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NOTES ON AGRICULTURAL PRODUCTION IN THE ILLAWARRA REGION OF NEW SOUTH WALES.

BY

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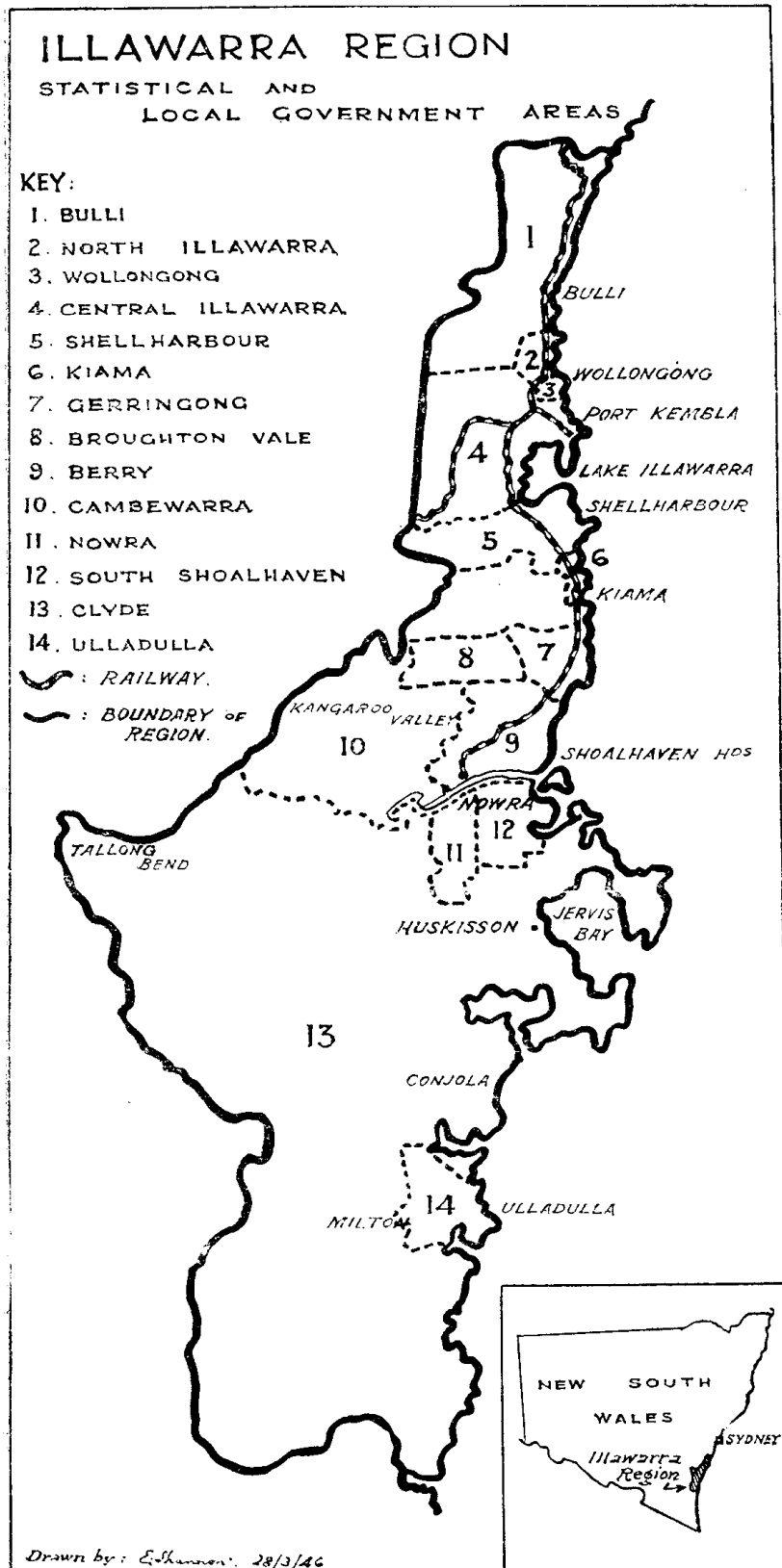
The Sherrard Committee, in its report on regional boundaries to the Premier of New South Wales in 1943, recommended the subdivision of the Eastern and Central divisions of the State into 17 regions. The regions were intended to supply a geographical framework for reconstruction and it was felt that future developmental programmes should be related to natural regions rather than existing administrative divisions. Large scale public works such as water conservation and electrification schemes affect whole regions rather than arbitrarily-defined shires or municipalities. Indeed, a harmony of economic and social interests within a recognisable geographical entity is the first premise of regionalism. By defining regions and drawing boundaries to conform with the various principles of natural subdivision States thereby avail themselves of natural administrative assets. The substitution of the regional for the purely local interest very often releases renewed vitality and creative energy. Localities are as a rule too small to do much more than prime the parish pump. Collected into regions, however, they gain a new perspective, a natural unity and power to achieve much within the limits of their resources.

