseases or fruit pests. The absence of rain—should there be one—does not matter. So great an authority on agriculture as Sir Rider Haggard, when he visited Yanco last year and addressed the settlers, said of these areas:—



AN EXTENSIVE VICTORIAN IRRIGATION SCHEME.

“I want to speak a few words as to what a neighbourhood you have. I have been this morning for miles round the Experimental Farm, and I have seen many of the blocks of land which have been taken up, and I can only tell you that I, who have had some experience in these matters, and have studied the development of many

lands, temperate, sub-tropical, and tropical, have never seen, I think, more beautiful land, or land which responds more quickly to any reasonable treatment or sufficient supply of water. . . . You are blest with a wonderful situation. You are fortunate in having a Government that is helping you in every way in regard to buildings, the terms on which you take up the land, and in the provision of water, and I am sure it only rests with yourselves to make a success of your residence here as farmers."

At present there are about 600 irrigation farmers at Yanco settled within eighteen months on holdings aggregating nearly 30,000 acres. The only township in the area is Leeton, which is growing with the famed rapidity of towns in the American west. Other townships are planned for other parts on the huge area, and sites are already available for the town of Griffith, in the Mirrool district



MIXED FARM.

of the Yanco. Leeton district is connected by railway at Yanco siding on the Hay-Narandera line, and the Mirrool end also will have a train service in the near future with the Barellan line. Ultimately no farmer on the Yanco area is to be distant more than 10 miles at most from the railway, and in the future—one is tempted to prophesy it of the near future—the Yanco farming area will be the heart of the agricultural area of Australia.

THE SOUTH AUSTRALIAN VALLEY.

The only other State of Australia which derives any benefit from the Murray River system is South Australia. The Murray flows for the last 450 miles of its course through this State. There are no more tributaries after it crosses the border into South Australia, and consequently no more schemes of the sort described in

the two upper river States. The South Australian irrigation settlements are not so big as those in the upper river States, but are more numerous, and are dotted along the banks of the river from the State boundary to the ocean.

To a certain small extent land is irrigated by gravitation in South Australia—that is, on reclaimed flats in the lower reaches, where the water is shut out by means of levees. Between Lake Alexandrina (into which the Murray discharges) and Mannum (46 miles above) there are 25,000 acres of swamp flats which can be, and are being, reclaimed and used in this way. The soil has proved very rich and fertile. There is at present 1924 acres (117 blocks) of this reclaimed land under cultivation. At Mypolonga, near Murray Bridge, the reclamation of 1883 acres is nearing completion, and a pumping plant is being erected for supplying the high land also with water for irrigation. This area, comprising 1270 acres, will be subdivided and allotted with the adjoining reclaimed lands. Included in other fertile swamps now being reclaimed are:—Pompoota, 563 acres; Wall, 466 acres; and Swanport, 116 acres.

But in the main irrigation by gravitation is not possible in South Australia, and the water has to be pumped from the river to the gardens on the banks. This entails a heavier water rate per acre, owing to the cost and maintenance of pumping machinery. But results are not much different, and the science of irrigation farming is spreading quite as rapidly in South Australia as in New South Wales and Victoria.

The outstanding evidence of its fertility which the Murray valley shows in this State is the irrigation settlement of Renmark. Renmark, as has already been said, was founded by the Chaffey's



VINEYARD, RIVER MURRAY IRRIGATION.

as one of the two earliest irrigation settlements in Australia. It is worth noting that Renmark was settled almost entirely by colonists direct from England, and that only in recent years was there any

considerable influx of settlers from other places. It is almost an English garden village. As an instance of how the virgin wilderness can be converted into a happy garden, it is as well worth quoting as any in Australia. Its total area is not 6000 acres, yet it supports a population of 2500 souls, and produces fruit worth, last year, about \$816,000.00. The fruit grown here, as at Mildura, is for drying rather than canning. The largest harvest is in grapes and currants, but there are 250 tons of dried apricots produced annually as well as other stone fruits—peaches, nectarines, and plums. Pears also pay very well. Probably most renown abroad has been won, however, by Renmark navel oranges, which grow as big as a baby's head, and have been declared to be the finest oranges ever seen in Covent Garden.

Below Renmark there is 6200 acres of irrigable land at the new settlement of Berri, of which 88 blocks, containing 1743 acres, have



A GROUP OF AMERICAN LANDSEEKERS.

been allotted to farmers. The Government has here established an irrigation farm of 80 acres for experimental work. Lower down the river, at Lake Bonney, the Cobdogla irrigation area is under survey. Here it is proposed first to deal with 3000 acres on the 40-ft. level, to be followed by 8500 acres at an 84-ft. lift, and 6800 acres at 100-ft. lift. The whole area will be irrigated from Lake Bonney, where sufficient water can be impounded to supply the full area of 18,300 acres. The Waikerie irrigation area, consisting of approximately 2500 acres of irrigable land, divided into 115 blocks, has already many flourishing orchards—the remnant of an earlier communistic village settlement. It is anticipated that at no distant date there will be one continuous irrigation area from Overland Corner to beyond Renmark (approximately 100 miles) with the bulk of the back lands, above the irrigation contours and within reasonable

distance of the frontage, used for dry farming and stock running. On the opposite bank of the river, near Renmark, are Lyrup and Loxton, the centres of thriving wheat districts in the back country behind them. Lyrup is the last remaining of the communistic village settlements founded in 1894, but is mostly held by farmers individually. It is a flourishing area of 500 acres of orchards.

