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IRELAND

IRELAND

ITS PHYSICAL, HISTORICAL, SOCIAL
AND ECONOMIC GEOGRAPHY

by

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of Manchester; formerly Reader in Geography,
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*With 8 Plates
2 Folders, and 96 Text Maps*

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TO THE MEMORY OF
MARGARET JOYCE FREEMAN
' Ceramic'

December 7, 1942

TO THE MEMORY OF
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The physical geography of Ireland is so closely related to that of Great Britain that to the imaginative eye the intervening seas exist only as a geological creation of yesterday. Climatically, Ireland often experiences what Britain will shortly endure; its vegetation may be in part pre-glacial, but has also been drawn from Atlantic and European sources in post-glacial times to be moulded into a distinctive form in an insular environment. For the rest, population, industry, communications, settlement and social life, the story must tell itself both in the general chapters and in the more detailed regional treatment of these pages. This book may at least demonstrate that there is abundant scope for research on the geography of Ireland; and its author hopes that those who can add to his own knowledge will do so, especially if they disagree with the conclusions reached here, for as a wise man once said, no one is convinced that he is wholly wrong except when convinced that he is wholly right.

A first necessity for the worker in geography is a sympathetic approach to people, and the author has at least found the Irish sympathetic to him and willing to give information on their farms, their families or their jobs. In many cases, the assurance that he had no connection with any government department immediately produced a lessening of reserve and an invitation to enter the farm kitchen. There is also a debt of gratitude to the many students, clergy, teachers, shopkeepers and others who have given information on the communities among whom they live. Most of these informants have been quite oblivious of the value of their information, and few of them may read these words, but the debt remains. Much of the field work has been done with various friends, some of it in the annual field weeks of the Geographical Society of Ireland, all of which have proved interesting ventures in joint research.

On many occasions the author has been indebted to his friends on the staff of Trinity College, Dublin, and of other universities, and to many more whose assistance has been invited at various stages. A list of names is impossible in such circumstances, but three must be mentioned: Dr. A. Farrington of the Royal Irish Academy, for constant help and advice, Mr. J. P. Haughton, M.A., M.Sc., Lecturer in Geography in Dublin University, for so much companionship in these investigations, and Mr. F. M. Synge, M.Sc., for some splendid maps. To the rest, unnamed, the author adds equally cordial thanks and the assurance that the errors are his own.

T. W. FREEMAN

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AUGUST, 1948

*(Now of School of Geography,
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(Photo: Rev. Fr. Browne, S.J.)
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16. New housing estate, City of Dublin
(Photo: Irish Tourist Association)



1. THE TWELVE BENS, CONNEMARA

2. AN ESKER NEAR TRIM, CO. MEATH





3. FARM AND WINDSHORN TREES, CO. CLARE
The old cottages are now used as farm buildings.

4. TREES ON CUTAWAY BOG, NEAR EMO, CO. LEIX





5 CATTIE FAIR AT CASHEL, CO. TIPPERARY

6, CATTIT CRAZING IN PARKLAND, CO, MEATH



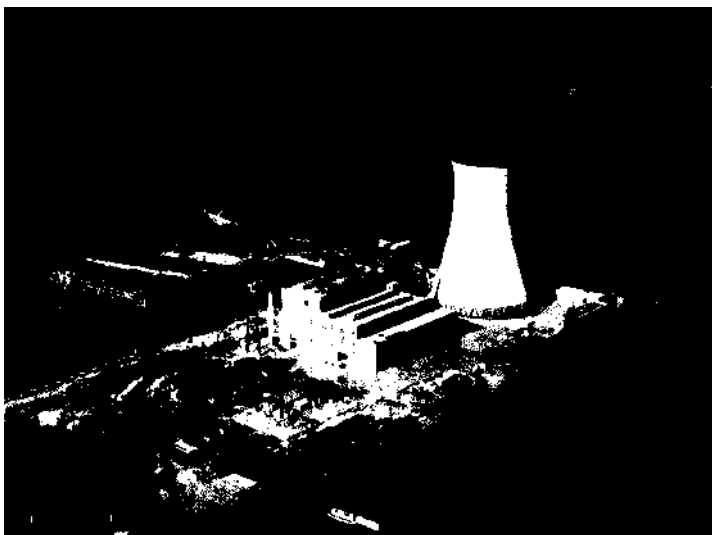


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9. CREAMERY IN CO. CLARE

hurns are brought on horse and donkey carts: note the pile of turf (peat) by the roadside.

10. INTERIOR OF CREAMERY, CO. TIPPERARY

There is a separator and a butter churn.





11. FACTORY AT TRIM, CO. MEATH

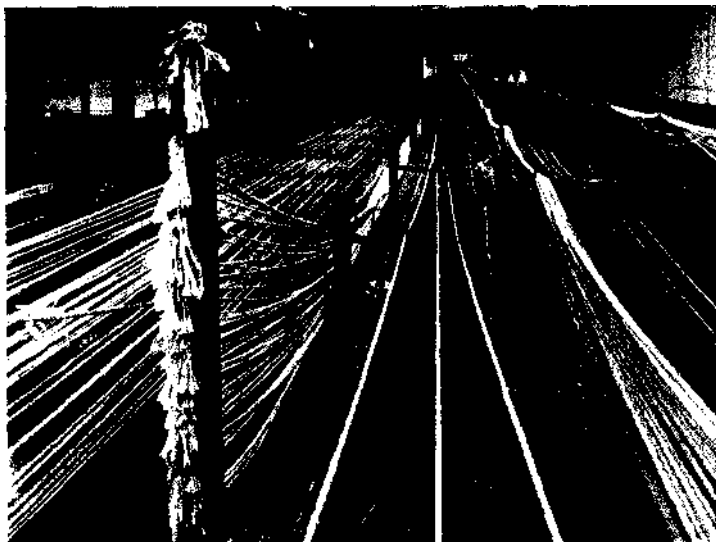
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[YARDS](#) IN BELFAST

THE ROPEWORKS AT THE JULIAS! THE LARGEST IN EUROPE





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16. NEW HOUSING ESTATE, CITY OF DUBLIN



PART I

PHYSICAL, HISTORICAL, SOCIAL AND ECONOMIC GEOGRAPHY

CHAPTER I

INTRODUCTION

ENGLAND, THAT utmost corner of the west' is the description of Shakespeare in *King John*: how much more remote the island beyond, variously defined as 'the sister isle/ 'Ireland the outpost,' 'unhappy Ireland,' or even 'John Bull's Other Island'! Mackinder shows in the first chapter of *Britain and the British Seas* that before the age of discovery the western margins of Europe formed the end of the world with the ocean as the last barrier known to man. Against the experience of centuries the records of the early Norse penetrations of America seem a mere incident; and Ireland, even more truly than England, was a western outpost, cut off from its nearest neighbours by sea. It lies, too, far from the southeast or 'continental angle' of Britain, and like the western part of the larger island is perhaps best considered as part of the Atlantic fringe of Europe, yet the Age of Discovery was not a major crisis in Irish life for most of the world's shipping passed it by. No Irish port emerged on the scene during the seventeenth and eighteenth centuries in a position comparable with ocean-minded Bristol or slave-trading Liverpool, though agricultural produce was sent out from various Irish harbours in exchange for imported manufactured goods and luxuries of various kinds. In short, neither the age of discovery nor the industrial revolution affected Ireland as closely as Great Britain, so that even now, in the middle of the twentieth century, maritime and industrial interests have not the power they possess in Britain.

Historically Ireland has a clear individuality that reflects its distinctive space relations, for it is not now and probably never could have been made merely a detached fragment of an entity known as the British Isles, or, as Professor A. G. Tansley calls them, 'the British Islands.' Yet there are similarities in the physical environment, for Ireland is structurally the westward extension of Britain and climatically not infrequently Britain's anteroom, having a preview of the weather on the way to the larger island. Its natural vegetation, though floristically poorer and having certain local characteristics, is closely related to that of Britain, but as

soon as the human landscape comes to the mind's eye contrasts emerge, for the farms are smaller, the towns farther apart, and industry everywhere of less significance than in Britain, if one excludes the city of Belfast and its hinterland. And there are deeper contrasts still, not least in religious allegiance, in social customs and in outlook which, though varied from one person or group to another, inevitably reflects a difference both of historical development from Britain and hardly less of the impact of current world problems and struggles on the country.

In the prehistoric period Ireland stood at the end of the world in even greater measure than Britain, and, so far as is known, no palaeolithic immigrants ever arrived, though there are traces of mesolithic settlements which appear to have been of small extent. In the megalithic age Ireland emerges more definitely on the European scene, having immigrants who must have come by sea, both from Scotland and from other parts of Western Europe: the 'Atlantic sea routes,' to use the term of Sir Cyril Fox, along which men travelled coastwise, making short passages across the open sea, were already important. On these routes the peninsulas of Brittany, Cornwall and Southwest Wales, and the remoter havens of Spain and Portugal all figured; and there is strong evidence that Ireland, penetrated on all its coasts, had a steadily increasing population. This megalithic phase was merely the forerunner of the Bronze Age, in which Ireland became a place of pilgrimage for its gold. To what extent settlers and traders came across the Irish sea by the several short passages, especially the fourteen-mile journey from Kintyre or the slightly longer run from Galloway, and to what extent the immigrants travelled the longer routes can only be guessed, but apparently all were used, and Ireland established a position of some consequence in the western world of the day. It lay beyond the sphere of Roman government and even of Roman invasion in the early centuries of the Christian era, though it retained contact with the remainder of the western European world, and there is evidence of emigration from Ireland across the Irish sea at this time.

An age of peculiar fascination follows that of the Roman invasion in Britain, for while England received the Anglo-Saxon invaders, Ireland remained the centre of a Celtic, western world in which Christianity acquired a strong monastic organisation, and was so missionary-minded that its priests penetrated almost the whole of Britain and many parts of the continent: once more, the routes across the Irish sea and the western peninsulas of Britain, with Brittany, were used, and Irish 'saints' were known far and wide. At home, a territorial organisation into small units known as *tuaths* developed, and the more ambitious rulers began to aspire towards domination of a large part or even of the whole of the country.

Norse invaders were at first ravagers of the land, but later peaceful settlers who, with prophetic acumen, chose Dublin as their chief centre, and Wexford, Waterford, Cork and Limerick as their four other main settlements. They fostered trade with ports in the west of Britain, notably with Bristol, and once again the Irish sea route had its voyagers, though the Norse people never conquered Ireland and in time were absorbed into the general population. After them came the Normans who, one century after William I came to England in 1066, crossed St. George's Channel and began a penetration of the land which at first seemed likely to impose upon it the distinctive features of Norman organisation. The Normans were creators of towns and framers of laws which differed considerably from the older native laws, but in the end they failed to make Ireland part of their domain, except for a small but important territory known as the 'English Pale,' and in their twilight period the country was once again 'native,' though it possessed more towns than ever before, had a diocesan system covering the whole of the land, and a county system that was at least embryonic and capable of expansion. The more serious days of Anglo-Irish relations still lay ahead.

Tudor and Stuart policy was to bring Ireland into closer relations with Britain by plantations or, in the case of Antrim and Down, by permitted immigrations. Once more, the northeast received a preponderance of settlers from Scotland, as during the prehistoric ages, but the immigrants elsewhere came mainly from England: the Cromwellian phase was the most crucial of all, as in it the new landlord class was established more firmly than ever before. Not far distant was the eighteenth century, the time when the landlords in their demesnes and the poor farmers or labourers outside them were the two main classes of the country: by the eighteenth century Ireland had more towns than in any previous phase, as both the Tudors and the Stuarts recognised the essential place of the towns in any organised state. The Act of Union with Britain in 1800 seemed the logical climax of British policy towards Ireland, as from the Norman age the essential aim had been to incorporate the island into Great Britain for many reasons, including its economic value as an outlet for manufactures and as a producer of foodstuffs. But until the Belfast merchants attracted the coal and iron to build their ships, together with the raw materials for their manufactures, the impact of industrialism was slight.

The Act of Union was not, and could not be, the final solution, as the forces arraigned against it among large sections of the Irish population were too strong for it to remain. The partition between the six counties and the twenty-six gave a compromise solution in 1921 which, whatever its merits, is already deeply rooted in the life of the land. In effect, Northern

Ireland is part of Britain and Eire a republic, though it is now clear that her major trading contacts must be with Great Britain. There are those who hope to create, at first in Eire and ultimately in the whole island, an all-Irish republic, Irish-speaking and having, it is said, no trace of the invasions and alien settlement of the past thousand years; they look back with admiration to centuries long past, such as that of the Celtic church, as times when Ireland had its own distinct individuality and experienced a golden age. What the future relations with Britain may be, one can only speculate; and the author will leave the reader to do that. Also of interest is the relation of Ireland and America, with whom the main contacts are neither maritime nor industrial but human, and therefore individual and personal, as there are three to four times as many people of Irish extraction on the west side of the Atlantic as at home. Similarly, there are human contacts with Britain as well as the inevitable maritime and commercial relations. The westward location of Ireland may prove an asset if air services are destined to replace other means of communication, and if the advantages of landing in Ireland are to remain so great that commerce and manufacturing industry must follow *in its wake*, but there is still no sign that any such development is likely.

This book is divided into two parts, General and Regional: in Part I the features of the country as a whole are discussed, and in Part II there is a series of regional chapters. The subjects in Part I are structure and landforms, climate and weather, and vegetation, which, taken together, are aspects of the physical environment; then follows an outline of the historical geography, distribution of population, settlement and society, agriculture, industries and communications, all of which relate to the social and economic life of Ireland. It is impossible to provide, even in a book of these dimensions, a full treatment of the historical development in each of the aspects studied, though whenever possible, some allusion is made to the hundred years that have passed since 1845, when the Famine reversed the population trend and initiated the decline that has continued to the present. In some chapters such as population, industry and communications, a brief review of trends from the early part of the nineteenth century is given. Very clearly, the Famine years in Ireland are a crisis period of a magnitude comparable with that of the Industrial Revolution in Britain. In this book the Census year, 1891, is frequently mentioned, as by then the first great waves of emigration were spent; 1891 also saw the beginning of the classic investigations of the Congested Districts Board, which revealed the lamentable social and economic conditions of the poorest areas of the land, though happily since then social amelioration has removed some of the extreme poverty for which

Ireland has long been notorious. At the beginning of Part II there is a general chapter on the regional divisions of Ireland, in which much of the material in Part I is summarised as a preface to the more detailed regional studies.

A NOTE ON PLACE NAMES

Those who have visited Eire will be aware that each place has an English and an Irish name, and that the postmarks are in Irish only: they may also be aware that the Census form is bilingual, but that the income tax forms normally arrive in English. A request by the author for a telephone extension in his home brought an acknowledgement in Irish, followed later by a refusal, owing to the present scarcity of supplies, in English: the country is therefore bilingual. In the choice of place names for this book the name in general use is employed whenever possible, and the list of names given in the Census volumes has been taken as a guide in most cases, but not all. Thus, Leix, or Laoighis, is preferred to Queen's County, and Offaly to King's County: similarly, Dun Laoghaire is used instead of Kingstown and Cobh rather than Quccnstown. Difficulties arise in the choice between Navan and An Uaimh, Co. Mcath, as the Census gives the former for the rural district and the latter for the town; again, Bagenalstown (Co. Carlow) is still in general use, though efforts are being made to popularise Muinc Beag. Some familiar old names die hard, and the only concern of the author is that every place may be located: in Northern Ireland only one name, the English form, appears on the railway stations, in the Census returns, and *in* the various other official documents, so no difficulties arise.

A NOTE ON THE BIBLIOGRAPHIES

The bibliographies at the end of each chapter list the general sources used, together with any more detailed studies that are available. There are, so far, very few specialised articles of a distinctively geographical character for any part of Ireland, but in time the work of the Geography Departments in two Irish Universities, Dublin and Belfast, should result *in* a more adequate treatment of the regional geography. In Chapter V, Historical Geography, reference has been made to individual paragraphs by a series of numbered references: elsewhere the sources are indicated by a general statement except when detailed location of an individual source has seemed desirable. For several journals, the standard abbreviations given in the *World List of Scientific Periodicals*, second edition, Oxford, 1934, have been used, but titles of other journals have been given in full. The abbreviations are listed here:

<i>Econ. Geogr.</i>	Economic Geography, Worcester, Mass.
<i>Geogr.J.</i>	Geographical Journal, London.
<i>Geogr. Rev.</i>	Geographical Review, New York.
<i>Int. Geol. Congr. BrusseUs</i> (1922)	International Geological Congress (also London, 1948).
<i>J. Ecol.</i>	Journal of Ecology, London.
<i>Quart. J. Geol. Soc. Lond.</i>	Quarterly Journal of the Geological Society, London.
<i>Quart. J. R. Met. Soc.</i>	Quarterly Journal of the Royal Meteorological Society, London.
<i>Proc. Geol. Ass. Lond.</i>	Proceedings of the Geological Association, London.
<i>Proc. Linn. Soc. Lond.</i>	Proceedings of the Linnean Society of London.
<i>Proc. Prehist. Soc.</i>	Proceedings of the Prehistoric Society (formerly P. P. S. of East Anglia), Cambridge.
<i>Proc. R. Irish Acad.</i>	Proceedings of the Royal Irish Academy, Dublin.
<i>Sci. Proc. R. Dublin Soc.</i>	Scientific Proceedings of the Royal Dublin Society.
<i>Scot. Geogr. Mag.</i>	Scottish Geographical Magazine, Edinburgh.

REFERENCES

A pioneer work on the geography of Ireland is Fitzgerald, W., *Historical Geography of Early Ireland*, London, 1925; there are chapters on Ireland in the standard works dealing with the British Isles, especially Mackinder, H. J., *Britain and the British Seas*, 1907; Herbertson, A. J., and Haworth, O. J. R., *Oxford Survey of the British Empire*, vol. i, 1914; Stamp, L. D., and Beaver, S. H., *The British Isles*, London, 1933; Demangcon, A., *Les Isles Britanniques*, Paris, 1927, and translation by E. D. Laborde, London, 1939. A particular debt is owed to the writers of three works—Cole, G. A. J., *Ireland the Outpost*, 1919; Cole, G. A. J., and Hallissy, T., *Handbook of the Geology of Ireland*, London, 1924, and Fraeger, R. L., *The Botanist in Ireland*, Dublin, 1934. With the latter should be noted the same author's popular but informative *The Way that I went*, London and Dublin, 1937. The author has pleasure in recording that a volume on Ireland will be included in a work dealing with the British Isles by Professor J. Solch of Vienna University.

CHAPTER II

STRUCTURE AND LANDFORMS

IRELAND is, to use Grenville Cole's phrase, 'the last outpost of Eurasia against the oceanic depths of the Atlantic,'¹ an island lying to the west of Great Britain. Maritime influences penetrate through the land, which consists of a framework of southwest-trending Caledonian hills and east-west Armorican chains around which lowlands spread in unbroken continuity. The Caledonian uplands of the north and west are separated only by a narrow break from those of Scotland, and the Armorican chains have a structural continuation in South Wales, England and continental Europe. In Ireland the two structural lines, so important in the make-up of the Eurasian continent, meet; they finally cross in the Appalachians. They dominate the Irish scene as they appear in lines of uplands, varying from low hills to mountain chains, which are visible from almost every lowland through which the traveller journeys. (See Figs. 1 and 2.)

Many of the country's uplands lie near the coast, with the unfortunate result that it has been frequently compared to a saucer in elementary textbooks. Some of the uplands are clearly visible from the surrounding seas. In the east the Antrim basalt plateau overlooks Belfast lough and the North Channel, the Mourne and the Carlingford mountains rise above the fiordic lough which separates them, and the Leinster chain reaches Dublin bay; in the south and southwest the long Armorican chains stretch from the cliffed shores of Waterford to the great peninsulas that lie on either side of the Kerry rias; in West Connacht the metamorphic rocks appear both on low shores and in quartzite cliffs such as those of Achill, and in Donegal there are similar cliffs, but some low shores also. Long sea inlets lead to mountains and lowlands in the west, and the coast, with its mixture of mountain, sea, peninsulas and offshore islands, is one of particular beauty. (See geology map, Folder 1, at end of book.)

The interior of Ireland is essentially a lowland and lies mainly around 200 ft. rising gently to 400 ft. and varied by a number of low hills 600-1,000 ft. high. In this book the term 'plain' has been avoided, as it suggests a flatness which is not characteristic of the centre of Ireland: rather is there considerable topographical variety for the rock floor is uneven, and the cover of glacial and glaci-fluvial materials adds to the diversity. Where the

¹ *Ireland the Outpost*, 1919, p. 9.

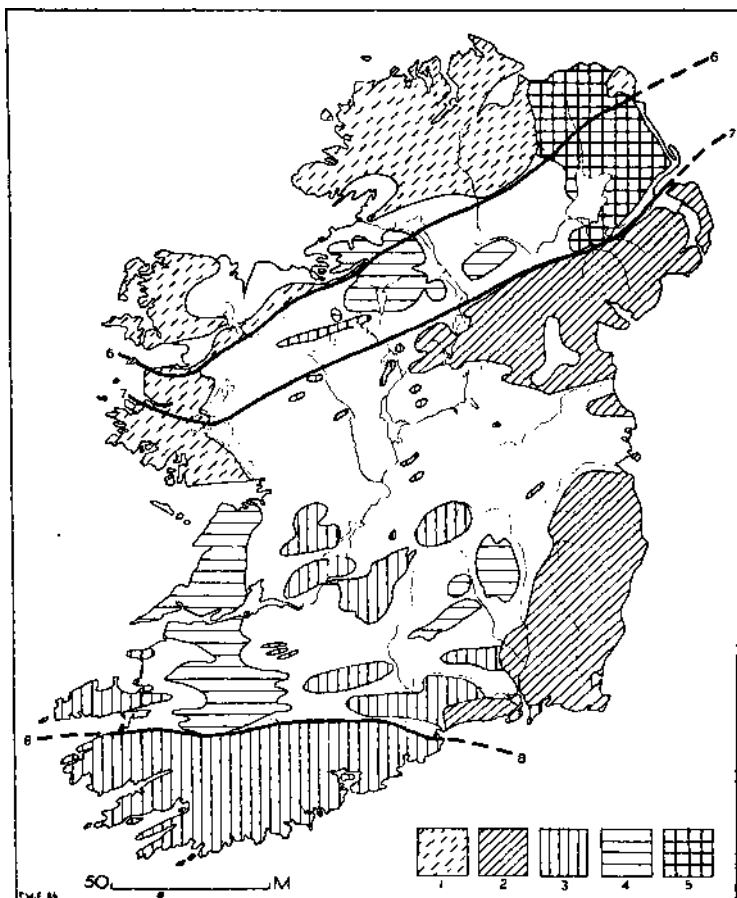


FIG. 1.—STRUCTURAL ELEMENTS

1, Western Caledonian masses; 2, Eastern Caledonian masses (Newry axis and Leinster chain); 3, Armorican uplands with intervening lowlands in the south; 4, Carboniferous plateaus; 5, Basaltic plateaus and lowlands; 6 and 7, continuation (6) of Highland Boundary and (7) Southern Upland boundary faults (6 and 7 after E. B. Bailey); 8, see text, p. 19.

drifts are absent, as in part of the lowland near Galway bay, the scene is karstic, but the underlying rockfloor is rarely visible elsewhere, and the drifts are as much as 200 ft. deep in places. Variety is therefore the main feature of this lowland, which may be roughly delimited by a line drawn from Dundalk to Boyle, Co. Roscommon, and thence in two concave curves from Boyle to Galway and from Galway to Dublin. The Central Lowland is the heart of Ireland, and routes along the dry ground formed of drifts or eskers have been followed for thousands of years: in addition, easy passageways along valley and lowland corridors lead from it to every Irish shore. South of the Dublin-Galway line, for example, tongues of lowland spread round the various uplands and lead to the fertile valleys of Munster.

Around the lowland there are several types of landscape, each owing its distinctive character to its structure and history. The ranges west of the Leinster chain, though of Armorican structure, have the Caledonian trend, and it is only in the extreme south, between Co. Waterford and Kerry, that the trend as well as the structure becomes typically Armorican. Contrasting with these ranges are the plateaus of upper Carboniferous strata which survive as monadnocks in the 'Leinster coalfield,' and in a stretch of country between Galway bay and Killarney: of little economic value or aesthetic attraction, these dreary plateaus lie off the main commercial and tourist routes. To the west, the Carboniferous limestones give place to a variety of ancient sedimentary and metamorphic rocks with many igneous intrusions, and the green fields or karsts of the Lowland are replaced by the bog-covered lowlands and towering mountains of West Connacht. In Clew bay, however, a stretch of the Central Lowland, made up of drumlin-covered limestones, reaches the coast to divide West Connacht into two parts: in the lower Moy basin there is also a drift-masked Carboniferous limestone lowland, separated from the centre of the country by the Ox mountains, a long tongue of sedimentary and metamorphic rocks with a clear Caledonian trend. The finest of the Carboniferous plateaus of Ireland, which includes considerable areas above 2,000 ft., lies between the Curlew hills and Donegal bay: in this country there are numerous escarpments of limestone or Millstone grit, some Coal Measures of quite minor economic importance and a number of corridor-valleys, of which the greatest, the drumlin-covered and lake-strewn Erne valley, opens a natural avenue from Donegal to the Ulster basin around lough Neagh.

The historic province of Ulster has a number of hill masses, but is primarily a lowland. In the northwest, consisting of the Foyle basin and Donegal, there are metamorphic rocks comparable with those of the Scottish Highlands, and, like them, intruded by great spreads of granite.

In Donegal, as in Mayo, quartzites stand up in conical peaks, such as Errigal, and the Caledonian trend appears clearly in such ranges as the Derryveagh, the Glendowan and the Urris. The Sperrins, too, are Caledonian in structure. This line is accentuated by the deep valleys that lie parallel to the mountain chains, which are penetrated by occasional transverse cuts. In the east the long tongue of Ordovician and Silurian rocks that extends through Down, Armagh, Monaghan and Cavan (the 'Newry axis') is also a Caledonian feature comparable with the Southern uplands of Scotland or with the Leinster chain. The worn-down stump of a Caledonian range, it survives as a hilly upland, rarely more than 1,000 ft. high, except where igneous intrusions form the Slieve Croob, the Mourne, and the Tertiary ringdykes of Slieve Gullion and the Carlingford peninsula.

Analogues of the Scottish Highlands and the Southern Uplands are bounded by faults correlated with those defining Central Scotland (see Fig. 1): thus, the 'Highland Boundary' fault skirts the south side of the Sperrins, and the 'Southern Boundary' fault runs along the edge of the Holywood and Castlerock hills. The intervening basin of sedimentation has Old Red sandstones which form an upland to the northeast of Enniskillen, lower Carboniferous beds in the Monaghan corridor, and upper Carboniferous strata in the Slieve Beg. Later sedimentary rocks, which cover a large coalfield beneath Lough Neagh, include Permian, Triassic, Liassic and Cretaceous beds: of these the Triassics floor the Lagan valley and extend through the Dundonald gap to the shores of Strangford Lough. Over these beds lie the basalts, which form scarps 1,000 ft. high facing Lough Foyle in the west and the Lagan valley with the Antrim coast in the east: in the centre of the basalt country is the Bann valley which has, around Lough Neagh, some clays of later date than the basalts which have not been precisely dated, though they are pre-glacial. The last great episode in the evolution of the Ulster landscape was the Quaternary glaciation, which left the lowland plastered with a variety of sands and gravels, and also with swarms of drumlins in parts of the Lagan and Bann valleys; the surrounding plateaus have melt water channels and lake beds, notably in the Glens of Antrim and in the neighbourhood of Ballycastle.

Ireland's topographical variety is the result of its complex geological history, in which the Caledonian and Armorican influences emerge more obviously than the Alpine storms of Tertiary times, which were felt rather as a phase of volcanic activity and fracturing than of folding: it is not improbable that the Tertiary movements separated Ireland from Britain and left it as an island on the continental shelf of Europe. The ice sheets of Quaternary times spread over a land surface that was at least

broadly comparable with the Ireland of today in form and outline. The greater part of the land was covered by ice at some time, though not necessarily at the same time, and it has recently been suggested that an area extending inland from Dingle bay was never glaciated at all (see p. 29). In the glaciated mountains, the imprint is seen in overdeepened valleys, some of them moraine-strewn and partly covered with the clays of late-glacial lakes; in the lowland there are sheets of ground moraine, drumlins, eskers, kame and kettle moraines and, hardly less important, the channels of late glacial meltwaters. The present drainage therefore shows, in most of the lowland, the imperfect adjustment so far achieved during the post-glacial phase. It is, above all, the glacial influence that provides the final elements of topographical diversity in the Irish scene.

STRUCTURE AND TOPOGRAPHY

The geological evolution of Ireland is outside the scope of this work and may be studied in the excellent Handbook by Cole and Hallissy (see p. 42), in which the story is admirably told. There can be no doubt that various peneplane levels exist in Ireland, but considerable research is needed before their extent and form can be determined: such research is made difficult by the varying thickness of the drift cover. The highest and least certain of these levels, around 2,000 ft., is said to be Devonian: it is seen on Slieve League, Donegal and on various hills in South Mayo, where the last relics of Carboniferous strata are now being removed. The second level, around 600-800 ft., was called the South Ireland peneplane by Miller, on account of its wide development in the Armorican area: Cole and Hallissy suggested that it originated by the degradation of a Cretaceous cover. Another peneplane level, more extensive than either of the above, is seen around 200 ft. in the Central Lowland and throughout the low-lying country that spreads around the various uplands. This peneplane truncates rocks of widely divergent lithological composition, and occurs alike on igneous, metamorphic and sedimentary rocks, and especially on Carboniferous limestones. In parts of the Central Lowland it rises to 400 ft. in gentle undulations, but while many traces of a levelling around this height have been seen, the recognition as a separate surface of erosion, though possible, is premature. These three levels, 2,000, 800 and 200 ft., are sufficiently prevalent to provide one key to the regional geography in many parts of the land. Several of the rivers, such as the Nore, Suir, Barrow, Slaney and Boyne, flow in sluggish courses across the 200 ft. peneplane, and then incise themselves in it to reach the present sea level. Again, the Cork rivers cut through gorges in the 800 ft. and 200 ft. surfaces, and are fed by tributaries that are torrent courses in their

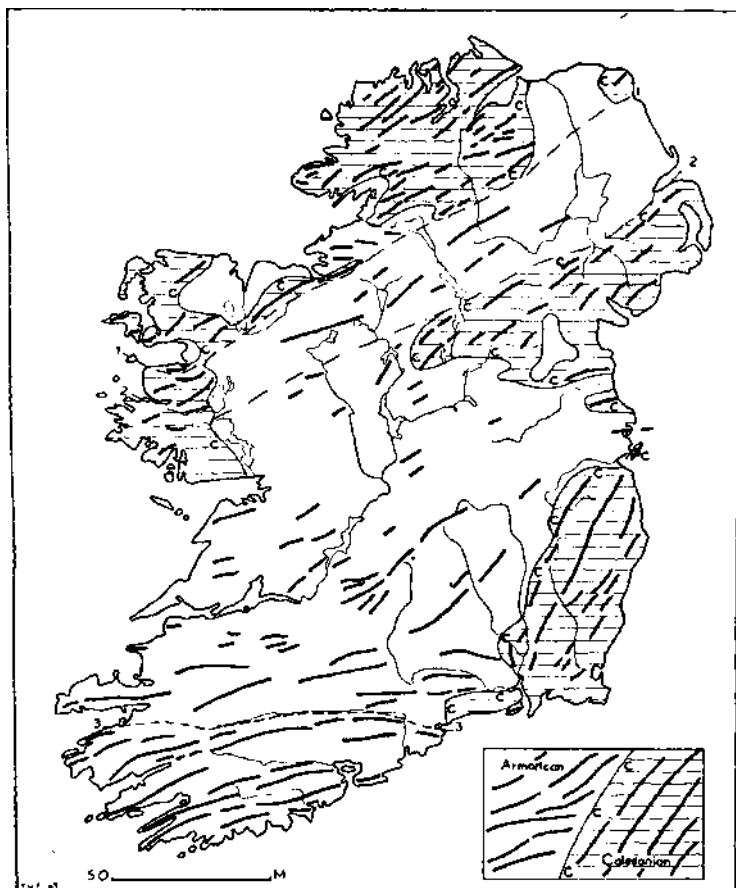


FIG. 2.—TREND LINES IN CALEDONIAN AND ARMORICAN IRELAND
For 1, 2 and 3, see 6, 7, 8 in Fig. 1.