Illawarra region, 30 miles south of Sydney, was probably the most clear-cut example of "regionalism" the Sherrard Committee encountered. Except in the coastal areas, New South Wales does not fall readily into natural regions. Physiography has imparted a large measure of topographical uniformity to the plateau, slopes and plains of the interior. Natural boundaries are as much determined by climatic and soil variations as by topography. Along the coast, however, river basins and their watersheds provide quite satisfactory boundaries between regions. The 3,000-ft. eastern highland plateau faces the coastline throughout the greater part of its length and most of the coastal regions centre on enclaves of lowland hemmed in between coastal spurs of the main plateau.

Natural Boundaries of Illawarra Region.

Illawarra region centres on the Shoalhaven River, although it extends for about 50 miles each side of the Lower Shoalhaven valley. In the north, its boundary lies along the eastern edge of the 1,000-ft. plateau which forms the coastline between Austinmer and Wattamolla. The western boundary follows the plateau edge, swinging to the west below Robertson and cutting across the plateau until it reaches the lower Shoalhaven Gorge. The gorge forms the boundary of the region for the next 40 miles (see Plate 1). The river lies at a depth of about 2,000 feet in a 3,000-ft. plateau. At Tallong Bend the Shoalhaven turns abruptly south and the boundary of the region follows it to its junction with the Endrick River. Then it follows the high watershed between the Upper Clyde and the Shoalhaven to a point east of Braidwood. At Mount Budawang the boundary turns east and, crossing rough "spur" country, reaches the coast at Point Upright.

MAP I.



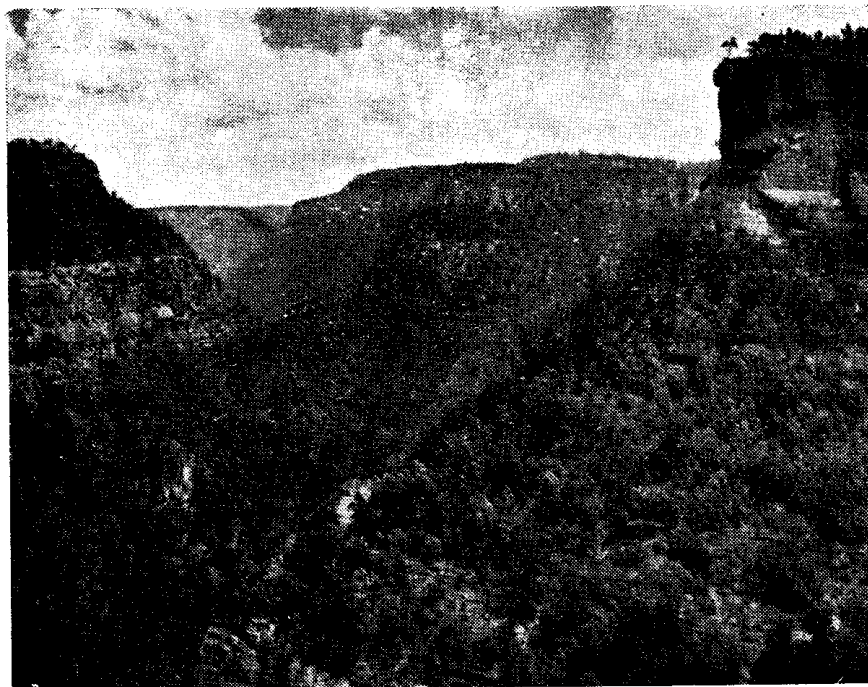
Topography has thus furnished almost perfect boundaries for Illawarra Region. Deeply dissected and unproductive sandstone plateau separates it from the low undulating Sydney plain. A higher continuation of the same plateau flanks it on the west, the rugged edge of which separates it from the undulating tableland of the southern highlands (see Plate 1). South of the Shoalhaven Valley, rugged plateau spurs cut off the coastal basins from the undulating plateau west of Bungonia and Braidwood. Illawarra Region is thus ringed by plateau, most of which is barren, Hawkesbury sandstone. The eastern scarp, in addition, includes some of the most rugged country of the State. Access to the coastal lowlands and the Shoalhaven Valley is in every case by way of steep passes down the plateau scarp. For instance, the route from Sydney follows a 1,000-ft. plateau-ridge before descending by a number of passes to the Upper Illawarra Plain. Bulli Pass is the oldest and most famous of these. Further south, the Macquarie Pass provides a direct link between the coastal dairy-lands of Central Illawarra and the plateau at Robertson. The Moss Vale-Robertson district is also linked with the Kangaroo Valley and ultimately the Shoalhaven by two passes in the vicinity of the Fitzroy Falls. In southern Illawarra a good highway connects Jervis Bay with the plateau, ultimately linking the Commonwealth Naval Base with the Federal Capital. But apart from these links, Illawarra is effectively cut off from the tablelands to the west.

