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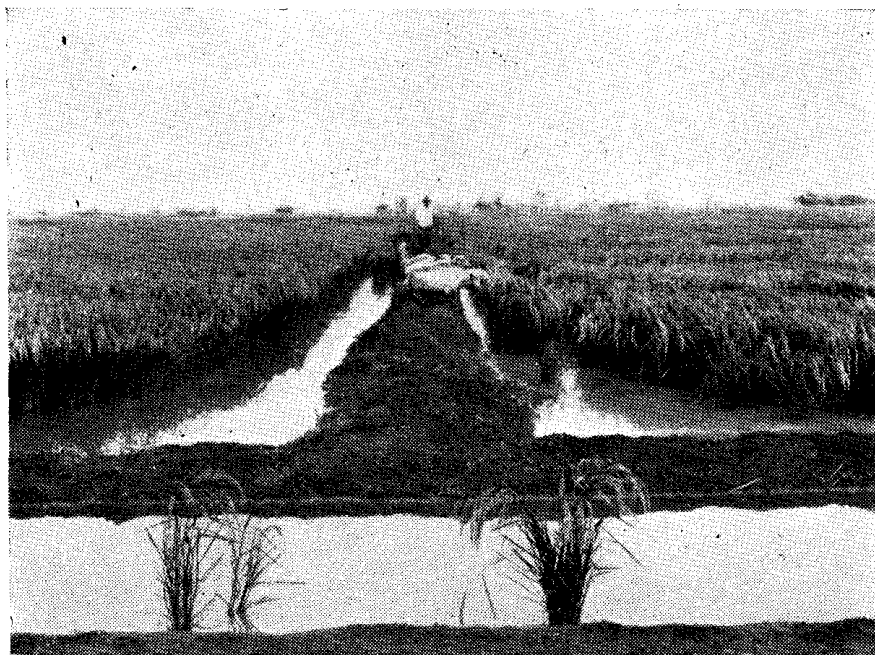
TRENDS IN AUSTRALIAN IRRIGATION.

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Early History.

It is now 60 years since the Chaffey Brothers laid the foundations of irrigation farming in Australia. Accepting the invitation of Alfred Deakin, then Premier of Victoria, they had left their native California in the 1880's to settle in Victoria, where, backed by the Government, they set about diverting Murray River water for agricultural purposes. Both Mildura and Renmark, established as irrigation settlements in 1887, are memorials not only to the Chaffey Brothers but also to Premier Deakin, who later became Prime Minister of Australia. As in so many other fields Deakin was acutely aware of Australia's real needs; unlike many of his contemporaries he had no illusions about the aridity of the Australian climate. While others talked of the continent's unlimited resources, Deakin was preparing the way for an expansion of agriculture into the transmontane basins and plains. He was well aware of the aridity and climatic uncertainty of the interior. Permanent agricultural settlement—except in a