The Armorican east-west line is clearest in the south and southwest; the Caledonian line is best marked in the Leinster chain, the Newry axis country, the Ox mountains, and in the uplands of the extreme northwest.

lower reaches, and are steadily working back into the peneplanes through youthful valleys. Many of the rivers are now cutting through the Quaternary deposits, but the rockfloor has been reached in places.

The Irish landscape shows five main structural elements, each of distinct age and form (see Figs. 1 and 3); they are here indicated categorically, and then treated more fully.

1. *The Western Caledonian Masses* (Northwest Ireland and West Connacht), pp. 13-16.—They consist largely of pre-Cambrian, Ordovician and Silurian rocks, subjected to several phases of metamorphism by pressure and igneous intrusions. Long-continued weathering has produced extensive lowlands, but quartzites form peaks, and Caledonian mountain-building movements have produced uplands which generally have a northeast-southwest alignment.

2. *The Eastern Caledonian Masses* (the 'Ncwry Axis' and the Leinster Chain), pp. 16-18.—The two masses possess a granite core intruded as the Caledonian folds arose, but their physical history has differed so markedly that the present form shows contrasts. The Newry axis is generally hilly with a few mountainous areas such as the Mourne; the Leinster chain is a central upland surrounded by lowlands having, on the east, lines of hills marking igneous outcrops.

3. *The Armorican Fold Mountains*, pp. 18-22.—Three groups of uplands may be distinguished: (a) the southwestern block, defined by a structural line from Dingle bay to Dungarvan; (b) the isolated uplands between the Leinster chain and the lower Shannon; (c) hills exposing Devonian inliers of the Central Lowland.

> 4. *The Carboniferous Plateaus*, pp. 22-24.—Monadnocks of upper Carboniferous strata survive in three areas: (a) Castlecomer-Slieve Ardagh, or the Leinster coalfield; (b) from Killarney to Gal way bay, intersected by the Shannon; (c) Sligo, Leitrim, Fermanagh and Monaghan.

5. *The Tertiary Basaltic Area*, pp. 24-25.—Lavaflows of basalt in the northeast form plateaus and lowland: around their scarped margins Carboniferous and Mesozoic strata outcrop and form lowlands.

1. THE WESTERN CALEDONIAN MASSES

These old masses, which are the foundation stones of Ireland, were already reduced to base level by Ordovician times, but were raised into fold mountains by Caledonian movements, which were accompanied by faulting and volcanic eruptions. They show a northeast-southwest trend, widespread faulting in the same direction or at right angles to it, and



FIG. 3.—MAJOR LANDFORMS

1, Highland type, sharp peaks; 2, Major uplands; 3, Minor uplands; 4 Carboniferous plateaus; 5, Basalt plateaus; 6, Basalt lowlands; 7, Lowlands, pre-Carboniferous rocks; 8, Lowlands, Carboniferous and later rocks.

also differential weathering between quartzites, granites and schists. In West Connacht, quartzite mountains rising above a lowland around 200 ft. are the main feature of the landscape, but in Donegal the Caledonian line stands out clearly in a number of quartzite ranges with conical peaks, such as Muckish-Errigal, Aghla, Knockalla, Urris and Slieve Snacht. Slieve Tooley and Slieve League, in the southwest, have been bisected by marine attack, and present precipitous scarps, rather than actual cliffs, from their summits to the sea. The granites intruded between Ardara and Mulroy bay form hills of smoother outline, such as the Blue Stack mountains, the Glendowans and the Derryveaghs: from many of the lowlands in Donegal it is possible to observe the contrast between the smoothly moulded granite hills and the conical peaks of the quartzites. In the Errigal range and the Slieve League peninsula there is some of the wildest and most typically highland scenery in Ireland, and the landscape is almost as mountainous around the Blue Stack and the Aghla ranges, the Sperrins, and also in the Fanad and Inishowen peninsulas. Much of the northwestern Caledonian mass, however, consists of plateaus rather than mountains; and there are extensive coastal lowlands with occasional hills. In all probability the 800 ft. and 200 ft. surfaces are widely represented in Donegal: the presence of the 2,000 ft. surface on Slieve League has already been noted. Glacial scouring has moulded both the mountain valleys and the coastal lowlands in the west, but deposition is more apparent in the east, where the rivers are youthful streams heavily charged with detritus, which is laid down in sheltered loughs and bays.

The metamorphic mass of Connacht, which is divided into two sections by Clew bay, has an impressive offshoot in the Ox mountains. The northern part of the mass, made up of metamorphic rocks, has been worn down to hills of 800-1,200 ft., or to lowlands, except in the wonderful quartzite peaks of Achill and West Mayo. Croaghnaun, at the west end of Achill island, falls precipitously from its summit of 2,192 ft. to the sea; other quartzite hills, *conical* and isolated, exist in the Nephin beg range, and, a little farther east, stands solitary Nephin, 2,464 ft., the highest peak of all. These mountains, largely bare rock, possess a starkness of outline that is accentuated by isolation in the surrounding lowlands and sea: unlike the Errigal range, they stand alone, revealing the resistance offered by quartzite against all forms of denudation.

Ordovician and Silurian sediments are exposed between Croaghpatrick and a line south of Killary harbour. These mountains have a smoother outline than the quartzite peaks; on them rest the last remains of a Carboniferous cover and they probably possess, around 2,000 ft., relics of a peneplane. Faulting has broken the upland into fragments

separated by deep valleys: two of the major faults have been correlated with the lines of fracture that limit Central Scotland. The Highland Boundary fault runs to the south of the Croaghpatrick range and along the landward face of the Ox mountains, which is a moorland around 1,500 ft. The Southern Boundary fault runs from the north shores of Lough Conn westwards; here the Silurian beds fade out, and the pre-Cambrian floor of Connemara is revealed.

In west Connemara the Twelve Bens (misnamed Pins) rise above a peat- and lake-covered lowland as a splendid group of quartzite peaks more than 2,000 ft. high. The Maumturk range, also of quartzites except in the north where Silurian slates appear, has been described as 'the tangled cluster of the Twelve Bens stretched out in a curved line with their tops rubbed off.' Elsewhere lowlands prevail, though the Gal way granites form country rising in gentle lines to heights of 1,000-1,200 ft. Connemara offers some of the most complex problems imaginable to the geologist, and may prove to be entirely pre-Cambrian in origin and present form, for it has no known relics of later deposits.

2. THE EASTERN CALEDONIAN MASSES

The two Caledonian masses of eastern Ireland, the Newry axis and the Leinster chain, are comparable in age and formation, but sharply different in present form. The Newry axis is mountainous only where igneous intrusions are exposed at the surface in the Carlingford peninsula, the Mourne mountains and Slieve Croob, Co. Down; elsewhere it is a lowland rising into low hills. The Leinster chain, on the other hand, stretches as a continuous upland for over seventy miles from Dublin to Co. Waterford, with numerous summits over 2,000 ft. The Newry axis was protected from erosion by a cover of Carboniferous and probably Triassic beds, but the Leinster chain has been attacked by denuding agents, probably without interruption, from Devonian times. Consequently, Silurian strata have been removed from the Leinster chain and Ordovician beds now survive only on its margins: the Newry axis, on the other hand, still retains most of its original Silurian cover.

The Newry Axis.—The Newry axis extends from the coast of Co. Down through South Armagh, Monaghan and Cavan into Co. Longford, and finally disappears a few miles east of the Shannon, near the town of Longford. Granites of Devonian age appear at the surface in a belt around Slieve Croob, and form hills reaching 1,755 ft. but otherwise are hidden except at Crossdoney, near the town of Cavan: this reappearance shows that a long bar of igneous rock occupies the core of the Caledonian fold from Longford to the sea. The Ordovician and Silurian strata are,

in fact, highly contorted, but the general Caledonian trend is clearly expressed in the present landscape. Drumlins, however, are so numerous that they dominate the scene: as many of them are 100 ft. high and some have a rock core, it is difficult to imagine and impossible to reconstruct the form of the rockfloor. In Cavan, Monaghan and Longford, long ridges rise to a height of 800-1,000 ft.: in Armagh and Down, there are three main topographical elements, (a) a low-lying surface, apparently continuous with the Central Lowland, now existing at 200 ft. or less, and well developed in the Ards peninsula; (b) hills around 600-1,000 ft., probably belonging to the 800 ft. surface, which is also seen on the west of the Mournes, and (c) the hilly country formed of intruded rocks, of both Devonian and Tertiary date. As noted above, Devonian vulcanicity is represented in Slieve Croob and the surrounding area. The Tertiary vulcanicity has left strongly marked features in two ringdykes, and in the granite knot of the Mournes. The Slieve Gullion ringdyke has a central hill of 1,894 ft. with a series of smaller hills 750-1,000 ft. high around it: in the Carlingford peninsula, immediately adjacent to the Slieve Gullion area, part of a second ringdyke appears in gabbro hills. Both these areas were also intruded by granites in Tertiary times; in the Carlingford peninsula the granites form a basin, but in the Mournes they survive as dome-like crests with pinnacles and crags above long talus slopes. The Mournes, a range of less mature outline than the Wicklows, have a clearly marked northeast-southwest trend.

The Leinster Chain.—The Leinster chain is a vast anticlinal arch, with a granite core, flanked by Ordovician sediments metamorphosed into mica-schists near the actual junction; long tongues of schist are included in the granite and Lugnaquilla has a schist cap on its summit. Cambrian rocks on the east side of the chain consist of slates that have weathered into low-lying country, now drift-covered and fertile, and of quartzites forming knob-like bosses on Howth head, a line of three peaks in Bray Head, the Little and the Great Sugar Loaf, the summits on the edge of the Vartry peneplane, and the Forth mountains, Co. Wexford.

This anticlinal arch is perceptible as a structural feature for over ninety miles from the coast of Waterford to the tiny island of Rockabill, off Balbriggan in the north of Co. Dublin; for seventy miles it is a well-marked upland possessing, in the Wicklow mountains, the largest area of continuously high ground in the country. Ordovician and Silurian sediments were raised into an arch by Caledonian movements and, as the arch arose, a granite magma was intruded along its core. Up to this point, its development was similar to that of the Newry axis, but henceforth its history was on quite different lines. During Devonian and

Carboniferous times, the Silurian strata was stripped off, the granite exposed, and the whole mass seared by deep valleys. Some of the granite pebbles were incorporated in the Carboniferous beds. The denudation was continued from Carboniferous times onwards, and the glaciations, perhaps three in number, added their moulding influence to that of other agencies. The chain, therefore, is now an interesting mixture of mature and youthful features, for its crests, so well seen from the surrounding lowlands, are smooth and gently moulded curves where the granites are exposed, and the deep glaciated valleys are a contrasting and youthful feature. The quartzite hills maintain their distinctive form around Bray, and there are already signs that a line of hills is associated with the junction of the granites and the mica-schists: if this be so, the granites will eventually be weathered into a lowland with a fringe of mica-schist uplands.

The smooth upland surfaces of the Wicklows may be part of an ancient peneplane: they show a general accordance of summit levels. The 800 ft. level may be recognised in the Vartry and Blessington basins (see pp. 280-284), both of which are areas sloping from 1,000 to 600 ft. The 200 ft. level, clearly seen on both flanks of the mountains, truncates rocks of widely different resistance: a considerable flattening has been observed around 400-600 ft. also. But the relationship of all these possible surfaces is at present obscure, and their recognition is complicated by the difficulty of mentally removing a drift cover of varied form and thickness.

3. THE ARMORICAN FOLD MOUNTAINS

In the Carboniferous period Ireland was almost completely submerged except for a few islands such as the Leinster chain; and Carboniferous limestones still cover approximately half the surface. This phase of geological history is therefore important on this count alone, and the Armorican folding that followed is equally significant. The first indications of these movements was the emergence of Ireland above the sea level, to which we owe the presence of Coal Measures (but not of much coal) which have been largely removed by denudation. The Irish landscape still shows the lines of Armorican folding with remarkable clarity in a number of anticlines and synclines in which Carboniferous beds directly overlie Old Red sandstones, the former in the valleys, and the latter as ridges. The correspondence of the older rocks with the ridges and the younger with the valleys is remarkable, but, as Cole has pointed out, fortuitous, for had the Carboniferous rocks been quartzose conglomerates and the Devonian rocks mainly limestones, the upstanding ridges would have been synclinal and the valleys would lie along the crests of the anticlines. The parallel ridges of the south of Ireland owe their

preservation, therefore, to the petrological character of the Old Red sandstone. Rocks of Silurian and Ordovician date, mainly shales and sandstones, appear as inliers in the core of the anticlinal structures; they have weathered into basins surrounded by hills of the more resistant Old Red sandstones. The Comeraghs, for example, and craggy hills of lower altitude, rise above a basin of Silurian and Ordovician rocks. Similarly, on the other side of the Suir valley, the peak of Slievenaman and a number of hills, all of Old Red sandstone, guard an upland basin that is the Silurian and Ordovician core of the anticline. Again, in the Galtees, the relation between structure and surface is equally impressive: the high mountains, culminating in Galtymore, 3,018 ft., are of Old Red sandstones, but to the west these beds have been removed to expose a basin almost entirely surrounded by the last marginal relics of the former Devonian cover. Almost all the Armorican ranges farther north have peaks of Old Red sandstone and upland basins where the older rocks are exposed.

The Central Lowland is primarily a rolling drift country with a rock-floor of Carboniferous limestones, through which older rocks appear in anticlinal ridges of Old Red sandstones resting on Silurian and Ordovician beds. The adjustment to structure differs from that of the south for, as yet, the anticlines are just being revealed and marked out as hills. Though differing in present landforms, one may regard the various parts of Armorican Ireland as one structural unity: the Central Lowland may show the condition possessed by the south at an earlier phase, before its Carboniferous cover had been largely removed. Finally, it has been suggested that the underlying structure of the country between the Caledonian masses of the northeast and northwest is also Armorican in, for example, the coalfield below lough Neagh. Armorican folds, in short, dominate the scene in the south, are just perceptible as landform features in the centre, and are almost completely hidden in the north.

The Armorican ranges of Ireland fall into three groups as structural and landform units. They may be classified as (a) the southwestern block, (b) the isolated ranges south of the Dublin-Gal way line, and (c) the minor hills of the Central Lowland.

(a) *The Southwestern Block*.—This is clearly marked off as a structural feature by a more or less northward overthrust of Old Red sandstone over Carboniferous beds: this important tectonic line, which runs from Dingle bay to Dungarvan, is continued into Pembrokeshire and probably into northern France, where it may mark the northern limit of the coal-fields. Within this area, the Old Red sandstone anticlines exist as low ridges in the east and as mountains farther west, where several peaks

reach 2,500-3,000 ft., culminating in Carrauntoohill, 3414 ft.—the highest mountain in Ireland. The Carboniferous strata are varied: in the synclines forming the valleys of the Blackwater, the Bride, the Cork Bride¹ and other rivers around Cork and Youghal, there are limestones, but to the south there are shales hardened by pressure metamorphism into slates. These slates have been weathered into a landscape of valleys and low ridges, best developed in the extreme south of Co. Cork: they include some sandstone beds, such as the Coomhola grits, which display a sharp resistance to erosion and stand up as hilly ridges (see Fig. 70, p. 357). This southwestern block shows Armorican structure in its most interesting form: so far, none of the drainage has cut through the Old Red sandstone beds to reveal the underlying Silurian and Ordovician floor, and the most striking evidences of past cycles of erosion are seen rather in the peneplaned ridges around 200 ft., 400 ft. and 800 ft., above which level the mountains rise. The river system, evolved in pre-glacial times, has returned to its original course almost everywhere, but is now cutting through a variety of drifts and glacial fluvial deposits.

(b) *The Isolated Ranges*.—West of the Leinster chain and north of the Dingle bay-Dungarvan line, Armorican structures are etched out in a number of isolated ranges and plateaus which rise above the general level of the Carboniferous lowland. The two Carboniferous plateaus, monadnocks affected by Carboniferous folding, are discussed on pp. 23-24: the ten major hill masses are comparable in structure with the mountains of the extreme southwest, but towards the north are bent into a trend parallel with the Leinster chain. In north Kerry, there are two peninsulas that are isolated uplands approached by lowland routes: of these the Dingle peninsula has an unbroken ridge in the Slieve Mish (Baurtrcgau, 2,796 ft.) and, farther west, mountainous ridges culminating in Brandon, 3,127 ft., together with some isolated peaks and considerable areas of lowland. The 'Dingle beds' of this peninsula have been ascribed to at least three periods (Ordovician to Devonian), and its structure is not clearly known. The second, and much smaller, Kerry head peninsula, on the south side of the Shannon, is an Old Red sandstone ridge some 700 ft. high; its trend is bent slightly to the south, like that of the Dingle peninsula.

Three narrow ridges of Old Red sandstone rise to more than 900 ft. in the heart of the Limerick lowland: farther east, the Ballyhoura-Galtée upland has an interior basin where the Silurian and Ordovician rocks appear, but the mountain character prevails in the Galtée range.

¹ To distinguish between the two rivers named after St. Bride (Bridget), the one which joins the Lee near the city of Cork is called the Cork Bride: the other is tributary to the Blackwater.

Parallel to the Galtees is the Slievenamuck range. The association of Old Red sandstone mountains with basins of earlier rocks is also a feature of the Slievenarrian range, and of the long chain of hills known in its various parts as the Kilworths, Knockmcaldowns, Comeraghs and Monavullaghs. The 800 ft. level is extensively developed around these mountains, which rise to more than 2,000 ft.: the Comeraghs have wonderful corries eaten into the heart of the range with cliffs as much as 1,000 ft. high.

The bend of the Armorican folds into conformity with Caledonian trends becomes marked north of the Slievnaman-Galtcc line; Cole suggests, in explanation, that the old Caledonian mass was largely eroded away in the south but still extant as crumpled hills farther north, and therefore able to influence, indeed to control, the direction of the Armorican folding. In any case, the simulation of a Caledonian trend gives the countryside its characteristic stamp: roads and railways from the valleys of Munster all swing northward in their journey to Dublin. The range of hills, variously named, from Slievfeelim to the Roscrea gap, the Slieve Bloom, the Arra mountains and the Slieve Aughty, all show a northeast trend; their summits vary from 1,207 ft. in the Slieve Aughty to 2,278 ft. in Keeper hill. They are for the most part irregular groups of gently swelling hills composed of Silurian strata, chiefly slates and grits, and made conspicuous in places by more or less horizontally imposed and truncated cappings of Old Red sandstone, which form such landmarks as Keeper hill, the highest summit, and the Devil's Bit mountain near Templemore. These blocks of hills owe their diversity to the superior resistance of Old Red sandstone over the Silurian beds, but they do not possess the basin and range structure of the Slievenaman, the Comeraghs and the Galtee-Ballyhoura mountains, partly because they have been influenced by powerful fault movements.

(c) *Armorican Hills of the Central Lowland.*—The Central Lowland possesses considerable topographical diversity: its hills consist either of monadnocks that are relics of the middle and upper Carboniferous cover, of small volcanic bosses such as Croaghau, 769 ft. between Edenderry and Tullamore, or of Armorican ranges in which Devonian strata are revealed. None of these rises to an altitude of even 1,000 ft. or covers more than a few square miles, yet most of them are conspicuous features. In some of the hills the Old Red sandstones have been removed, and the underlying Silurian strata exposed; a few have igneous intrusions. The fourteen inliers of this type include the chain of hills near Kildare, Lisduff, and Ardagh (near Longford) and, on the west side of the Shannon, the Slievebawn range, which has a maximum elevation of 864 ft. The Curlew hills (818 ft.) extend as a continuous range for nearly thirty miles

from lough Allen westward, but the smaller inliers of east Connacht rise only slightly above the general lowland level.

4. THE CARBONIFEROUS PLATEAUS

The Carboniferous cover that at one time extended over almost the whole of Ireland has been attacked by denuding agents for so long that it now survives on little more than half the surface: only in the northeast is it still covered by later strata. Over most of Carboniferous Ireland the older beds form lowlands and the younger plateau-like uplands. The following table will be a useful guide to the remainder of this section; it shows a generalised succession for the area between Cork and the Curlew hills.

TT	[5. Coal Measures.
"?"	J 4. Sandstones and Shales (Millstone grits and Pendle-
Carboniferous	side series).
	(3. Sandstone, shale and limestone series (Yoredalc).
Lower	2. Carboniferous limestone.
Carboniferous	1. Lower limestone shale.

Local variations are numerous; thus, the lower limestones are replaced by slates in the extreme south, and a 'calp' or black earthy limestone appears frequently in low hills of the Central Lowland. Reefknolls exist as small craggy hills in the country around Dublin and also around Middleton in Co. Cork; and in the Limerick lowland igneous intrusions, of Carboniferous date, occur (see pp. 389-391, and Fig. 74).

The morphological minutiae of the Carboniferous lowlands and plateaus are largely determined by the lithological character of the strata. Two fortunate aspects of Ireland's physical development are the partial removal of the upper Carboniferous beds, and the deposition of drifts over the lower Carboniferous limestones. The coalfields are so heavily faulted and fractured that they provide little wealth; and the bare Carboniferous limestones, seen around Galway bay, are a karst of bare rock in places. On the other hand, the drift-covered lowland east of the Shannon is rich and fertile, for its soils are frequently marls due to the admixture of lime with the drift. The lower limestones and shales (1 and 2 in above table) normally form the peneplane surface around 200 ft. in the Central Lowland: disposed in shallow synclines, they rest conformably on the Old Red sandstones revealed in a few anticlinal hills.

The three plateaus lie on the margins of the Central Lowland and their edges, frequently scarped, are prominent features of the landscape, though the plateaus themselves are deeply intersected by river valleys. The

Castlecomer and the Slieve Ardagh plateaus are separated by the Nore valley; the great line of plateaus that extends from Killarney and the upper Blackwater valley to Galway bay is divided by the Shannon estuary, and the third plateau area, which stretches from Sligo through Leitrim and Fermanagh into Monaghan, is in effect a series of plateau uplands rising above corridor lowlands.

The Castlecomer-Slieve Ardagh Plateaus.—These form a somewhat broken ridge, of Armorican structure but Caledonian line, entirely surrounded by Carboniferous lowlands, above which they rise in sandstone escarpments that are particularly well marked on the west side of the Barrow valley. The plateaus are really synclinal basins with the Coal Measures in the centre, notably in the Castlecomer area, which is drained by the river Dinin to the Nore. The Slieve Ardagh hills are cut by several gaps, one of which carries a railway line from Fethard to Thurles, but the whole of the Lcinster coalfield, as it is somewhat optimistically called, forms a clear feature of the landscape from the Stradbally hills to the Rock of Cashel. The coalfields are discussed on pp. 337-338: they have been mined considerably during and since the war of 1939-1945, but possess some economic importance at all times.

The Killarney-Galway Bay Plateaus.—These plateaus, also of Upper Carboniferous strata, have rounded summits around 1,000 to 1,200 ft., and a maximum elevation of 1,441 ft. near the source of the Blackwater on the Cork-Kerry border. They form long sweeping lines above the lowlands that surround them, and have an escarpment edge on the west side of the Limerick lowland and, less clearly, in central Clare. South of the Shannon the plateau is penetrated by wide valleys and consists primarily of Coal Measures with flagstones: in Clare, the Coal Measures remain only in isolated patches such as Slieve Callan, 1,282 ft. The flagstones exposed over a large part of southwest Clare form undulating plateau country which reaches the sea in the magnificent Cliffs of Moher, which are 600 ft. high. In northwest Clare, however, both the Coal Measures and the flagstones have been removed, and the underlying limestones exposed in the Burren, a karstic area consisting of an upland with ridges around 1,000 ft., wide waterless valleys reaching Galway bay and a narrow coastal lowland on the Atlantic shore. Only one small river, the Caher, reaches the sea by a drift-filled valley, but the underground waters flow through caverns and appear intermittently at the surface. A recent investigation revealed a cave three and a half miles long, the longest so far discovered in Ireland. The Burren is remarkable not only for its landforms, but also for its vegetation, which includes Alpine and Mediterranean plants in association, and shows the direct effects of wind exposure, for it

is planed to ground level on the coast, but reaches woodland status in sheltered hollows (see pp. 394-396).

The Sligo-Monaghan Plateaus.—These Carboniferous plateaus are strongly faulted and separated by deep, wide valleys with numerous lakes: some of them rise to 1,500-2,000 ft., and their sharp escarpment edges mark them off very clearly from the valleys by which they are penetrated. The escarpments are variously formed of limestones and Millstone grits, and have weathered into long talus slopes. The most westerly outposts of the uplands are two hills near lough Arrow, Carrow-keel and Keishcorran, 1,057 ft. and 1,188 ft. respectively, and Knocknarea, 1,078 ft., overlooking Sligo bay; from these hills the plateaus extend for nearly seventy miles eastward to Slieve Beagh on the fringe of the lough Neagh lowland. The area is drained by the headwaters of the Shannon, by the middle and lower Erne with its tributaries, and by various short rivers flowing to Sligo bay. The valleys have been widened and deepened by ice, and possess sheets of ground moraine with numerous drumlins, which appear as islands in the lakes, especially in the two Erne loughs. Some of the limestone uplands provide sheep pasture of good quality, but otherwise the plateaus are peat moors; they are of little economic value except in the Arigna coalfield, where workable seams exist both in the Coal Measures and in the Millstone grits on either side of lough Allen (see p. 457). Scenically, however, this area of Carboniferous plateaus is far more attractive than either of the plateau areas discussed above, for the combined work of fracturing, sub-aerial erosion and glaciation has produced a landscape marked by variety rather than uniformity, in which wide valleys with lakes are surrounded by steep-sided hills, climbed by few but visible to many.

5. THE TERTIARY BASALTS OF THE NORTHEAST

Basalts poured out in Tertiary times in a series of flows, many of which are 15-20 ft. thick, still cover more than 1,500 square miles in the north-east, but were at one time much more extensive. They form gloomy plateaus over 1,000 ft. high, with scarped edges overlooking Belfast lough and lough Foyle. Later earth-movements have bent and lowered them to form the lough Neagh basin, where clays of recent but uncertain date, perhaps Pliocene, have been laid down. The basalts rest on Triassic, Liassic and Cretaceous strata, which are exposed in the escarpments. The north coast of Antrim has a remarkable series of basalt cliffs, of which the best known is the Giant's Causeway, where there is a lower layer of regular, hexagonal columns and an upper layer of thin, irregular prisms moulded into fantastic shapes called by such names as the Giant's Organ:

in between these two sets of columns a fossil laterite is seen as a bright red band near the Causeway.

The northeast of Ireland owes its identity as a landform unit to these basalts, which have been faulted and warped into a basin surrounded by plateaus. The deep valleys cut into the plateau include the corridors between Belfast and Antrim, and from Larne to Ballyclare, and the cliff-walled Glens of Antrim, farther north, which possess a remoteness and individuality that marks them off from the remainder of Ulster. But in the extreme northeast, between Cushendun and Ballycastle, gnarled schists and gneisses of pre-Cambrian age are exposed; structurally continuous with the promontory of Kintyre, they belong to the same morphological province as the Scottish Highlands. The basalts mask the continuation of the Highland Boundary fault into Ireland, though it runs along the edge of the Sperrin mountains, and thence beneath the Bann valley and the Antrim plateau towards Scotland.

The margins of the basalt outcrop are marked by sharp changes in the landforms and soil almost everywhere; there could, for example, be no greater contrast than that between the bog-covered basalt and the fine-swarded chalk at Whitepark bay, a few miles east of the Giant's Causeway. Many of the excellent sheep pastures of the northeast lie on similar small outcrops of chalk. In the Lagan valley the basalt escarpment towers above the Triassic lowland, which extends in a salient to Strangford lough between low hills of Ordovician and Silurian strata. The remarkable survival of Mesozoic beds in the northeast must be ascribed partly to the protection given by a basalt cover once of greater extent than now, for elsewhere in Ireland these beds have been removed and older landscapes exposed. It is, however, the glacial phase that has influenced the agricultural life most fully as the soils of the northeast owe their variety to the mingling of many types of local and transported materials.

GLACIATION

The glacial geology of Ireland has been actively studied ever since John Ball, in 1846, suggested that the deep valleys of Mount Brandon, in the Dingle peninsula and of the Purple mountain, Killarney, were gouged out by glaciers similar to those he had seen in the Alps. Writing one hundred years later, one recognises that each discovery has opened up fresh problems which can be solved only by detailed regional work throughout the land. Two main problems stand out: first, the actual history of the glaciation and its correlation with that of Britain and Europe, and second, the mapping of the glacial and glacialfluvial deposits that cover most, but not the whole, of the country. The first of these problems

THE NEWER DRIFTS

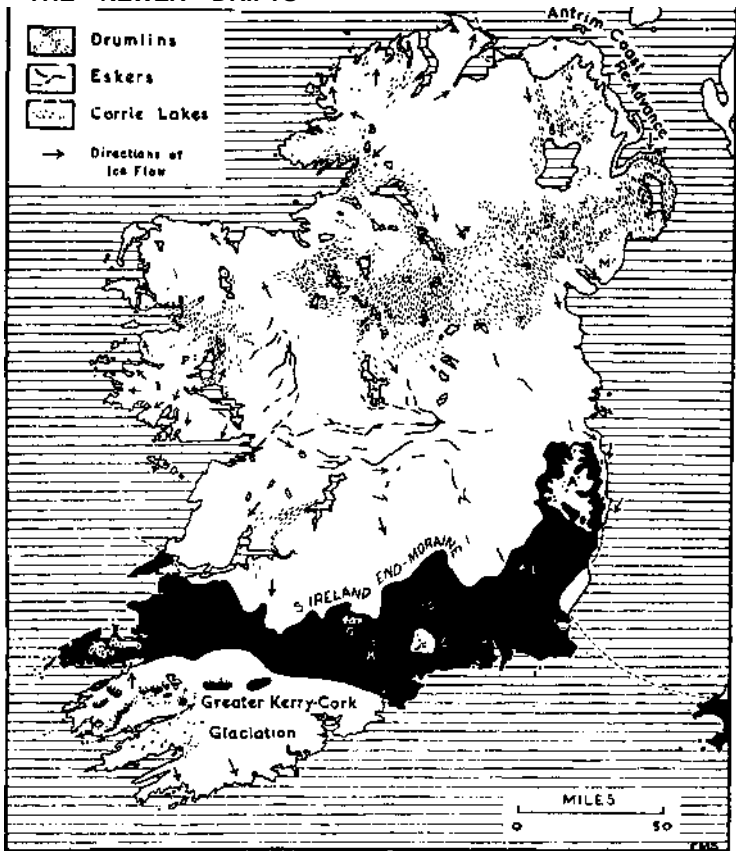


FIG. 4.—GLACIATION: THE NEWER DRIFT

The South Ireland end-moraine marks the southern limit of the Midland General glaciation; for the limit of the earlier Eastern General glaciation, see Fig. 5. The limits of the Greater Kerry-Cork glaciation are also shown; other glaciations indicated are A, Athdown (Wicklow mountains); L, Mount Leinster; S, Slievenaman; C, Comeraghs; G, Galtees; K, Knockmealdowns; P, Partry mountains (Co. Mayo); B, Bluestack mountains (Co. Donegal); M, Mourne mountains. All these glaciations except the Eastern General have left drifts characterised by fresh topographical forms. The ice margins of the Antrim Coast re-advance, the South Ireland end-moraine from Carlow westwards and from Enniskerry to Arklow, after *Charlesworth*; the margins of the Greater Kerry-Cork glaciation Mount Leinster and the South Ireland end-moraine in Co. Dublin and Co. Wicklow, after *Farrington*.

Drumlins. Those in Antrim, Down, Armagh, Donegal and Fermanagh, after *Charlesworth*; for Monaghan, see *Kinahan, T. H., Geological Memoir of the Ballyhaise area*, and *'Irish Geography,'* vol. 1, p. 85; for Mayo, the *Clare Island Surveys*, and for

has been treated in many papers by Charlesworth and Farrington and also in W. B. Wright's *Quaternary Ice Age*: in addition, a brave attempt at correlation has been made in *The Irish Stone Age*, by H. L. Movius. The second problem, the form and distribution of the deposits, has received some attention in the works so far mentioned, and in many more, such as Sollas's paper on the eskers of Ireland, published in 1896: unfortunately, most of the geological maps were made and the memoirs written at a time (1858-1891) when the immense importance of glacial action was not understood. It is only fair to add, however, that some of the memoirs contain vivid descriptions of various glacial features.