Sub-Zones of the Region.

Direction of movement in the region has thus been chiefly longitudinal. The coastal highway between Sydney and Melbourne runs through Illawarra from north to south and, together with the railway, is the main commercial artery. The railway from Sydney does not extend beyond Nowra. South of the Shoalhaven, road transport is supreme, although in normal times small coastal vessels supplement the road and rail in moving agricultural surpluses to points outside the region.

Links with the west are still mainly "strategic." In 1932, a developmental railway connecting Port Kembla with Moss Vale was opened with a view to securing a direct trade link between the tablelands and slopes and the coastal industrial belt. The railway has to contend with very steep grades between Robertson and Unanderra. It is difficult to assess its influence on the development either of the coast or the interior, although its value during the war was above argument. In normal times, however, the bulk of the trade of the region flows out and enters from the north either by road, rail or sea.

North-south movement within the region is not impeded by any major topographical barrier. Between Upper Illawarra and the Lower Shoalhaven the plateau edge approaches the coast and there is a narrow belt of hilly basalt country between Shellharbour and Gerringong (see Plate 2). Road and rail are compelled to follow the coast for about ten miles to avoid the steeper spurs which run down to the sea. At Gerringong the coastal flats open out again, and the scarp veers away to the west. Berry is on the



The Shoalhaven Gorge. Below Tallong : Note Sandstone Plateau.

northern edge of the Shoalhaven flats and the view to the south discloses the wide valley of the Lower Shoalhaven. Illawarra Region falls readily into five sub-zones:—