IRRIGATION SCHEMES IN OTHER STATES.

Western Australia.

Western Australia is expected shortly to begin on a scheme for a number of small irrigation settlements on several coastal rivers in the south-west. This locality has an equable climate all the year round, though the land is rather heavily timbered in most parts as compared with virgin country in the eastern irrigation settlements in Eastern Australia.

The best example of irrigation at present in this State is on the Harvey River, where there is about 1500 acres under orchard and other cultivation by this means. It is considered by experts to be specially fine country for citrus trees. Stimulated by the examples of Victoria, New South Wales, and South Australia, the Western Australian Government is proposing to impound water in four small rivers in the coastal district to the south of Perth—the Collie, Murray, Serpentine, and Brunswick—where there is about 450,000 acres suitable for irrigation. On these rivers the scheme is for ten weirs to conserve in all about 7000 million cubic feet.

The scheme was hung up last year through the failure in the Upper House of the State Parliament of a Government measure to grant all water rights in the rivers concerned to the State authorities. This obstacle, however, is not expected to be permanent.

Queensland.

In Queensland, where cattle-breeding and sugar-growing are the chief farming industries, irrigation has been tried to a certain extent among the sugar canes, though the rainfall is heavier in these more tropical latitudes, and irrigation is therefore not so necessary. In the Bowen and Lower Burdekin cane districts especially the annual rainfall is not adequate as a general rule; consequently, it has been found necessary to irrigate pretty freely. In the Bundaberg district only a few of the large growers went in for irrigation, whereas in the Lower Burdekin and Bowen districts the number of irrigators and the areas irrigated are fairly large.

The irrigation plants on Bingera, Fairymead, and Qunaba plantations (Bundaberg), and on Pioneer and Kalamia Estates (Lower Burdekin) are on a somewhat elaborate scale. In the Bowen district the water is raised from the Don River and Euri Creek by means of centrifugal pumps driven by oil engines, and distributed over the land through galvanised iron piping. The crops raised comprise citrus and tropical fruits and vegetables.

The proprietors of the Pioneer and Kalamia Estates (Lower Burdekin) render liberal assistance to growers, who realise the necessity of irrigating their cane areas. The utility of growing cane by irrigation was forcibly impressed upon one grower in this



THE HARVESTER AT WORK

district by practical results. Previously his crops were generally unprofitable, but, encouraged by the experiences of his neighbours, he decided to accept the assistance of the millowners, who fitted up a plant for him at a cost price of between \$1440.00 and \$1920.00, the payments extending over a number of years. From the first season's crop this grower increased his yield by fully 75 per cent., and as a result realised a substantial profit. To-day there are 121 growers irrigating an area aggregating 5590 acres in the Lower Burdekin district.

The irrigation plant on Bingera plantation was installed in 1901 at a cost of \$144,000.00. The water is pumped from the Burnett River into a reservoir of 8,000,000 gallons, whence it is distributed by natural gravitation through pipes and open drains. There has been no necessity to use the Bundaberg plants for some years owing to the prevalence of good rain seasons.

About 2000 acres of cane are irrigated on the Fairymead plantation.

Steps are being taken by the State Government to create a water trust in the Lower Burdekin irrigation district.

Tasmania.

Tasmania, southernmost State of all, is blessed with a rainfall all over its surface, which would make artificial irrigation absurd.

HOW THE IRRIGATION SETTLER BEGINS.

For the most part the irrigation areas which have been described are closer settlement schemes under Government-control. Indeed, it may be said that all the young settlements are to-day Government settlements. This is necessarily so, for the State Governments, without exception, have in recent years bought up many large private holdings for subdivision into closer settlement farms, and especially has this been the case on the river frontages.

The areas of the settlers' blocks are usually between 30 and 60 acres, with 50 as an average. This land is ready to be connected with the neighbouring main irrigation canal, but the settler must himself clear it of timber, fence it, and provide it with his own private watering channels. Photographs taken on the spot and herein published show what this country looks like. In no case is the country heavily timbered, and frequently the clearing is the lightest work of all, especially where the trees are already dead.

If the settler has capital enough he can, of course, hire labour to clear and fence his land, plough it, grade it, put in his channels, &c. He will be best advised to do this himself, however, wherever possible for at least five reasons:—(1) He will find generally that, however much capital he may start with, he never does have money



SURVEYING IRRIGATION AREAS.

he can easily spare for this luxury; (2) by doing it himself he is teaching himself, and is acquiring an added satisfaction with his own work any way; (3) he will find that all his neighbours do their own grubbing work, and they like him better if he does his; (4) he

can get advice as to how to proceed readily enough from Government inspectors, who prefer to see a man who can help himself; (5) he is making capital all the time, for the Government will advance him money on such improvements shown.