Several workers, including Kilroe, Cole and Hallissy, drew attention some forty years ago to the importance of soil classification in a predominantly agricultural country. Kilroe, for example, in his *Soil Geology of Ireland* (1907), produced a map on the scale of 1 : 633,600, in which he showed that most Irish soils originate from drift. Some of the older rocks, such as quartzites, certain granites and shales, weather into infertile soils, but the patches of drift laid over them support farmlands, and the cultivable area is therefore greater than the 'solid geology' map would suggest. Some of the limestone karsts in the Burren district of Clare and in the Galway bay district are of such slight agricultural value that the drift-cover of Ireland would seem to be one of the country's most precious possessions. Analysis of Irish soils with modern pedological technique has been begun by Gallagher and Walsh, who show that many of the soils developed on the limestone drift are of high fertility, given good drainage: they also suggest that removal of many of the peat bogs in the Central Lowland will reveal fertile soils of a *{en* character.

Two main phases of icesheet glaciation have been recognised in Ireland, as in England: their deposits have been called the Older and Newer drift, or the first and second General Glaciation. Farrington, however, has recently suggested that the names Eastern General (older) and Midland General (newer) glaciations should be used, as they refer to the areas where the respective deposits are best seen. Both these ice-sheets left limestone-bearing drift over large parts of the Central Lowland and on the mountain sides to a varied limit that reaches at least 1,700 ft.

Bantry bay, *Farrington*. Other drumlins in Cavan, Sligo, Leitrim, Clare, Roscommon and elsewhere are added from observations (not previously published) by F. M. Synge.

Eskers. Only a skeleton plan of the eskers is shown here: the main sources are Sollas, 1896, with the maps and memoirs of the Geological Survey.

The corrie lakes have been taken from the ½" to the mile maps.

Map compiled and drawn by F. M. Synge.

in the north of the Leinster chain. The drifts of northeast Ireland, which are derived partly from Scottish sources, are varied and include schists both from Scotland and from Co. Antrim with chalk and basalt of local origin: in the Silurian country local materials figure prominently. The older icesheet (Eastern General) covered almost the whole of the country and part of the present seabed: the newer (Midland General) icesheet reached a line running from the mouth of the Shannon to the Leinster chain, which it surrounded and penetrated (see Fig. 4).

A third icesheet coming from the mountains of Kerry and West Cork reached the extreme eastern limit of Co. Cork and deposited drifts, largely sand and gravel, containing local materials: it was of a later date than the older (Eastern General) glaciation, but its exact limits are not known. A recent important discovery is an unglaciated area on both the northern and the southern areas of Dingle bay and various areas inland (Fig. 5): this removes the assumption, so long held, that the whole of lowland Ireland was glaciated at some time, and opens peculiarly interesting questions for those studying the country's flora.

The nature and form of the deposits associated with these icesheets is of great importance through all the lowland parts of Ireland. It is not remarkable that the two words given to science by the Irish language are 'drumlin' and 'esker': Ireland has drumlin swarms of greater extent than those in Britain or America and eskers comparable with those of Finland. The drumlins are ice-moulded ridges, composed entirely of drift in many places, but possessing rock-cores in others; as few sections are available, the distinction between the two forms is not easily drawn, though in the area east of Newry and in the 'rock country' of Cavan every gradation between rock drumlins and typical drift hills may be seen. In the immediate neighbourhood of Belfast, subdued drumlins occur: they are too small to be mapped and are in effect transitional forms grading into hummocky sheets of ground moraine. The actual form of the drumlin landscapes is varied: in some places they stand up as individual hills, in others they occur as an impacted series. But the drainage is impeded by their presence everywhere, and there are numerous lakes or ponds, which are being steadily filled by silt; some have already been replaced by a fen or peat bog. The extent of the drumlin belt is remarkable: it stretches from Belfast lough and the neighbourhood of Dundalk across the whole country to Donegal, Sligo and Clew bays, and there are also isolated swarms in the lower Bann valley, various lowlands in north and west Donegal, and, far to the south, around Bantry bay (see Fig. 4). As yet only parts of the drumlin swarms have been mapped, but Charlesworth has estimated that there are tens of thousands covering in all some 4,000 square miles or more, which is one-eighth of

the whole area of Ireland. The smaller drumlins tend to be rounded and the larger elongated: the largest recorded, a drumlin in Donegal, was c. 2,150 yards long and 575 yards broad, but most are much smaller. Three groups of drumlins were investigated by Charlesworth with the following average width and breadth: Donegal, 500 by 280 yards, ratio

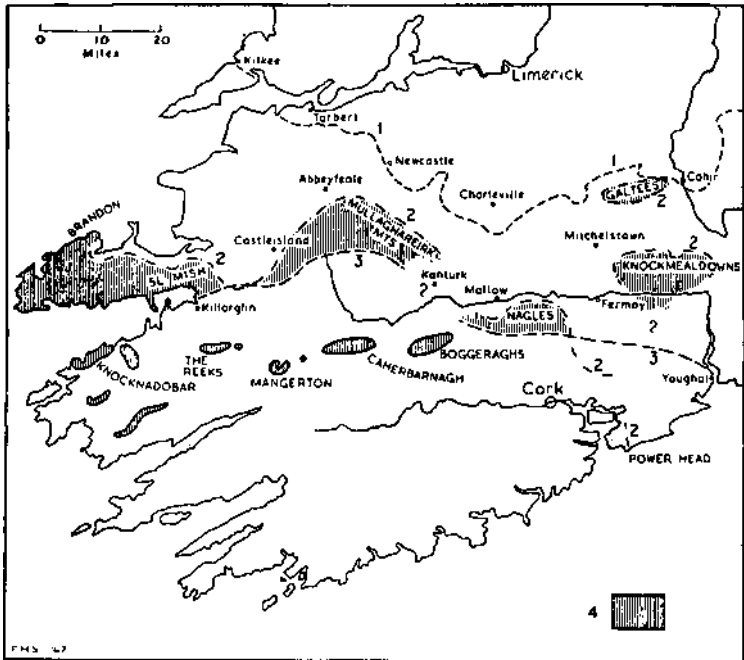


FIG. 5.—GLACIATION, SOUTHWESTERN IRELAND

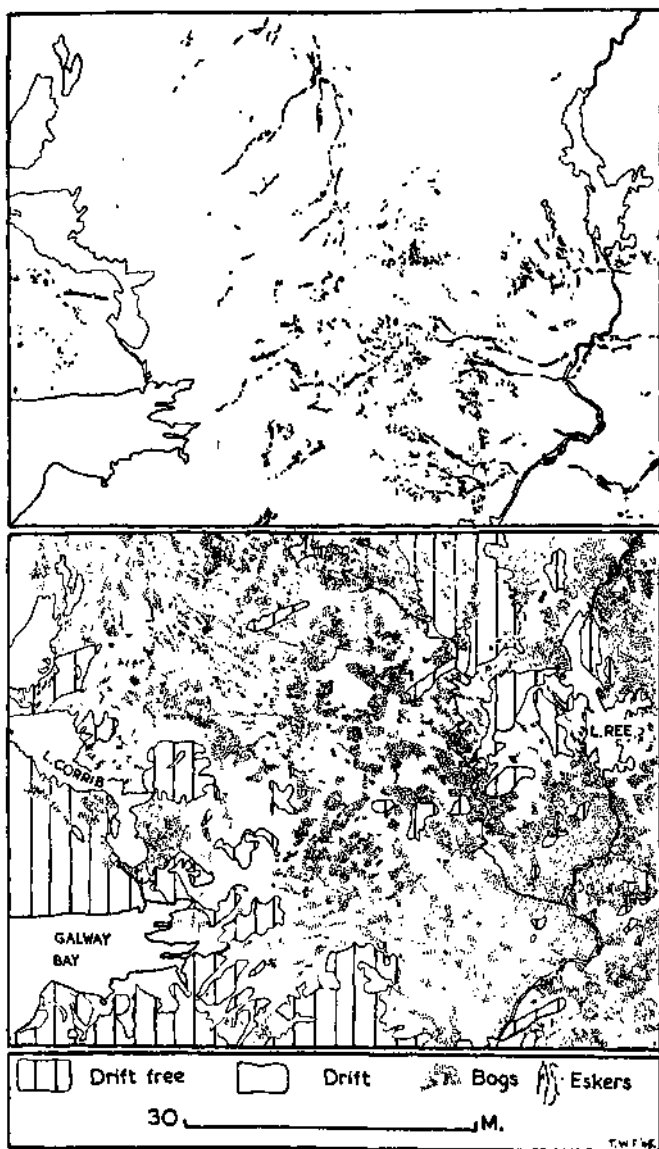
1, Southern limit of end-moraine of the Midland General glaciation; 2, Southern limit of drift of the Eastern General glaciation; 3, Northern limit of Greater Kerry-Cork glaciation; 4, Unglaciated areas.

The outlines do not represent exact limits: within the 'unglaciated' area there were small corrie glaciations not shown here (but see also Fig. 4).

Map drawn by F. M. Synge and originally published in 'Irish Geography,' vol. 1, p. 92.

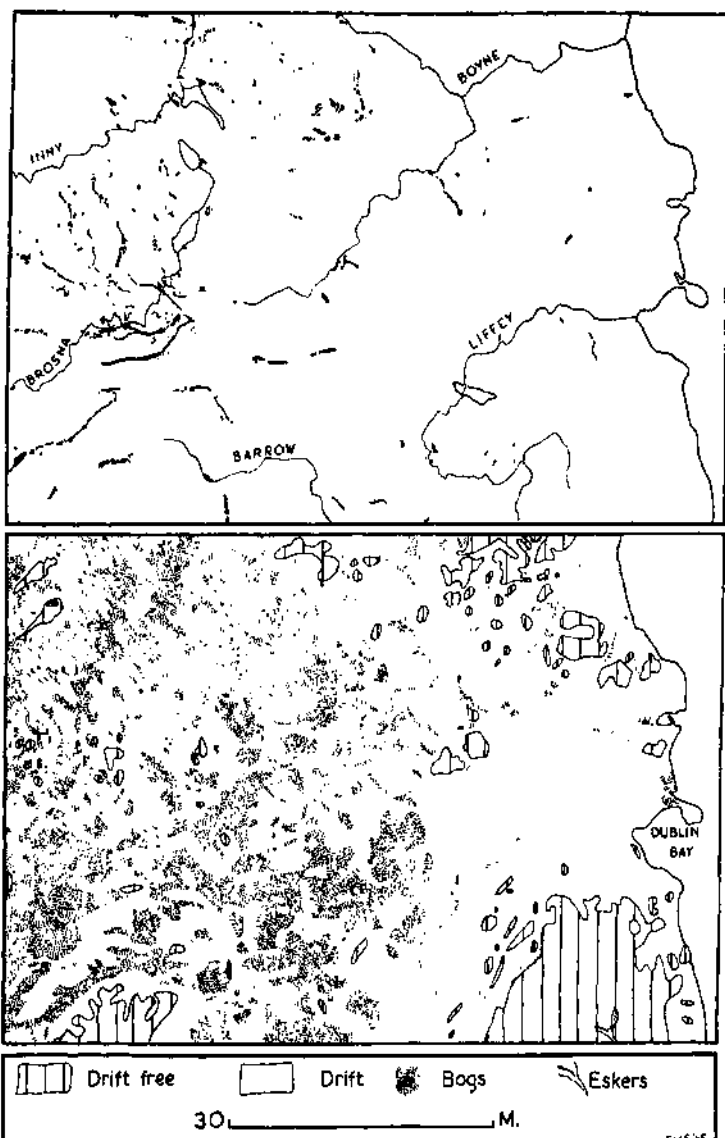
i*8 : 1; Bann valley, north of lough Neagh, 560 by 280 yards, ratio 2 : 1 ; and Ards peninsula, 420 by 245 yards, ratio 1.7 : 1. The average length and breadth is similar to that recorded in other areas, and especially in southwest Scotland, 450 by 250 yards, ratio 1.8 : 1.

The eskers of Ireland are hardly less remarkable, though once again thorough mapping is needed to establish their relationship to other



FIGS. 6 AND 7.—ESKERS, DRIFT,

The data are drawn from Sollas, W.J., 'A Map to Show the Distribution of Eskers the information on the 1" to the mile



DRIFTFREE AREAS AND BOGS

in Ireland,' *Sci. Proc. R. Dublin Soc.*, vol. 5, series 2, 1896, which is a summary of geological maps. See Fig. 4 and comments in text.

deposits. While their form is varied, the most characteristic type is the long sinuous gravel ridge standing at least 20-30 ft. above the surrounding countryside, often marked by a line of trees or followed by a road. In the country south of Trim, Co. Meath, and near the Shannon, there are well-defined ridges of this type, but they grade into highly complex masses of sand and gravel which may perhaps be kame and kettle moraines or meltwater accumulations. Therefore the maps showing eskers, which are based on Sollas's paper of 1896, must be received with caution: not only do they include a variety of forms but they are also a mere skeleton of the whole, as they are based on the incomplete observations of the Geological Survey officers of more than fifty years ago. There appears to be an east-west series which is met and crossed by a north-south series; their origin has been variously linked with the deposition of material in the beds of streams beneath the icesheet, with successive deltas laid down by the meltwaters on the margins of a decaying icesheet, and by the infilling of cracks that appeared in the last stages of the glaciation. This last theory is due to Flint, and was inspired partly by a comparison of Irish and American conditions.

Important as drumlins and eskers are in the Irish scene, it is the many types of drift grouped as 'Timestone gravel' that cover the greater part of the lowland and form the parent material of most of its soils. A primary distinction may be made between the strongly weathered but older impervious boulder clay of the Eastern General glaciation and the fresher and more gravelly drift of the Midland General glaciation. While the line of demarcation between these may be revised in time, it is at least clear that the drifts are thicker in the centre and north than in the west and south, where the cover is generally a thin rind of smoothly moulded and mature appearance. In the Cork valleys, for example, where yet another icesheet brought materials from the mountains to the west, the drift is rarely deep except in a few patches. But the newer deposits of the Midland General glaciation include the drumlins, and drifts ranging in depth from a few inches to more than 200 ft. in the Curragh, near Kildare; as a rule, the covering is thickest in the east and thins out into occasional extinction westwards, where the driftless karsts of Clare, Galway and Roscommon stand out as distinct morphological units. The absence of drift in these areas has been ascribed to strong erosive action near the centre of the icesheet, and to the removal by subaerial denudation of any cover that may have existed.

The mountains of Ireland show a wide variety of glacial forms which include corries and deeply trenched valleys with lateral and terminal moraines; around their margins there are evidences of meltwater channels and lakebeds that imply a drainage system controlled by the disposition

of the lowland ice at various times. There were probably at least three phases of glaciation in the Wicklow mountains: the earliest, or Enniskerry mountain glaciation, has only recently been recognised, and its very existence is problematical. The second, or Brittas mountain glaciation, has been distinguished in the Mount Leinster group, and the Comeraghs, as well as in the Wicklow mountains, where it was an icecap stretching to the coast in the east, but of unknown extent in the west. The last, or Athdown mountain glaciation, has left clearer traces than either of its predecessors; its glaciers were confined to the valleys, except on the Vartry plateau (see pp. 282-283), where a piedmont glacier was formed. On Mount Leinster and the Comeraghs, the Athdown stage was little more than a corrie glaciation. The relation in time between these three mountain glaciations and the spread of the lowland icesheets is a matter of conjecture at present, but the Athdown glaciation postdates the Midland General glaciation, and is separated from it in time by a temperate phase discernible in deposits beneath the Ballybetagh bog, near Dublin and elsewhere: it is in and beneath the bogs of Ireland that the solution of many problems lies. When the late-glacial and post-glacial evolution of Ireland has been unravelled, it will be possible to deal more adequately with some of the major problems connected with geomorphology, flora, vegetation and, not least, archaeology.

Several other mountain masses of Ireland show clear evidence of glaciation, probably in more than one phase. In Kerry and West Cork, *ice* accumulated to the west of Kenmare poured northwards through the Reeks and the mountains around Killarney, and formed a series of crescentic moraines on the lowland facing Dingle bay (see Fig. 73). It was therefore a piedmont glaciation, which produced an extremely rugged landscape in the valleys and hills that were overridden: but the plucked and scoured surfaces of such areas contrast with the smooth outline of Mangerton and Stoompa, two hills that were nunataks rising out of the ice. The Reeks have the appearance of an arete, but they, too, were nunataks, and their peaks are of pre-glacial origin. Some of the corrie basins show how very deeply ice can establish itself in the heart of the mountains; everywhere, except on the summits, the gouging action of *ice* is apparent in this well-known area. The *ice* also moved southwards from the Kenmare river area and passed across the Bear peninsula to Bantry bay, finally reaching a line marked by moraines from the Shehy mountain to Skibbereen. Its southward movement was responsible for many bare rock surfaces and overdeepened valleys, but there are also considerable accumulations of drift, some of which exist as drumlins around Bantry bay. The *Memoir* of 1864 describes these as 'clearly distinguishable from the hills of rock by their smooth regular

forms and their green cultivated sides, while the rocky hills are rough, and dark with heather and gorse. The drift hills are round, mostly isolated mounds of 100-150 ft. in height, and standing on a base of about half a mile in diameter, with bare rock showing in the land between them/

The Dingle peninsula experienced a corrie glaciation which became a valley glaciation at its maximum: such hills as Brandon, Slievanea, Stradbally and Baurtregaum are corrie-worn and overlook deep valleys with lakes held up by moraines. The forms are comparable with those on the south side of Dingle bay: thus Brandon, a sharply peaked range reaching 3,127 ft., is not unlike the Reeks, though rather more thoroughly moulded by corries, and the lower hills have smooth upper surfaces above cliff-walled corries and over-deepened valleys very similar to those around Killarncy. The various peninsulas from Dingle southwards possess clear indications of every type of mountain glaciation from corrie formation to valley moulding and icecap action terminating in piedmont moraines: the southwest of Ireland therefore has in its landscape the effects of glaciations comparable with those of the Alps, Scandinavia and Alaska of the present day. W. B. Wright has remarked that some of the forms, notably the moraines, possess a freshness far greater than that of even the Midland General glaciation; one may add that the scenery of this region owes its extraordinary charm largely to this last glacial phase, and especially perhaps to the large number of lakes which range from isolated tarns in corries to the deep water-filled hollows of valleys formed by ice-pressure.

The various mountain chains of the south, between the Kerry-Cork ranges and the Leinster chain, probably experienced at least two mountain glaciations: the most obvious evidences are the corries of the Gal tees, the Knockmcaldowns and the Comeraghs. Coomshingaun, in the Comeraghs, perhaps the finest corrie *in* Ireland, is cut into the heart of the mountains, and has cliffs 1,000 ft. high rising above a lake which is held up by a very large block moraine. Many of the neighbouring corries are almost equally impressive, but the range possesses a smooth upper surface comparable with that of the other mountain masses.

The mountains of Connacht and Donegal lie within the area covered by both the major icesheet glaciations of Ireland; in at least one phase, they nourished glaciations that were contributory to the main icesheet rather than independent icecaps like those of the Wicklow mountains or Kerry and West Cork. This distinction was seen as long ago as 1872 by Kinahan and Close, who showed that ice accumulated to a depth of 2,000 ft. in the Maumturk-Twelve Bens area and flowed out in every direction. Iceflows pushed down Killary harbour and moulded it

into a fiord, passed south and west across Connemara to the fringing islands, north to the Moy estuary and the whole of northwest Mayo, and west through Clew bay. The iceflow that moved southeast to Galway carried its characteristic granite into the Central Lowland as far east as Maryborough and possibly even farther. These mountains of West Connacht, therefore, were in the heart of the glaciated region: and the scouring action of ice is seen both in and around them, especially in Connemara, where many of the bare rock surfaces are covered only by the bog that has grown during post-glacial times. A later phase of glaciation is represented by corries and some of the sharply cragged valleys in the mountains.

The Donegal mountains were also a centre of ice dispersion. Although the mountain valleys were deep before the ice appeared at all, glacial overdeepening has accentuated them and made rock basins that are now occupied by lakes, of which lough Veagh is 139 ft. deep and lough Eske 101 ft. deep. In the mountain heartland of Donegal, the Caledonian line was brought out by ages of erosion, phases of faulting and the action of ice: here it is easy to see the tremendous erosive power possessed by valley glaciers that were flowing through valleys already formed, and probably in a youthful stage of the erosion cycle. On the fringes of the mountains two types of surface occur. In the extreme west, notably in the Rosses, accumulations of drift are rare; and erratics, including some of great size, are scattered across a countryside of bare, moulded rock. Elsewhere drumlins and ground moraine cover the lowlands, for example around Donegal bay and in the northern peninsulas. The western landscape in the Rosses is therefore comparable with that of Connemara and with the more remote Scottish Hebrides, but the eastern landscapes of Donegal possess affinities with the drift-covered lowlands of Ireland.

It may ultimately be possible to recognise two or more stages in all the mountains of northern Ireland, but as yet no finality of judgment has been achieved: for example, it is not at all certain that the corries of Donegal belong to a late phase. The Mourne and the Carlingford mountains show evidence of more than one glaciation: in an early phase the mountains were partly, if not completely, covered with ice, but in a later phase the ice approached from the northwest, sent tongues of ice through the Mourne and spread in strength on either side of the Carlingford peninsula. The ice deepened the Carlingford lough and made it fiordic. This phase has been called the 'Carlingford readvance' by Charles worth, who suggests that its influence may have extended from Newcastle, at the northern end of the Mourne, to Dundalk and possibly even farther into the Central Lowland. The lowlands around the mountains possess a remarkable series of moraines that were deposited during its

decay, and the valleys of both the Mourncs and the Carlingford mountains are thickly plastered with morainic material. Meltwater clays have added to the thickness of the deposits, which are known to be 172 ft. deep in the Silent Valley on the seaward side of the Mourncs. Much of the fertile land in the Carlingford peninsula consists of drift and lake-clays, and in many places the limit of cultivation corresponds almost exactly with the spread of these deposits. The meltwater channels of this phase are also remarkable: on some of the Carlingford mountains they survive as a fossil drainage system, now completely abandoned and comparable with similar relics in the Wicklows. Finally the Mourncs have, a number of corries, probably formed during a late glacial phase: the Sperrin mountains possess a similar corrie moulding and are also remarkable for their lake clays.

The wealth of meltwater channels in Ireland is well known, but their evolution can only be explained by reconstructing each phase of glaciation on a regional basis. This is clearly impossible here, and therefore only a general statement will be made. Two points are of special importance.

(1) The meltwater channels are most obvious in and around mountain masses where lowland icesheets trapped the waters poured out from melting ice: such areas include the Leinster chain, the Carlingford mountains and many more. The Leinster chain channels indicate a drainage system for the most part parallel to the main axis of the mountains, and so at right angles to the consequent river system of the time before and after the Ice Age. The meltwater channels were formed during more than one phase, and some were links between chains of lakes imprisoned by the lowland icesheets. No general rule can be applied to more than one hundred and twenty channels, ranging from minor depressions across fields to gashes several hundreds of feet deep and joined, in some cases, by a network of tributaries. Almost all are now occupied by small misfit streams, though they are significant features of the landscape offering useful tracks for railways and roads. The channels in and around other uplands, such as the Mourncs, the Carlingford mountains, the Sperrins and others are equally striking, and the Antrim plateau has a remarkable series of deserted channels, many of which are cols from one valley to the next.

(2) The part played by meltwaters in the evolution of the lowland landscape is much more difficult to determine, but not less important. As the lowland ice decayed and the last vestiges of mountain glaciation disappeared, the present drainage began to develop. The volume of water available from even a small icesheet must have been very large, and many of the hollows existing between patches of ground moraine or drumlins in the Central Lowland were filled by shallow lakes, of which some

survive to the present day, though all have been reduced in size and many extinguished altogether. Some of the lakes became fens on which peat bogs developed as the climate became damper from the Atlantic climatic period, c. 5,500 B.C. One may still observe the fen formation around many of the lakes, and especially around the now much-reduced lough Neagh (which is, however, of pre-glacial formation). Melt waters in the lowland also made channels, as they must have possessed considerable erosive power and were working through relatively soft materials. Some of these channels are still occupied by rivers, but others, such as those in the Collon hills, Co. Meath, now have tiny streams that are essentially misfits. While it is possible to imagine these great meltwater floods, one can only suggest at present that they played an important part in the moulding of the post-glacial river courses; it may not be too remote an hypothesis that most of the rivers in the centre and north are poor relations of the great meltwater streams. Charlcsworth, in his study of the northeast, gives us a picture of a greater Lagan and a greater Bann, spreading out into lakes more numerous and vaster than those of the present, but discernible from the sands and gravels laid down on their floors.

RIVERS

The rivers of Ireland have courses of considerable variety and are attractive elements in the scenery. They cross the Central Lowland as slow-moving streams, frequently surrounded by bogs and marshes, and in many cases reach their estuaries through incised valleys. Most of the rivers have senile courses on the Central Lowland, and become youthful near the sea: the Shannon, for example, having moved slowly with a drop in level of only 55 ft. through more than a hundred miles across the Central Lowland, falls more than 100 ft. in the last sixteen miles from lough Derg to the tide water level at Limerick. This fall in level has now been used for the major electricity station in Eire, and a similar fall at Ballyshannon, on the Erne, is now in process of exploitation for supplementary supplies of power. Most of the present rivers are cut in drifts, and have not as yet reached the underlying rock floor; where Carboniferous limestones underlie these drifts, as, for example, in large parts of the Central Lowland, their porosity and solubility enable them to develop an underground drainage system with caves, channels and natural reservoirs. The underground water table varies from season to season, and from year to year, and reaches the surface in some of the lakes in the lowland, such as those in the course of the Shannon. The turloughs, or intermittent lakes of Clare and Galway (see pp. 389,411), are unconnected by any surface drainage, and here the underground river system reaches its

fullest expression *in* almost driftless country. The stream density is low in many of the limestone lowlands of Ireland, but waters from underground sources reach the rivers and lakes that act as the central drainage arteries of the country.

The river systems of Ireland show at least some degree of adjustment to the structures of the country, especially in the south, where the east-west synclinal valleys between the Armorican chains are occupied by subsequent streams, such as the lower Suir, the Blackwater, the Bride and the Lee. The right-angled bends of some of these rivers led J. B. Jukes to develop his theory of superimposed drainage as long ago as 1862: the north-south reaches of the rivers were, he held, parts of an original consequent system developed on an initial Cretaceous surface since removed by Tertiary denudation. Though modified in detail, Jukes's theory survives in essence to this day, and was used as a basis for a modern river-study of the same region by Miller in 1939. If the modern drainage of southern, and perhaps also central, Ireland was initiated on a Cretaceous cover (of which no trace survives), the consequent line may well have been north-south in Kerry and Cork, and northwest-southeast in Waterford and Wexford: as the underlying structure was revealed, however, subsequent tributaries became more important, and in some cases finally established themselves as the master-lines in the drainage systems.

Armorican Ireland has been divided into three parts (pp. 18-22, and Fig. 1): (a) the southwestern block, defined by a line from Dingle bay to Dungarvan, (b) the country with isolated ranges and plateaus, northwards to the Dublin-Galway bay line, and (c) the Central Lowland proper. The subsequent lines are more fully developed in the first of these than in the second, where some of the master streams, such as the Upper Suir, the Norc and the Barrow, appear to be consequents developed on the Cretaceous cover and surviving, largely in entrenched courses, to the present. On the other hand, subsequent lines are established in the lower Suir, the Tar and the Aherlow (see Fig. 65, p. 332), in the King's river, a tributary of the Nore (see Fig. 59, p. 315), and in numerous other streams. The trellis pattern here is made up of major consequents with tributary subsequents: but in the southwest the subsequents are almost, though not quite, supreme. The Central Lowland with its ill-organised drainage has no clear pattern in its river system, though its numerous north-south streams, such as the Suck, the Shannon above Athlone, and the left-bank tributaries of the Boyne, may possibly be relics of Cretaceous lines. The Barrow rises at an altitude of less than 400 ft. and the Boyne, too, is a river of the lowland. The Shannon rises in the Carboniferous plateau country near Sligo bay, flows sluggishly over the western part of the lowland receiving tributaries of similarly lethargic habits,

and then fills lough Derg, an ice-hollowed basin, before beginning its final spurt through rapids to the estuary.

The Caledonian southeast is a distinct morphological province with the Leinster chain as its central axis. The rivers show an interplay of consequent and subsequent elements, but only one, the Slaney, cuts through the chain: it flows through a steep-walled granite gorge in a well-defined gap between the Wicklow mountains and the Blackstairs mountains. Like its near neighbours, the Barrow and the Nore, the Slaney is an incised river for many miles above the estuary, and may be a survival from the consequent drainage of Cretaceous times; it rises in Lugnaquilla, the highest mountain in this part of Ireland, winds round the west of the chain before proceeding through it to cross the Wexford lowlands, and receives a number of left-bank tributaries running parallel to the Leinster chain which are subsequent elements in the drainage pattern. The Blackstairs mountains in the south and the Wicklows in the north both form a definite drainage divide best seen in the north, where cols lie between deep valleys drained to the east and west respectively. There are, however, strongly marked subsequent depressions such as those drained by the middle Liffey and the Vartry, on either flank of the mountains; and throughout the Wicklow-Wexford lowlands routes followed by roads and railways are drained by streams running parallel to the mountains, which are subsequent lines in the drainage. Dr. A. Farrington, in a careful study of the Liffey, has shown that it owes its present curious course largely to the working out in pre-glacial times of a subsequent basin (see Fig. 53 and pp. 280, 282).

The rivers of the northeast show a marked adjustment to structure: the Bann, rising in the Mourne and fed by tributaries from the hilly country of the Newry axis, flows northwards in a basalt-floored depression with upstanding plateaus on either side. The Lagan rises in the Slieve Croob, runs towards lough Neagh, then bends sharply northeast and flows to Belfast lough through a depression between the basaltic plateau edge and the Ordovician and Silurian hills. The glens of Antrim and of the Mourne mountains are drained by short, swift-flowing streams: hardly less striking is the valley of the Newry river, a deeply incised and ice-worn cut in hilly country.

Easy passes lead from the Bann valley to the Foyle and Erne basins, both of which open ways to the western seaboard. The Foyle, with its major tributary, the Strule, rises in the low Devonian hills to the northeast of Enniskillen, receives numerous tributaries from the Sperrin mountains and the eastern margins of Donegal, and, having cut through the ancient metamorphic floor of the northwest, passes through Derry as a broad river to the lough. The Donegal peninsulas and mountains are drained

by numerous short streams, many of which run in troughs parallel with the lines of peaks. The Erne is a river of the drumlin country from its headwater streams on the Central Lowland and in the hilly area of Monaghan to the sea in Donegal bay: its four main lakes, Gowna, Oughter, upper and lower lough Erne, all possess islanded drumlins, and it winds slowly through such country with almost imperceptible gradients, finally reaching the sea by a sharp fall at Ballyshannon. This feature is comparable with that of the Shannon: it defies satisfactory explanation, but is now of great economic importance as a new power station is being built.

The Carboniferous plateau between Sligo, Leitrim and Fermanagh are drained by the headwaters of the Erne and the Shannon, and by several short rivers which merge into estuaries around Sligo bay. The Moy, farther west, runs parallel to the Ox mountains and then swings northward, reinforced by several tributaries from the bog-covered lowlands of Mayo, into Killala bay. The Corrib, on the lowland east of Connemara, has a completely dry channel in Carboniferous limestones between lough Mask and lough Corrib, and receives many subterranean waters before it reaches the sea at Galway: its tributaries include the Clare river on the lowland and various streams from the west.