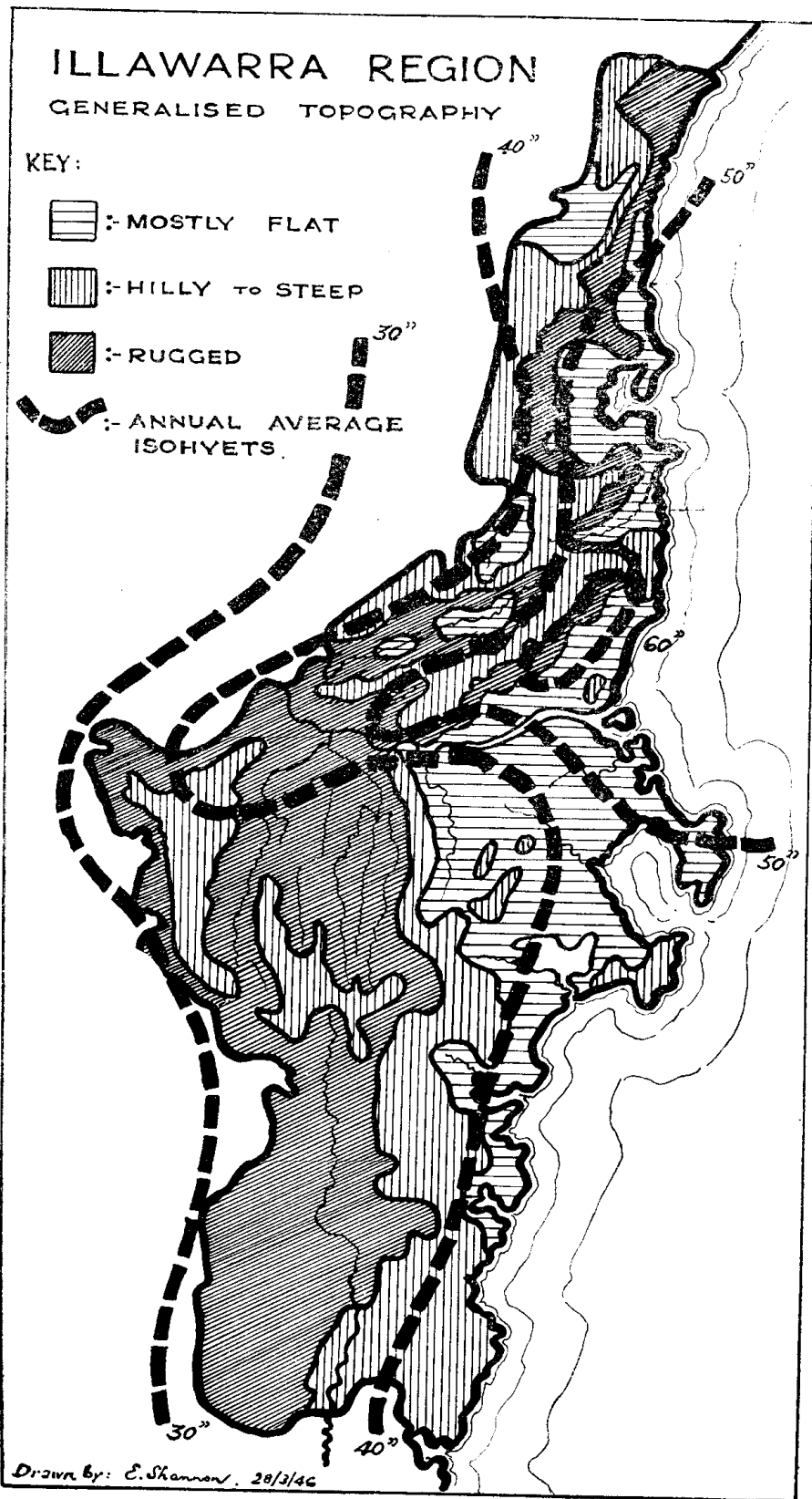
- (1) The Upper Illawarra Plain extending from Thirroul to Shellharbour.
- (2) The hilly to steep coastal basaltic slopes between Shellharbour and Berry (see Plate 2).
- (3) The valley and flats of the Lower Shoalhaven (see Plate 3).
- (4) Coastal basins south of Jervis Bay.
- (5) The Cambewarra and Kangaroo flats.

From these five sub-zones come the agricultural and industrial production which have given the Illawarra an economic importance in New South Wales out of all proportion to its area (0.8 per cent. of the State).

Climate.

On the evidence of average annual rainfall, Illawarra is a uniformly well-watered region. Every part receives more than 30 inches per annum; small pockets record more than 60 inches. The isohyet pattern has been strongly influenced by local topography, and rainfall is markedly orographic. The 1,000-ft. scarp along the coast has induced a 50-inch isohyet in the Upper Illawarra Plain, and the coastal lowlands between Wollongong and the mouth of the Shoalhaven receive an average rainfall exceeding 50 inches. The 40-inch isohyet lies a few miles west of the 50-inch line. It follows the crest of the scarp bending west to

MAP II.



include most of the Cambewarra and Kangaroo districts. It also includes the Lower Shoalhaven Valley, which seems to have induced a westerly extension of humid conditions. The 30-inch line lies beyond the boundaries of Illawarra. There is a small isolated area on the hilly to steep slopes west of Shellharbour and Gerringong which receives over 60 inches. Broughton Vale is roughly in the centre of this pocket.



Coastal Basalt Hills in the Gerringong District.

Average annual figures thus indicate an adequate rainfall for Illawarra. In fact, however, the rainfall of the region is notoriously unreliable. Despite its proximity to the sea, it experiences relatively severe droughts every few years, and there are wide and frequent departures from the average. No marked seasonal incidence characterises rainfall in the region. In some years maximum falls are recorded in summer, in other years in winter. Uncertainty of distribution introduces an element of uncertainty into pastoral and agricultural activities. Production varies considerably from year to year, depending on the amount and distribution of the rain. Accordingly, it is not possible to rely on average annual figures for an indication of the reliability of the region—at least for non-irrigated crops and pastures.