It is unwise of any settler leaving England or America to chose his block before he sails, and require a house to be ready built for him when he arrives. In 99 cases out of 100 when he reaches his new home he finds he would rather have had some other block, or have had the house in some other position. Setting out in such a way he cannot expect to be thoroughly satisfied, and many English settlers' grievances in the new country have originated in just this fashion. Let him have his house built by Government contract if he wishes, but let it be after he arrives, and has settled his preliminaries on the spot. He will probably like to see other



VIRGIN LAND

settlers' houses first. Until his house is ready he can live, and live comfortably, in a tent. The Australian climate makes this not only easy, but even pleasant. And, once again, a strong reason for doing so is that most Australian settlers do it.

As for the other work, the clearing and fencing, he should do it himself, with hired assistance if necessary. When performed entirely by employed labour, clearing costs anything from \$1.20 to \$7.20 per acre, fencing costs about \$8.00 a chain, channelling \$0.36 to \$0.48 a chain, and grading and seeding for lucerne from \$14.40 to \$19.20 an acre.

If the settler has this work done for him a 50-acre block will probably cost him—before he begins to feel it his—\$72.00 or so (at first) for clearing, \$216 for fencing, \$72.00 for channelling (with

cost of regulators and sluices), and \$192.00 for grading and seeding 10 acres of lucerne, or \$462. This total must not, however, be taken as correct in all cases. The cost of clearing varies considerably with the locality. The house will cost him another \$720.00 or \$960.00 at least, and over and above this he will have his implements and horse and cows to buy, and himself to keep while he is waiting, and his water rates and rent to pay on the land.

Again, it should be emphasised that the settler will find he can least spare money to pay for any of this work which he is able, by energetic effort, to do for himself. The sooner he can feel himself his own master, the better. From the timber he removes he can cut his own posts for fencing. The fencing wire he can generally buy on terms from the Government. Inspectors will help him place the channels and advise him in the grading.

These foregoing remarks apply to both Victoria and New South Wales irrigation areas. The statements are necessarily very general. There is, practically speaking, very little financial difference between the two schemes. There are a few differences in detail which the intending overseas settler should examine closely for his own satisfaction. He can obtain these details from the State Governments themselves and compare them.



AN IRRIGATION FARMER'S HOME.

New South Wales.

The Government authorities will build the settler's house for him, also any sheds he may require, the limit of expenditure by the Commissioner being determined according to the size of the farm. This assistance in the way of building is to be paid for by deposit of

10 per cent. of cost, the balance by twenty half-yearly instalments, interest at 5 per cent. being charged. Should the settler elect to build his house himself, material may be obtained on similar terms, the deposit being 5 per cent. He may have carried out for him,



WHEAT BEING CARTED TO RAILWAY STATION.

up to a maximum cost of \$264.00, ploughing, grading, head ditching, or other agricultural work. Fencing posts are obtainable on ten years' terms. Trees are available, deposit one-third of cost, balance by two annual instalments, with interest at 5 per cent. Cows may be purchased at auction, deposit \$7.20 per head, balance by monthly instalments of \$2.40 per head.

The average cost of clearing land at Yanco is about \$7.20 an acre. The unimproved value of the land there varies from \$72.00 to \$144.00 an acre, and the rental is at 2½ per cent. Thus the annual payments, it will be seen, amount to practically the same as in Victoria. The tenure is perpetual leasehold, with reappraisal after twenty-five years. Settlers have full rights to improvements and transfer. If, after he has been there for some time, the settler wishes to sell out, he can get full value for his work and improvements and his standing crops from the incoming purchaser. The purchaser from him pays for these, and simply continues the annual unimproved value rental to the Government.

The water rate is \$1.20 the acre foot. This charge is reduced by half for first year, increasing yearly by \$0.12 per acre foot to the full charge, \$1.20. These charges for water will cover all the requirements of the settler, both for stock, domestic, and irrigation purposes.

Victoria.

The Government authorities will, as has been said, undertake a certain amount of initial work for a new settler, such as channelling, grading, and seeding, house-building, and procuring dairy stock. But the amount of work the Government will do for him in this way is limited, and necessarily so. No settler can ever become a farmer by deputy; and besides, even on terms, this all costs money. If the settler does his own clearing, fencing, channelling, he can in three or four months' time call in the Government inspector to calculate the value of this work, which all ranks as improvements. Even the smallest and roughest shed he builds for his tools, or to shelter his horse or cow, will be accounted as an improvement. In this way he ought certainly to be able to show \$576.00 worth of improvements on the virgin country, and the Government will advance him in money 60 per cent. of these improvements, or, say, \$345.60. The money thus advanced is to be repaid on fifteen years' terms. The superior advantage of receiving \$345.60 over having to pay \$576.00 needs no pointing out. With the \$345.60 the settler can buy stock, or trees with which to plant other portions of his 50 acres.