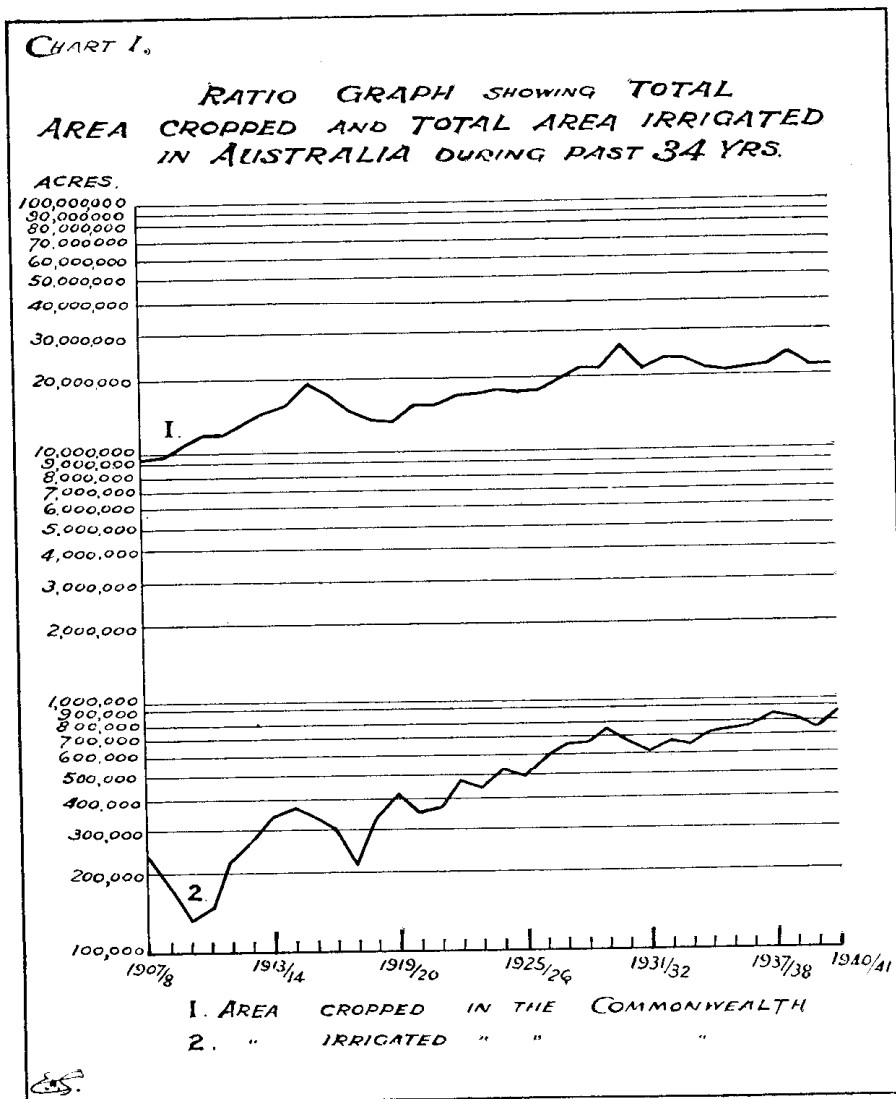


Rice Crop, Leeton, Murrumbidgee Irrigation Area.

few favoured areas—would always depend on irrigation; it alone would decide whether there would ever be an expansion of the agricultural frontier beyond the mountainous eastern fringe of the continent.

Deakin also realised that the size of the Australian problem at once placed it beyond the individual's capacity to solve. The world's most arid continent combined the smallest population—in his day only about 3.6 million—with probably the greatest

challenge Europeans had met in a temperate environment. Such a problem called for governmental action; its size could be matched only by the combined resources of the state. The foundations of publicly-owned irrigation schemes were accordingly laid in an era which in theory disapproved of public ownership and initiative. The peculiarities of many of Australia's problems have called forth their own solutions—solutions which at times may have seemed unorthodox and distinctive. On the other hand, is not unorthodoxy the price of colonial settlement? The most rigid institution is no proof against a change of environment. "Man makes but nature moulds." The history of Australian settlement is in many ways a study of the impact of an old culture on a new land. State-owned irrigation is but one reaction of many man has had to the peculiarities of the Australian environment.