The average daily maximum temperature for the region is 70 deg., the daily minimum between 50 and 55 deg., giving an average daily range between 15 and 20 deg. F. The average daily minimum temperature for the coldest month is between 35 and 40 deg. F. (above the frost limit), the average daily maximum temperature for the hottest month is between 80 and 85 deg. In normal years Illawarra thus has a twelve-month growing period with relatively mild summers. Sea breezes temper summer conditions along the coast to an appreciable extent.

Settlement of Illawarra.

Discovery of the Illawarra district followed quickly on the first settlement at Sydney in 1788. Bass and Flinders are usually credited with the first landing on the Illawarra Plain. Permanent settlement, however, came much later. In the 1820's there are reports of cedar cutters in the Upper Illawarra. The fertile basalt areas were originally scrub covered and contained numerous stands of valuable softwoods as well as cedar. Only after clearing the timber was it possible to run stock on the succulent native grasses which rapidly established themselves on former scrub areas. In the 30's and 40's, settlers began to graze beef cattle on the Upper Illawarra Plain. Further south, the Lower Shoalhaven was being pioneered by the Berry family, with headquarters at Coolangatta, near the mouth of the river. In the 50's and 60's pastoral settlement was rapid; in addition, a beginning was made to develop the Illawarra coal deposits at the northern end of the region. After the 60's Illawarra began to contribute substantially to the coal production of the State, hitherto the monopoly of Newcastle and the Lower Hunter.

The raising of beef cattle remained the chief activity of Illawarra farmers until the 90's. During those years pedigreed stock were introduced and local strains developed. Before the change-over to dairying, Illawarra beef cattle already had an Australian-wide reputation for excellence.

Settlers moved into Illawarra almost entirely by sea. Tiny ports sprang up along the coast, and were the centres from which settlement spread. It was not until the 90's and later that a railway link with Sydney was established. Good roads into the Illawarra Plain are a development of the last thirty years. Thus, for nearly a hundred years, the region was practically land-locked from the rest of the State. Coal, timber and beef cattle were exported from the region in small coastal freighters.

In the 90's and subsequent decades, Illawarra farmers began to turn from beef cattle-raising to dairy production. The English butter market was open to Australian farmers after the invention of bulk refrigeration. Adaptation went on speedily until the Illawarra had been changed almost entirely to a dairying economy. About this time the North Coast dairy belt was also being opened up, and many of its pioneers were drawn from the ranks of Illawarra families.

Predominance of Dairying.

To-day the predominant primary industry of Illawarra Region is dairying. Arable cultivation is chiefly limited to the raising of fodder crops, a necessary precaution in a region where rainfall, though heavy, is unreliable. Maize, lucerne and oats are the chief fodder crops produced. In the last two decades there has been a marked trend away from butter production to fresh milk. The Sydney Milk Board area has gradually been extended until now it includes practically the whole of Illawarra. Metropolitan demand for fresh milk is continually rising, and the Milk Board offers special price incentives to wholemilk producers. Accordingly, butter production has declined during recent years. When pasture is short and milk supply low, practically the entire

Illawarra output is diverted to the Milk Board. Only in good seasons when milk output is high and the demand from Sydney less is much butter made in Illawarra factories.

Although Illawarra is only 0.8 per cent. of the area of New South Wales, it has 1.6 per cent. of the State's agricultural holdings. This 1.6 per cent. represents only 0.21 per cent. of the total area of all holdings in the State. The average area of farms in the region is 307.2 acres, an area much below the State average of 2,280 acres per holding. By New South Wales standards Illawarra farms are therefore small. Illawarra's 1,208 holdings employ 2,232 permanent rural workers (owners, tenants and permanent labourers), or 1.9 per cent. of the permanent rural labour force of New South Wales. The region is thus much more intensively settled than most parts of the State, a characteristic usually associated with dairying districts in New South Wales.

In 1944-45, 21,698 acres in Illawarra, or 0.43 per cent. of the State's cropped area, were cultivated. At least two-thirds represented fodder crops. Orchards and vegetables occupied the remaining 7,000-odd acres.

A comparison with the State position in regard to the several features discussed above is set out in Table I.