The cost of clearing in Rochester and Shepparton districts is very small, and often \$1.20 an acre will pay for it. This is where the only timber is old, ringbarked, dead stuff. The land is valued at from \$38.40 to \$72.00 an acre unimproved, and the settler buys



HORSES ARE EASILY KEPT IN GOOD CONDITION WHERE LUCERNE IS AVAILABLE

it at that price. His annual payment represents about 6 per cent. per annum on the unimproved annual value, and he pays for the land in $31\frac{1}{2}$ years of instalments. He then gets the freehold. The annual water rate is in most districts \$1.20 for each acre foot, and

there is also a small extra levy for stock and domestic rate. (The water rate at Werribee is at present \$4.80 an acre.) Fifty acre feet (which means using the equivalent of 1 ft. deep of water all over the 50 acres) thus costs $50 \times \$1.20$, equal to \$60.00 a year.

South Australia.

There are again some slight differences in details of settlement and advances. Each State Government, the settler should remember, is doing this closer settlement work at cost price, in the interests of increasing the farming area, and the cost price does not greatly vary all along the river. The State Governments have all developed finance of advances to settlers to a fine art. If the intending settler procures full particulars from each State, and works them out, he will find that he can get Government money to start with from each of them on very much the same terms, and there are no terms so cheap anywhere else in the world to-day.

FIRST CROPS OFF THE
VIRGIN LAND.



The water for irrigation in South Australia, for instance, costs more—having to be pumped—and the rate is \$7.20 per acre foot. But for the first year only a quarter rate is imposed, and not till

the fourth year does the full rate come into force. In South Australia, too, a local advisory board assists in the general management of the settlements, although this is under the direct control of the Government. Four members of the board are block-holders,



VIEWS SHEWING
BENEFITS OF IRRIGATION
IN
CULTURE OF LUCERNE
AND
FRUIT TREES.



elected by the general body of local lessees, and the fifth a competent Government officer, who is appointed Chairman of the Board. There is no such Board in the other States. In assisting the settler to carry out primary improvements the Government may advance him up to \$72.00 per acre for the purpose of making improvements under a first mortgage of his block to the Minister, and repayments are over twenty annual instalments. Or the Government will advance up to \$2880.00 on improvements already effected.

In each State small areas of dry country outside the irrigation blocks may be obtained by irrigation farmers who want room to run stock on. No settler can take up more than one irrigation block, though in the case of a family there would be nothing to prevent sons and daughters over 18 years of age each having an adjacent 50-acre block, and this is frequently done.

THE FIRST YEARS.

There is an obvious difference between the applicants from oversea for these blocks in the closer settlement irrigation areas, and the applicants at home in Australia; the Australian has generally experience of the farming conditions obtaining, and the new-comer from overseas has not. But this difference is considerably exaggerated, and in actual working fact does not amount to much.

The immigrant farm settler wants to know how much the venture will cost him before he begins to recoup himself from the land, and how he should proceed to reach that desired state by the shortest possible route. Now, much depends on the settler's character. One man with \$2400.00 may fail where another with \$480.00 would succeed. And this, of course, is true of all business undertakings. Asked to decide such probabilities for an inquirer, an adviser can only produce actual examples of what men have done. But if the intending settler has grit and industry, and some idea of business economy, he can begin with \$1440.00 on these Australian closer settlement irrigation areas to-day, and in six years' time or so find his block returning to him \$1440.00 or \$1920.00 a year. This statement is made on the carefully-considered estimates of the authorities in charge, whose careers depend on the success of settlers. The first three or four years will be no light work for the settler, but it is healthy, and he is his own master; and when the first pioneering stage is over he can afford to sit back and rest.

At another page will be given the personal stories obtained on the spot from new farmers themselves within the past few months. They are the best possible means of explaining to the new-coming settler what life and work is like. Meanwhile some general idea of procedure can be given as a rough guide to the man who has never been through it.

The new settler, having visited various localities with special railway facilities which the State authorities have made for him, selects his block of land. There are Government officers in each district to help him over the first steps in preparing it. They will advise him that during the first three years, at any rate, he can expect no return from fruit trees, and therefore he should carry on some other sort of farming while his fruit trees are coming into bearing. They therefore advise the growing of lucerne (alfalfa) and dairying. Lucerne seed costs about \$0.36 a lb., and 10 to 12 lbs. are required for the acre. Some other fodder crop to go with the lucerne—millet or sorghum—should also be planted. Millet seed costs about \$0.48 a lb. Good cows can be bought for about \$38.40 a head. The Government will advance money on improvements with which the settler can buy cows, or they will buy him cows on a stock mortgage—that is, he must pay back the cost of his cows by instalments, and cannot sell the stock again till he has paid to the Government the cost of them. Each cow properly fed should return him \$1.44 or \$1.68 a week in cream; and on an average a cow is in milk for seven months of the year—that is to say, a cow ought to pay its cost before the first year is out. The co-operative butter

factories, which exist in every district, pay \$0.20 or \$0.22 a lb. for butter fat—1 lb. cream can be obtained by separator from about 2½ gallons of milk—and if the farmer is a shareholder in the factory, as he should and easily can be, he will also get a dividend on profits. To what extent butter factories have improved conditions for small dairymen will appear later from the examples quoted.

In addition to profits from the butter factory, the settler can expect to sell part of his lucerne crop, and lucerne hay is often worth \$14.40 or \$19.20 a ton. Every three or four years, Australian farmers declare, lucerne goes up in price, and the man who has a good store of it can sell for \$28.80 a ton.