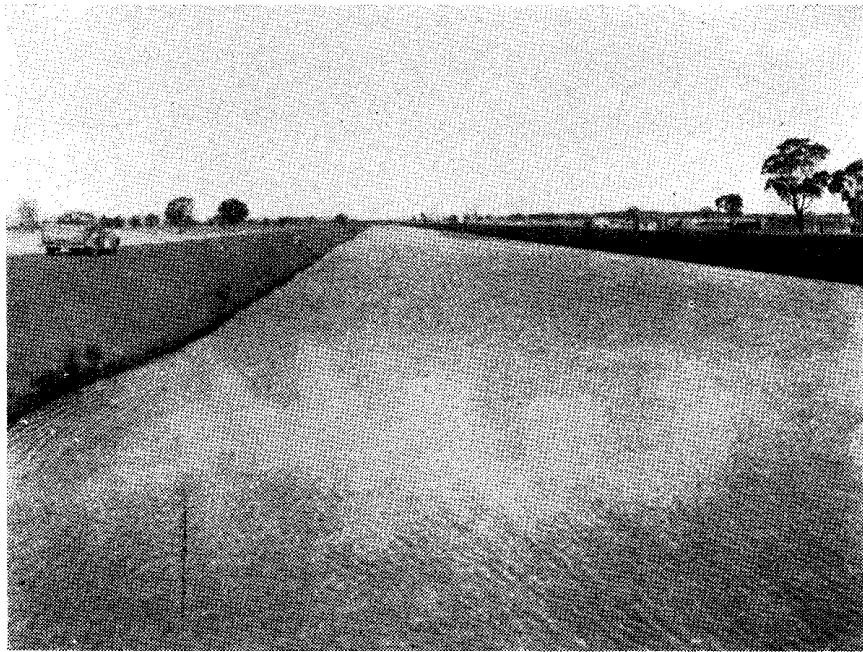
Since the 1880's Australia's irrigated area has grown fairly rapidly (see Chart I). In 1940-41 about 850,000 acres were under irrigation; since then the area has expanded still further following the opening of new irrigation districts in New South Wales (Berriquin and Wakool). By no means all the available land in these irrigation districts is at present being irrigated; but it is certain most farmers within reach of the irrigation channels will bring increasingly large areas of their farms under water each year.

Irrigation expanded most rapidly in Australia between 1917 and 1930. During that period the irrigated area nearly trebled, and its rate of expansion was considerably higher than that of the area cropped throughout the Commonwealth. Relatively more acres were being brought under irrigation than were being brought under agriculture as a whole, although the period 1917-1931 saw Australia's cropped area increase from less than 15 million acres to about 25 million acres.

Types of Land-use under Irrigation.

Victoria has never lost its lead over the other States in irrigation farming. An impetus derived originally from the efforts of Deakin, Syme and the Chaffeys has not slackened. In 1940-41 Victoria had nearly two-thirds of Australia's irrigated acres. It is not yet possible to say by what amount this proportion may have decreased as a result of recent developments north of the Murray. But in 1940-41 Victoria's lead was still very substantial (see Charts III and IV). The southern State has carried out what by Australian standards can only be described as vast schemes of conservation and irrigation in the valleys of its north-flowing rivers as well as on the southern side of the Murray. In addition to irrigated crops, large areas of pasture land on the dry side of the highlands have been brought under irrigation and a wealthy fat lamb and dairy industry established. By Victorian standards New South Wales has lagged, although published statistics tend to exaggerate the position somewhat. New South Wales in 1940-41 had only about 160,000 acres under irrigated crop compared with Victoria's 247,000 acres. In addition Victoria had about 350,000 acres of irrigated pastures while New South Wales is estimated to have had less than 200,000 acres. Unfortunately, exact figures are not available for irrigated pastures in New South Wales.* There were marked differences too in the relative importance of the various types of irrigated land-use. Victoria for instance used nearly half of its irrigated acres in 1940-41 to grow lucerne, green fodders and grasses; New South Wales, on the other hand, less than 25 per cent. Nearly half the irrigated area of New South Wales was used for cereals (a third for rice), while in Victoria less than 20 per cent. was so used (chiefly wheat). In Victoria a relatively greater area of irrigated lands was in vineyards or orchards—in absolute area more than double the New South Wales figure. Both States had about the same irrigated area in root, truck and miscellaneous crops.

* Accordingly irrigated pasture in N.S.W. has not been shown on bar in Chart IV.



The Mulwalla Canal, Berriquin Irrigation District ; the longest Irrigation Canal in Australia.

Irrigation in Australia amounts largely to irrigation in Victoria and New South Wales. Chart III emphasises the unimportance of the other States. Although South Australia is not far behind the south-eastern States in area cropped, the area irrigated is very small. Chart IV emphasises the predominance of vineyards and orchards in the irrigated area of South Australia, and hence the importance of the Murray irrigation settlements between Morgan and Renmark. South Australia's dried fruits industry has its basis in the Murray settlements; together with non-irrigated areas in the Mount Lofty hills they also produce most of the State's wine.