Table I.—*Farm Statistics, 1944-45.*

	Area of Holdings.	Area under Crop.	Sown Pasture.	Persons permanently engaged on farms.	Number of Holdings.
	acres.	acres.	acres.	no.	no.
Illawarra ...	371,110	21,698	74,992	2,232	1,208
N.S.W. ...	170,079,873	5,044,792	2,293,920	117,154	74,566
Percentage ...	0.21%	0.43%	3.26%	1.9%	1.6%

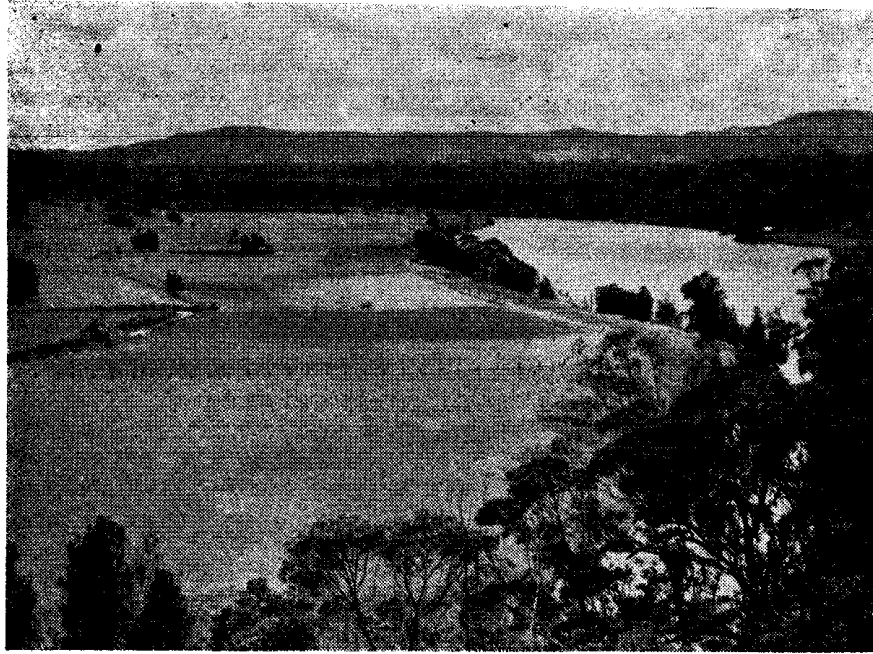
Dairy Production.

Illawarra has 5.1 per cent. of the registered dairy cows but only 2.5 per cent. of the total cattle of the State. The regional importance of dairy, rather than beef, cattle is thus indicated. About 5.5 per cent. of the State's wholemilk production comes from Illawarra. Table II sets out the production of dairy products in greater detail. The percentage importance of Illawarra has been indicated by including figures for total State production:—

Table II.—*Dairy Products.*
Five-year average ending 1940-41.

	Wholemilk.	Butter.	Cheese.	Bacon and Ham.
	gallons.	lbs.	lbs.	lbs.
Illawarra ..	17,404,510	2,507,981	776,451
N.S.W. ..	315,953,200	114,982,259	7,236,443	25,293,054
Percentage ..	5.5%	2.2%	10.7%

The most intensively grazed and hence the most productive pastures of the region occur between the Lower Shoalhaven Valley and Lake Illawarra, that is, in the northern half of the region. Although Clyde Shire to the south includes substantially more than half of the total area of Illawarra, it is one of



River Flats on the Shoalhaven at Nowra. Cambewarra Range in the Background.

the least productive divisions. Clyde has less than 4 per cent. of the registered dairy cows and only 3 per cent. of the milk output of the region. Both soil and topography are unsuitable for intensive farming in most parts of Clyde. Soils have developed on sandstones, shales and conglomerates of the Lower Marine Series, and are poor in plant food. Pastures are hard to establish and native grasses have little stock-feed value. Moreover, the western half of Clyde is too rugged for agricultural or pastoral use. Only where basalt flows have given rise to pockets of good soil is intensive grazing possible. Dairying in the Milton-Ulladulla district has only been made possible by the existence of an isolated basalt pocket in the surrounding shales and sandstones.

Between the Lower Shoalhaven and Lake Illawarra, basaltic soils predominate. They have developed on tertiary basalts and dolerites which once covered a wide area on the plateau and coastal lowlands. Existing basalts are mere remnants of the wider flow. On the plateau, basalts are scattered between Robertson and Moss Vale; and there are similar pockets along the coast in the vicinity of Port Kembla, Dapto, Shellharbour, Kiama, Gerringong and Berry. Generally, the soils have the appearance of deep red-brown loam. They were originally scrub-covered. When cleared, native grasses and paspalum were introduced and

excellent pasture beds established. In recent years, perennial rye grass and clovers have been very successful on areas of improved pasture.