COASTS

Ireland was connected by a land bridge with Great Britain in Tertiary times, and separated from it by the Alpine movements, probably in the Miocene and Pliocene periods. The fall in sea level during the Ice Age and post-glacial times may have reached 400 ft. or more, and the present coastline shows the effects of submergence, for its river valleys are drowned and its mountainous cliffs are among the most striking in Europe. The submerged valleys of the various rivers have been distinguished by soundings in estuaries such as Cork harbour, Dublin bay, or Belfast lough, and the shortening of their courses has led to heavy silting with alluvial materials that choke the tidal waterways and make dredging essential in every harbour. The little valleys on either side of the Blackwater gorge have patches of marshy alluvium due to infilling; the drumlins of Clew bay are being united one to another, partly through the accretion of mud around planted *Spartina townsendii*; and at the head of Dingle bay and other Kerry rias there are stretches of salt marsh destined to become firm land in time. Eventually the reclamation of considerable areas will be possible, and the outline of each estuary will be changed by the addition of 'intake' land. This process is accelerated by the building of sea walls and embankments, and by the dumping of waste materials as, for example, around Dublin bay, Belfast lough, the

Shannon estuary and lough Foyle (see Figs. 55, 74). In these four areas the economic motive has been active, but in the remoter parts of the country it operates only to a slight degree, and therefore the reclamation process is one of natural evolution rather than conscious planning.

Wave attack is strongly felt outside the areas of sheltered water: the force of the storms is particularly acute in the west, where Atlantic spray is thrown to a height of 300 ft. The coastal precipices of the west are almost 2,000 ft. high in Slieve League, Co. Donegal, and higher in Achill island, where there are quartzites: there are smaller but still impressive drops in such places as the Cliffs of Moher, where Carboniferous flagstones reach the sea and it is possible to look down 600 ft. into the water. The attack on many of the softer materials is even sharper, and may be seen in such places as Clew bay, where the drumlins are cliffed on the west side, but surrounded by shallow waters with accumulating silts on the east. As yet, the coast has a youthful line, and its recent submergence is revealed in the many islands and peninsulas that it possesses, especially in West Connacht and Donegal. But the silting of its bays was notoriously revealed by the pier building of the Congested Districts Board; many 'harbour works' served only to accelerate the process and add to the natural reclamation in progress.

From Cape Clear to Waterford harbour there are long stretches of cliff as much as 200 ft. high, broken only by the drowned valleys and inlets of the small streams deeply set in the lowland or coastal peneplane. The bays and inlets are silting up, in some cases, such as Dungarvan and Tramore bays in the south, and Wexford harbour in the southeast, behind sand dunes. The east coast from Carnsore point to Dublin bay runs generally parallel to the strike line of the Leinster chain and has a number of wide bays due to erosion in locally softer rocks and in the drifts exposed as many miles of low cliffs. Cambrian or Ordovician beds, with intrusions, are forming a number of promontories such as Bray head (quartzite), Wicklow head, Mizen point, Arklow head and Cahore point. Some of the bays between these have sand dunes partly stabilised by planting marram grass. Elsewhere the soft drift cliffs are subject to heavy marine attack, notably between Bray head and Greystones, which stands on a small promontory of Cambrian slates and grits with quartzites: the railway line has been moved inland, and the loss of land was estimated at 4 ft. per year between 1905 and 1928, and has been similar since. In 1928, a storm removed several houses from the north beach at Greystones; the old coastal railway track is in the last stages of disintegration, and the harbour at Greystones has been almost entirely swept away. North of Bray, erosion is also severe and here, too, the railway has been rebuilt farther inland.

Dublin bay is outlined between a granite coast on the south, around Dun Laoghaire, and the Howth peninsula, of Cambrian slates and grits with quartzites, on the north. For nearly fifty miles northwards to Dundalk the coastline is a smooth stretch of low drift cliffs or sand dunes, with a wide and gently shelving sandy shore. The rock floor is magnificently exposed on many of the beaches to the north of Howth, but the attack on the sea is more gradual here than in the area around Bray head.

The coasts between Dundalk bay and Belfast lough consist mainly of low cliffs, in which the drifts are exposed above Silurian rocks: Strangford lough has a profusion of submerged drumlins and resembles Clew bay, at the other end of the great drumlin belt which stretches across Ireland. The basaltic lavas form cliffs in Island Magee, but the plateau edge is generally separated from the sea by the narrow lowland on which the Antrim coast road is built. This lowland has several patches of raised beach, and is floored mainly by the Triassic, Jurassic and Cretaceous rocks preserved beneath the land floors; it is subject to landslips in places. In the north the coasts are of great magnificence: at Fair head, columnar dolerites form an escarpment with a talus of enormous blocks, and at Ballintoy and Benbane head, the basalts reach the coast in cliffs 300 ft. high. The columnar basalts of the Giant's Causeway are visited by thousands, but few explore the still more interesting cliff line of Benbane head, immediately to the east. Many miles of sand dunes in the bays lie between the cliffed coasts as far west as lough Foyle.

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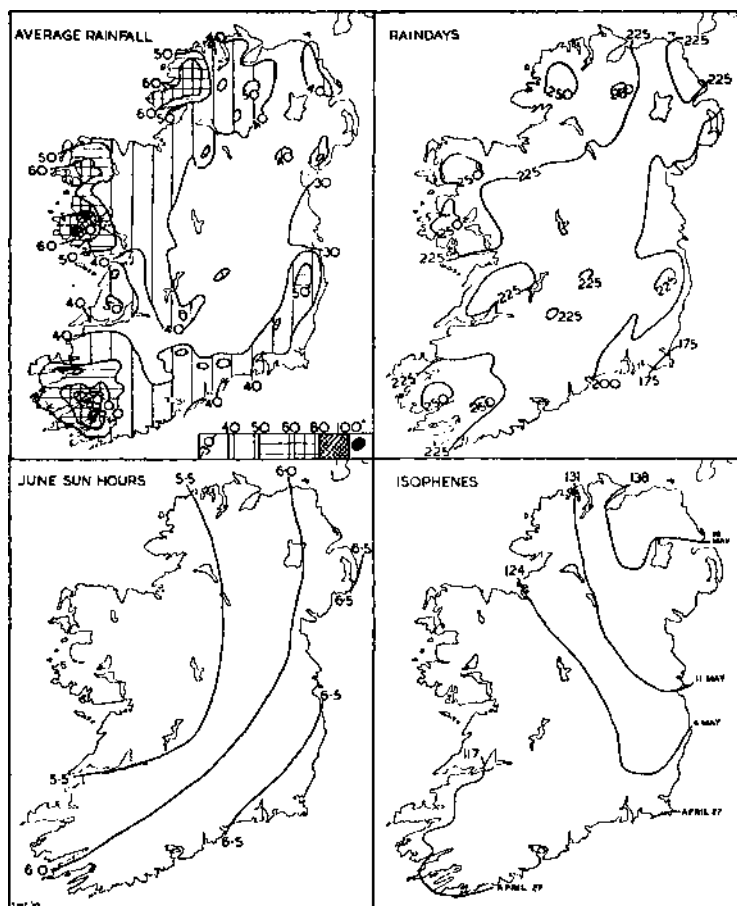
CHAPTER III

CLIMATE AND WEATHER

THE WEATHER of Ireland is commonly described as 'mild, moist and changeable*': extreme cold, long frosts, heavy snows in winter and scorching days in summer are regarded as exceptions to the general routine, in which one season grades imperceptibly into the next with rain as the only common element through the year. In some years December is so mild that almost any garden will have a number of flowers in bloom and January is hardly less attractive for its warmth in sheltered places: but in 1947 the conditions from January to March were as austere as those in many parts of the English Lowland, and snow or frozen slush lay on the roads for several weeks, causing acute traffic dislocation through drifting, and, later, floods. In the north traffic ceased for some days in the early part of March, and even places on the western seaboard, such as Sligo, were cut off for several days in February. Again, late frosts and snows have been recorded in the month of May, causing partial ruin to fruit crops: every year contains some exceptional weather conditions, some of which are a considerable hazard to the farming community.

CLIMATE

Climate is in effect average weather, or a statistical assessment of conditions that have an abiding quality over a number of years, and so enable comparisons to be made between one region and another. The mean monthly temperatures for the winter months in the west are 44°-45° (December to March), and in the east, 41°-43° (November to March): this numerical difference, though slight, means that there is a more marked check to plant growth in the east than in the west. While evergreen species flourish throughout Ireland in sheltered places, they are most at home in western valleys such as those around Killarney, which have luxuriant woods where evergreens such as rhododendrons spread themselves as if native, and the Mediterranean arbutus, a low shrub in its main home, becomes a tree, as it rarely experiences any check to growth through cold or lack of rain. The mean summer temperatures in Ireland range from 60° - 61° in the south to 57° on the coasts of Donegal, and the ripening of such cereals as wheat and barley is hindered in most years by the frequent spells of wet weather and a low proportion of sunshine. The extreme southeast, the lowlands between the Leinster chain



HG. 8.—CLIMATIC FACTORS; AVERAGE RAINFALL, RAINDAYS PER ANNUM, JUNE SUN HOURS AND ISOPHENES

The map of isophenes is copied from the *Land Utilisation Survey of Britain*, vol. i, p. 442, which is based on the *Phenological Report for 1934*. The floral isophenes are for 1891-1925. The remaining maps are from Bilham, E. G., *The Climate of the British Isles*.

and the sea, has an average of seven hours sun daily in June, which decreases to little more than five hours in the west (see Fig. 8): May or June are usually the sunniest months, after which there is a decline to the middle of winter. September (54° - 58°), so crucial a month for the harvest, is warmer than May but in many years so wet that the harvest is gathered with great difficulty (see Fig. 9).

The mean annual rainfall of Ireland is, by general consent, excessive: some four-fifths of the country has from 30" to 50", whereas a similar proportion of England has 20"-40". Only 500 square miles of Ireland has under 30", but at the other end of the scale there are falls of 50"-100" in various uplands with some of the valleys or adjacent lowlands. Relief rain figures prominently in the west from Cork to Donegal, and to some extent also in the south and east, but as Ireland's uplands are broken by lowlands, and consist rather of a number of separate ranges than of any continuous belt of mountains, the area with very heavy falls (say over 50") is much smaller than that in Wales or Scotland. Nor is there any pronounced 'rain shadow,' as almost all the lowlands near the western mountains have an annual fall of at least 40", and the lowlands in the east of Ireland have around 30", more than the falls on the coastal strip of Scotland from the mouth of the Tweed to Moray Firth. The highest falls, 90"-100", are recorded from Kerry and West Connacht: individual stations include the Gap of Dunloe, Killarney, 94"; Aasleagh, at the east end of Killary harbour, 95"; and Delphi Lodge, in the Mweelrea mountains, 99". Other lowland stations with very heavy falls include Garinish island, near Bantry, 70"; Kenmare, 65"; Inagh, Co. Clare, 67" (this on the east side of Mount Callan): falls of 60"-70" are also recorded from stations in the Sperrin mountains and the Mourne mountains.

The number of raindays in Ireland is high, and ranges from 175 in the extreme southeast to 200-250 on the west coast: the average period of rainfall at Cahersiveen is 834 hours; twice that of London. The south and southeast have the best sunshine records: the average percentage of sunshine at the normal climatological stations in all parts of Ireland, 28-30%, is more than that of the Orkneys (c. 25%), comparable with that of Birmingham (29%) or York (28%), though less than that of Falmouth (38%). Ireland is not so much a country of perpetual rain as one in which frequent showers alternate with sunny periods. There is a marked winter maximum of rainfall in the west, and a more even distribution in the east: while no station has a summer maximum, Dublin has an August maximum due to occasional thunderstorms or very heavy depression rains. One historic fall, on August 24-26, 1905, brought 2" of rain to the whole of Ireland east of a line from Cork to Larne, more than 4" to large parts of Down, Meath, Dublin and Wicklow, and over 5" on

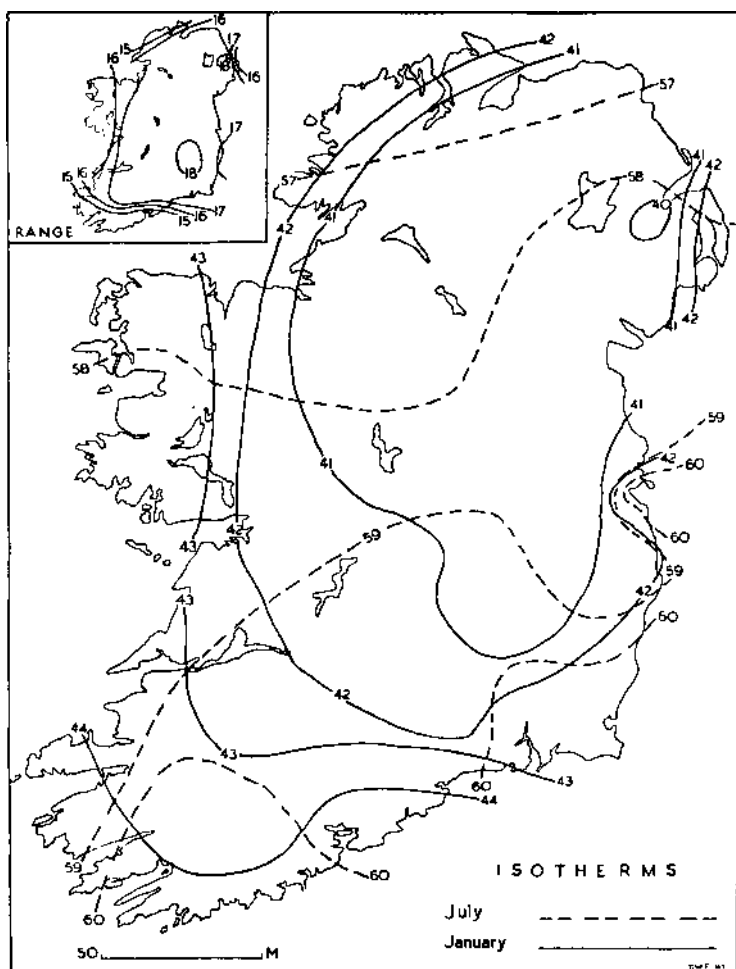


FIG. 9—JANUARY AND JULY ISOTHERMS, RANGE OF TEMPERATURE

These maps have been compiled from data in the Meteorological Office Averages of Temperature for the British Isles for periods ending 1930, and differ slightly from *Bilham, op. cit.*, pp. 151,156-157. The lines are approximate, as the number of records is too small for certainty.

some 300 square miles, with the heaviest falls in the extreme north of the Leinster chain and on the lowlands of Meath. Almost all the rain fell on August 25, and was associated with a northeasterly wind, which apparently caused the southwesterly air to rise and lose its moisture rapidly. This storm, comparable with the famous East Anglian rains of August 25-26, 1912, caused widespread damage, especially around Bray, Co. Wicklow, where the water flooded the lower part of the town to a depth of 4 ft.; furniture and barrels of beer floated out to sea. Three bridges were swept away, a weir was destroyed, many trees were uprooted, roads were undermined by the waters, and the level of the river bed was permanently lowered. Dr. H. R. Mill, commenting on this heavy fall, said that it recalls Symons* famous dictum that 'a fall of 4" in one day may occur any place in the British Isles.'¹

The variability of rainfall from year to year is less in Ireland than in Great Britain: the mean percentage deviation from the normal ranges from 6% in the northwest to 12% in the southeast. Fig. 10 shows the annual falls at Queen's University, Belfast, and the yearly average for Ireland computed by the staff of the British Rainfall organisation. At Belfast the variability averages 9%, and inspection of the diagram will show that over two-thirds of the seventy years had 90-117% of the average recorded fall. The average for Ireland shows a narrower range, of 7-8%: out of seventy-five years, four-fifths had from 94 to 110% of the calculated mean. In each case the tendency for unusually wet or unusually dry years to occur is apparent: the extreme outer range for Belfast is 33% more or less than the average, and for the whole country, 25 %.

The rainfall is sufficiently variable to offer major problems for agriculture, generally from excess rather than deficiency, and not least in the harvest periods which in some years are delayed through September into October. Potatoes, oats and grass are better able to withstand these hazards than wheat or barley, which is normally restricted to well-drained soils in the eastern counties. One of the essential controls in the layout of a farmer's fields is natural drainage, for sloping lands dispose of too-frequent rains capable of making level ground water-logged: a microclimatological study of the land would show that a patch of hummocky ground moraine, a drumlin, or a hillslope of gentle gradient may provide an excellent site for arable fields while the low ground between them is indifferent pasture or even peatbog. Similar contrasts are seen in the natural or semi-natural vegetation, for woodlands and dry heaths are found in areas having quick, natural drainage: under the

¹ For this fall, see Moore, J. W., in *Quart. J. R. Met. Soc.*, London, vol. 32, 1906, pp. 1-10.

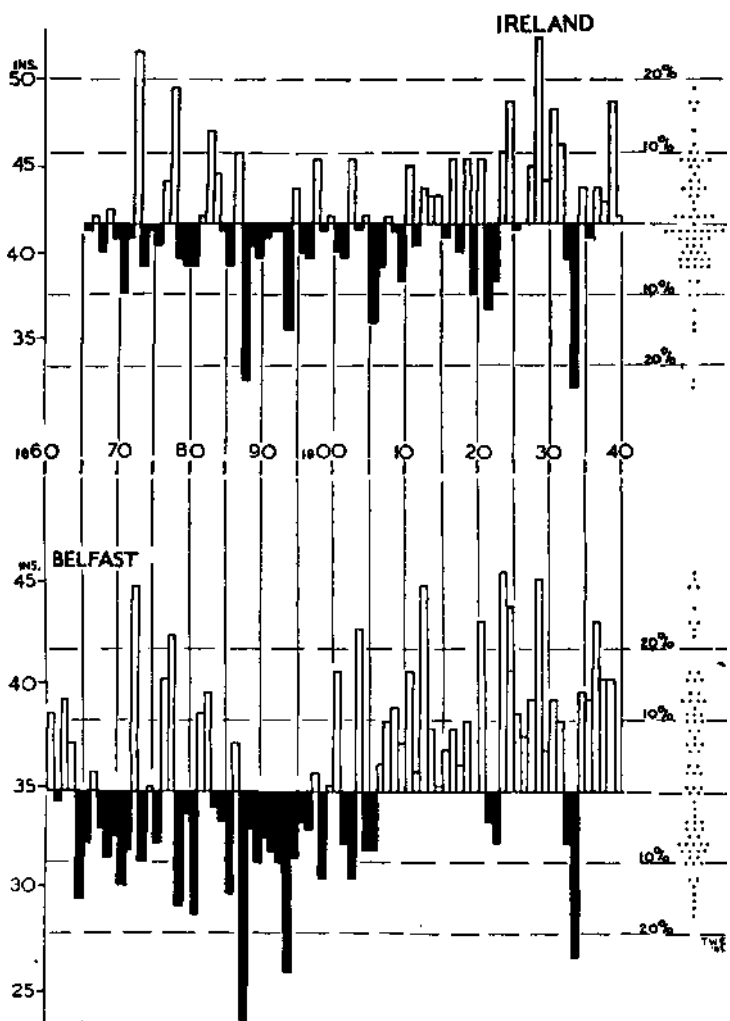


FIG. 10.—RAINFALL: UPPER GRAPH, AVERAGE FOR IRELAND; LOWER, QUEEN'S UNIVERSITY, BELFAST

The figures are taken from 'British Rainfall*' and from Salter, M. de C. 5., 'The Rainfall of the British Isles, 1921, p. 226. There is a tendency for a series of dry years to be followed by a series of wet years; few years have the exact average, though most are within 15% less or more. On the right hand side the number of years having each percentage of the average fall is noted.

present climatic conditions bog represents the climax vegetation of most of the uplands and many of the ill-drained parts of the lowlands, particularly along the western seaboard, where most of the farmland has been won from bog and, if neglected, speedily returns to its primitive state. The luxuriant woodlands of sheltered valleys in the west, of which those around Killarney are best known, show a prodigality of growth that makes them almost useless for economic purposes: mosses, lichens, ferns and other epiphytes cover the tree trunks in profusion, rhododendrons and even bamboos spread through the woods like weeds, and growth proceeds through the mild, moist days of winter almost unchecked by cold for the decay and renewal are simultaneous. In the east, however, the growth of woodlands is much less hindered by the spread of parasitic vegetation and there is an abundance of magnificent trees, many of them in parklands: here the Forestry Commission has found many more favourable sites for its plantations than in the sheltered western valleys.

Westerly winds predominate in Ireland, though naturally a climate experiencing the passage of so many depressions has winds from every quarter at some time during the year: at Donaghadee, Blacksod Point and Dublin, nearly two-thirds of the winds are from some direction between south and northwest. Cahersivecn has 14% of calms, a higher proportion than that for any other major station in the British Isles, but its winds are generally similar to those of other Irish stations. Winds of gale force are most frequent in the northwest, where they average 40 per year, against 36 in the southwest and slightly less in the Irish Sea. Most of the gales are from a westerly direction: they are so severe a menace to shipping that many inhabitants of islands and remote coastal districts in the west profit from periodic salvage hauls. The light railways in Donegal, Clare and Kerry (see pp. 248-251) take precautions against gales, and anemometers were installed at Quilty, Co. Clare, and Dunfanaghy Road, Co. Donegal, to give warning of danger. On the West Clare Railway, carriages are ballasted with concrete slabs beneath the seats when the wind reaches 60 m.p.h., and all services cease when the wind reaches 80 m.p.h. At Quilty, a gust of 112 m.p.h. was recorded on January 17, 1922: if authentic, it is a record speed for the British Isles; there are also records of 109 m.p.h. from Dunfanaghy Road, on January 28, 1928, and several winds of more than 90 m.p.h. on other occasions.

The absence of trees on the exposed western coasts of Ireland is usually regarded as a direct result of the exposure to westerly winds, chiefly of moderate strength, but including some gales. Where the country is level or gently sloping, bog is generally developed, but on the steeper slopes and other areas having good natural drainage, heaths occur. In some areas near the coasts a halophytic vegetation, which owes its

presence to the effect of salt spray, has been recorded by observations between Kilkee and Loop Head, Co. Clare, and at Kinclassagh Head, Co. Donegal. On the Clare coast the stronger westerly winds carry flecks of spray in such quantities that maritime or halophytic species are dominant up to a height of 100 ft., and frequent up to 300 ft., where they disappear and a heather moorland is established. At Kinclassagh Head, halophytes compete with alpine and various other plants characteristic of the adjacent rocky or peaty areas to make a curious local association up to an altitude of 100 ft., the 'spray level': even on a fine day large flecks of spray are driven inland by west winds, and the air is moist and salty. Some form of *Plantago* sward has also been recorded by Dr. R. L. Praeger on the south slopes of the Great Blasket Island, Co. Kerry, on Clare Island, Co. Mayo (to 50-100 ft.), on Inishkeen and Inishturk, and at the western end of Achill island (to 300-400 ft.). In all probability, the presence of this form of vegetation in several other localities merely awaits observers.

Individual woods and trees show wind-moulding, for example on Lough Mask, Co. Galway, where the trees on islands are about 30 ft. high on the east but much smaller on the west. On the islands of lake Muckno, Co. Monaghan, the same shearing is to be seen, but not in any one direction, as the winds appear to vary from one part of the lake to another. Further, at some points on the east coast, individual trees are bent westwards, implying the killing of buds and shoots by strong east winds: more frequently, however, trees are bent eastwards. Under the present climatic regime the natural tree limit, conditioned both by landforms and by the weather, is almost at sea level along the western coasts, around 600-800 ft. in the western mountains, but much higher in the drier east, probably 1,000-1,500 ft. Even in the west, a slight degree of shelter will allow a shrub vegetation to develop: the Burren of Co. Clare, a district of limestone pavements and tabular hills, has a low-growing ground flora on the windswept coastlands and exposed slopes, but in a few slight depressions hazel scrub is found, and there are woods in the valleys away from the coast (see also pp. 394-396).

The climates of Ireland are more favourable to grassland than to arable farming, and crops are won with a hard struggle in many years: it is perhaps not remarkable that the Irish speak of 'saving the harvest.' The scheme of stock farming is based on grass, for in the south and west it is possible to leave cattle in the fields for almost the whole of the year, and in the east and north natural pastures are available for as much as ten months. The replenishment of the herds is conditioned largely by the relative times when spring follows winter: in the 1891-1925 map of floral isophenes, it will be seen that twelve selected plants bloom around

April 27 in the southwest, and three to four weeks later in the northeast. This may be correlated with the classic work of J. Hooper, who showed that calves were born some weeks earlier in the southwest than those in the Central Lowland, which in turn were available before those from Donegal, Cavan and Monaghan. It is in such ways that climatic factors influence an agricultural population.

WEATHER

'Mild, moist and changeable' is a suitable text for a sermon on weather, but such conditions are not invariable as those who experienced the weather from January to March, 1947, will be aware. No systematic treatment of this cold spell is available for Ireland, but its main features are well known: sheep were buried in snowdrifts; roads and railways were blocked for some days in places; snow lay for weeks in most parts of Ireland, and was still seen in the Wicklow mountains in the middle of May; blizzards swept various parts of the country at different times; and the meltwater floods, though less severe than those of eastern England, caused further losses of cattle and delayed spring sowing into April and even May. Conditions of comparable severity were recalled by the elderly from the winters of 1893-1894 and 1894-1895, when minimum temperatures of 20 ° and 22° were recorded even at Cahersiveen with much lower temperatures inland. In such years many of the Mediterranean and sub-tropical plants that normally thrive in Ireland suffer severely, though sharp night frosts are more dangerous than heavy falls of snow. The average number of days per annum with snow is 18 in Dublin, 13 at Birr, 11 at Malin Head, Donegal, but only 3 at Roche's Point, Co. Cork, and 5 at Cahersiveen.

Floods due to heavy rainfalls are naturally more frequent than those caused by snow melting, though the Shannon experienced both in the autumn and winter of 1946-1947. In September, 1946, the harvest season was so wet that a national appeal was made for volunteers to help to bring in the crops, many of which were standing in flooded fields. The Shannon overflowed and covered many of the 'callows' or low-lying pastures through which it flows in its middle course above lough Derg, and the volume of water was great enough to impose a severe test on the various -drainage works along the river. In March, 1947, floods comparable with those of the previous autumn were caused by the melting of snow combined with heavy rains. To add to the difficulties of the country, the peat supplies stored in the open air, as they must be owing to their bulk, were saturated by rain in the autumn, then covered by heavy winter snows which on melting impregnated them with water a second time, and finally drenched with rain.

Periods of deficient rainfall also create difficulties in the Shannon basin, as the Ardnacrusha power-station depends on the inflow of water from lough Derg, which acts as a reservoir for the whole of the catchment basin: the level of the Shannon lakes is partly affected by the level of the underground water supplies, which are drawn from Carboniferous limestones. Records of the average intake exist from 1894, and an average was struck as a basis of expectation for the flow feeding the tailrace (see Fig. 75, p. 392): between 1932 and 1944, only one year, 1938, gave more than the computed average, and in four, 1932, 1933, 1934 and 1941, the deficiency was more than 20%. In 1932, the drought of January to March lowered the level of the lakes and river so seriously that the inflow did not reach the average until the end of the year: in 1933, the lakes were full from January to March, but a nine-months' 'dry season' followed, in which the average inflow was less than half that of the record dry year, 1905, and lough Derg reached the lowest known level by Christmas. The year 1934 had low levels from April to August, but a series of more favourable years followed, and the next drought was that experienced between April and October, 1939, when the intake was little more than a third of the 'average.' The year 1943 had a spring drought, and in the brilliant spring and summer of 1944 the dry spell lasted from February to August, though the following winter was wet. Obviously averages mean little under such conditions, as every year shows some unusual element: before the supplies of imported coal to Eire were drastically reduced, the periodic deficiencies of the Shannon scheme could be met from the coal-fed station in Dublin bay, but severe electricity rationing became necessary from 1942.

There are few records of first and last frosts at any Irish station, but Roche's Point and Cahersiveen have never recorded temperatures below 32° in the months May to September, and Malin Head has a similar immunity from June to September. Inland stations are far less favourably placed: at Armagh, near an important fruit-growing area, only June to August are definitely frostless, and at Markree, Co. Sligo, frost has been recorded in every month except July. Similarly, the Dublin (Phcenix Park) station, in an exposed position, has recorded temperatures below 32° in every month except June, July and August. An interesting seventeen-year record at Roundwood, Co. Wicklow, altitude 700 ft., from 1920 to 1936, showed an average of only thirty frosts per annum, the first occurring between September 28 and December 6, and the last between March 7 and May 19. The liability to late frosts, and even to falls of snow, is a well-known phenomenon in Ireland, as in Great Britain; in some years, mild springs induce early blossoming of fruit trees, but the promise of good crops is shattered by frosts, as, for example, in 1945,

when a brilliant spring was broken by a spell of frost and snow at the end of April around Dublin, and in 1943, when the late frost and snow, combined with high winds, on May 9, was similarly destructive.

The examples of weather drawn from the years 1943-1947 show the importance of the unexpected element in the cycle of the seasons; yet a wide range of weather is natural enough under a climatic regime in which winds are associated with cold northeasterly or warm southwesterly conditions; on many occasions families of depressions cross Ireland, so that the country has a preview of Britain's weather. Severe cold from the westward spread of the continental conditions in winter, and the genial warmth of anticyclones from southerly sources in summer, reach Ireland less frequently than the east or south of England. The climatic affinity of Ireland is with the west rather than the east of Great Britain: Kerry resembles the southwest of Wales, Donegal, such parts of Scotland as Skye or Kintyre, and East Ulster resembles the southwest of Scotland. The east of Ireland and the greater part of the Central Lowland is perhaps most comparable with the drier parts of North Wales or with Cheshire, for it has a moderate, rather than a heavy, rainfall and a seasonal range of temperature much lower than that of areas in the English Midlands or the east coast.

CLIMATIC REGIONS

Ireland, though small in area, is sufficiently large to show a variation in its climates that is of considerable botanical and agricultural significance; its uplands, though almost devoid of weather records, are so different from the lowlands that they have been separately indicated in Fig. 11. Of the six types distinguished here, the first three might be called 'Extreme Atlantic' to use Professor A. G. Tansley's term, and the remaining three might be termed 'Irish lowland type,' as in them the maritime influences, though strong, have not the dominance seen on the Atlantic coasts.

1. *The Northwest*.—The rainfall is from 40" to 70", except in the north of Inishowen (Malin Head, 32") and a few sheltered lowlands: the maximum fall is in winter. The mean temperatures for the coolest month, January or February, are around 42° near the coasts and slightly less inland (*e.g.*, Markree 41° from December to February), and the summer means are around 57°-58°. Gales are frequent in winter, and persistent westerly winds inhibit tree growth along the coast. The combination of high rainfall and mild winters allows luxuriant plant growth in sheltered places, but bogs are developed where drainage is poor; oats and potatoes are the crops most suited to the climatic conditions.

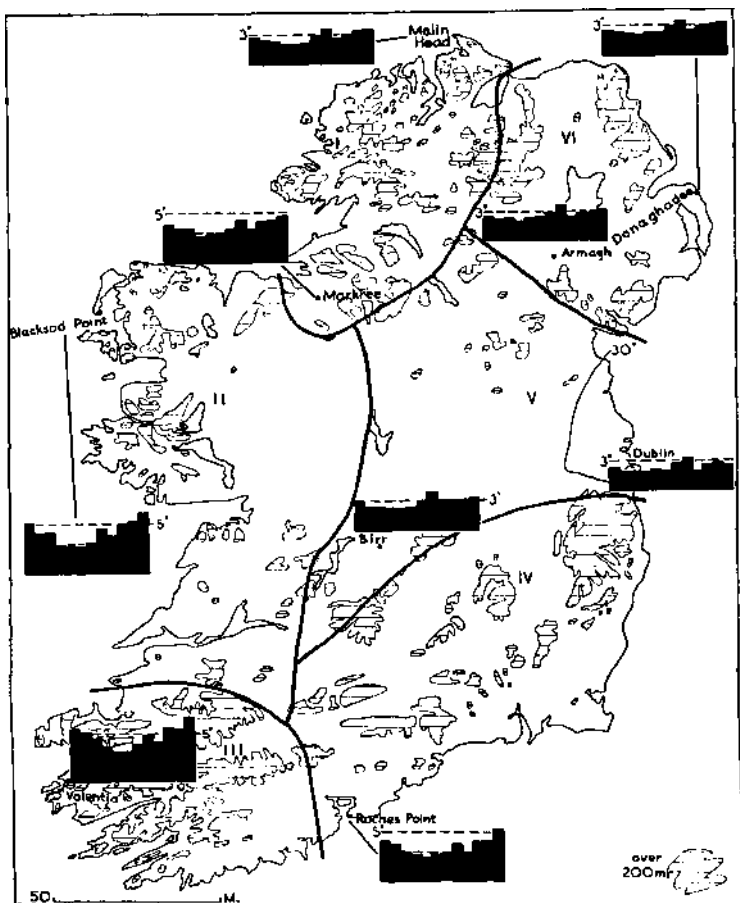


FIG. II.—CLIMATIC REGIONS, WITH RAINFALL AT SELECTED STATIONS

The six regions are described in the text; the areas over 200 m. are shown as they must inevitably be regarded as separate climatic enclaves, though there is little definite information of the ways in which their weather and climate differs from that of the lowlands.