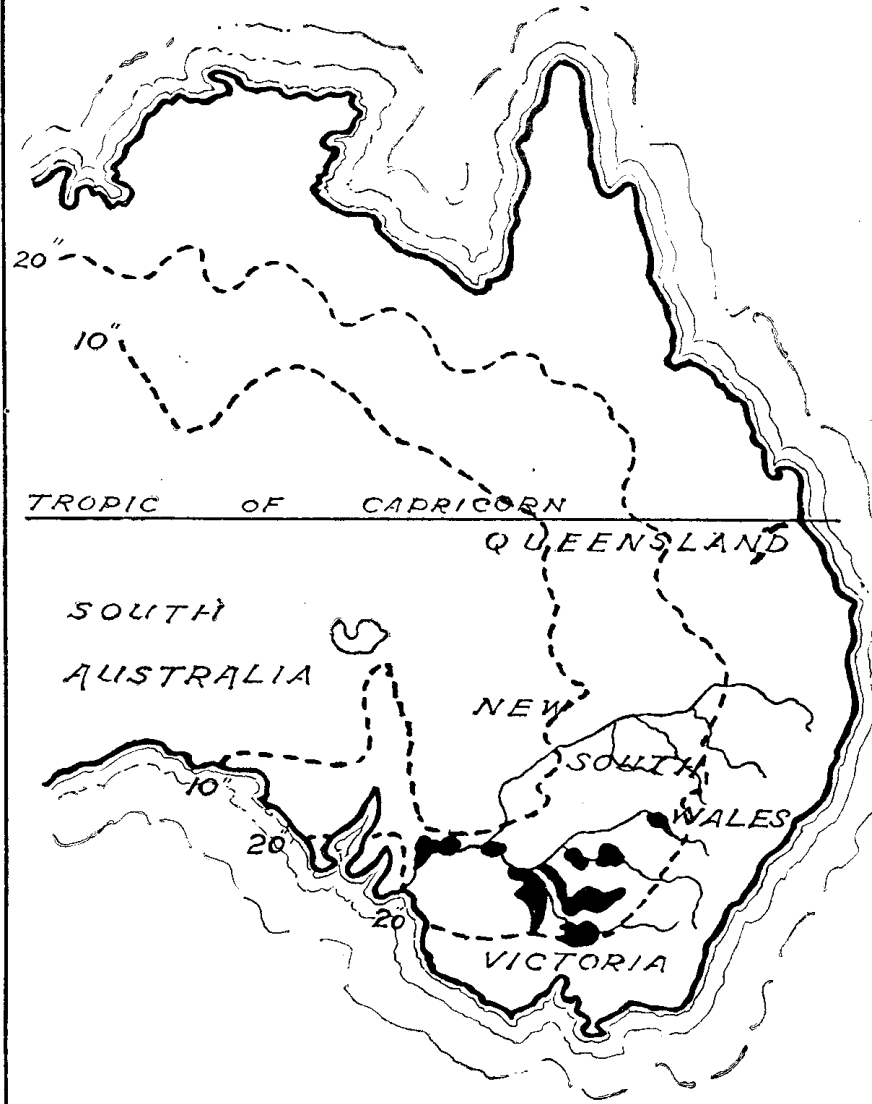
Queensland's 61,000 acres of irrigated farmland are used almost entirely to grow sugar. The Dawson Valley is the most important district. Small irrigation plants pump water from the river during the dry months. Other irrigated crops such as cotton and pine-apples are relatively unimportant.

Between 1930 and the outbreak of World War II Australia's irrigated area remained steady at about the 700,000 acre level. During the same period the area cropped throughout the Commonwealth fell from its all-time high of 25 million acres in 1930-31 to about 21 million acres in 1931-32, at which level, except for small fluctuations, it remained for the rest of the decade.

Present-day Trends.

The effects of World War II (not shown on Chart I) are starkly apparent in figures recently published. By 1943-44 the area cropped throughout Australia had fallen to 15.9 million acres. It is not yet known by what amount irrigation declined if at all

CHART II.