Lucerne grows best with a moderate watering frequently applied and good sun. In many cases lucerne crops which were seeded in the spring have given astonishing results six or eight months later. It

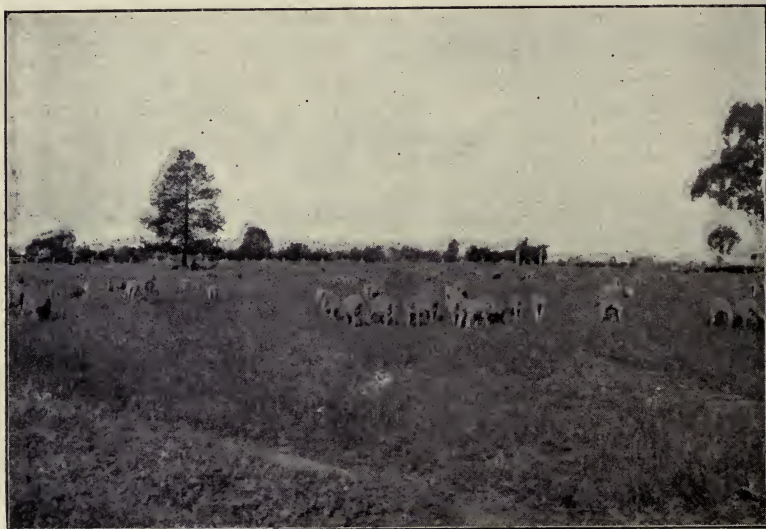


FIRST YEAR'S CROP OF LUCERNE HAY.

can be cut six or seven times in a season, and grows better with every cutting. In six weeks in the summer lucerne will grow up from the shaved stubble to a luscious green crop 3 ft. high. For the first two or three cuttings after seeding the yield is, of course, small—only 5, 7, to 10 cwt. to the acre. But, if properly tended by the first cutting in the second season it may probably yield a ton. Lucerne is undoubtedly—both of itself and through the stock it will develop—the quickest money-making plant any ground will grow in the world.

The irrigation farmers to-day in Australia are breeding cows, horses, sheep, pigs, chickens, ostriches—all on this same fodder. A blockholder who has 10 acres of lucerne carefully seeded and cultured will have no fodder worries, and often must hire labour to help him to get one cut crop in before the next grows up. He does

not care if it never rains at all, or if all the natural grass dies. His water is always assured from the channels, and his lucerne, once started, grows itself. He can work the land to any limits if he manures it from time to time.



SHEEP GRAZING ON LUCERNE.

Some farmers who weary of the eternal milking of cows have tried fattening sheep instead in their lucerne paddocks. They buy store sheep, and sell them fat six weeks later. I have seen several men making a handsome profit in this way—buying sheep for \$1.08 to \$1.44, and selling them fat for \$1.92 to \$2.40. But this would not pay so well if everyone went in for it, and, anyway, the success depends on getting the market right at each end of the transaction, which in turn means acquaintance with the farmer's own district and surrounding districts as well.

There are two ways of feeding lucerne to stock—as cut dried hay, and by turning the animals loose on to newly-growing stubble. The settler should not turn stock on to the ground until the lucerne roots and plants are well established and a year old, and then, too, it will mean his subdividing his lucerne ground into small paddocks. He will probably do this, anyway, in course of time as his farm grows.

Pig-raising on lucerne and as an adjunct to dairying is a most profitable industry in the irrigation areas. The officer-in-charge at Rochester has stated that farmers will frequently say, as they come in to pay their rent cheque: "I paid for this out of my last four pigs, Roy." One irrigation farmer interviewed said he had bought a breeding sow, and in fourteen months had made \$219.00 out of the progeny of this one animal. The pork export trade of the United States—so large has American home consumption grown—

has decreased rapidly during recent years, till to-day it is almost nothing at all, and there is no reason why Australian farmers should not step in to take America's place.

Poultry-raising is also profitable when conducted on a sufficiently large scale. A notable experiment is the breeding of ostriches on the irrigation farms. The initial purchase of the birds requires more capital, perhaps, than the \$1920.00 farmer could obtain, but the results are wonderfully successful. One man only so far is ostrich-farming on Yanco area, and he cuts his birds' feathers three times in two years, and gets about \$33.60 worth of feathers from each bird at each cutting. He keeps eighty birds on 60 acres of lucerne.



OSTRICH RAISING ON LUCERNE.

In such ways, then, can the irrigation farmer keep the pot boiling while his block is maturing and his young fruit trees are growing. Apricots, peaches, nectarines, plums, and oranges will bear well in the fourth year, and return a fair crop even in the third. Their best years are after six. Vines will produce in the second year, especially sultanas and currants, and give good crops in the third year. It is not possible to quote fruit yields in the new Government irrigation settlements, for nowhere are they yet three years old, and the areas at Yanco and Rochester are barely two years of age. Most settlers, after getting their lucerne started and their dairy herd going, have gradually been putting in fruit trees during the

first eighteen months on their blocks. It is when these begin bearing that the farmer can see his profits assured, and feel himself a man of substance.