2. *Connacht and Clare*.—In general character similar to region i, this area has slightly milder winters (42° - 43°), very slightly warmer summers (generally 58° - 59°), and even more abundant rain, with falls of around 100" in the heart of the mountains and 40"-60" per annum on all the lowlands except those near the Shannon and a strip of inland Clare. Strong winds limit tree growth on the coasts and peatbogs are developed on the ill-drained lowlands: Mediterranean species are locally abundant. Agriculture is pastoral, with sheep on dry limestones, cattle elsewhere, and the crops are mainly oats and potatoes.

3. *The Southwest*.—The rainfalls are 60"-100" in the mountains of Kerry and West Cork, little less in many of the mountain valleys, and 50"-60" on the adjacent lowlands—*e.g.*, Cahersivecn 56", Killarney town 55"—though some coastal stations have less than 50": there is a pronounced winter maximum. Excessive rain is combined with a winter warmth (December to March means, 44° - 45°) that invites comparison with Mediterranean resorts, but there the comparison ceases, for the southwest has rain on three days out of four, and an average of little more than one hour's sun per day in December and January. The summers are warmer than in regions 1 and 2: sheltered places show a particularly luxuriant vegetation and Mediterranean species, evergreens of all kinds, and sub-tropical exotics, thrive. Bogs are developed on areas of poor drainage, and the farming is mainly pastoral, with oats and potatoes as important crops.

4. *The Southeast*.—The rainfall in the lowlands is 30"-40" in the east and centre, but over 40" in most of Co. Cork and Co. Waterford (*e.g.*, Roche's Point, at the entrance to Cork harbour, 42"): the uplands have falls of 40" upwards. The winters are mild, with means of 44° - 45° along the south coasts, and around 42° - 43° on the east coasts, where sheltered places show a luxuriance of vegetation not unlike that of southwest Ireland. The summer months are comparatively warm, with July means of 59° - 61° , and the sunshine records show that the lowlands between the Lcinstcr chain and the sea are more favoured than any other part of Ireland, with a June average of seven hours' sun per day. The mountains are bog-covered, though in most places the bog is being heavily eroded under the present climatic conditions: the lowlands have bogs only in particularly ill-drained patches, and there is no blanket bog similar to that of the west (see pp. 68-70). This climatic region has some excellent arable land on sloping ground, producing rich crops of oats, barley, potatoes, turnips, sugar-beet and, in certain situations, wheat: its pastures are equally good and the climate is far more favourable for farming than that of the western regions. The tree limit in sheltered valleys is probably

around 1,000-1,500 ft., and forestry plantations are reclothing bare slopes with trees up to the natural limit. In many places around the Leinster chain, the upper limit of settlement and farming is around 1,000 ft., itself an expression of the favoured climatic position of the region.

5. *The Central Lowland.*—This, the area of the lightest rainfall in Ireland, includes two areas with less than 30" per annum, of which the larger extends from Dublin northwards to Clogher Head (near Dundalk) and inland for some twenty miles, and the second covers a few square miles around Banagher on the Shannon: the latter is not well attested. The stations outside these areas show mean annual falls of 30"-40". The mean winter temperatures are around 40°-42°, varying to some extent according to exposure: the Dublin records are of particular interest here, for the Trinity College station in the city, at 12 ft. above sea level, has January means of 42·9°, while those from the Phoenix Park, at 155 ft., are 2° lower. The extraordinary mildness of the low-lying parts of Dublin and its suburbs is reflected in the early flowering of shrubs and trees, which are sometimes as much as a fortnight in advance of those in the outer suburbs standing only 100 ft. higher. Exotics of sub-tropical origin flourish along the coasts near Dublin almost as richly as in Cork or Kerry. The agriculture of the Central Lowland is pastoral in emphasis, for both the heavy and impermeable boulder clay and the limestone drifts give rich grasslands, but excellent crops are also grown, especially in well-drained situations: these crops include wheat, barley, oats, sugar beet, beans, peas, potatoes, turnips and mangolds. The present utilisation is not necessarily the most intensive possible under the climatic conditions, as there is very little market gardening or fruit growing, though recently some small pastoral farms near Dublin have been transformed into orchards and fruit farms with conspicuous success.

6. *The Northeast.*—Although the northeast is in many ways the most intensively farmed area of Ireland, its climate is cooler throughout the year than that of the remainder of the country. In winter the mean monthly temperatures are around 40°—e.g., Lisburn, c. 40° from December to February, Armagh, 40·5° in the same three months—but conditions on the coasts are warmer, and there are averages of 42°-43° at Donaghadee. The mean temperatures in the summer months are around 58°-59°, probably less on the north coast: the maps of floral isophenes show that the springs come approximately three weeks later than in the southwest. The rainfall is 30"-40" on the lowlands, but higher in the Mourne mountains (c. 40"-60", significantly less than in Donegal). Grassland predominates on most farms, with a substantial arable acreage given to oats, potatoes and flax, but normally very little wheat or barley: the region is renowned

for its excellent potato crops, including seeds, and for its cattle pastures rather than for the bread and brewing cereals, which are more at home farther south. Bogs and fens occur in depressions and around the many lakes in the drumlin belt: the natural tree limit is difficult to assess, but probably not less than 1,000 ft. in sheltered valleys, and the limit of farming is little lower than 1,000 ft. in such places as the western side of the Mourne mountains.

REFERENCES

The most important statistical sources are the Book of Normals, Averages of Temperature for the British Isles for periods ending 1930, Averages of Bright Sunshine for the British Isles for periods ending 1930, all published by the Air Ministry, London. The rainfall statistics are contained in the annual issues of *British Rainfall*, Air Ministry, London, annual to 1939. Books dealing with the climate of the British Isles include Bilham, E. G., *The Climates of the British Isles*, London, 1938, and, for rainfall, Salter, M. de C. S., *The Rainfall of the British Isles*, London, 1921. In addition there are interesting comments on climate in Tansley, A. G., *The British Islands and their Vegetation*, Cambridge, 1939; Scully, R. W., *Flora of Co. Kerry*, Dublin, 1916, and Pracger, R. L., *The Botanist in Ireland*, Dublin, 1934. The data on the supply of water to the Shannon hydroelectric station have been drawn from the annual reports of the Electricity Supply Board, Dublin.

CHAPTER IV

VEGETATION

IRELAND is a long-settled country in which the effects of human occupation are clearly apparent in the landscape, for more than two-thirds of the entire area is agricultural and less than 2% is forest. Fig. 12 shows the areas that are uninhabited and may therefore be expected to include some relics of the natural vegetation: in the main the uninhabited parts of the land are bogs, though they also include some limestone karsts in the area around Galway bay and in Roscommon, together with a few ecologically important fens, particularly around lough Ncagh and some of the lakes in the drumlin-drift belt. Even the bogs and fens, however, are so modified by centuries of grazing, cutting and artificial drainage that there are few places in which one can say with certainty, 'This is an area of natural vegetation.'

In this chapter attention is directed first to the composition of the present flora, with some treatment of its distribution; then follows a discussion of the vegetation types with special reference to bogs and woods. It will be seen that there are many fascinating ecological problems awaiting investigation, but readers of the various ecological papers listed in the bibliography will find that there is already a useful initial contribution to this subject.

THE FLORA

The flora is similar to that of Great Britain but numerically poorer: on a conservative estimate, there are 1,000 species¹ in Ireland against 1,500 in Britain; another estimate gives Ireland 1,300 and Britain 2,300, but the proportion is not markedly different. The comparative poverty of the Irish flora has been ascribed to the breaking-down of the connection between Ireland and Britain long before Britain was separated from the continent of Europe, as a result of which the movement of plants into Britain continued for some time after a severed Ireland was unable to receive immigrant plants, and in fact became gradually impoverished. Much of the Irish flora may have survived the Ice Age either on the ice-free strips within the present Ireland or on unglaciated areas now submerged. The evidence of Greenland, where three-fifths of the

¹ Species and subspecies of phanerogams and vascular cryptogams, native or naturalised. On this point, see Praeger, R. L., *The Botanist in Ireland*, Dublin, 1934, paragraph 34.

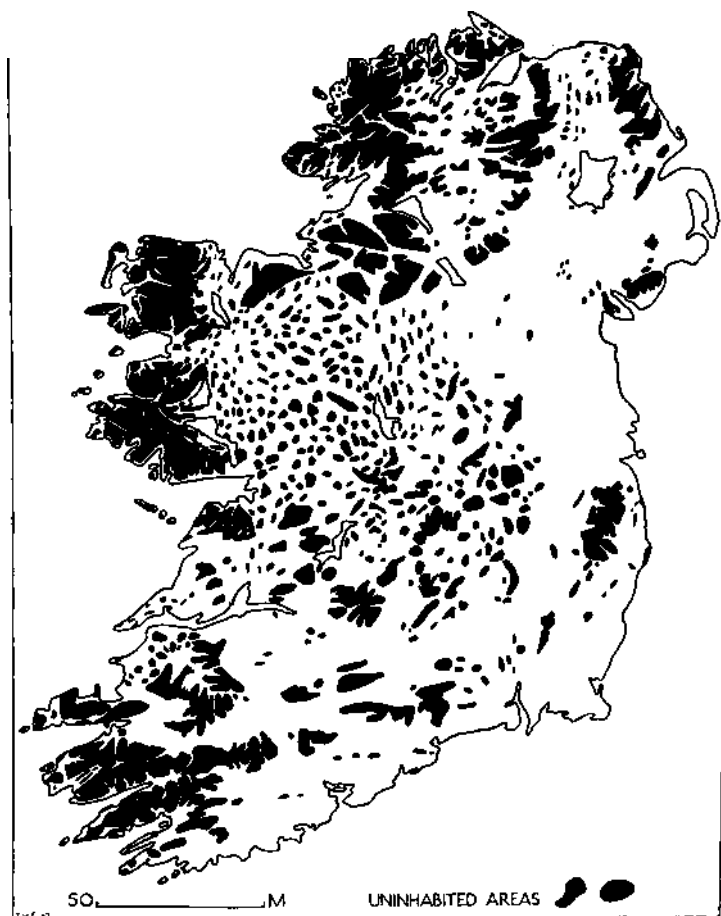


FIG. 12.—IRELAND: UNPOPULATED AREAS

This map includes those areas found to be unpopulated in compiling Fig. 22, p. 134. Most of the areas are upland rough pastures or lowland bogs; also included are some limestone karsts around Galway bay and on the Shannon-Suck interfluvium, Co. Roscommon.

pre-glacial flora is held to have survived the existence of the ice cap in its present position, is illuminating in this connection.

Special interest lies in the admixture, in certain Irish localities, of Alpine species with others of Mediterranean (Lusitanian) origin, which are now known to be pre-glacial: a further complication is the presence of a number of plants of American origin. These species are relics of floras which spread into Ireland from the Mediterranean, and from Greenland and Iceland respectively: they are found chiefly, but not entirely, along the western coastlands and for some distance inland. In some places they occur intermingled with one another, or with plants that have come from the east and form part of the Irish flora of continental European origin (see Fig. 13).

Lusitanian Species.—On the continent the Lusitanian flora is confined to the Iberian peninsula, with extensions along the Mediterranean and into southwest France. In England the same species, where present, are found mainly in the south and southwest; in Ireland they occur mainly in the south and west with foci in Kerry and West Cork, and in Galway with Mayo, whence there are extensions into Sligo and Donegal. The Lusitanian flora includes various saxifrages, the arbutus, various *Ericas*, including the Mediterranean heath (*E. mediterranean*), a butterwort (*Pinguicula grandiflora*), and an orchid (*Neotinea intacta*). Most of these are found in lowlands, especially near the coasts, but six ascend to heights of 1,700-3,370 ft. The high humidity of western Ireland appears to favour these plants, but at least some of them can withstand cold conditions and thrive even on peaty soils: in the Burr en area of Co. Clare, they are found at sea level mixed with Alpine plants.

American Species.—These plants, which appear to have reached Ireland from Greenland and Iceland, are not found in Europe south of Ireland, where they occur along the west coast and around certain lakes, such as lough Neagh, where *Spiranthes stricta*, lady's tresses, an orchid, grows in the damp meadows, and lough Derg, where a rush, *Juncus macer*, has been found: this species is also recorded in various Wicklow valleys and from various localities in the south. In general, the American species are much less conspicuous than the Mediterranean in Ireland.

Alpine Species.—The Alpine flora is poor in its range of species, but has a distribution of particular interest; though the mountains have wide heathery moorlands there is no continuous area of land at a sufficient altitude to possess an arctic-alpine vegetation similar to that of the English Lake District (Cumbria), Snowdonia or the Scottish Highlands. The alpine plants are more abundant in the north than the south, and as a

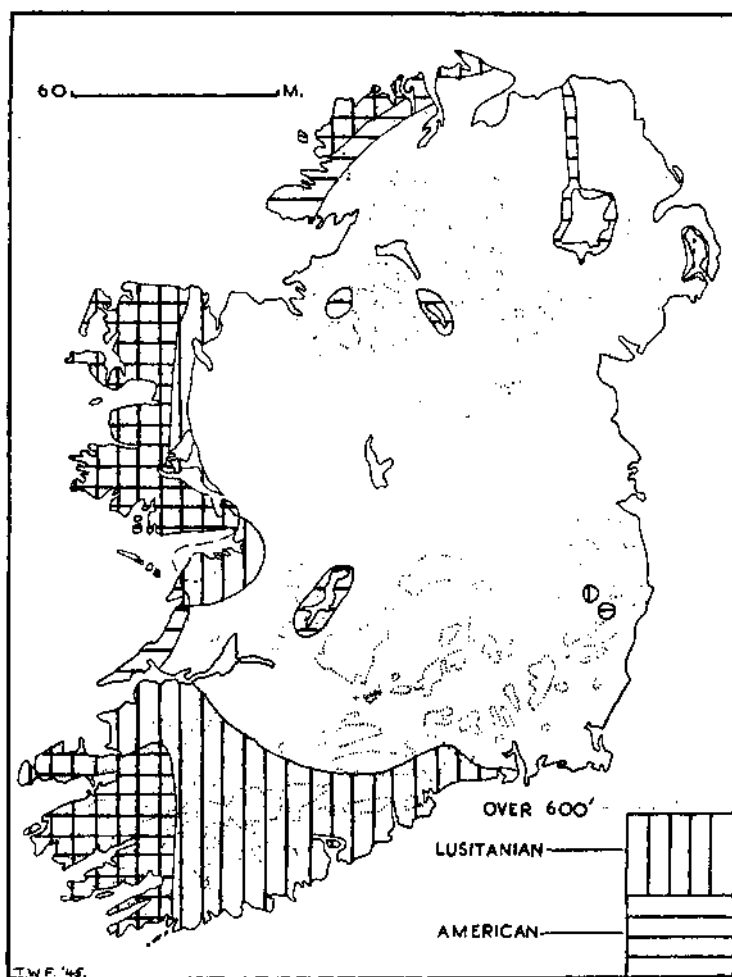


FIG. 13.—HIBERNO-LUSITANIAN AND AMERICAN FLORAS

Each of the floras is represented mainly in the west, though the occurrences in the east suggest that their distribution may eventually prove to be wider than this map suggests.

group are most numerous around 1,000-1,200 ft.: they occur especially on various north-facing scarps, but are found down to sea level in the west of Ireland, as in the west of Scotland. This depression to sea level on the west may seem to be a striking reflection of climatic conditions, but, if so, the effect is indirect and probably due to the restriction of tree growth which has allowed the alpine species to colonise areas near sea level just as it has allowed Mediterranean and American plants to grow in similar places. In Kerry, for example, which has the mildest maritime climate in the country, eight alpine species have their headquarters near sea level, and of fifty-four species found above 3,000 ft., all but two were lowland plants or plants commonly found at any altitude in Ireland. The Burren of Co. Clare has alpine vegetation from 1,000 ft. down to sea level: the bearberry (*Arctostaphylos uva-ursi*), *Dryas*, *Gentiana verna*, occurs with such Lusitanian forms as orchid (*Neotinea*) or the maiden-hair fern (*Adiantum capillus-veneris*). The nearest approach to an alpine sward occurs on patches of exposed ground in the west, such as Curraun Achill, at 1,200 ft., where the bearberry, crowberry (*Empetrum nigrum*) and dwarf juniper (*Juniperis sibirica*) form a dense carpet. On the Meenawn range, Achill island, at 1,300-1,500 ft., there is a very close sward consisting mainly of heather (*Calluna vulgaris*) and the three species named above, with a dwarf willow (*Salix herbacea*).

THE LOWLAND FLORA

Part of the lowland flora may be divided into calcicole (lime-loving) and calcifuge (lime-allergic) groups which, with significant exceptions, reflect the nature of the soil in which they grow. The tendency towards soil acidity is marked in Ireland, and neutral soils are in many cases made acid by the addition of humus compounds. The calcicole flora is therefore restricted to the limestone crag-lands and pavements of the west, to limy sea-sands, to the limy gravels of the eskers in the Central Lowland, and to the calcareous boulder clay found in parts of the Central Lowland: some of the best cattle and sheep pastures consist of grasslands with limy soil.

The calcifuge flora is well developed in the peat bogs of the Central Lowland and in various uplands areas. In some places the contrast between the calcicole and the calcifuge floras appears in a striking boundary, as around Galway bay where the Burren to the south has a calcicole flora on the gaunt limestone hills, and the vast bogs of Connemara have a calcifuge flora. The calcifuge flora occurs on areas of metamorphic rocks in the northwest and west, on Silurian slates in the northeast, on Devonian sandstones and slates in the south, and on the Coal Measure shales of the southeast, for example the Castlecomer plateau. The Central Lowland is,

in fact, ringed round with areas of calcifuge vegetation, much of which is on non-calcareous drift.

In many areas now cultivated or recently cultivated, the areas of naturally calcifuge vegetation on acid soils are made apparent by the gorse (*Ulex Gallii*, *U. europceus*) along the hedgerows or in the fields, by the bracken fern (*Pteris aquilium*) in similar situations, by the foxglove (*Digitalis purpurea*), and above all by the reed- and sedge-ridden pastures. Nevertheless there are many exceptions to any general correlation, such as calcifuge species on limestones, probably due to local soil conditions: heavy rain may have leached out all the calcium carbonate in some limestone areas and left an acid soil on limestone.

DISTRIBUTION OF VEGETATION

The distribution of types of vegetation on non-agricultural land in Ireland has not been thoroughly worked out in Ireland by ecologists and detailed regional studies are needed to enrich the general picture, though Tansley has given an admirable summary of scattered work, and added some valuable observations through recent fieldwork: Praeger's *Botanist in Ireland*, though primarily floristic, included some pertinent comments on plant associations. The detailed regional work includes the studies of Pethybridge and Praeger in the Wicklow mountains (see pp. 272-274), of White and others around lough Neagh (see p. 499), and Armstrong and others in the Mounie mountains (see p. 498). Bogs remain a significant feature of most Irish landscapes: they occur on all the mountains and cover large areas on the lowlands. The lowlands near the east coast from Belfast to Dublin, around the Wicklow upland, and from Wexford to Co. Cork have the fewest bogs, and therefore the most continuous agricultural settlement. There is a general increase in the area of bog from east to west, though some of the largest bogs, notably the Bog of Allen, are developed within twenty miles of Dublin, and there are large bog-free areas on the bare limestones extending north and south of Galway bay. It may be estimated that bogs cover at least one-fifth of the area of Ireland.

The remaining types of vegetation include the small but significant area of woodland, such as small patches of primeval forest, shelter belts, demesne woodlands and modern plantations. Areas of highly specialised vegetation in such areas as fenlands and sand dunes are locally significant, but small in total extent. One of the most interesting and least explored vegetation belts is the fluctuating area of hill-pastures between the present farmlands of valleys and lowlands and the moorlands covering the hills. The limit of cultivation has receded downhill during the past hundred

years, and few attempts have been made to improve and reoccupy the areas that have been allowed to become derelict.

THE BOGS

Few of the bogs are now in their natural state for the population have been cutting the edges of all the more accessible bogs as fuel supplies for centuries. This cutting has been accelerated recently owing to the scarcity of coal: in 1945, 4,007,000 tons of turf (peat) were cut by farmers in Eire, an increase of 16% over the cut in 1939. This does not include the large amount cut under various special government schemes. The cutting of turf may be regarded either as the removal of a natural reserve of fuel which is replenished very slowly, if at all, or as the uncovering of potential farmlands. The inhabitants of certain islands off the west coast, whose fuel reserve of turf has long since been exhausted, would take the former view: some farmers who manage to grow crops of potatoes or oats on soils cleared of bog would take the latter view. But the bogs have a significant place in the rural economy of many of the poorest parts of Ireland, for they provide rough pasture for sheep and cattle and bedding materials for animals, and their removal frequently reveals a stiff clay that is saturated with water, and of no agricultural value.

Bog formation depends upon a number of topographical and climatic factors which have not as yet been fully investigated. The lowland bogs of Ireland generally lie on the drift-covered Carboniferous limestone surface, and the upland bogs are on many different types of rocks with or without a covering of drift. Only in a few places is the contrast between bogs and farmlands or bare limestone surface seen as a clear line of demarcation. The contrast between the north and south shores of Galway bay has been noted above (p. 64): the edge of the Carboniferous limestones, bare or thinly covered with drift, is also seen as farmland for many miles north of Galway bay against the bogs overlying metamorphic rocks lying to the west. The basaltic plateau of Northern Ireland is peat-covered in places, but around its margins chalk soils support good grasslands. Generally the bogs have no clear limit, but grade off imperceptibly into marshy ground or fenland modified by pasturing and drain cutting. A few of the apparently untouched edges of bogs are occupied by a luxuriant growth of heather, bracken or gorse (*Ulex europceus*), and even in places with birch and pine.

The Irish bogs have been divided by Tansley into two types, raised and blanket. This corresponds fairly closely with the traditional recognition of red (raised) and black (blanket) bogs. It does not correspond to any distinction between upland and lowland bogs, but rather to a

climatic division between areas of very high humidity (blanket bogs) and those of more moderate humidity (raised bogs).

RAISED BOGS

Raised bogs are built up on fen, marsh or valley bog in basins which may be small, but in some cases cover as much as twenty square miles. These bogs acquire the name 'red bogs*' from the prevailing red-brown colour of their vegetation. They develop in eastern Ireland, where the rainfall is little more than 30", and become more widespread towards the west where, however, they are eventually replaced by the blanket bogs. The conditions of high, almost constant humidity, low evaporation with much cloud undoubtedly favour their accumulation, but they could not have attained their extraordinary prevalence in a naturally well-drained countryside. The widespread drift covering of lowland Ireland necessitated a redevelopment of drainage as the Ice Age passed away, and no well-organised system could arise with a rock-floor of soluble Carboniferous limestone. The sprawling lakes of the Shannon and many other lakes in lowland Ireland are indications of an immature drainage system favouring the growth first of fen and then of peat. It is tempting to regard such bog growth, in so far as it depends on ill-organised drainage, as partly due to the presence of a widespread lowland peneplane about 200 ft. above sea level, possibly with a second peneplane about 400 ft., though these two levels, so widespread in the Central Lowland, may be part of the same surface.

The raised bogs, once established, have their distinct cycle of development, first worked out in Sweden by Osvald, and subsequently in Ireland by Osvald and Tansley. The developing bog consists of a series of hummocks and hollows inhabited by different species. The peat in the hollow is built up until a new hummock is formed, and the top of the old hummock becomes the site of a new hollow, and so the whole cycle proceeds. In the succession *Sphagna spp.* are of primary importance: species of high water requirement dominate the wet hollows, and species tolerant of drier conditions form the hummocks. Various mosses and liverworts may settle among the *Sphagna spp.* Cotton-grass (*Eriophorum vaginatum*, *E. angustifolium*) may also appear, but it rarely possesses in Ireland the dominance over large areas which is so characteristic of the Pennine moors. Bell heather (*Erica tetralix*) is seen first in the wet hollows, but becomes more frequent as the hummocks develop. It is even more tolerant of wet conditions than heather (*Calluna vulgaris*), which is found occasionally in the hollows, but becomes luxuriant and even dominant after hummock formation has begun. In this stage headier finds good drainage for its roots in the *Sphagna* cushions. Finally *Cladonia sylvatica*

grows on the older hummocks and the heather decays, possibly owing to age or insufficient nutrition, but hardly to drought.

The hummock-hollow form of bog-lands will be familiar to many who have crossed them. In some eastern bogs an intermingling of fen may be seen: some valleys and hollows in the east have fens (mainly drained for cattle pastures) in sites where bogs would develop under the conditions of heavier rainfall that prevail farther west. The widespread bogs of the Shannon valley and its tributary the Suck owe their development partly to a rainfall of about 40" per annum, coming on more than 200 days. The bogs as a whole have slightly convex surfaces and are thus raised a few feet above the surrounding countryside. The slope is very slight, and in one case measured proved to be 1 in 100, or 3°. Natural bog development pushes the drainage to the edge of the bog, where a 'lagg' or marginal ditch is formed. In the Irish bogs a natural 'lagg' is almost unknown, as the drainage has been very much altered by cutting for fuel and the construction of artificial channels across the bog to make the surface drier. The drainage of the surrounding fen areas has also exerted a considerable influence on the bogs.

While the true raised bog with its typical plant association and succession is abundantly represented in the Central Lowland of Ireland, many areas of heathery moorland are also seen. These are much drier and may arise on sandy soils, some of which show a clear moorpan or hardpan due to the leaching out of mineral constituents from the surface. In some cases the *Calluna vulgaris* association may become dominant through improved drainage consequent upon turf cutting. The bog will then cease to develop, and in time a few birch and pine trees may colonise the area. One problem which needs fuller investigation is the relation of bog development to slope: in the Central Lowland even a slight slope allows sufficient natural drainage to prevent bog development and permit agricultural occupation of the land. It is now generally believed that raised bogs develop everywhere on a fen base, and that they are, under the local climatic conditions, a succession stage postdating fens. Fenlands are now rare in Ireland, and generally confined to very small areas, except around lough Neagh (see p. 499).

BLANKET BOG

The term 'blanket' was first suggested in 1935 for bog-lands which cover the country like a blanket, in regions of high precipitation and humidity, with low evaporation and infrequent sunshine. The blanket bog is not of necessity built up on fen or on the sites of old lakes, but spreads indiscriminately over all flat or gently sloping areas in lowlands and mountains up to an angle of 15°. These conditions are met on low-

lands in the west of Ireland and in uplands and highlands throughout the country. Under certain conditions bogs on slopes of perhaps as little as 4°, already viscous, may 'flow,' causing those bog-flows or minor landslides which may submerge farmlands with peat (see pp. 70-71).

Many lowland areas in the extreme west of Ireland from Donegal to Kerry are covered with blanket bogs. The bog is broken only by small outcrops of rock, in some places *roches moutonnees*, with heather and gorse, or in a few exceptional and well-sheltered places by dwarf woods of oak (*Quercus sessiliflora*) and birch (*Betula pubescens*) or by scrub of hazel, hawthorn, willow, rowan and holly. The farmlands are confined to small areas of alluvial land near streams, or to small local patches of better-drained land (see, e.g., p. 374). The bogs have innumerable lakes and lakelets varying in size from small pools in the peat to considerable areas of water which may be enclosed by rocky rims with heath or scrub. Some of the low-lying basins are the sites of old lakes which have been partly covered with bog vegetation, and in some there are vestiges of marginal reedswamps. In many lowland areas the all-pervading bog is the major and almost exclusive feature of the landscape: in Mayo and Galway continuous bogs cover some hundreds of square miles, and the bogs of Kerry and Donegal, though smaller, are hardly less impressive.

The blanket bogs have been formed during the past two and a half millennia (the sub-Atlantic period), and the pine and birch forests of sub-Boreal times are exposed by cutting or erosion. The blanket bogs may possess a hummocky form and even a hummock-hollow cycle similar to that of the raised bogs, though this appears to be much less usual. The hummocks have a sphagnum base and are capped with heather alone or with bell heather, *Scirpus coespitosus*, and cotton-grass. A wide variety of species are found, alone or in association; *Scirpus* or cotton-grass may dominate wide areas or occur with heather, bell heather and similar plants. Tufts of *Scirpus* occur in the Wicklow mountains, and are actively forming peat. When the peat is cut, and the drainage therefore improved, headier may invade the cleared areas. *Molinia* is also widespread and forms striking tufts in which many plants already mentioned may be seen. An even poorer moorland, described by Pethybridge and Praeger as 'a kind of moss tundra,' has the *Rhacomitrium* (moss) developed with dwarf heather and crowberry (see p. 274, and Fig. 50).

Considerable variety is seen in the blanket bogs and they are a much less dreary landscape than a necessarily brief survey would suggest. The cotton-grass becomes a beautiful red as it fades in autumn, the *Scirpus* a golden brown, the heather and *Ericas* are attractive in the late summer if dull at other times, and the bog-myrtle (*Myrica gale*), with its deep brown fruits, is equally colourful. Springs in the mountains give flushes of bright

green grass, made the more vivid by the sombre vegetation around them, and forming an especially strong contrast against the white *Nardus* grass of dry patches. Progress across the bogs is easy only in rare and exceptionally dry periods of summer or when the ground is frozen hard in winter: at other times the wetness of many blanket bogs has to be experienced to be believed.

The upland blanket bogs appear to be decaying rapidly at present. Cutting for fuel may accelerate run-off and thus make possible the development of natural drainage. The sheep on the mountains may so reduce the vegetative cover that drainage channels develop. On some moorlands, numerous ditches several yards wide and several feet deep are in process of rapid expansion: their sides consist of brown peat obviously loosened by weathering and devoid of plant growth, and some of them function as channels for flood waters. All these features are common to upland bogs and the results are seen in the peat-brown colour of Irish rivers in their upper courses. The lowland blanket bogs are naturally more stable, but they, too, are being steadily removed for fuel.

BOG-FLOWS

The bog-flow is a phenomenon ascribed to many causes but due in some cases to exceptionally heavy rainfalls that add great weight to the peat and cause the upper layers to slip and 'flow' down hillsides or into stream valleys. The conditions favourable to bog-flows may be provided by indiscriminate cutting of the upland bog without due regard for drainage. In any case peat on sloping surfaces must tend to slide downhill, but sudden acceleration of this process may have catastrophic effects if the peat slips over from a level moorland into a steep-sided valley. Such a case was recorded in Co. Kerry in 1896 on Gneevgullia mountain, to the northeast of Killarney, where the face of the cut turf gave way and a vast mass of peat rushed down the valley, finally reaching the Lower Lake of Killarney, fourteen miles away. A 'sea of black peat' was left in formerly cultivated lowlands with 'heather-covered floes' near the burst: the black peat consisted of the lower and more plastic part of the bog and the 'heather-covered floes' of the upper and drier parts. The area of peat removed from the mountain was about three-quarters of a mile square, and the burst revealed the remains of a sub-Boreal pine forest. A family of eight people were carried away and buried with their home and live-stock.

The bog-flows resemble avalanches in their tragic possibilities, and while a number have been recorded, many pass unnoticed, especially if they are on a small scale and take place in uninhabited regions. It has recently been established that actual slipping may take place on a slope of not more

than 6° , even if the peat is thoroughly firm to its base. If a quantity of peat dams a stream temporarily, water will be ponded for a time but will ultimately sweep down the temporary dam and carry the debris forward. But if the under-layers of the peat are themselves semi-fluid, a burst, followed by a violent flow, may occur on a slope of 4° . In view of the fact that blanket bog occurs on slopes of as much as 15° , and since periods of heavy rainfall are frequent, bog-flows probably occur in every Irish mountain range. Flows have been actually recorded in Wicklow, Clare (Slieve Aughty mountains), Donegal, Mayo and Kerry.