STATE IRRIGATION AREAS
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in the early stages of the war; evidence suggests, however, that non-irrigated crops, chiefly wheat, accounted almost exclusively for the decline in the cropped area. Recent developments in the Wakool and Berriquin irrigation districts of New South Wales suggest that the irrigated area in Australia may well have risen during the latter years of the war. Until up-to-date statistics are available, however, it will not be possible to measure the extent of recent changes.

Large-scale irrigation schemes up to the present have been confined almost entirely to the low-rainfall regions of interior south-eastern Australia (see Chart III). In the past Governments have concentrated on supplying cheap water to farmers on the semi-arid fringe, and so most of Australia's irrigated acres are to be found between the 10 and 20 inch rainfall belt of the south-east. The rainfall gradient drops steeply as one moves inland from the coast; from 35 inches or more the average drops to 20 inches in less than 350 miles.

State-sponsored irrigation in the humid and semi-humid coastal fringe has not yet been attempted to any extent as there has been a tendency to regard the coast as a safe rainfall zone. But consideration of average annual statistics obscures the uncertainty of coastal rainfall. Until recently little attention seems to have been given to the study of actual rainfall behaviour in these reputedly favoured areas of the south-east. Irrigation, in the past, has been looked upon mainly as a way of extending the agricultural belt of south-eastern Australia. Only of late has it assumed significance as a stabiliser as well as a creator of agricultural wealth. Most of the schemes in the Murrumbidgee-Murray Basin have been primarily concerned with creating entirely new and hitherto impossible forms of land-use on the arid margins of the agricultural belt. The Goulburn Valley and the various settlements along the Murray and the Murrumbidgee have been primarily concerned with making "the desert blossom like the rose." As a result, entirely new forms of settlement and production have been superimposed upon hitherto empty areas.

For those who have stressed development in all its aspects and particularly agricultural development, irrigation has had a particularly strong appeal. During the first three decades of this century Australians were almost obsessed with the need for filling in the map. They were embarrassed by their empty spaces; worse, many of them were sceptical of the few who, realising the inherent aridity of the continent, had sketched in the boundaries beyond which settlement could not go. The expansion of irrigation in the semi-arid fringe lands of the south-east has been urged on by a multiplicity of aspirations. Considerations of national expansion have been as important as the more immediate aim of supplying local agricultural communities with a permanent water supply. Irrigation schemes in the past have been examples of national planning, and to this extent gestures not only to Australians but to the world at large of the country's capacity to overcome some of the more difficult problems of an unfavourable environment.

CHART III DIAGRAMMATIC REPRESENTATION OF AREA CROPPED IN EACH STATE AND AREA IRRIGATED (1940-41). SQUARES ARE IN PROPORTION TO AREA: FOR STATISTICS SEE TABLE.