Some of the fruitgrowers of Ardmona, a sixteen-year-old fruit irrigation area near Shepparton, are worth \$96,000 and \$144,000 to-day. Oranges often yield an annual profit of \$192.00, or \$240.00 an acre, at Renmark and Mildura, other old-established fruit areas. Sultanas and currants, properly cultivated and worked, can be made to return just as much. This is not to say, of course, that they always do; but it is possible, and it all depends on the farmer. Where Nature does so much for him the farmer is apt to grow lazy.



1 and 2.—TWO-YEAR OLD PEACHES.

3 and 4.—ONE AND TWO-YEAR OLD SULTANAS.

From peaches, apricots, and plums, taking an average orchard, a gross return per acre of about \$120.00 is shown in the fifth year. It has been estimated by practical fruitgrowers that a low calculation is \$96.00 per acre net return for apricots, peaches, plums for drying, pear and apple for export and local use; \$120.00 per acre for citrus (orange chiefly); and from \$72.00 to \$96.00 per acre for currant, sultana, and raisin grapes when in full bearing.

An orchard in full bearing in the irrigation settlements will fetch anything from \$480.00 to \$960.00 an acre. Let the settler contrast this with the \$48.00 to \$72.00 an acre, for which he can buy the original land.

At Renmark and Mildura—irrigated fruit areas of 5000 and 12,000 acres respectively—the value of the annual produce of dried apricots, peaches, pears, raisins, and currants is about \$2,736,000.00 per annum. But this does not take into consideration lucerne and fodder crops, and the orange and olive orchards—and these settlements are noted for their oranges—also are naturally not included. A fair estimate of the “dried fruit acreage” at these two places would probably be 70 per cent. of the whole 17,000 acres, or 12,000 acres, which makes the annual yield of the “dried fruit acreage” about \$240.00 an acre.

The Government irrigation areas will probably not dry their fruit produce, but can it instead. The State authorities are constructing canning factories for both fruit and vegetables, and these factories will in time be taken over by the farmers on the co-operative principle, just as the butter factories have been. No private firm or trust will be allowed to deal with the produce of these settlements, and make dividends for themselves out of the farmers' hard work. The New South Wales Government has already built butter, bacon, and canning factories at Leeton (Yanco). Similar factories are planned for Rochester and Shepparton in Victoria.

Vegetable-growing, too, is well worth while at these places, especially on the smaller blocks near the town. Several farmers at Bamawm, near Rochester, are making a handsome living already by growing cabbages, potatoes, onions, peas, and beans for the township and the surrounding district. One man made \$384.00 last



THE IRRIGATION FARMER MAKES A START WITH DAIRYING.

year out of a strawberry bed of half an acre. At Yanco special “workmen’s blocks” of 2 acres, placed nearest in to the township, have been divided off, and the idea is that ordinary labourers, who do not wish to take up irrigation farming on a bigger scale, but

prefer to stick to their trades of carpentering, smithing, or whatever it may be, shall be able to have these small irrigation blocks, and grow vegetables in their spare time. It has been found that these 2-acre workmen's blocks are specially in demand, and at Leeton district to-day there is not one left. The rush is likely to be repeated at Mirrool (another part in the Yanco area) as soon as that township is ready to be built.



A CO-OPERATIVE DAIRY FACTORY.

At Yanco, too, another innovation is tobacco-growing. Two English farmers are cultivating it, and another settler, who has had tobacco experience in South Africa, has a large area under tobacco, and has erected a drying kiln and curing sheds to deal with his own and neighbours' produce. The growth of the crops is certainly encouraging so far. The time of planting was largely experimental in the first year, but it is now evident that the best time to set out tobacco plants is in the middle of October. It comes off in four months, and the land may be used during autumn and winter for other crops. Considering the great demand for tobacco in Australia, and the quantities of the leaf imported, it seems that tobacco is likely to become a highly payable auxiliary crop on the Murrumbidgee areas. The returns are calculated at between \$240.00 and \$288.00 per acre.

As regards prices of stock and implements, a Rochester grower has furnished the following estimate:—

| | | | | | |
|---------------------------|----|----|----|----|----------|
| One horse | .. | .. | .. | .. | \$120.00 |
| One plough | .. | .. | .. | .. | 21.60 |
| One harrow | .. | .. | .. | .. | 14.40 |
| One cultivator | .. | .. | .. | .. | 12.00 |
| One cart | .. | .. | .. | .. | 48.00 |
| Harness, two sets | .. | .. | .. | .. | 48.00 |
| Good cows (each), about | .. | .. | .. | .. | 33.60 |

An equipment of cream separator and buckets, new, costs about \$144.00, but these can often be bought second-hand for much less. Stock, as has been said before—and implements, too, for that matter—can be bought on money advanced by the Government on improvements made. It need not represent the settler's own capital.

EXPERIENCES OF MEN ON THE SPOT.