WOODLANDS

The greater part of lowland Ireland appears to be well wooded, and there is a marked absence of trees only in some western districts on or near the coast, and in the major peat bogs of the Central Lowland. The appearance is deceptive for Ireland is the least forested country in Europe (apart from Iceland), and only 2% of its area is covered with woodlands. There are numerous shelter-belts, single trees in hedges or fields, copses or woods in private parks, but few traces of natural woodland are to be seen. Such woodlands occur mainly on hillsides never cleared for grazing and cultivation, or on inaccessible islands in lakes. Though some of these woods have been invaded by sub-spontaneous pines from plantations and occasionally by other trees (see pp. 72-73), there are a number of natural oak woods (*Quercus sessiliflora*), along with birch and ash in places. The oak woods are highly varied, and a number of trees form a lower stratum or exist as co-dominants with oak to form a mixed woodland or scrubland. Such trees include holly, hazel and rowan and more rarely hawthorn, aspen, yew and, around Killarney, arbutus. Willows and alders have their normal dominance in damp places and some remarkable hazel scrubs are developed on limestone crags in the west, notably in the Burren of Clare. The natural woodlands may be seen in some of the Wicklow valleys, notably Glendalough and the Vale of Clara, in Mayo around Pontoon, in Sligo on Lough Gill, in Kerry around Killarney, and in other places mentioned elsewhere in this book (see pp. 396, 472, 450, 475).

No reliable estimate of the tree limit under the present climatic conditions can be made. There is evidence that in the sub-Boreal period forests of pine and birch covered many hills and lowlands where peat bog is now the climax vegetation. It is worthy of note that the tree limit is at sea level along the exposed western coast, but it rises sharply to 600-800 ft. in Kerry, and in the east of Ireland it may be as high as 1,500 ft. in some sheltered valleys. The splendour of individual trees in gardens,

parks and hedgerows suggests a former forest vegetation of some luxuriance over now cultivated lowlands, though many of the finest trees in Ireland today are introduced species, such as beech and sycamore and various conifers, such as pines, spruces, firs and larches. Among the conifers only the juniper and the yew are native, but the introduced species are widespread in plantations, and the Scots pine at least is able to sow itself and compete with birch on many dried peat bogs and hills. The planting now in process, which is mainly of coniferous trees, will remove the spacious and open aspect of many mountain valleys.

NATURAL AND SEMI-NATURAL WOODLANDS

The term 'semi-natural*' is perhaps safer than 'natural' in any discussion of existing Irish woodlands, as few of them have been immune from timber gathering, if not actual clearing, sheep grazing and even cattle pasturing. In modern times some of them have been invaded by sub-spontaneous pines and others have been 'beautified' by the planting of exotics. A few woods have managed to escape some or all of these influences, and it is reasonable to hope that remnants of natural woodland will survive, though some lie within areas now controlled by the Forestry Commissioners.

The famous woods of Killarney have an evergreen quality which distinguishes them from the deciduous woods of Britain and continental Europe. It is therefore proposed to consider them as a special Atlantic type of woodland most fully developed around Killarney and seen also near but not on the western seaboard of Ireland. The climatic influence of mild winters (January mean temperature 43° , with mean minimum 37° at Killarney), the infrequency of frost and the heavy rainfall spread through the year with constant high humidity, are largely responsible for the development of a forest type of some richness, or more accurately of constant growth and constant decay.

The Killarney Woods (Atlantic Type).—These woods have recently been closely studied by a party from the Cambridge" School of Botany. They may be regarded as natural over wide areas as there has been only local planting of exotics, and the woods have been badly neglected for a long time. Like most Irish woods, they have *Quercus sessiliflora* as the dominant tree with a subordinate layer of *Ilex aquifolium*. These oak-holly woods are the most widespread type, but some patches of pure holly wood also have been observed. The margins of the Killarney woods are now the main locality for the arbutus, which reaches a height of 30 ft. in Ireland but is generally only a shrub in the Mediterranean: the lack of any seasonal drought may account for its relatively majestic

development, and it is commonly grown as an ornamental tree with marked success in and around Dublin.

Evergreens are frequent in the Killarney woods and many introduced species appear sub-spontaneously along with the native holly and ivy. Among them are the *Prunus lusitanica* from Portugal and the Atlantic islands, *Rhododendron ponticum* from the Caucasus and the Balkans, *Laurus nobilis* and *Viburnum tinus*. The native evergreen yew is widespread and forms some pure woods, especially on patches of bare or thinly covered limestones, and its present distribution may be due partly to sub-spontaneous sowing. In the woods of Killarney there is a rich growth of epiphytic vegetation on fallen logs and even tree trunks; boulders are generally covered with a matted vegetation. The plant cycle on boulders is first liverworts, followed by heavy mats of tall mosses, filmy ferns (*Hymenophyllum* spp.), but the mats of moss are frequently washed off by rains and the cycle begins again. A similar development is seen on the trees and logs, which are colonised by comparable, but not necessarily identical, species, including the filmy fern, herb robert (*Geranium robertianum*), *Poly podium vulgare*, *Ilex*, *Saxifraga spathularis* and *Rhododendron ponticum*. The general impression of these natural and semi-natural woods is that their very richness makes them practically useless: in them one species preys upon another and there is little good timber available, for beauty of scene and fascination of detail are combined with perpetual decay. The best utilisation for such an area is a National Park and open-air museum of woodlands.¹

The woods of Glengariff, at the head of Bantry bay, are like those of Killarney in general aspect, as oaks are dominant, with holly in the second layer and some arbutus on the margins. The curious spread of *Rhododendron ponticum*, apparently at the expense of holly, has been observed in the woods of Glengariff. Similar woods occur around Kenmare, and the arbutus has also been recorded as a native tree around lough Currane, near Waterville. If the presence of arbutus may be taken as an indication of quality of climate, it is rather puzzling to find that a gap of 160 miles separates its stations in Kerry and West Cork from those around lough Gill, Co. Sligo. Praeger has suggested, on literary and place name evidence, that it was formerly much more widely distributed, but that its range has been reduced by cutting for firewood: in so sparsely wooded a country, this theory seems plausible, though all efforts to find it in the scattered patches of semi-natural woodland in east Mayo have failed. The woods of lough Gill, Co. Sligo, are very similar to those of Killarney; oak is dominant, with birch, hazel and holly

¹ A full analysis of the Killarney oak woods is given in Tansley, A. G., *The British Islands and their Vegetation*, Cambridge, 1939, pp. 327-340.

as a second layer and arbutus on the margins. There is a luxuriant ground vegetation which includes ferns, mosses and bilberry.

Other Irish Oak Woods.—The remaining oak woods of Ireland are confined to two main types of environment, hillsides and lake islands, and although the surviving patches cover only a small area, the evidence available suggests the former existence of oak woods of some variety. A wood near lough Gill, Co. Sligo, has hazel and ash as co-dominants with oak, covering moss-grown limestones with a rich ground flora of anemone, goldilocks (*Ranunculus auricomus*), wood sorrel, bluebells and primroses; the abrupt change to metamorphic rocks is seen in the sudden appearance of bilberry and the disappearance of nearly all the flowers except wood sorrel and bluebells. The ash and the hazel also disappear, and are replaced by birch and holly. The woods on islands in lough Erne have oak dominant, with ash, birch, alder, aspen, holly, rowan, crab-apple, hazel, hawthorn, and bushes such as the spindle-tree, buckthorn, guelder-rose, blackthorn and willows, underneath which there are several species of fern and also primroses, wood anemones and bluebells. These dense highly mixed woodlands are on islands of drift-covered limestones and sandstones. The oak woods near Pontoon, at the southern end of lough Conn, Mayo, have *Quercus sessiliflora* dominant, with birch (*Betula pubescens*), rowans, holly, ash and hazel. Ivy and honeysuckle climb trees and cover rocks; and the rich ground vegetation includes bracken, ferns, bilberry and a wide variety of flowering plants. Some patches of natural or semi-natural woodland in this neighbourhood are rich in alders. Many of these woodlands are of the rich western Irish type, which in all probability was once widespread in areas away from strong winds. But wind-cut woodlands also occur: some of the rocky islets in the many small lakes of Connemara have planed scrub with rowan, juniper, willow, holly, ivy and, less frequently, birch, yew and oak. The windward side of such islands may be devoid of trees altogether and have only heather, *Ericas*, gorse (*Ulex Gallii*) and bracken.

In eastern Ireland any form of natural or semi-natural woodland is extremely rare except in some of the valleys in the Wicklow mountains, especially those drained by the Avoca and its tributaries. These are oak woods (*Quercus sessiliflora*) with hazel and holly as a second stratum. The ground flora is fairly limited and one wood in Glenmalur has only wood sorrel and wood sage, but in most cases there are also wood anemones, bluebells, foxgloves, wood rushes, bracken and various ferns, according to local shade conditions. Nearly all these woods have now been taken over by the Forestry Commission and already some have been replaced by plantations.

PLANTED WOODLANDS

The history of the Irish woodlands has been carefully investigated by A. C. Forbes, who shows that the decline in the natural forest cover was a process of slow attrition by cutting, burning and grazing from Neolithic times onwards. Although the maps and records of Norman and post-Norman times are virtually useless as historical evidence, there appear to have been a few Royal forests similar to those in England. However, the name 'forest' does not survive in any part of Ireland as it does, for instance, in Sherwood Forest or the New Forest, and the forest laws were hardly applied except perhaps in the Glendalough area which covered part of the Wicklow mountains. Fallow deer were brought to Glencree, north Wicklow, in 1224 from Chester, and it is possible that the herd in the Powrscourt demesne are descended from them. The Wicklow upland may well have been a largely uninhabited and partly forested area at this time, and there is an interesting record of clearing of woodland at Glendalough in 1229.

Ireland was very sparsely wooded by the seventeenth century, and this has been attributed to the heavy export of timber in Tudor times. In Queen Elizabeth's reign the destruction of all woods in which the Irish might hide was advised, but commercial considerations won the day, and speculators bought up any existing lots of timber for the export trade. The chief trade in Irish timber was for pipe staves and charcoal burning, but in all probability its general use at home was more destructive than its cutting for export abroad.

The need for afforestation was recognised in various ordinances of the sixteenth and seventeenth centuries, but it was not until the eighteenth century that the planting of introduced and native trees became widespread. The yew is probably the oldest planted tree, partly on account of its religious significance. The *Topographia Hibernica* of the fourteenth century states that 'yew is commonly planted in cemeteries for ornament,' and some old yews, singly or in avenues and walks, may have been planted around monasteries. There are scattered records of planting in private parks during the sixteenth and seventeenth centuries, among which the most interesting is that 'firs' (Scots pine?) were planted in many parts of Ireland, and also that Sir Walter Raleigh planted cherry trees, elms, walnuts, sycamores and spruces at his estate in Co. Waterford.

The trees planted before the end of the seventeenth century included Scots pine, stone pine (*Pinus pinea*), English and Dutch elms, the Spanish chestnut, lime, walnut, hornbeam, the evergreen oak, plane, mulberry¹

¹ Four of the best-known mulberries are in the Fellows' Garden, Trinity College, Dublin; they are commonly said to have been planted on the foundation of the College in 1591 and at each centenary. Two senior members of the College staff

and *Robinia* (locust tree or false acacia). In the eighteenth century many demesnes and deer parks were planted with belts and clumps of trees, or with single trees so placed as to beautify grasslands. In most cases landscape effect was the prime consideration, but some useful timber reserves were made where plantations were laid down. The many demesnes in lowland Ireland and in such areas as eastern Wicklow give the countryside its present wooded appearance. The trees planted were chiefly beech, oak, elm, chestnut and lime, with a mixture of conifers, pine, spruce, silver fir, and in some cases the Lebanon cedar. The European larch was introduced about 1750, and all the trees so far mentioned are excellently developed in Ireland.

Some records of planting around Dublin are of special interest. The development and planting of the Phoenix Park began in 1740, and the two Botanic Gardens in the city, at Glasnevin (the National Botanic gardens) and Ballsbridge (Trinity College gardens), were opened before the end of the eighteenth century. The magnificent trees in these parks and gardens include many exotic species such as palms, eucalypti and evergreens which may also be seen in sheltered areas throughout Ireland. The Royal Dublin Society gave premiums for tree planting between 1741 and 1807, but the scheme was not very successful, as, according to Arthur Young, too little attention was given to the fencing of plantations, and the peasantry were in such constant need of timber that many woods were spoiled. Arthur Young also commented on the youth of many of the plantations that he saw on his travels, and held the opinion that they could be multiplied almost indefinitely.

The nineteenth century saw the development of planting for timber production, but the area wooded showed no great increase during the century. The planted area in 1791 was estimated to be 105,000 acres, but this figure apparently excludes a great deal of natural woodland that was subsequently cleared and replanted. The pressure on the land during the pre-Famine years drove the level of cultivation higher up the valley sides and at the most some 4,800 acres were planted annually. This was merely

recall the planting of the youngest mulberry about 1893; according to Provost McDonnell's Inventory of 1860, the next oldest was planted on April 1, 1848, by the then head gardener. It is improbable that any tree was planted in 1791 as the bicentenary was not an occasion of great celebration, though the first centenary was a time of rejoicing. About 1800, one of the most famous of all College characters, Jackie Barrett, stated his belief that the oldest mulberry was more than four hundred years old, and had been planted in the garden of All Hallows monastery before the foundation of the College. The tradition of a mulberry for each hundred years is attractive but hardly reliable.

Thanks are due to Dr. K. C. Bailey, Registrar of the College, for assistance in compiling this note; see also Forbes, A. C., in *Proc. R. Irish Acad.*, vol. 41, C6, 1933, pp. 171-172.

an extension of demesne planting on rather more advanced lines. Some of the demesne owners brought in Scottish nurserymen between 1825 and 1850, and plantations were laid out in which American conifers from the Pacific states were used. The most important introductions were the Douglas fir (*Pseudotsuga taxifolia*) and the Sitka spruce (*Picea sitchensis*), but a large number of conifers was also tried. Various famine relief schemes took the form of timber planting, and by the end of the century the area of woodland was over 300,000 acres. The Japanese larch was not introduced until the end of the century, but its reddish colour has already made it familiar in the forest landscape.

The Irish Forestry Commission was founded in 1908, when a detailed enquiry into the possibilities of forestry in Ireland was carried out. This Commission reached the conclusion that about 250,000 acres of suitable land could be acquired: since then nearly half this area has been taken over for forests in the whole of Ireland. The estimates of enthusiasts were, and are, very different and range from 2,000,000 to 6,000,000 acres—i.e., from 10 to 30% of the whole country. Such views still find occasional expression, but even the aim of the Forestry Commissions to plant 1,000,000 acres now seems impracticable. The Congested Districts Board included forestry as one of the remedial measures for the poor regions under their control, but their one experiment was a dismal failure. Knockboy Forest, near Roundstone, Connemara, was planted on a drained bog-land with imported trees, then with native trees and finally with trees raised from local seed. The Atlantic winds killed the young trees or gave them a stunted inclination to the northeast. £10,000 was wasted on this experiment, and the only result was the provision of all-too-abundant cover for woodcock and hares.

There are over 300,000 acres of woodland in Ireland now, of which about two-fifths in Northern Ireland and three-fifths in Eire is state-owned. Private planting has virtually ceased and the state policy is mainly to set out large plantations, but also to develop some woods of a few hundred acres. Large unsettled estates are needed primarily for agricultural resettlement unless the land is of poor quality, though some have already been partly forested: land already farmed cannot be acquired as a general rule without causing hardship or at least meeting substantial local opposition. In Eire, approximately three-fifths of the land acquired between 1933 and 1943 was 'bare land' of two classes—portions of old demesnes not suitable for agricultural development, and land above the present limit of cultivation. There were 116 forests under state control by 1943, of which 66 had an area of more than 1,000 acres. Conifers are the main trees planted, but both in Eire and in Northern Ireland the intermingling of belts of trees differing in colour adds to the scenic

attraction of the new woods. In Northern Ireland, Norway and Sitka spruce cover 58% of area, European and Japanese larches 21%, pines 15%, and other trees 10%. In Eire, the avowed policy is to plant a proportion of broad-leaved trees, especially in the old demesnes, and in most years at least 10% of the area set has deciduous species: the main conifers are Scots pine, Norway spruce, European and Japanese larches. The Sitka spruce is now less favoured than in former years, but is a useful tree in areas with a moderate exposure to sea winds, where the Japanese larch, the Contorta pine and the Corsican pine also flourish. The Douglas fir has not proved suitable except on sheltered and well-drained sites, but the Japanese larch has the merit for the forester that it can maintain itself at high altitudes, even well over 1,000 ft. in many of the uplands of the south and east.

Two organised efforts to encourage tree planting may be mentioned as an epilogue to this chapter on a sparsely wooded Ireland. When the canals were built from Dublin into the Central Lowland, a number of elms were planted along the banks to provide water pipes for the city: the use of wooden pipes has long since been abandoned, but many of the elms survive after more than a century as noble trees now highly vulnerable to damage by strong winds. The second effort is the work of the Irish Roadside Trees Association, a society centred in Dublin which has already succeeded in persuading a number of local authorities to plant trees along both the main highways and the quiet residential roads. Where this is done, a new road soon loses its monotony, and spring comes to suburbia with a blaze of flowering *Primus* and other species: this work carries on the tradition of the demesne planters on a much more democratic basis, and its full effects will only be seen with the passage of the years.

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CHAPTER V

HISTORICAL GEOGRAPHY

IRELAND, LIKE England and France, is a country with a tradition of settlement and agriculture extending over several thousand years, and therefore, in human terms, an old land and not new, like many parts of America, Australia, or even the Soviet Union. Its fields have existed for generations, even for centuries, though the farmers change the boundaries from year to year, according to their needs and enterprise, so that the tide of agricultural settlement and enterprise has advanced at times and receded at others: a multitude of small changes have moulded so old a landscape into its present form. In all the changes something abides, such as the tendency for farming units to be small in many parts of the country and, perhaps even more important, for tools and implements used by the farming population to have a form distinct from those used elsewhere. E. E. Evans, in *Irish Heritage*,¹ has shown that this feature of the country's life is as clear and definite in the immediate neighbourhood of the northern towns as in the remoter west. Ireland has a considerable part of its population living at a simple level that might be called 'peasant' (a term not loved by many people in the country), preserving many traditional practices and implements that are of undeniable antiquity: and much of the non-material culture is being investigated by the Folklore Commission, which is well able to sift the chaff of fantasy from the wheat of authenticity.

The preservation of highways is less frequent in Ireland than in England, where so many prehistoric and Roman roads are still recognisable as ridge ways on chalk downlands and other hills, and not a few of the main roads preserve the straight courses of the Roman engineers. Many roads in Ireland have been lost through changes in the distribution of population in a country of disturbed political history, combined with the late and somewhat sparse development of towns. The multiplicity of roads in Ireland is such (see p. 239) that any lane will be abandoned and forgotten once it has served its usefulness, though some fords on rivers have a long tradition of use: the lower Bann fords, for example, are excellent sources of prehistoric materials. The antiquity of settlement in Ireland is a less

* For references, see end of chapter.

obvious feature of Ireland than of England, for the village with an old church and ancient houses is a rare phenomenon: many of the older churches are now abandoned and roofless, and almost all the humbler houses have a restricted life, and in time are replaced by others. All over Ireland there are ruins of stone houses, the best of which are used for animals, the worst merely a pile of stones: even less durable are the mud-walled cottages of which, in some cases, no trace remains within a few years. In general, while it is not difficult to detect the imprint of the eighteenth and nineteenth centuries in the landscape, it is only with a more sweeping imagination that earlier centuries emerge to view: few of the towns have even a single Tudor house, though several have streets with a number of stately Georgian houses and public buildings.

The changing landscape of Ireland is a palimpsest in which the earlier efforts of man are less obvious than the later ones, though traditions show a remarkable degree of survival in the daily lives of the inhabitants. Much of the political tension has centred around the problem of poverty and lack of opportunity, and one essential feature of the historical geography is the fight for land between the native population and various immigrants differing both in outlook and, since the Reformation, in religion. The life of the poorest people of the land still involves unceasing labour for a very small return, times of stringency when food resources are low through bad harvests or poor catches of fish, and even the near threat of starvation on occasion. The reports of the Congested Districts Board from 1891 onwards give a picture of the very poor not unlike that provided by many travellers of the nineteenth century, and the Gaeltacht Commission of 1925,² quoting a Royal Commission of 1909, spoke firmly of various western communities as 'to a large extent the wrecks of past racial, religious, agrarian and social storms in Ireland,' who, 'in a bad year, are saved from extreme privation only by relief measures, and so constitute a serious financial danger to the nation, though they are a most valuable potential asset.'

In this present age, the thought of Ireland as a country of emigration comes most easily to the mind, but through the centuries immigration has been not less important, and the position of the country in relation to the rest of the world, or its 'space relations,' are therefore worthy of consideration. The ideas of Sir Cyril Fox in the *Personality of Britain* are suggestive in this connection:³ he divides Great Britain into two parts—the 'Highland zone,' which comprises Scotland, Cumbria, Northumberland and Durham, the Pennines, Wales and its borders, and the 'Lowland zone,' which includes the southeast of England and the Midlands. Obviously, the 'Highland zone' stands nearest to Ireland, which is its natural if now insular continuation: Ireland is not, however,

primarily a highland country, but rather one in which uplands and lowlands interpenetrate. Nor is that all, for an important environmental influence in the life of Ireland through the ages has been the contrast within its lowlands between the bogs and the dry ground made up of morainic material, glacialfluvial deposits such as eskers and outwash gravels and, in a few restricted areas, actual rock outcrops.

A further idea of Sir Cyril Fox, that *in* the Highland zone type? of culture and social organisation arrive late if at all, but have the quality of continuity, is also fruitful in relation to Ireland. It is clear that many prehistoric ways of life lingered on into historic times in Ireland, and that the Norse, Anglo-Normans, and later immigrants, had only a very partial control of the island they entered as traders or conquerors; again, the Romans and the Anglo-Saxons, who left so vital and abiding an imprint on the English Lowland, never penetrated Ireland at all. Although Ireland has qualities in common with the western or Atlantic side of Britain, it is yet sharply distinct from it: even the northeast, though part of the United Kingdom, has a social complexion quite different from that of Scotland, and a rural landscape of small farms that is peculiarly its own.

In the remainder of this chapter, the position of Ireland is considered period by period, but only in broad outline, though some tentative suggestions are made on the regional geography of past ages, for the aim of historical geography must be the elucidation of the life of men *in* relation to the environment at definite periods of time. Much is transitory, but some things abide, unshaken by revolution, famine, invasion, political reorientation, industrialisation and other changes of a cataclysmic nature (see Fig. 14).

PREHISTORIC TIMES⁴

In late-glacial times Ireland lay beyond the limits of the inhabited world, though Scotland was already occupied by wandering groups of hunters; only in post-glacial times was Ireland penetrated, and the first settlers, with a culture of Mesolithic affinities, probably came in the Boreal climatic period around 6,000 B.C. The time of gradual transition from Arctic conditions to the warmer Boreal climatic phase is one of great importance in the moulding of the Irish landscape, as the rivers, fed by melting snow and ice, were larger than at present and eroded wide channels, and many of the glacial deposits were re-sorted into outwash sands and gravels. In this phase the birch, the pine and the willow began to form forests as the climate ameliorated from tundra to the more 'continental' conditions of Boreal times, in which the summers were probably similar to those of the present but the winters colder and the precipitation less; during this phase, around 6,800-5,600 B.C., hazel and

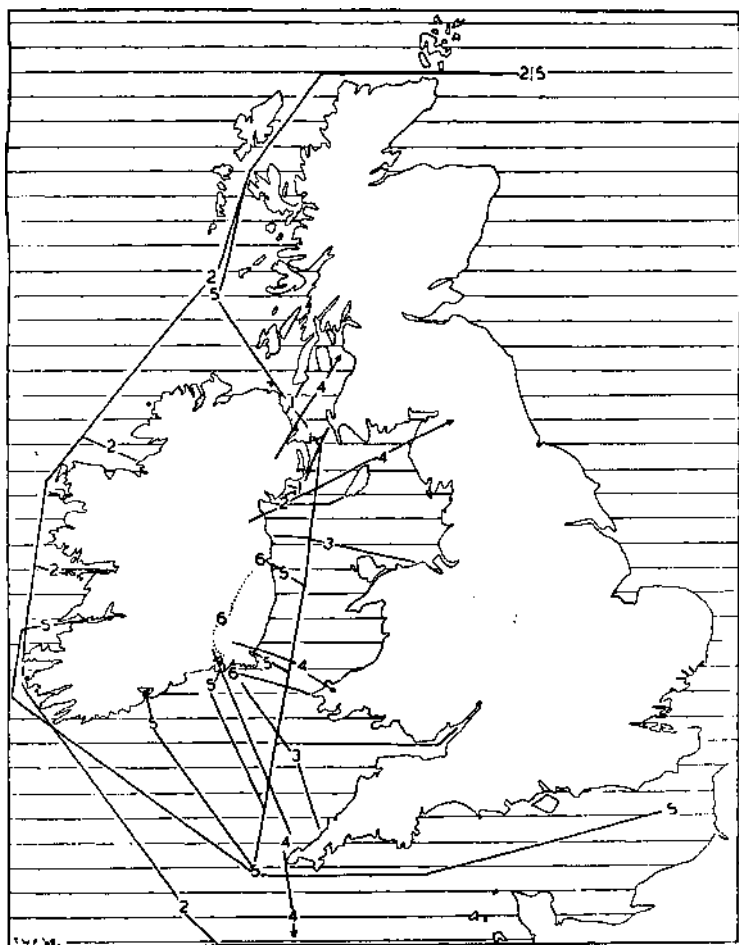


FIG. 14.—SPACE RELATIONS OF IRELAND

The mainlines of overseas movement affecting Ireland are shown diagrammatically: 1, Mesolithic; 2, Neolithic; 3, Bronze Age; 4, Age of the Celtic Church; 5, Norse; 6, Norman.

pine became dominant, with elm and oak in the later stages as the climate improved towards its optimum around 4,000 B.C. The land emergence of Boreal times probably extended to the present 20-fathom line, but it is impossible to say whether the land-connection with Britain was complete. The sites chosen by the first settlers, and not now submerged or lost, include many open beaches, especially those rich in flint derived from the chalk of northeast Antrim and spread by ice along the present eastern coastlines. Down and Antrim have the main traces of Mesolithic occupation and consequently the name *Larnian* has been proposed for the culture associated with northeast Ireland, southwest Scotland and nordiwest England. Traces of occupation of Mesolithic affinities also occur along various rivers, notably the Bann, and on various sandhills, but many of these are of much later date than the Boreal phase and some communities, regarded as epi-Mesolithic, remained at a primitive level, living mainly by fishing, collecting and possibly fowling until the early part of the Christian era. The whole story of the Mesolithic Age and its long survival as a primitive cultural relic into later ages cannot be told until more excavations reveal its full extent: so far, the northeast stands out as an area of special importance.

Around 5,600 B.C. the Atlantic climatic period, which covers three millennia, began: in its earlier stages conditions became warmer and moister, so that a climatic optimum was reached somewhere between 4,000 and 3,000 B.C., after which cooler conditions returned once more. The sea rose above its present level and forests were thicker than ever before, with pine prominent at first and a mixed oak forest, with elm, birch and alder as significant elements, appearing later. The climate, at once warm and moist, favoured peat accumulation in the many hollows left between the various glacial and glaci-fluvial deposits, many of which were fenlands under the earlier and somewhat drier climatic regime. The Atlantic period was followed by the cold, dry sub-Boreal phase, in which peat accumulation was arrested (2,500-750 B.C.), and trees, including pine, grew on the drying bogs, in some of which various relics of the Neolithic and Bronze Ages have been discovered beneath a further layer of peat accumulated during the sub-Atlantic phase, in which wet oceanic conditions prevailed once more. The epi-Mesolithic culture, as noted above, survived through all these phases, but the arrival of Neolithic settlers sometime around 2,000 B.C. (probably earlier) is of vastly greater importance, as it marks the time when Ireland was opened to immigrants from several parts of Europe and assumed its significant position on the Atlantic seaways of Europe.

Ireland has a remarkable variety of megalithic monuments, many of which were built long after the first megalithic settlers arrived and even,

it is suggested, in the late Bronze Age. Exact mapping has shown that the horned cairns found in the north are comparable with those around Solway Firth, in the Clyde area and also in the Isle of Man. Farther south chambered cairns are found, notably in the Boyne valley, and at Baltinaglass hill, on the west side of the Wicklow mountains, which are comparable with those of Caithness. Various derived forms occur, such as the 'lobster claw' type, which is related to the horned cairns of the north, and there are also many simple dolmens, apparently late and degenerate forms. It is clear that the megalithic people came along the Atlantic sea route, possibly both direct from Brittany and even Spain, and also from Great Britain and the Isle of Man, and the actual routes of entry probably included various estuaries and bays around the coast, and not least Sligo bay and Carlingford lough, both of which have numerous megaliths in the vicinity. Galway bay and the Aran islands should also be noticed, as they too lie in an area with a remarkable number of megaliths.

Stone circles and standing stones are also plentiful in Ireland, but generally of uncertain age, though an excavation of particular interest at lough Gur, Co. Limerick, has led to the dating of a circle at 1,700 B.C.; a beaker was found on the site. So few beakers have been found in Ireland that this phase of the Early Bronze Age was formerly thought to be of little significance, but it may eventually prove that the beaker people, racially a cross between Nordic and Alpine elements, settled in at least a few places. The first megalith-builders and the beaker people herald the Bronze Age, when Ireland became the focus of a widespread trade in gold ornaments. Although the country is not rich in minerals and its copper and gold mines have long since been abandoned, the copper lodes of West Cork and Co. Waterford, and possibly also those on the eastern side of the Leinster chain at Avoca, were exploited in the Bronze Age, and smelted with tin (imported from Spain or Cornwall) to make bronze. The source of the gold was probably the same auriferous tract of Co. Wicklow, the only Irish locality in which gold has been found in economic quantities in modern times, though as yet few Bronze Age relics have been found in this area. While estimates of the extent of occupation can only be speculative, the Bronze Age saw the emergence of Ireland on the European scene, still closely linked with the Atlantic sea routes, preserving its megalithic traditions and, without question, having an increasing population.

In the later phases of the Bronze Age, around 750 B.C., the sub-Atlantic climatic phase, a time of damp weather conditions, replaced the drier sub-Boreal phase, and peat accumulation became important once again not only in the west of Ireland but also in the drier centre and east, where **many hollows have been steadily filled up with peat, sometimes of a**

fenny nature, to this day. Many crannogs originally planned as lake dwellings are now completely surrounded or covered by bog, which has buried numerous other prehistoric relics such as implements, and even more substantial evidences of occupation such as roads built of logs in the Bog of Allen and elsewhere. One example of a road in the Bog of Allen was ascribed tentatively to the Bronze Age, as a bronze spearhead was associated with it. Iron probably came to Ireland about the beginning of the Christian era, though relics of the Iron Age are singularly few: at this time the population included people whose equipment was still characteristic of the epi-Mesolithic, Megalithic and Bronze Ages, and Ireland lay beyond the easy reach of the invading hordes of Iron Age people who spread from continental Europe to the English Lowland.

The Roman legions never landed in Ireland, though Agricola, in A.D. 81, contemplated an invasion with a force of only one legion and auxiliaries, certainly an underestimate of the force he was likely to need.⁵ Before the end of the second century, and still more during the third and fourth, the menace of raids from Ireland impelled the Romans to fortify parts of the Welsh coast, much as they fortified sections of the east coast against the Saxons or kept a guard on the Roman wall against incursions from Scotland. By the beginning of the fifth century, people from Ireland, the *Scotii*, were established in some strength both in north and south Wales, in Cornwall and in Argyll, but there is little trace of these settlements in the next two centuries, and it is not certain whether the people were expelled or absorbed. All the evidence suggests that the population of Ireland must have increased steadily during the prehistoric ages, and it is not improbable that considerable numbers of refugees, escaping from the Romans and later from the Saxons, went to Ireland and that a number of slaves, some of whom were Christians, were taken across the Irish sea.