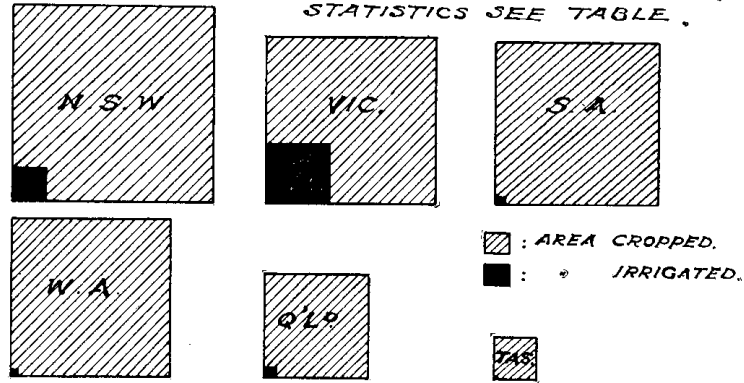
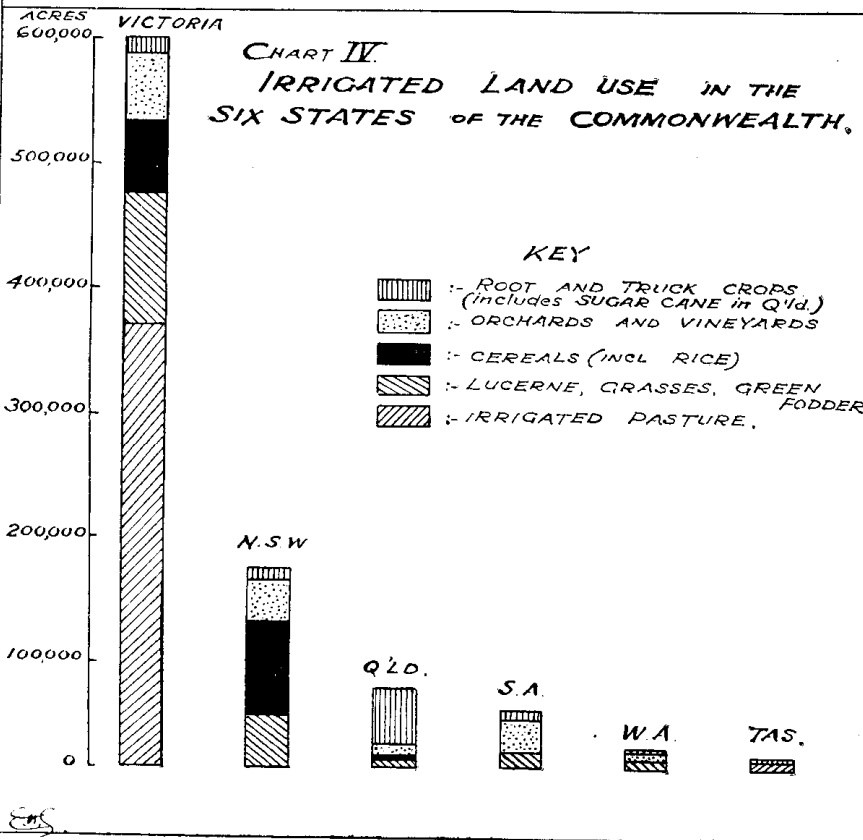


TABLE SHOWING AREA CROPPED AND AREA IRRIGATED IN EACH STATE OF THE COMMONWEALTH.

STATE	AREA CROPPED	AREA IRRIGATED
NEW SOUTH WALES	6,374,354 ACRES	158,337 ACR. (a)
VICTORIA	4,467,191 "	596,662 " (b)
SOUTH AUSTRALIA	4,254,348 "	46,268 "
WESTERN AUST.	4,026,969 "	14,513 "
QUEENSLAND	1,734,248 "	60,961 "
TASMANIA	253,941 "	8,821 "

(a) Excludes pasture and fallow land.
 (b) Includes irrigated pasture.



Plans for the Future.

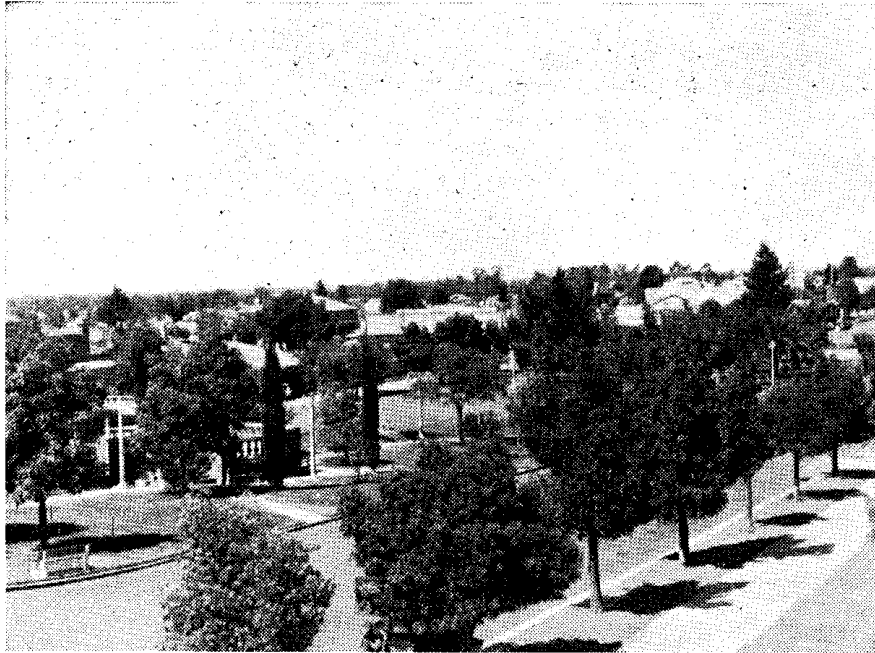
What of Australia's plans for the future? In what way has State experience with irrigation moulded earlier policies or led to the formulation of new ones? Under Australia's system of Federal Government the carrying out of irrigation schemes has remained a matter for the six States. The Constitution, however, by no means precludes Federal financial assistance to the States, should it be necessary. Under section 96 ". . . the Parliament (of the Commonwealth) may grant financial assistance to any State on such terms and conditions as the Parliament thinks fit . . ." Backed by this authority the Commonwealth could, if it approved of State plans for a new irrigation scheme, make available a grant-in-aid. The future may well see an increasing amount of Federal money returning to the States via section 96.