The following stories were got from men on the spot in November and December, 1913, on the irrigation farms in Northern Victoria and Yanco (N.S.W.). These are the most advanced of any Government closer settlement irrigation schemes in Australia:—

H. L. Clarke (from Attleborough, Norfolk), Bamawm, Rochester, Victoria.—Block valued at \$55.60 per acre unimproved; has 35 acres—12 acres lucerne, a few young trees, 10 acres wheat and maize, 10-15 acres untilled. Keeps five cows; yield about \$1.68 each a week in cream. Came to Australia four years ago with \$240.00. Worked for two years on sheep and cattle stations in New South Wales back country. Saved \$480.00 from wages, making \$720.00 capital. With this moved to Victoria. Went to friend in Bamawm settlement and took up block near by. Knew nothing about irrigation; worked for six months with friend on friend's block. Lent



IRRIGATION FARMERS CAN ESTABLISH A HOME AT A MINIMUM OF COST WITH GOVERNMENT ASSISTANCE WHERE NECESSARY.

friend money, and in this way lost all but \$120.00 of original capital. Clarke then left to work own block. Clarke, who married in the meantime, had only small two-roomed house on his land. Went on to land with \$9.60 in pocket; \$96.00 of \$120.00 he spent in buying little furniture, farm tools, and second-hand separator, also an old horse for \$14.40. While he cleared land

Government put in 10 acres lucerne for him on terms. Split his own posts from timber on land, and erected his own fencing. By March, 1913, had taken three cuttings from the lucerne—19 tons in all, which he sold for \$230.40. Also sold some posts and firewood from cleared timber. Got five cows on advance terms from Government on improvements shown. Between March and June worked for six weeks at neighbour's hay-press for \$1.44 a day wages, and at night time, on return home, continued clearing his own block and attending to lucerne by moonlight. Estimated it cost him and wife together \$6.00 a month on living necessities; neighbours were kind, and often gave them vegetables and lent implements. In November, 1913, had stack of 10 tons lucerne from last cutting and 20 tons which he was then cutting—2 tons to the acre. Crop so heavy he could hardly harvest it himself. Reckoned by March, 1914, to discharge current debt to Government. Intends to run more cows, also pigs. Will plant orange trees in wheat paddock when wheat taken off.

H. Leopard (from Canada), Ballandella, Rochester, Victoria.—Block of 38 acres—15 acres lucerne, 5 fruit, rest barley, oats, maize. Came three years ago with \$1320.00. Brought wife with him. Cleared and fenced land himself. First year bought ten cows from Government on terms to keep himself going. Now has thirteen cows and several calves. Is gradually weeding out cows, and building up fine herd; average return, \$1.20 a week. Intends to increase herd to twenty-five. Bought mare for \$81.60; exchanged first filly from her



FIRST STAGE OF SETTLER'S HOME.

at two years old for a gelding worth \$115.20. Has now another foal at foot. Whole area is thoroughly cultivated. Estimates his fruit block is worth \$96.00 an acre. Is to-day only \$216.00 in debt to Government. Says until co-operative factory was started got

only 38 per cent. test of cream from proprietary firms; with co-operative factory test jumped up to 54 per cent. at once. No previous experience of irrigation.



WHEN THE DAY'S WORK IS O'ER.

W. W. Vickers (from Derbyshire), Ballandella, Rochester, Victoria.—Came two and a-half years ago with \$1440.00, wife, and two young boys. Was bridge builder by profession; had experience of irrigation in India. Has 67 acres—47 lucerne. Unimproved value of land was \$54.00 per acre. House cost \$1270 on terms. Government put in 10 acres lucerne, while he did own clearing and fencing. Has stock of 27 tons lucerne. His scheme is to grow lucerne to sell, as he is very close to Rochester township. Will pay expenses easily this year. Next year expects to make profit of \$1440.00. Two boys (aged 10 and 12) have learned how to irrigate, and are of great assistance.

W. Stover (from California), Shepparton, Victoria.—Capital \$2400.00. Block, 63 acres; unimproved value, \$79.20; value high because land generally cleared, and old house and farm buildings existing were bought in with it. Half-yearly rent, \$177.80. Has 45 acres lucerne, 2 or 3 fruit, rest oats. Has been here twelve months. Is partner with neighbouring settler in sheep-raising. They buy store sheep together and fatten them for periods of a fortnight alternately on either block. Has now half share in 400 sheep, but could run at least twice as many. Reckons about fifteen sheep to acre. Sheep fatten in six weeks or two months; owners make about \$1.00 a head on the deal. Sheep are bought on three months' bills. Sharing 400 sheep every two months with \$1.00 profit, he makes net \$240.00 a year, not including the value of lucerne hay, of which he has good stacks. Had no previous farming experience.

W. G. Parker (Australian), Shepparton, Victoria.—Block, 44 acres. Had irrigation experience at Ardmona. Came eighteen months ago to virgin country with \$144.00, two or three cows, two horses, and wife and three children. Has only half his left arm, but cleared and fenced his land himself, built cow-sheds, and put in channels and a few acres of lucerne. Got fencing wire on credit from local storekeepers. Already possessed small two-roomed wooden house, which he removed from Ardmona. Arranged with local carpenter to re-erect house and add three more rooms, he (Parker) assisting him where possible, and carpenter estimated cost of this work at \$840.00. When house was finished Parker submitted improvements to Government valuer, and received on them advance from State of \$1286.40 cash. With this he paid carpenter and storekeeper's accounts, and commenced new storekeeper's account for



LUCERNE HAY.

implements and living necessities. Having proved his credit, he said, this was easy. Has eight good cows, five calves, seven pigs, a good Ayrshire bull, three horses, and a few fowls. At present (eighteen months after starting) does not quite pay expenses, but soon will. Has $5\frac{1}{2}$ acres pears and peaches, and the rest fodder. Reckons cows return \$1.28 a week each in cream. Intends breed pigs as best quick-paying industry.