THE AGE OF THE CELTIC CHURCH (AGE OF THE SAINTS)

At no time is the distinction between the western section of the British Isles and the eastern clearer than this, the traditional golden age of Irish history according to many of its people.⁶ The eastern lowland of Britain received the Anglo-Saxon hordes, but the west was Celtic and Christian and from the Irish Church missionaries penetrated all parts of Europe. The church in Ireland received no shock comparable with that of the heathen Anglo-Saxon invasion of the English Lowland, and developed distinct characteristics. The contrast between the Celtic and continental churches centred around the date of Easter and the monastic system. Although the Council of Aries, 314, and the Council of Nicea, 325, had given rulings on the date of Easter, the Celtic church kept the older date,

but the controversy became acute only during the sixth and seventh centuries, when contact with the continental churches became general. Similarly the Irish monastic system was a product of isolation; although it is possible that St. Patrick, whose arrival is generally dated 432, was sent to establish the diocesan system, every early Irish church was monastic. A few of the Irish churches date back to the fifth century and many more were established during the following centuries. Some of the 'saints' founded several churches to form a *paruchia* which might be scattered over the whole country, though many were associated with the *tuaths* or smaller political units of the times (on these see p. 88). Again, many of the churches were in remote places, including rocky islands off the coasts of Ireland and Great Britain, and before the end of this missionary phase the churches of Irish monks were established in all parts of Ireland, in Great Britain, and in many parts of the continent: for example, the work of evangelisation carried the Irish into southwest Germany, where the people were still pagan during the seventh and eighth centuries, and through the Frankish domains from the seventh century onwards.

There is an apocryphal element in some of the stories of Irish saints, and not least of St. Brendan, who was associated with Clonfert and lived during the sixth century.⁷ St. Brendan visited a number of luxuriant islands, long celebrated as the Fortunate Isles or Isles of the Blest, sojourned for a time on one of them, and, it is said, reached a coast whence he penetrated the interior by a forty-day journey, halting on the banks of a great river in a land of fruit and gems. He saw volcanic action, thought he was viewing the infernal regions, and observed, according to one account, Judas in perpetual torment. The narratives point to the possibility that St. Brendan reached Madeira and neighbouring islands, but the wanderings of the saint were sufficiently extensive for him to view icebergs as well as tropical islands set in warm seas.

In time the association of the Celtic church with the older date of Easter made their missionaries less welcome, and the clash between Celtic and orthodox views came to a head at the Synod of Whitby, 664; but the conflict between the missions of the Celtic Church and those of St. Augustine, spreading from Iona and Canterbury respectively, failed to deter the missionaries from their enterprise both in Britain and on the continent. The Venerable Bede (c. 672-735), himself working in a diocese where Celtic Christianity had been powerful, wrote of the constant contact between Ireland and Britain. Some of the wide influence was achieved by the successors of St. Columba at Iona, with which Durrow, Kells and Derry were associated; at one stage missionaries from Iona were the dominant influence in Northern Ireland, Scotland and Northumbria.

The learning and art of the monastic churches has been studied by many workers, who have shown the singular perfection of Celtic forms, notably on the crosses still preserved beside ancient churches. Kenney writes of the secular literature as the 'mental revelation of an early Mediaeval people, practically unmodified by ecclesiastical control, in which primitive, pre-Christian and pre-Roman elements are mingled.'⁸ During the ninth century Irish influence in European scholastic circles reached its height; many of the exiles were teachers of grammar or scribes, and the surviving manuscripts include the book of Kells, in which the gospels are copied with an endless wealth of exquisite scroll-work. How far the monastic church influenced the life of the people remains obscure, though some of the monasteries were surrounded by small communities of people, and in time some of the abbots became lay lords, whose family held the office from one generation to another, with the monks as farm labourers. The relation between the ecclesiastical and secular authorities is also obscure, though there are indications that the local ruling families commonly held control of the monasteries, at least in the later phases.

During this phase, and for some centuries before and after, Ireland was politically organised into a number of *tuaths*, which were in effect small states,⁹ probably about eighty to one hundred in number, which tended to form associated groups under the leadership of one particular state in the group: Irish life was not tribal, for the *tuaths* were in effect political divisions administering laws through their own judicial and executive organs. Citizenship was given to those holding property in land, to men of learning including clergy, and to those versed in the liberal crafts such as housebuilders, chariot-makers, the builders of ships and boats, harpers but no other musicians, and to many more, but not to tenants, craftsmen, strangers and those defying the laws. The laws were those of Ireland, but their administration was through the local assembly over which a king presided: he was also the commander of forces in war and a judge in the public courts. A source of weakness was the elective system by which a new king was chosen from any son, grandson or great-grandson of a former king, or in other words descendants of one great-grandfather: not unnaturally this tended to split up the royal family into several rival factions. There were no standing armies except possibly during the third and fourth centuries A.D., and the long resistance of the *tuaths* to the Norse and the Anglo-Normans was sustained by civilian levies. In social organisation the *tuath* was vastly different from the city-state of the Mediterranean, for, O'Neill says, 'the Irish state remained a rural city, a city of the fields. Its chief occupation was agriculture, and all its magnates were agriculturists/

The combination of *Etuaths* into groups probably formed the basis of the provinces: thus *Dal Cuinn*, the division of Conn beyond the Shannon, was the foundation of Connacht, and one of its families held the high kingship of Ireland from c. 404 to 1002.¹⁰ This kingship was centred at Tara, Co. Meath, on land wrested from *Laigin* (Leinster) and possibly *Ulidia* (Ulster) to make the kingdom of *Mide* (Meath), which consisted of the eastern part of the Central Lowland, in what is now the counties of Meath, Westmeath and Longford. It is commonly said that many of the early roads centre on Tara and wind across the eskers of the Central Lowland, but exact confirmation of their courses is generally lacking, and the word 'esker' does not, as commonly supposed, itself mean 'road,' but merely a ridge or elevation.*

In many ways the age of the Celtic church presents a picture of a civilisation of distinctive quality developed in an insular environment which, by its remoteness, was able to preserve ancient traditions and to build something with a quality of greatness. Sir Cyril Fox's point about the continuity of tradition in the Atlantic world is apposite here: never was the conservatism of Ireland more thoroughly seen than at the Synod of Whitby in 664. Even so, the civilisation did not keep itself to itself, for never were the Irish more eager to spread their religion and learning. The shock of external contact came later. Irish monks remained on the continent of Europe at several famous monasteries, including Ratisbon, Wurzburg, Nuremberg, Constance, Vienna and many more, but eventually they were replaced by Germans or others: at Ratisbon, the last Irish monks were ejected in 1515 on the ground that the monastery was founded by the Scotii who must, it was argued, have come from Scotland and not from Ireland.

THE NORSE INVASION AND SETTLEMENT

The Norse peoples, coming both from Denmark and Norway, arrived off the Irish coasts around 795, and for two centuries they plundered monasteries and spread ruin through large parts of the land; sailing up the rivers in their long-boats, they established themselves at times in suitable bases such as estuaries and inland waterways, among which lough Neagh was important.¹¹ Several of the monasteries were sacked by the Norsemen on numerous occasions: thus, there are records that Armagh was sacked at least nine times, Clonmacnoise ten, Kells five, Glendalough four, Lismore six and Kildarc sixteen: the Round Towers in Ireland were probably built to defend the churches, to store treasures, to watch for invaders, and, in times of peace, to serve as belfries. The aims of the Norse

* Quin, E. G. and Freeman, T. W., 'Some Irish Topographical Terms,' *Irish Geography*, vol. 1, No. 4, 1947, pp. 86-87.

peoples were partly to acquire loot, but their attacks, though savage, were intermittent, and the Church was by no means submerged either at home or abroad, for many Irishmen still went to continental Europe during this phase, though they were teachers of grammar and scribes rather than ascetic monks: the saint had become the scholar. Ireland was hindered in its resistance to the Norse peoples by the lack of any unified control, for the High Kingship existed more as a symbol than as an effective controlling force, but the Norse peoples settled down as traders and Christians rather than as pirates and pagans, and in time were absorbed into the general population, as elsewhere in Europe. Although the tales of their ravages come from every part of Ireland, their final settlement was limited to small kingdoms around Dublin, Wexford, Waterford, Cork and Limerick.

The Norse kingdoms of the ninth and tenth centuries include the four major ports in central and southern Ireland, Dublin, Waterford, Cork and Limerick. All these ports were trading centres beside a river, on sites not unlike that of Copenhagen, which originated as a wharf beside a sheltered creek: in Dublin ships used the Dodder estuary at Ringsend and a riverside wharf on the Liffey near the centre of the city; at Cork, a creek between two islands in the Lee (see p. 355); at Waterford, the confluence of the St. John's river and the Suir (see p. 325), and at Limerick, a sheltered haven guarded by the islands on which the older part of the city is built (see p. 403). The Kingdom of Dublin, which appears on a map as a forerunner of the Pale to which the Normans were reduced in their less prosperous phases, controlled the vital crossing of the Liffey in the tidal reaches and for some distance inland (probably as far as Leixlip, the 'salmon leap'), and included two minor river ports, Wicklow and Arklow, and various other havens rarely visited by modern shipping but well suited to the navigation of a thousand years ago.

Only a small part of Ireland was under the direct control of the Norsemen in the early years of the eleventh century, and the remainder was divided into 'kingdoms' which show an interesting relation to the groundplan of the country. Thus, the Kingdom of Ulidia foreshadows the east part of Ulster, and the Kingdom of the North is its westward continuation through varied mountain and lowland country to the western seaboard. Connacht was the land to the west of the Shannon, though Clare was linked with Munster by crossings at two ancient ecclesiastical centres, Limerick and Killaloe. Tributary to Connacht in the eleventh century was the Brefni kingdom, which straddled the west part of the great drumlin belt and the plateaus south of the Erne valley. The Meath kingdom, one of the most interesting and persistent in Irish history, covers the Central Lowland from the Shannon to the sea; Meath is not

now recognised as one of the provinces, though the name still survives in the dioceses and in two counties. The Leinster kingdom is based on the valleys and surrounding lowlands between various mountain ranges, and its major rivers are the Slaney, which alone pierces the Leinster chain, the Barrow and the Nore: with the last of these the kingdom of Ossory is associated. Finally, Munster consists of the east-west ranges and lowlands that extend from the neighbourhood of Waterford into the magnificent peninsulas and bays of Kerry, together with the less attractive and generally low-lying country around the long dreary estuary of the Shannon, with Clare.

The impact of the Norse people on Ireland is difficult to assess, and much of the tradition centres around the plundering, of which it has been written, 'From the fury of the Northmen, Good Lord deliver us.* But in later years they laid the foundations of towns destined to be important for centuries. The 'Ostmen' of Dublin founded Christ Church Cathedral in Dublin, on a ridge beside the Liffey in 1040, and their appointment of a bishop consecrated at Canterbury helped to orient the Church towards the rest of Europe. Some of the monasteries pillaged by the Norse never revived, but others, such as Clonmacnoise, maintained themselves and their monastic tradition: the craftsmanship achieved a new perfection during the Norse period both in stone work, for example the High Crosses of Tuam and Monasterboice, and in gold and bronze working, seen in the Cross of Cong. Architecture was similarly successful, and Romanesque tradition was linked with Irish design to produce such buildings as Cormac's Chapel, on the Rock of Cashel. There was, in fact, the same continuity of tradition that marked previous ages, combined with the first clear signs of town growth: there was also the political instability which made possible the Norman invasion from Wales in 1170, at the invitation of Dcrmot, King of Leinster.

THE NORMAN 'CONQUEST'

At the time of the Norman invasion the *tuaths* were still in existence and life in Ireland was essentially rural, for towns were unknown to almost all the population except in the vicinity of the Norse centres. The Irish used most of their land as rough pastures, and had improved very little and cultivated still less, though they had crops of wheat, barley, rye and flax: possessing several arts, they found idleness more attractive than work as a general rule. In the Church an effort was made to divide the country into dioceses, but contemporary accounts say that the clergy still preserved their monastic traditions rather than a more pastoral and organising outlook, and were in fact given rather to the life of contemplation than to the improvement of their flock.¹²

The Normans failed to make Ireland into a single kingdom, though from the beginning of their invasion they recognised the strategic importance of Dublin, which submitted to Strongbow within a few weeks of his arrival in the late summer of 1170. Dublin was given its first Charter in the winter of 1171-1172, under which the city was to be inhabited by men from Bristol, with whom there were already considerable commercial contacts: the early records suggest that Dublin had inhabitants drawn from several other towns as well, who settled on the south side of the river within the old walls, while the survivors of the old Norse population moved across the river to a suburb known as Villa Ostmanorum, or Ostmanstown, a name still surviving as Oxmantown. Various strategic points were fortified by motte-and-bailey castles and by more permanent strong structures, and the Normans established themselves firmly in the old Norse centres, Waterford, Wexford, Cork and Limerick, and in various other places including New Ross, Kilkenny, Carlow, Arklow, and many more that are still important market towns. Having these bases, the Normans hoped to conquer Ireland through the great Anglo-Irish nobles, but in time many of their lordships became virtually Irish, and the English kings were never able to secure the measure of unity and control that they established in the English Lowland.

During the thirteenth century, Anglo-Norman power spread through the country leaving, however, many areas unsubdued or owing merely nominal allegiance to the Crown. The area most effectively controlled was Leinster, though even here the Wicklow mountains remained unconquered and the country now known as Leix and Offaly preserved its independence. Munster had lordships based on the valleys and the lowlands of the south around Cork, and the Decies covered what is now Waterford: a kingdom of Limerick extended into what is now Kerry. The de Burgh family fought for Connacht from 1201 with varying fortunes and established the town and castle of Galway against the attacks of the 'men of Connacht'; this town, the 'key to all Connacht,' was walled from 1270 onwards and became a lone outpost of English influence, differing in language and culture from the surrounding country but able, through its strong strategic position, to maintain itself as an important town through every stage of historical development.

The Anglo-Norman lordships were strongly held until the early fourteenth century, but the Gaelic chiefs, aided in their designs by the quarrels of Norman families, were gradually able to regain parts of their former territory. There was no effective anglicisation of the country, nor was there any centralised force to subdue rebellion and, even more important, the Normans were adopting Irish customs. Neither the English language nor the English law was known in the greater part of

Ireland. The Statutes of Kilkenny, 1366, endeavoured to present further absorption of the English by the natives, and the preamble states that 'now many English, forsaking the English language, fashion, mode of riding, law and usages, live and govern themselves according to the manners, fashion and language of the Irish enemies, and have also made divers marriages and alliances with the Irish enemies aforesaid': it was therefore enacted that the English should not adopt Irish customs, should speak English only, marry wives of their own nationality, and that, in the part of the country controlled by the English, no Irishman could become a beneficed clergyman. The 'land of peace' envisaged in these laws was the counties and liberties of Louth, Meath, Trim, Dublin, Kildare, Kilkenny, Carlow, Wexford, Waterford and Tipperary: here alone, it then seemed, was there any hope of maintaining the English ruling-class as a strongly entrenched force. Although the laws remained in force for more than two hundred years and were re-enacted on several occasions they failed to establish a social order in which the conqueror and conquered remained distinct one from another, for many of the English were absorbed to become 'more Irish than the Irish themselves.' Not all, however, for Anglo-Irish families still remain a not inconsiderable element in the 'land of peace' and their apartness from the general population has been made sharper by a divergence in religion from the sixteenth century: it is in the area mentioned in the Kilkenny Statutes of 1366 that demesnes or parks are most numerous: here, too, the farm units are larger than in the land either to the north or to the west, and substantial Protestant communities are still to be found (see Fig. 15).

The final refuge of the Anglo-Normans was the English Pale, a strip of country which was based on Dublin and the coast to the north and south, with inland boundaries varying considerably from one time to another: in times of weakness it was hardly more than the modern county of Dublin, but in times of strength it reached far into the lowlands to compass part, if never all, of the 'land of peace.'¹³ At the beginning of the fifteenth century the English lordship had almost ceased to exist, and Ireland was under the control of a Gaelic and Norman aristocracy, with only a few eastern counties as a relic of the 'land of peace.' The Kilkenny Statutes were hardly observed at all, and even the English ecclesiastics were reported to be in full flight, especially from the counties of Wexford, Waterford, Kilkenny and Louth, the very areas where the spread of English customs and culture seemed most probable. In 1435 it was said that the king's writ hardly extended more than thirty miles from Dublin, and that beyond this enclave the power lay with 'enemies and rebels': some thirty years later the Pale was defined, apparently for the first time, as the counties of Louth, Meath, Dublin and Kildare, but in fact it was

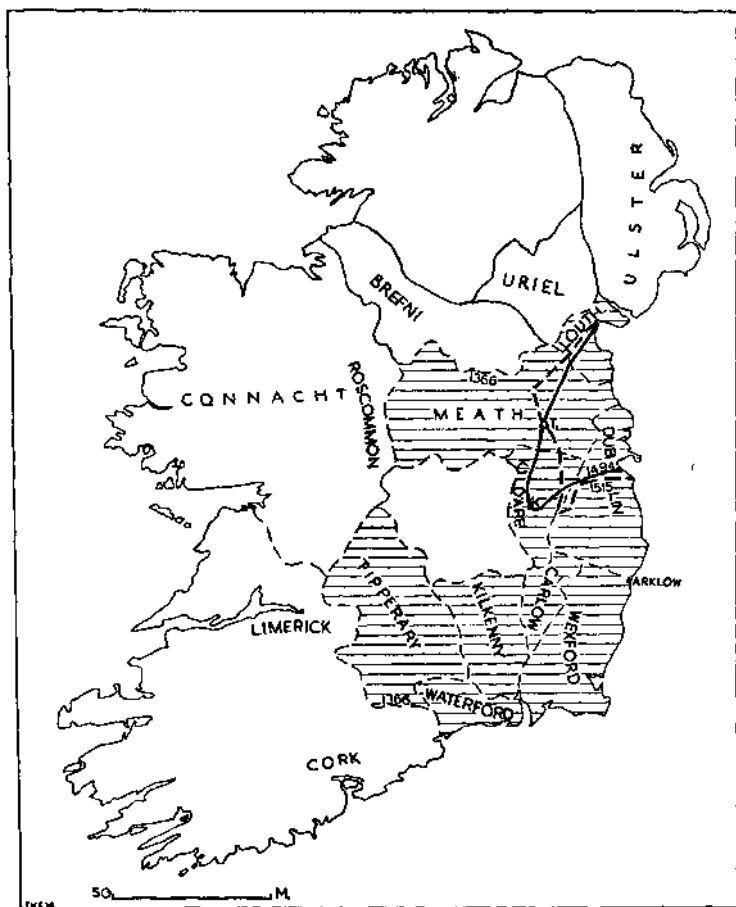


FIG. 15.—THE 'LAND OF PEACE' AND THE ENGLISH PALE

In 1366 the Statutes of Kilkenny aimed at establishing the 'land of peace' in nine counties. With Meath is included the liberty of Trim and the modern county of Westmeath. The boundaries shown here are only approximate; the town of Arklow was allied to Kildare in the fourteenth century, and no county of Wicklow existed. At no time was the 'land of peace' effectively held throughout the area shown.

Thanks are due to Dr. Jocelyn Otway-Ruthven for assistance in the compilation of this map and also of Fig. 16.

considerably smaller. Even the Pale was not secure, for many Irish ways prevailed there too, and raiders entered it to steal cattle. In 1494, after the Tudors had been in London for nearly ten years, it was suggested that the Pale should be protected from insurgents by a double ditch, to run from Dublin to Kildare, and thence northward to Trim and on through Meath to Dundalk (see Fig. 15): in 1515 it was reported that 'the folk daily subject to the King's laws included half of the county of Louth, half of Kildare, half of Dublin and half Meath,' of which the last meant the modern county of Meath with Westmeath excluded.

Although the Normans failed as conquerors, the Ireland of 1500 was in many ways different from that of 1170; towns¹⁴ were die great gift of the Normans to Ireland; the first of them were the old Norse or Ostman centres which became royal towns with mayors during the thirteenth century. The establishment of Dublin as a capital city was of particular importance: made an ecclesiastical city by Ostmen, having a Norman charter and a mixed population, a port trading especially with Bristol, situated within sight of the hills but at the seaward end of lowland routes from all over Ireland, it became the great political, economic and social centre of Ireland, but always more cosmopolitan than the country as a whole, as London is in England or Paris in France. The other towns were less securely entrenched in the life of the country, and of those shown in Fig. 16 a number have perished or failed to grow, partly because the ancient custom of selling goods at rural fairs allowed the 'enemy,' according to an Act of 1431, to 'take great customs and profits to the depression of the boroughs and the trading towns.' Some of the Norman towns, however, have had a continuously successful career since they were founded: thus, the west coast towns, such as Galway, Limerick, Tralee and Dingle, had a strong maritime trade with France and Spain, from which wines and cloth were imported in exchange for wool and hides. Fig. 16 shows that towns were most numerous in the southeast of Ireland, and a comparison with Fig. 24, p. 139, will show that this is still the case, though in the twentieth century Ulster has a number of towns depending on industry, of which some were established in Tudor and Stuart times. There is considerable evidence that in time the Irish conquered the towns by infiltration, and it is reported that Irish was heard more frequently than English in the streets of Galway during the reign of James I. The names of families prominent in Galway include Lynch, Kirwan, Nolan, Fallon and Tully in Galway around 1350, and the effort to keep the Irish and English apart failed in the end, so that no meaning was left in bye-laws stating for example that 'no O' or Mac (shall) strut or swagger through the streets of Galway.'

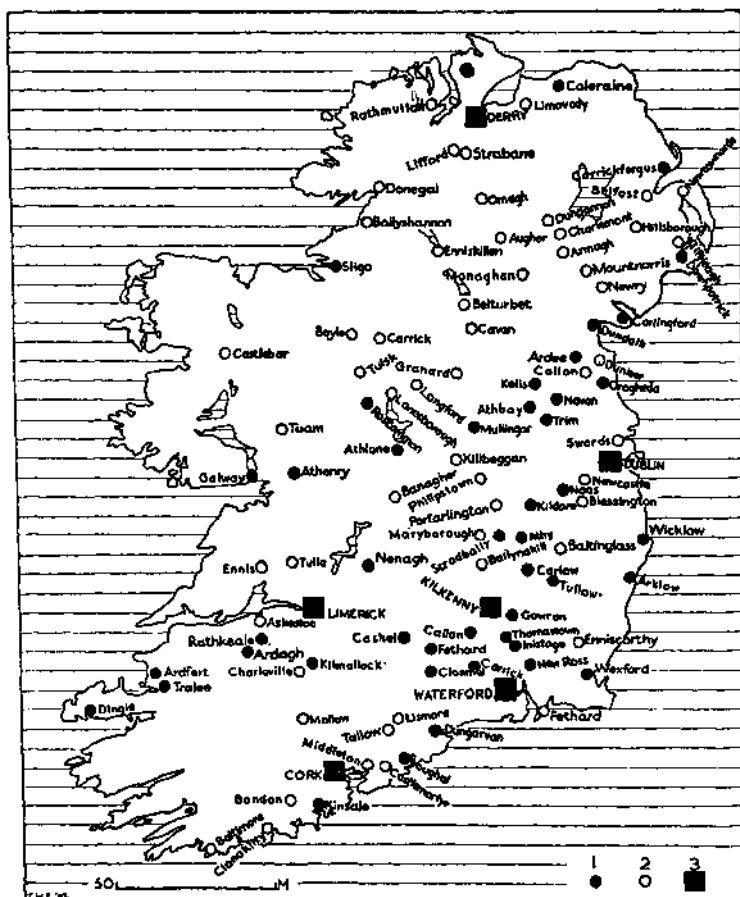


FIG. 16.—TOWNS IN IRELAND

1, Norman foundations; 2, Tudor and Stuart foundations; 3, Cities.

For sources, see note 12, p. 114. There is a list of southwestern towns in Orpen, G. H., *Ireland under the Normans*, vol. 4, p. 49; see also Moody, T. W., *The Irish Parliament under Elizabeth and James: A General Survey*,¹ *Proc. JR. Irish Acad.*, vol. 45 C6, 1939, pp. 41-81.

Most of the towns shown had charters, but there were many more mediaeval towns not included, of which a large number have little importance today. Some shown here are now mere villages, but most of the major towns are included; the towns of Ulster are mainly associated with the plantations.

THE TUDOR AND STUART PLANTATIONS¹⁶

In 1500 Ireland's veneer of urban settlement, though important in the country's trade, was an insufficient basis for the political and commercial integration that the Tudor monarchs had in mind, yet a county organisation covered most of the country and the dioceses were well-established units comparable, if not exactly identical, with those existing today. The impact of the Anglo-Norman phase of occupation was seen most fully in some of the towns and around some of the strongholds of the nobility in Leinster and Minister, and least clearly in Ulster and Connacht. From Tudor times onward the effort to conquer Ireland was made more firmly than before, either by the conciliation and anglicisation which some thought possible or by war. Henry VIII hoped, at least before the effects of the Reformation were seen, to win the country by a natural process of pacification in which the chiefs were to give their allegiance to the Crown in return for titles to the land and English law. At first the towns were loyal to the Tudors, as their citizens expected greater trade, security from the predatory attacks of the Irish, and the maintenance of the privileges granted in their Charters at the beginning of the sixteenth century: at this time Dublin and several other towns were said to be 'adorned with fine buildings, prosperous, secure in their mediaeval guild organisation, and in every way comparable with the major towns of England.'

The Plantations brought new elements into the population of Ireland even more surely than the Anglo-Norman settlement, for one of the essential aims was to make parts of Ireland 'Tor ever English' (or Scots in some cases), as civilised nuclei of a country ruled by the Crown. Hardly less important was the establishment of many new towns of which some acquired Charters, especially under the Stuarts, and the rehabilitation of many old centres. In some ways the plantation was feudal in conception and designed to attract people to settle down as farmers rather than to wander over large areas with their cattle. The only Irish villages were clusters of houses around mansions or churches, and the houses were made of rods or wattles plastered over with clay and covered with straw, in effect circular huts supported on poles, with no window, but a hole in the roof to let out the smoke from a fire on the floor. Some of the historic sites were neglected and even Armagh was reported in 1586 to be a 'small village near the church and friaries' which were 'Tor the most part broken or neglected.'

PLANTATIONS IN LEINSTER AND MUNSTER

Leix and *Offaly*, immune from direct Norman influence, were among the first parts of Ireland to be planted, and their now-abandoned names,

Queen's and King's county respectively, commemorate the making of the two shires under Philip and Mary in 1556 on lines similar to those of their neighbours, Meath, Kildare, Kilkenny and others. Parishes were formed and the main centres were to be 'Tor ever' Maryborough (Leix) and Philipstown (OfFaly). But in 1575 it was said that now both counties are much spoiled and wasted, by the race and offspring of the old native inhabitants which grow great and increase in number; and the English decay, both in force and wealth, and are not of ability to answer their rents and services, but let their land to Irish tenants.' The main danger came from the O'Moores of Leix and the O'Connors of OfFaly, who were banished to the neighbourhood of Tarbet and various other parts of Munster and Connacht in 1608: some fourteen years later, the plantation was said to be successful. As a whole, the Leix and OfFaly plantation showed features typical of others, among them the fear that the whole purpose would be defeated by the settlement of the Irish on land given to the English, the transportation of refractory elements to the west, and the founding of new towns.

The MUNSTER plantation began around 1586, and large parts of the province were divided into seignories, or lots, of 12,000, 8,000, 6,000 and 4,000 acres, to be held by the 'undertakers,' together with various common lands. The various attractions laid before the settlers included descriptions of the fertile soil 'apt for wheat, rye and barley,' the abundance of good timber, deposits of ironstone (ore) and lead, delicacies such as oysters, mussels and cockles, all kinds of edible birds including wild swan, cranes, pheasants, partridges, quails and woodcock, and a cost of housekeeping less than one-quarter that of England. The whole account, which was written in 1590 by Robert Payne, an undertaker in Co. Cork who hailed from Nottinghamshire, reads like the prospectus of any new company exploiting virgin resources, but other accounts suggest that the new settlers were not always fortunate, and also that Ireland became a bolt-hole for undesirables. In 1588, one of the Pembroke family said that 'our pretence in the enterprise of plantation was to establish in those parts piety, justice, inhabitation and civility, with comfort and good example to the parts adjacent . . . our drift now is, being possessed of land, to extort, make the state of things turbulent, and live by prey and by pay.' Many of the undertakers would not let land to settlers for a period of more than twenty-one years or three lives, and found it profitable to let land to Irish tenants who were generally willing to pay higher rents, but the 'better kind,' it was said, really tried to plant their territory with Englishmen, who were drawn in many cases from Dorset, Somerset, Devon, Lancashire and Cheshire.

Two men of renown, Sir Walter Raleigh and Edmund Spenser, were

among the undertakers: the former was conspicuously successful and the latter not, though he wrote very attractively of the countryside in which he lived for some years. Raleigh acquired various lands in Co. Waterford, and subsequently added 40,000 acres in Cork, Tipperary and Waterford, including the town of Youghal, already a port, and the salmon fisheries on the river Blackwater. In 1604 he sold those lands to Sir Richard Boyle, 'the first and great earl of Cork,' who rebuilt various towns, and founded the frontier towns of Bandon, Clonakilty, Enniskean and Castletown to hold the settled country against the Irish of West Carberry (Co. Cork) and Kerry. The Earl employed some hundreds of workmen and 'created several corporations of Protestant English traders.' Spenser had a much smaller estate of some 3,000 acres in Co. Cork and lived in an old castle at Kilcolman, three miles from Doneraile. In 1598 he complained that the settlers had been attacked by the Irish, and that they had adopted the ways of their persecutors to become predatory in their turn: his Memorandum to the Queen said, 'out of the ashes of desolation and wateness of this your wretched Realm of Ireland, vouchsafe most mighty Empress our dread Sovereign, to receive the voices of a few most unhappy ghosts . . . which lie buried in the bottom of oblivion, far from the light of your gracious sunshine. . . .' Gloriana, it seems, was too far away, and Spenser, after his house was burned, retired first to Cork and later to London.

At the beginning of the seventeenth century, the most advanced parts of Ireland were Leinster and Munster: the Pale had some timbered houses in the countryside and a number of towns, and the remaining areas of these two provinces had several walled towns and cities, a number of minor towns and a considerable export trade, especially with Spain. An account of 1611 shows that the major ports were Dublin, 'to which all the kingdom resorts'; Waterford, the next in importance, but with only one-third the trade of Dublin; Cork, Drogheda, and Galway, three towns of approximately equal commercial importance; New Ross 'a poor ruined town out of trade': Dungarvan, 'a very poor fisher town,' Youghal and Kinsale. Much of the export and import trade was conducted through London, Chester and Bristol: the exports included hides and skins, timber, tallow, fish, flax, leather, wool, linen yarn and frieze (homespun), all of which may be grouped as raw materials or the surplus of domestic industry. The imports included wine (always prominent), iron, salt, spices and a wide variety of manufactured articles including pewter, textiles (notably silk), groceries and ammunition. There was spinning and weaving in the towns and some domestic production of yarns and cloths.

ULSTER UNDER THE TUDORS AND STUARTS

Ulster in the sixteenth century had very few towns, though a number of Anglo-Norman castles and some ancient ecclesiastical buildings survived, most of them in ruins. In the reign of Elizabeth the Earl of Essex was given the government of Ulster, but he reported that the difficulties of colonising 'this waste country* were almost insurmountable, owing to the opposition of the natives and *the* failure of the 'adventurers* who, 'having not forgotten the delicacies of England and wanting resolute minds to endure travail,' were eager to return home, though some English had settled in Ulster during the reign of Elizabeth as during the Anglo-Norman phase. A survey of 1586 suggests that the whole province was in a primitive state with, however, great agricultural potentialities: in Antrim and Down there had been many immigrants from the western islands of Scotland who had settled along the coasts, encouraged by the O'Neills. In the effort to encourage the immigration of lowland Scots and English, the British Government gave the Mac-Donnell a large part of Antrim, defined as *die tuaths* between the Bush and the Bann, to which they added the Glens of Antrim and the Route early in the seventeenth century. In Co. Down there was also a tradition of Scottish immigration, and in 1606 the Montgomerys were established in the county: on their arrival the country was so desolate that 'thirty cabins could not be found, nor any stone walls, but ruined roofless buildings, a few vaults at Grey Abbey, and a stump of an old castle at Newtownards.' The Montgomerys brought over smiths, masons and carpenters to Donaghadee and Newtownards, who built houses of stone and humbler cottages and booths with sods and saplings of ash, alder and birch, using rushes for diatch and bushes for wattles. In summer, Donaghadee was only three hours from Port Patrick, and boats crossed two or three times a week bringing more immigrants: within a year the colonists, aided by good harvests in the years 1606 and 1607, were selling grain in Scotland and Newtownards had become an important centre trading with Belfast, then a small but growing town.