The basalt soils are the ultimate basis of the Illawarra dairy industry. A grazing intensity map of the region is largely a repetition of the soil types. Because the basaltic areas are discontinuous, land-use shows a similar fragmentary pattern. Good and inferior soils are closely juxtaposed and productivity varies widely within small areas.

A comparatively small area between Central Illawarra (Albion Park) and Berry has the great majority of the region's dairy cows. It is the heart of the Illawarra dairy belt with five of the region's seven butter factories. The Lower Shoalhaven Valley from Bamerang to the sea and centred at Nowra is on the southern edge of the main belt. The alluvial flats on both sides of the river are valuable grazing land, particularly in the lower reaches. Somewhat cut off from the main belt is the Kangaroo Valley district, included in Cambewarra Shire. Dairying is of considerable importance on the limited areas of alluvial flat between the Cambewarra Range on the south-east and the main plateau to the north. Well south of the main dairying districts is the isolated Milton-Ulladulla factory. Milk production is high in this district considering the limited area of grazing land. Butter, cheese and wholemilk are the chief products of the district. There is a cheese factory at Milton and a butter factory at Nowra.

Compared with wholemilk, butter is of secondary importance in the dairying economy of Illawarra. The region produces about 2.2 per cent. of the State's butter in an average year. The Nowra factory has the largest output with about 40 per cent. of the regional total. Fresh milk for the Sydney market is the chief concern of farmers between Nowra and Wollongong; only about 25 per cent. of the milk produced in Illawarra is marketed as butter. Fresh milk is transported by fast trains to Sydney, 50 miles to the north.

Livestock.

Table III.—*Livestock.*
Five-year average ended 1940-41.

	Dairy Cows.	All Cattle.	Pigs.	Sheep.
	no.	no.	no.	no.
Illawarra	55,736	74,272	7,778	12,709
N.S.W.	1,083,164	2,930,270	416,738	52,709,180
Percentage	5.1%	2.5%	1.9%	0.02%

Livestock numbers are set out in the table above, and the relative importance of Illawarra as a dairying district is indicated. The small number of pigs is somewhat surprising until it is remembered that the region is essentially a producer of fresh milk rather than butter. Unlike the North Coast dairy belt, there is

little or no separated milk available for feeding pigs in Illawarra. In the absence of grain feeding, pig farming is complementary with dairying only when butter is the chief product. The small number of pigs in Illawarra is a reflection of its specialisation on wholemilk for the Sydney market. No factory bacon or ham is made in the region.

Fodder Crops.

Apart from improved pastures, of which Illawarra has 74,992 acres (or 3.26 per cent. of improved pastures of the State), maize, lucerne and oats are the chief fodders grown in the region. Of the three, maize is much the most important and Illawarra has 2 per cent. of the State production of maize grain. Camberwarra Shire grows about one-third of the regional crop, with second place going to the various districts of the Lower Shoalhaven Valley. South Shoalhaven and Berry together produce nearly 25,000 bushels, or one-third of the crop.

Table IV sets out the chief hay crops of Illawarra and compares them with average State production.

Table IV.—*Hay and Grain.*

Five-year average ending 1940-41.

	Wheaten Hay.	Oaten Hay.	Lucerne.	Maize Grain.
	tons.	tons.	tons.	bushels.
Illawarra	16	433	622	67,452
N.S.W.	391,580	355,113	152,050	3,297,495
Percentage	0.005%	0.1%	0.4%	2.0%

Not much maize is grown on the basaltic hills between Berry and Shellharbour, although these are the chief grazing lands of the region. Farmers depend on natural and improved pastures rather than crop fodders. Unreliable rainfall has caused a high percentage of crop failure in the past, and it is felt that some system of permanent water supply is needed before farmers will be induced to plant fodder crops. Lucerne is grown fairly widely on alluvial flats, and is most in evidence in the Lower Shoalhaven Valley. Oaten hay has in the past been grown most intensively by farmers in Berry municipality, although the crop is to be found in most of the Illawarra districts.

Fodders to supplement pasture feeding are essential if milk supplies are to be maintained. Illawarra production has suffered greatly in the past from lack of fodder in dry spells. Milk production will continue to fluctuate widely until adequate fodder stocks are built up by farmers and maintained at a satisfactory level.