Each of the six States has plans for an extension of irrigation. New South Wales is at present ahead, and it seems likely that before long it will not only overtake but rapidly surpass Victoria. Such a development in any case would merely be normal since New South Wales, apart from its greater natural resources and population, has vastly more land capable of being "reclaimed" by water. In addition to further developments in the Murray and Murrumbidgee Valleys—the cradle of Australian irrigation—the Government of New South Wales is pushing ahead with water conservation and irrigation schemes in its more northerly valleys. A number of rivers which flow down the western side of the highlands and ultimately into the Darling are in process of transformation. The Lachlan River has already been partly stabilised by a large dam at Wyangala. Soon the waters of the Macquarie and the Namoi are to be controlled by large storage reservoirs at Burrendong and Keepit. The completion of these projects in central and north-western New South Wales should bring a measure of security never before known to farmers in those parts of the State.

Indeed, security is perhaps the keynote of these new schemes. There has been a perceptible change in emphasis during recent years; thirty years ago irrigation was regarded, as we have seen, more as a means of extending the agricultural frontier than of stabilising the existing one. To-day, on the other hand, Governments are primarily concerned with extending the blessings of an assured water supply to existing land-holders. Elaborate schemes of new settlement have not the popularity they had thirty years ago. Stabilisation is now held to be as important if not more so than expansion. To-day it is fairly widely admitted that Australians must bend their efforts to conserving what resources they have rather than attempt to defy the facts of climate and geography in general. Conservation and stabilisation are the pressing problems of to-day. •

Drought is a much more persistent enemy of the primary producer than depression and it is far more frequent in its visitations. Schemes at present under way in New South Wales thus

aim at bringing a large measure of stability to farmers in many parts of the State; through the farmers irrigation will bring stability to the various industries. As the larger rivers are brought one by one under control producers will benefit in a number of ways. Moreover, stability will not be the only gain; it is reasonable to expect a substantial diversification and intensification of land-use in regions within reach of permanent water; and hence a more numerous and more closely-settled farming population.



View of Leeton from Offices of the Water Conservation and Irrigation Commission.

Perhaps most significant is the Government's extension of its interest to sub-humid lands in the coastal belt of New South Wales. It has been recognised that many districts on the Coast are as much in need of an assured water supply as those west of the highlands. More important, existing forms of land-use are being made unstable by the uncertainty of the rainfall distribution. It has meant something of a departure from past thinking to admit that the dairy industry, for instance, on many parts of the Coast is in a hazardous position because of recurrent drought. The Government has recognised the existence of this problem; for instance, already it has begun a large water conservation scheme in the Hunter Valley which, when completed, should eliminate the worst effects of drought and bring stability to dairy farmers and others in the region. New South Wales, in the Hunter Valley, is thus pioneering a new field in Australian irrigation. Its aim is to bring stability and greater prosperity to one of Australia's most important industries and regions.