J. Carver (from London), Shepparton, Victoria.—Block, 60 acres. Has been in Australia one month. Brother-in-law with him. Capital, \$2400.00. Wife will come out to him when house is ready. Was ploughing for first time when I saw him. Will sow lucerne millet for fodder; later, fruit trees. Hires horses and implements. Has two cows for own use. Will start dairying and pig-raising as soon as he has fodder in hand. Had no previous farming experience.

Henderson and Johannsen (from Manchester, England), Shepparton, Victoria.—Block, 60 acres—30 young fruit trees, 12 lucerne. Started eighteen months ago with \$4320.00. Their house cost \$1680.00. Have six cows and four horses. Require ten cows to pay their way until trees bear. Their young orchard alone is worth about \$2880.00 now. Consider settler should have at least \$2400.00 to start with, as they did. Had small mixed-farming experience in England.

H. Paget (Australian), Werribee, Victoria.—39 acres—15 lucerne, a few vegetables. Has been on block five months. Unimproved value of land \$105.60 an acre. Came with \$2280.00, including value of five horses, a waggon, and four cows. Did his own clearing and fencing. Cows return \$1.72 a week each. Makes \$9.60 a month out of four pigs. Intends plant more lucerne and 7 acres trees. Will run fowls. Reckons will not have spent \$1440.00 before block is paying for itself.

W. Lennon (from Staffordshire), Yanco, New South Wales.—50 acres—10 lucerne, remainder cereal. Intends dairy farming only; no fruit. Came two years ago with \$1440.00. Block rent is \$96.00 per annum. House cost \$516 for materials, and another \$96.00 to build. Cleared and fenced block himself, also did six weeks' work for the Irrigation Commission at \$2.40 a day wages. Work on block represents only one year's work, as he came before water was available. Has ten cows, five young heifers, and a few pigs. Will gradually increase his stock. Cows return him \$1.56 a week each in cream. Block is now paying for itself.

P. Le Bas (from Channel Islands), Yanco, New South Wales.—54 acres—20 lucerne, rest cereal. No fruit. Came with less than \$480.00 and wife and child. Has five cows, which return him \$6.48 a month each in cream. Intends dairy farming; will run ten or twelve cows, and let them pay the rent, and will pay off house money by selling hay. Intends to hold the land for five years, and then sell out at a profit. Did his own clearing and fencing, and helped build house; made most of his own furniture and farm gates, &c.

P. D. Williams (from Sutton, Surrey), Yanco, New South Wales.—Father, three sons, and two daughters have each 50 acres, and run as one 300-acre farm. All under lucerne. Their project is to take up sheep station near by in the drier country, and use fodder grown on their irrigation block. Have spent \$24,000.00 in last two years, but have built expensive house, and had all fencing and clearing done by contract. Have tried ranching in California, and prefer Australia.

J. Craig (England), Yanco, New South Wales.—Brother farming with him; together run 180 acres—22 lucerne, 70 cereal, 17 peaches, 15 oranges. Came nearly two years ago; have spent \$10,800.00 on the place. House cost \$1680.00; employed labour to clear, fence, and plant trees. Put in peach trees as soon as land cleared; these trees should bear well next season. Lucerne is young; cut it early to stool it out, and got 5 cwt. to acre. Hay crop averaged 2½ tons to acre. Made about \$3360.00 this year by selling

hay. Next year they expect to make \$4800.00 off the block—\$960.00 of it from peaches. Reckon it costs them \$2880.00 to run the block, so that they expect to show \$1920.00 profit next year.

Schmitz and Hahne (Germany), Yanco, New South Wales.—105 acres, all under oats except 1 acre potatoes. Brought \$2880.00 between them. Crop of 30 bushels to acre this season returned them \$1920.00 for first year. Will go in for dairying and pigs. Reckon to see money spent all back by third year.

H. Richter (Broken Hill, New South Wales), Yanco, New South Wales.—18 acres—5 sultanas, 2 currants, 3 fruit trees, 3 cereal. Came from the mines twenty-one months ago with just over \$960.00. Kept going first year by selling vegetables grown on land; this year will go out working with his horse and implements to keep the block going. Next season this will be unnecessary, as sultanas and currants (which are now fifteen months old) should yield good crop. Expects \$576.00 from them next season and \$1920.00 from vines and fruit trees in the following season. This return will steadily increase as fruit trees and vines mature. Rent for block is \$57.60 a year.

C. Young (Victoria, Australia), Yanco, New South Wales.—58 acres; rent, \$83.52 a year. Came with \$1920.00. In first six months got \$480.00 from block for wheat crop—18 bushels to acre. Built his own home at cost of \$360.00 for material, which he bought on terms from commission; thus saved \$384.00 on house. Intends sow part lucerne this year on cropped land, also few fruit trees. Main idea, however, is to grow crops to sell, and deal in stock as advantage offers.



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