Dairying in the Berry District : Note Plateau in the Background.

Vegetables.

Illawarra Region is not important for its vegetable production. Only very small quantities of the more important crops are raised and these are largely directed towards the local markets. Production is set out in Table V:—

Table V—*Vegetables.*
Five-year average ending 1940-41.

	Potatoes.	Cucurbits.	Tomatoes.	Onions.
	tons.	tons.	$\frac{1}{2}$ -bush. cases.	tons.
Illawarra	353	78	1,441	1
N.S.W.	49,479	14,917	614,447	470
Percentage	0.7%	0.5%	0.2%	0.05%

The growth of industrial and mining populations in and around Wollongong and Port Kembla has influenced vegetable growing in Upper Illawarra. The daily needs of the local market have encouraged some intensive vegetable farming on the outskirts of the industrial area. Upper Illawarra, with a population of 60,000, is relatively densely settled, and the local market is considerable. Further south, tomatoes and potatoes are crops of some importance in Cambewarra Shire, and potatoes are grown on the Lower Shoalhaven flats. Total production is small, however, and barely meets local requirements.

Fruit.

As with vegetables, Illawarra is an unimportant fruit producer. Only one crop (apples) contributes more than 1 per cent. of State production. Table VI sets out the position in greater detail:

Table VI—*Fruit.*
Five-year average ending 1940-41.

	Apples.	Pears.	Oranges.	Lemons.
	bushels.	bushels.	bushels.	bushels.
Illawarra	11,073	1,313	820	372
N.S.W.	1,037,573	366,842	2,171,174	240,280
Percentage	1.06%	0.35%	0.03%	0.15%
		Peaches.	Plums.	Apricots.
		bushels.	bushels.	bushels.
Illawarra		2,052	616	249
N.S.W.		570,690	123,221	167,811
Percentage		0.35%	0.50%	0.14%

Citrus fruits are relatively unimportant, although orchards are scattered throughout the various districts. Central Illawarra and Berry have the largest production of oranges and lemons; Clyde Shire follows in third place.

Deciduous stone fruits are of slightly more significance in absolute output. There is a marked concentration of the chief varieties (plums, peaches, nectarines and apricots) in the northern shires and municipalities (Central Illawarra, Bulli, North Wollongong and Shellharbour). The demand for fresh fruit in the nearby urban market is without doubt the chief location factor. The lighter soils of the permo-carboniferous series are well suited to orcharding.

Apples are the most important fruit grown in the region; and 1.06 per cent. of the State's production comes from Illawarra. Three-quarters of the crop is grown in the Shire of Central Illawarra on the lighter basaltic soils. Not only soil but proximity to market has favoured growers in that shire. Cambewarra, Clyde and Bulli produce the remainder of the Illawarra crop. Pears are of less importance, but again Central Illawarra is the only substantial producer.

Other Products.

Table VII—*Miscellaneous Commodities.*

	Eggs. 1944/45).	Honey 5 year average	Wool ending 1940/41.
	Dozen.	lbs.	lbs.
Illawarra	299,272	45,591	72,000
N.S.W.	46,324,282	3,252,883	503,793,000
Percentage	0.64%	1.4%	0.01%

Although contributing only 0.64 per cent. of the State's egg production, the poultry industry is not without its importance to Illawarra. In 1944-45 nearly 300,000 dozen eggs were produced for commercial sale, the bulk coming from the northern end of the region. Bulli, North Wollongong, Central Illawarra and Shellharbour are the centres of the poultry industry. Again, the growing influence of the Wollongong-Port Kembla industrial conurbation can be seen. The poultry industry reacts to institutional rather than physical location factors; and proximity to market is one of its chief considerations. Not only does the Illawarra industry meet local needs; there is usually a substantial surplus for shipment to Sydney.

Illawarra is a region of growing industrial and agricultural importance. During the last twenty years it has risen to third place in the industrial life of New South Wales. Its new industries have grouped themselves around the Port Kembla iron and steel plant which was established in 1928. It is a region in transition, the agriculture of which will continue to feel the impact of expanding local markets. It is to be expected that more intensive land use will be the chief agricultural response to the growing demand of the industrial nucleus.

* The writer is indebted to Mr. W. Batt, Town Clerk of Nowra for the photographs used in this article.