The 1586 account speaks of Co. Louth, now included in Leinster, as part of the English Pale, possessing corporate towns at Drogheda, Dundalk, Ardee and Carlingford, but liable to frequent incursions from the interior. Co. Monaghan, which was not included in the Plantation except for some local grants, had 'no buildings, only a few defaced monasteries.' According to an account dating from the middle of the seventeenth century, this county was 'the most poor, barbarous, and despicable in the kingdom,' except for a few areas planted by the Earl of Essex and by Lord Blayney, who founded the town of Castleblayney in 1641.

The plans for plantations under the Stuarts included the granting of lots of 1,000, 1,500 or 2,000 English acres, together with woods and bogs, to undertakers who were to be either English or 'Inland Scottish*' (that is, **not** those from the Western Isles) and servitors, military men who also let out land to tenants. The counties of Down, Antrim and Monaghan were not included in the plantation; of these the first two had a considerable number of immigrants, whereas Monaghan was little influenced by the Scots or English. The counties to be planted were Fermanagh, Tyrone, Donegal, Derry, Armagh and Cavan. The Derry plantation, for example, which began in 1610, was preceded by an appeal to the corporation of London to provide settlers for the enterprise: like several other plantations, it brought numerous immigrants, some of them English, but more of them Scots, and also settled a considerable Irish population on the land. The countryside was described as well-watered (a fact which no one would question), with plenty of fuel available both from the woods and the peat bogs, fit for all kinds of husbandry and for the breeding of horses and cattle, suited to 'English sheep/ with an abundance of wild life, including deer, sheep, rabbits, martens (probably the pine marten, still occasionally found in Ireland), and squirrels. Flax, madder, hops, woad and even hemp could be grown. Fish, especially herrings and eels, abounded, and the rivers were liberally stocked: pearls could be found in the oysters of the Foyle estuary. In all these favourable circumstances, the area to be planted could supply London with beef, pork, fish, rye, barley and beans; the hemp and flax could be made into yarn, cloth and sails for the shipping, and the local stone and wood could meet the needs of the building trade. Moreover, the favourable position of Derry's excellent harbour guaranteed trade with Spain and the 'straits' (of Dover) and Newfoundland. Optimism marks the documents inviting the settlers, caution the recommendation that those who came to view the promised land should 'be led by the best ways' and lodged 'in their travels where they may, if possible, receive English entertainment in Englishmen's houses.'

There was no immediate displacement of the native population in the six counties escheated in 1610, for the aim, similar to that of earlier plantations, was to make islands of British territory as oases of 'civility and religion' in the midst of Irish barbarism and superstition.¹⁶ Some of the land was given to English and Scottish undertakers who settled British colonists on their estates, or to servitors or 'deserving' native grantees who were free to have natives as tenants, or for the support of the Church, chiefly to maintain bishoprics: on these lands the natives were **to** remain. In all, the undertakers, servitors and native grantees numbered only a few hundreds, and the plantation did not remove the

natives from the lands, partly because Ulster was then sparsely populated. The natives who remained were, however, reduced from the status of proprietors to that of 'tenants-at-will' though they were driven off the more fertile land only gradually, and that more by economic forces than by state policy. While there was some transference of population, expulsion was limited to the 'swordsmen' or armed followers of the Irish lords who were in theory sent to Munster and Connacht but in fact went mainly into the various remote fastnesses within the Ulster province. From the British point of view the plantations in Ulster, as in Leinster and Connacht, were only partially successful, as they failed to subdue Ireland: the more difficult years of Anglo-Irish relations still lay in the future, which held in store both the Cromwellian settlement and the Penal laws.

Cromwell confiscated more than half the whole area of Ireland for his soldiers and settlers, the Adventurers, who in many cases sold their debentures to speculators and returned to England, like many more before them. It was in this phase that transfer to Connacht and other parts of the west became more serious: it was in this seventeenth century that the last traces of the old Irish *tuaths* disappeared: it was now that a new landlord class was installed in Ireland, and the power of the old Catholic landlords was finally broken.

According to Petty,¹⁷ the 'profitable area' of Ireland in 1670 was 18,750 square miles, about three-fifths of the whole island, of which the new Cromwellian settlers had 7,000 square miles, the Catholics 5,500 square miles, and the older Protestant settlers the rest: the estimated population was 1,300,000 (but probably more), of whom 800,000 were Catholics and the rest Protestants, chiefly Presbyterians and Anglicans. Petty's estimates show that the land was more thoroughly occupied than at any previous period, though his 'profitable area' probably consists rather of land regarded as potential farmland than land actually exploited. Having undergone an agrarian revolution in which more land was settled than ever before, Ireland was ready for a commercial expansion, prevented partly by the Navigation Acts which, in 1663 and 1670, forbade direct Irish trade with the colonies and canalised her overseas commerce through England. The cattle trade with England ceased in 1667 and not long afterwards, in 1691, the Penal laws against the Catholics made the relations between the Church of Ireland and the remainder of the population still worse. The aim was twofold: to maintain the dependence of Ireland on England and to establish the immigrant aristocracy which had been planted in the country and enriched with the greater part of its landed wealth. Of the economic arrangements, Dean Swift said: 'Burn everything from England except her coal'; of the Penal

laws, Burke said: 'It was a machine of wise and elaborate contrivance, and as well fitted for the impoverishment and degradation of a people, and the debasement in them of human nature itself, as ever proceeded from the perverted ingenuity of man.'

ARTHUR YOUNG'S IRELAND¹⁸

Arthur Young's travels and residence in Ireland covered the years 1776-1779 and one merit of his work was his ability to see Irish life through the eyes of people at various social levels. He was not blind to the poverty of large sections of the population and suggested that the gentry might usefully employ more men on their too-abundant acres and allocate holdings to various families; he had actual experience of land settlement on the Kingsborough estates at Mitchelstown, Co. Cork. This problem is still acute, even after more than fifty years in which the Congested Districts Board and the Land Commission have possessed, and used, considerable powers of acquiring land for redistribution among the landless and those in need of additional acres.

The period of Young's sojourn in Ireland antedates the French Revolution, which spread radical political ideas and created new trading conditions throughout Europe; it also precedes the era of the Corn Laws, 1784-1846, which induced Irish farmers to till increasingly large areas of land to supply wheat to Britain, while themselves living on a diet in which the potato figured prominently. Young saw the beginnings of an arable expansion, which he regarded as in some ways against the best interests of the country, though he advocated with emphasis and maddening reiteration the cultivation of turnips for the winter feeding of livestock. The export trade in 1779 was chiefly of agricultural raw materials, and was growing steadily in volume under the stimulus of increasing demand in Britain. Industry was still primarily domestic, though there were a number of small-scale factories in various towns supplying the home market; of the industries, linen and wool figured in the export trade. The first signs of the industrial age were seen in the various canal projects and the improvement of the inland waterways, the expansion and reconstruction of various towns and the mounting interest in the supposedly considerable coal deposits of the country: there was also an increasing population, though emigration, it was said, drew off a number of the more adventurous elements. Young saw Ireland at a time when hope seemed reasonable and there was little to suggest the Famine conditions experienced seventy years later. True, the social and economic advance of the Roman Catholic majority, estimated by Young to be about four-fifths of the entire population, was impeded by the application of the Penal laws, though many recognised the futility of any continued

attempt to convert, or alternatively to subjugate, so large and unconquerable a section of the population. Young's picture of Ireland is therefore at once gloomy and optimistic; depressing conditions are painted faithfully and no class of the population escapes censure. The government is blamed severely for its 'interference/ commercial interests in both Ireland and England were shortsighted and selfish, but probably a reasonable mind would prevail among many in the end, with new towns occupied by workers in factories, more overseas trade for the ports, not to mention the widespread expansion of turnip fields, better crop rotations, improved cattle breeding and other ameliorations. But like Sir Robert Kane, who wrote hopefully in 1844 and dismally in 1884, Young died a disillusioned man.

In the late eighteenth century landscape demesnes or parklands figured prominently and in many cases covered at least two square miles, and often considerably more, much of which was in an unkempt condition and of little use except as pastures for the cattle and horses kept by the owner. The natural wealth of the grazing area, which included Limerick, Clare (possibly the east only), Waterford, and Meath, was apparent, but the rich lands in Limerick showed fences, drains, and buildings in ruins, and fields full of weeds, as waste as the mountains of Kerry. In the arable areas such as Louth, Kildare, Kilkenny, Leix and Offaly the industry of the population was more in evidence than in the pastoral areas, but generally the farms were too small and the tenants too poor to make the best use of the land; having no capital, they grew oats and wheat for sale, used teams of weak horses, manured the land inadequately, and possessed very few implements. Many of the houses were wretched hovels, consisting normally of one windowless room with walls of kneaded mud and straw, and the door was the only outlet for smoke. The thatch was straw, potato stalks, heather, or sods of turf: although the worst houses were in Connacht, there were several as bad in Limerick and elsewhere. Young appreciated the vital fact that the lowest economic and social level in Ireland was represented not only in the poorer western districts but throughout the country. He also reported that the farms of the north were even poorer than elsewhere and rarely consisted of more than 10 acres and generally of much less, and the main interests of the occupiers lay in the spinning and weaving of flax rather than the cultivation of the land.

The absence of forests was so marked that 'Baltic fir' was imported for building purposes: 'the greater part of the country exhibits a naked, bleak, dreary view for want of wood, which has been destroyed for a century past with the most thoughtless prodigality, and is still cut and wasted/ In all probability, most of the timber was cut for fuel, either

domestic or charcoal, though some had been cut for profit. Very little semi-natural woodland has survived in Ireland (see pp. 71-74), and most of the present forests, apart from those of the Forestry Commission, have been planted by the landed gentry. Young notes the great success of many recent plantations, which had such trees as larch, beech, Lombardy poplars and oaks, and also comments on the numerous ash trees planted in hedgerows which, however, were never cut but allowed to grow for thirty or forty years, by which time they were full of gaps. Ash trees are still a frequent feature in Irish hedgerows.

Many of the gentry built new houses during this period, and it is fortunate that so many of the stately Georgian houses have survived not only in the countryside but also in the towns, where they housed the middle and upper classes of the population. On the other hand, this age was strangely indifferent to the needs of the poor, who lived in squalor both in town and countryside, their thatched hovels grouped shapelessly together in or near the town or spread planlessly through the countryside. The very desolation and poverty of the countryside encouraged Young to hope for change. The short leases, twenty-one years to Catholics and three lives to others (a form of lease still surviving, though generally with the addition of a certain number of years), gave the tenants little abiding interest in their land, and in the event of eviction they became 'squatters' who built a house *in* a day or two, planted potatoes, and used any available pasture for the animals they brought with them. At the bottom of the farming scale the casual labourer appeared; unprotected by the Poor Law, the wandering families settled in any convenient place, for example under a dry bank where, 'with a few sticks, furze or fern, they make up a hovel much worse than an English pigsty, support themselves by work, begging and stealing if the neighbourhood wants hands, or takes no notice of them, the hovel grows into a cabin/ Young goes on to comment that around Mitchelstown he had often seen a family installed one morning where none was seen the day before, their rough shelter occupied by a man, a woman, six or eight children and a pig.

Some of the labourers employed on a seasonal full-time basis by the gentry were paid primarily in land rather than in money; on this land they grew potatoes and kept a cow, so that their main diet was potatoes and milk rather than bread, though in the north more oatmeal was consumed. The very poor had to hire a patch of land on which to grow potatoes on the 'conacre' system, but those with even 1 acre could grow sufficient to feed a family of eight for a year. Times of stringency there must have been, but Young found the people 'as athletic in their form, as robust and as capable of enduring labour as any on earth.* He adds, however,

that this capacity was carefully reserved for occasions when the worker wished it to be used. In some cases groups of farmers rented a mountain-side and, working together on a co-operative basis, gradually made considerable improvements. Each man had a potato patch for his family, kept a couple of cows, a few sheep, pigs and poultry, and acquired a small cash profit to pay the rent from butter, wool, oats and the sale of a few young cattle and lambs. If possible, the farmers let out some land to the landless on 'conacre*' for growing potatoes and oats, or took in cattle for part of the year. Apparently the farmed area was expanding in both the mountainous areas and the lowlands, and Young held the opinion that it would be possible to provide holdings for a substantially increased population.

The main produce of the farming was pastoral in the late eighteenth century, and there were substantial imports of barley, wheat, oats and flour. Already the arable acreage was expanding in many of the richer counties, chiefly those of Leinster, rather than in the poorer counties where subsistence farming prevailed. Young views this critically, asking, 'Ought you to turn some of the finest pastures in the world into the most execrable tillage that is to be found on the face of the globe?' The corn crops were full of grass and weeds, the harvest a tedious struggle with wet autumns, and manuring was little practised, though some lime or limestone gravel and even shell marls (reported from the Shannon and Wexford harbour) were applied to clay soils. Cattle and sheep were being improved by breeding, partly through the efforts of various landlords who introduced English stock. In 1837¹⁹ it was said that when a farmer in Co. Limerick ploughed up extra land, his neighbours regarded him as a man of sinking fortunes, falling towards the subsistence level from the status of a grazier, and it is clear that pastoral farming is deeply entrenched in many parts of Ireland by custom and respect as well as by factors of climate and soil, such as heavy rainfalls and the wide distribution of heavy clays that nurture rich grasslands but are hard to work for crops.

The industries of Ireland were few during the latter half of the eighteenth century, and the country's imports consisted mainly of manufactured goods. Linen cloth and yarn were the only significant industrial export, and the people of the north had already acquired a skill and tradition that made their wares famous, though as yet the industry was almost entirely domestic. It was the cotton industry that brought factories into East Ulster and, in time, drew the flax workers from their rural homes into drab towns; Young thought that the people would be much happier in towns than on the land. Their farms were used merely to provide a supply of potatoes and oats, a little pasture and the flax

needed for the spinning wheel; 'all the crops are nothing but filth,' and 'agriculture is extirpated, annihilated.' Some people believed that flax should be grown on land already exhausted by several crops of oats, whereas in fact it needs a rich soil plentifully manured; as the linen trade expanded during the century, more and more flax-seed, undressed flax and undressed hemp was imported. Ulster alone showed signs of industrialisation on any large scale in the late eighteenth century; Ulster alone has achieved it since.

Woollen manufactures were declining in the eighteenth century, partly because Britain protected her own production against Irish imports and thereby restricted the Irish producers to the home market. No heavy industries were found in Ireland, and no one foresaw the place that Belfast was to occupy in shipbuilding and allied industries a century later, yet it seemed that the coal resources were considerable and that their exploitation awaited only the provision of capital. No Geological Memoirs existed to show that most of the fields are highly faulted, difficult to work, and in any case contain only a limited amount of coal compared to those of Great Britain. Charcoal was the main industrial fuel of the day, though the "woods were already few and far between, and the Cumberland coalfield had a considerable export trade with Ireland. The iron founders bought ore from Lancashire, or pig iron from Bristol, Chepstow, Workington or Carron (Glasgow): five of the foundries were in Dublin, two at Belfast and one each at Enniscorthy, Mountrath and Newry. Much of the manufacturing enterprise of Ireland was in the hands of traders who kept workrooms rather than factories and sold goods of high quality and fine craftsmanship to the gentry; there is, for example, a tradition of handmade boot and shoe making in Dublin, and the wealthier homes of Ireland generally contain some old Irish silver, furniture and glass of superb quality and design. A few of the factories now operating in Ireland trace their origin back to the eighteenth century.

Roads and canals, with river waterways, were being constructed and improved during the late eighteenth century. 'Presentment' highways were made (see pp. 238-239) with public money, which was also available for the canals. One of these, the Newry Canal, was designed largely to carry coal from the neighbourhood of Coalisland, west of Lough Neagh, to the sea. Most of the canals have wharves, warehouses, hotels for travellers, tollhouses and bridges of neat design, and, near Dublin, rows of elms planted to provide the city with waterpipes. Young was scathing about the route followed by the Grand Canal from Dublin, as it struck through the heart of the Central Lowland instead of proceeding to the coalfields that he supposed to be so rich: there would, lie said,

with undue pessimism, be nothing to carry but turf, and 'who at Dublin would burn that with Whitehaven coals at their present price ?' The public works of the day also included harbours, piers, bridges, churches and schools, of which some have proved useful and many not: those familiar with the Irish countryside will know some harbour that never holds water, and probably never did, or some church for which no congregation ever existed.

Social conditions in eighteenth-century Ireland were marred by the continuance of the Penal laws against the Catholics, which prevented the vast majority of the population from rising above a humble level of society either in the countryside or in the towns, though there were some rich Catholic merchants and shopkeepers. Although these laws were abrogated or allowed to fall into disuse towards the end of the century, the social divisions remained acute and hampered the effective rise of a substantial middle class in both town and countryside. The landlords, some of whom were absentees in England or residents in Dublin, commonly employed middlemen to arrange the letting of land. Not all the landlords were pernicious in their habits, but their power was excessive; 'even in this polished age,' comments Young, 'there are instances of a severe carriage towards the poor.' The sons of the gentry rarely engaged in trade or any other occupation and many of the country houses had a number of relations who were 'idlers. . . whose best employment was to follow a hare or fox.' A more estimable element was the farmer of a couple of hundred acres, in effect the minor country gentleman, who possessed some capital and provided a certain amount of employment. Much of the trade was in the hands of the Protestants, and among the traders there were many whose power of exploitation was considerable, especially in the countryside. The Quakers were 'the only wealthy traders in Ireland,' according to Young, and while this is probably an exaggeration, the Quakers are still a numerically small group of respected citizens, strongly represented in the commercial life of the country. For the rich in the towns, especially Dublin, life was a gay round with many diversions such as theatres, concerts, dinners and overcrowded parties, but for the poor it was a hard struggle in pestilential slums. One section of the population had too much money and the other too little, yet capital was so scarce that industrial activity was insignificant.

The population was apparently increasing sharply;²⁰ Young believed it to be less than 3,000,000, though there are good reasons for believing that it was at least 4,000,000; even so, it was doubled within the period 1780-1845. Many factors favoured an increase, among them the ease with which a family could be fed with milk and potatoes, the pathetic simplicity of the housing, the acceptance of poverty as a fact of life by

the majority of the community and the universality of marriage. This last feature is in sharp contrast to conditions today, when Ireland has a greater proportion of bachelors and spinsters than any other country from which reliable data can be drawn, but the widespread celibacy has arisen gradually during the past hundred years. Young thought that children were 'not burthensome,' and that the happiness and ease of a family increased in proportion to their numbers. *Even* the servants in the great houses were married and had a family somewhere in the rear. Emigration was already a feature of Irish life, especially among the Presbyterians of the north who went to America. Apparently content with little, the Irish increased and multiplied so that Irish workers were available for the growing towns both inside the country and Britain. There was very little immigration except among the professional classes, for labour was cheap and Ireland was therefore a country 'to which no workman in the world ever yet emigrated.'

In spite of all the abuses, the peasantry was by no means as miserable as their slender economic resources would suggest. By nature hospitable, they were tireless conversationalists, their talk lit by humour and wit, and at times also by whiskey; lazy at work, they became spiritedly active in play, and showed the greatest feats of agility at hurling, 'the cricket of savages,' according to Young, but perhaps more comprehensible if described as hockey without the 'sticks' rule. They were warm friends and revengeful enemies, inviolable in secrecy and inevitable in resentment, great liars when convenient, yet outwardly civil, submissive and obedient. The reader is left to judge how far the qualities so assessed by Young survive to this day. One must note, however, the extraordinary tenacity with which the people held to the Catholic faith, and the devotion with which the priests maintained the celebration of Mass throughout the land. Maynooth College, for the training of clergy, was established in 1795, prior to which all the priests were trained in continental seminaries such as Rome, Salamanca and Louvain. Education was in the 'hedge schools,' held in a ditch or other inconspicuous place. But the worst days of oppression were past, and many of the large Roman Catholic churches in Ireland were built before the Penal laws were swept away in 1827: the Church rose to visible strength through the nineteenth century and now commands the allegiance of three-quarters of the population.

THE NINETEENTH CENTURY AND AFTER

The regional geography of any one phase in the nineteenth century could form a profitable subject for a book and it is impossible to do more here than to call attention to some of the major qualities in Irish life during the decades when social, economic and political changes were

rapid and even revolutionary. If one had to choose a few dates as crucial, four would stand out—(a) 1845, the beginning of the Great Famine, which caused the death of almost a million people (one estimate 729,000), the immediate emigration of at least a million more, and the rapid decline of the population from its peak level of approximately 8,300,000; (b) 1870, when the Church of Ireland was disestablished; in the previous year glebe lands were allocated to their tenants as purchasers, an initial and successful experiment which did not, however, involve a large area of the country, but yet demonstrated the possibility of changing the system of land holding; (c) 1891, when the Congested Districts Board began its survey of the poorest districts of the land, as a result of which many demesnes were divided into farms, various roads and light railways were constructed and social amelioration on a wide scale was planned; (d) 1921, which saw the division of Ireland into two political units, Saorstát Éireann (Éire since 1937) and Northern Ireland. Many other dates may seem hardly less significant to readers, not least 1932, when Fianna Fáil came to power in Éire and began a policy of re-industrialisation that has spread a wide range of manufactures through the country, or again, the two great wars which stimulated emigration from Ireland and affected the lives of all the population, whatever their views. As an understanding of many aspects of Irish life demands some recognition of recent developments, the nineteenth century receives some treatment elsewhere in this book, but a short summary may be useful here.

1. *Population Trends*.—Having doubled from 1780 to 1845, the population decreased rapidly to 1891 through famine deaths in the forties, heavy emigration and several minor famines along the western seaboard. Since 1891, the decline has been more gradual, though the country still remains one of emigration, as it fails to absorb the natural increase through excess of births over deaths, around 5% per decade. There is every sign that emigration is still considerable, even though complaints of a labour shortage are numerous (see Chapter VI).

2. *Agriculture and Land Distribution*.—Arable farming was expanding up to the Famine years, and the exports included cereals as well as cattle and dairy produce, but the country became dominantly pastoral in the eighteen-fifties and has remained so ever since, though during the 1914-1918 and 1939-1945 wars many grasslands were ploughed up for crops. The nineteenth century was a time of increasing strife and agitation for possession of the land by the people farming it, but the Land Acts from 1869 to 1936 arranged the transference and also gave the governments powers of compulsory purchase which are still exercised (see Chapter VIII).

3. *Communications*.—Canals seemed the acme of modernity in the late eighteenth century, and some then constructed have not outlived their usefulness. Railways were added in the mid-nineteenth century, but not until the twentieth century did they reach the poorer parts of the western seaboard, long hindered economically by isolation: many of the transport gaps had been filled by the 'Hans,' horse-drawn cars named after Charles Bianconi, an Italian who opened the first routes around Clonmel in [815. The main trunk roads were already in existence by 1800, and the pattern of by-roads became steadily closer, partly through 'presentment' construction, partly through various relief schemes and finally by the work of the County Councils (see Chapter X).

4. *Industries*.—Already in the eighteenth century it seemed likely that parts of the Ulster province were likely to become the major industrial area of Ireland, a forecast abundantly justified in the nineteenth century through the steady expansion of Belfast and its satellites and the concentration of cotton factories and, later, the linen trade combined with ship-building in what is now Northern Ireland. Elsewhere industry existed mainly to supply home demands and never figured prominently, except for a few articles, in the export trade. In general, the direct impact of the Industrial Revolution on Irish life was far less severe than in Great Britain or Germany, but also far less remunerative. The modern trends in Eire are of particular interest, as they show a planning of industry with electricity as the main source of power, in which the social desirability of reviving many country towns has been recognised, though Dublin has grown more rapidly than any other town (see Chapter IX, and p. 294).

5. *Political Factors*.—The settlement of 1921 caused the partition of Ireland into two governmental units, which have pursued different policies in subsequent years. Nineteenth-century Liberals in Britain saw home rule for Ireland as the ultimate solution, but were confronted with the slogan 'Home Rule is Rome Rule' from parts of the Ulster province; the solution achieved has meant that in Northern Ireland two-thirds of the population are Protestant, at every level of society, and that in Eire all save 7% (1936) are Roman Catholics. In Eire the Protestant minority includes the survivors of the gentry, a significant number of the commercial and professional classes, and some holders of medium-sized and large farms; near the Border, however, the Protestant communities generally represent every level of society (see pp. 166-178).

6. *Social Life*.—Although considerable numbers of people in Ireland live at an economic level that is extremely humble, both in the towns and the countryside, there has undoubtedly been a substantial improvement during the past hundred, and especially the past fifty, years. Having

few villages of the English pattern, social life centres around churches, inns, homes, the monthly fairs, and various 'towns,' some of which contain only a few hundred people. There are many grades in Irish social life, and it is not amenable to precise treatment; further, it is essentially different from that of Great Britain (see pp. 154-160).

Other aspects of Irish life, such as language, are treated elsewhere in this book: it remains to add that during the nineteenth century the Ordnance Survey made its first complete mapping of *the* country in the years 1830-1842, and published the first and only memoir to illustrate its new sheets in 1837. The Geological Survey issued its sheets from 1853 to 1890, mainly before modern glaciological theories were put forward, but the memoirs contain useful information on the structure and land-forms of the country.

SUMMARY

Ireland, standing on the western side of Europe, had close relations with the western part of Great Britain, especially with Scotland, at various times during the prehistoric period. If the concept of Britain as Highland and Lowland 'zones' may be modified to include an Atlantic sector, a conception more in accord with the physical geography, then Ireland too could be regarded as a part of the Atlantic world of Europe. Insulated from the European continent by the English lowland, it received many of its early immigrants and much of its early culture from those who travelled the seaways to the west of Britain. A rural society developed in which towns were an alien element, their place taken by gatherings such as monthly fairs, which still figure prominently in Irish life. Unconquered by the Romans—and possibly regarded as unconquerable—the country had a marked individuality during the early mediaeval period and became the home of a church whose missionaries and teachers spread through Europe by sea and land journeys; the Church was distinct in many features from the diocesan-minded Rome. The age of the Celtic church saw Ireland divided between various lords, but yet a potential nation-state, united by a distinct culture and Christian allegiance. The Irish way of life was not submerged by either the Norse invaders or the Anglo-Normans, both of whom left an imprint on the country which was deep in some ways and shallow in others. As Ireland was drawn closer to Britain in its life, the diocesan system of the Church prevailed over the monastic organisation of the early Christian phase, the country was divided into shires and towns were established for the first time, beginning with Dublin: it was not, however, until Stuart times that towns were found throughout Ireland. The Tudor and Stuart plantations, with the efforts at religious and political conquest they

implied, brought Ireland into closer contact with England than at any previous phase: from this time the land question, the economic status of the country as a whole and of its various social groups, became crucial. Out of fear there arose the Penal laws of 1691, which tried to subjugate the Catholic majority for ever in the interests of a Protestant ascendancy, with the result that a sharp dichotomy of wealth and poverty arose and much of the land was under-farmed. Meanwhile, the signs of Ulster's coming industrial greatness were apparent, but the linen industry was still domestic. The nineteenth century saw the life of Ireland altered almost beyond recognition through industrialisation, land redistribution, new means of communication, population increase to the summit of 1845 followed by mass emigration, and the increased strength of the towns: all these changes were perhaps less obvious to the outer world than the political tensions that raged so constantly. The ultimate solution, acceptable to some but not to others, came in the twentieth century, and gave the country two political entities which, it is already clear, differ so radically in policy and outlook on many social and economic questions that it is hard to see how they may eventually be united.

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1. Evans, E. E., *Irish Heritage*, Dundalk, 1942. In addition, much of the material relating to traditional crafts is published in *The Ulster Journal of Archaeology*, Belfast.

2. Gaeltacht Commission (*Comisiun na Ghaeltachta*), *Report*, Dublin, 1926, p. 36.

3. Fox, C., *The Personality of Britain*, Cardiff, 1932, 1933, 1943; for an interesting critical judgement, see Fleure, H. J., in *Geogr. Rev.*, vol. 36, 1946, p. 340, in which it is suggested that the term 'Atlantic Britain' should be used for those lowlands on the west side of Great Britain which received many early settlers. Obviously this idea is of some importance in relation to Ireland.

4. The literature of the prehistoric periods in Ireland is far too comprehensive to be detailed here. Important summary works with detailed bibliographies are Movius, H. L., *The Irish Stone Age*, Cambridge, 1942, and Mahr, A., 'New aspects and problems in Irish prehistory,' *Proc. Prehist. Soc.*, Cambridge, vol. 3, N.S. part 2, 1937, pp. 261-436: the main journals with archaeological papers are the *Ulster Journal of Archaeology*, the *Journal of the Royal Society of Antiquaries*, Dublin, and the *Proceedings of the Royal Irish Academy*. In addition, there are various regional journals.

Useful comments on finds, with an excellent bibliography, are given in O'Riordain, S. P., *Antiquities of the Irish Countryside*, Cork, 1942.

5. Collingwood, R. G., and Myres, J. N. L., *Roman Britain and the English Settlements*, Oxford, 1936, esp. p. 117. On the Irish settlements in the west of Great Britain, see pp. 278 ff.

6. The main source on the Celtic Church is Kenney, J. F., *Sources for the Early History of Ireland*, Part I, Ecclesiastical, New York, 1929, which has an admirable general introductory chapter.

7. The travels of St. Brendan are discussed in articles by Babcock, W. H., *Geogr. Rev.*, vol. 8, 1919, pp. 37-46; *Scot. Geogr. Mag.*, vol. 31, 1915, pp. 411-422.

8. Kenney, *op. cit.* in note 6, p. 5.

9. A valuable summary of the nature of the *tuaths* is given in O'Neill, E., *Early Irish Laws and Institutions*, Dublin, 1935, pp. 91-100.

10. The High Kingship and the various divisions of Ireland in pre-Norman times are discussed in Curtis, E., *A History of Ireland*, London, 1936, and *A History of Mediaeval Ireland*, London, 1923 and 1938.

11. On this phase, see Kenney, *op. cit.* in note 6; Curtis, *op. cit.* in note 10, including an appendix in *Medieval Ireland* on the later history of the Ostmen in Dublin, Waterford, Limerick and Wexford.

12. See Curtis, E., *History of Medieval Ireland*, pp. 12-18, for church reform. This book also has an appendix on towns, pp. 406-418; an interesting short work on towns is Webb, J. J., *Municipal Government in Ireland*, Dublin, 1918. Counties emerged gradually in Ireland from the twelfth century onwards; on the earlier phases, see Otway-Ruthven, J., 'Anglo-Irish shire government in the thirteenth century,' *Irish Historical Studies*, vol. 5, 1946, pp. 1-28. The classic work on the Normans is Orpen, G. H., *Ireland under the Normans, 1169-1333*, 4 vols., 1911-1920.

13. On the varied limits of the Pale, and its relation to the 'land of peace,' see Curtis, E., *History of Medieval Ireland*, esp. p. 353; an important source on the 1515 limits is given in Maxwell, C. E., *Irish History from Contemporary Sources, 1509-1610*, London, 1923, pp. 81-82.

14. Curtis, E., *History of Medieval Ireland*, Appendix III, pp. 408-416 (in 1938 edition), gives an account of the varied fortunes of the towns and shows that the revival of the Irish language, which began in the fourteenth century, 'reached the towns last of all.'

15. The material on Ireland under the Tudors and Stuarts is drawn from the original sources in Maxwell, *op. cit.* in note 13: Leix and Offaly, pp. 227-241; Munster, pp. 241-254; Ulster, pp. 254-307; towns, 354-371; trade and ports, pp. 372-375: see also the general introduction. For the ecclesiastical developments, see Phillips, W. A. (ed.), *History of the Church of Ireland*, Oxford, 1933-1934, and Edwards, R. W. D., *Church and State in Tudor Ireland*, London, 1935.

16. A modern historical work, with a geographical introduction, is Moody, T. W., *The Londonderry Plantation*, Belfast, 1938; see also Moody, T. W., 'The treatment of the native population under the scheme for the plantation in Ulster,' *Irish Historical Studies*, vol. 1, 1938, pp. 59-63.

17. For the work of Sir William Petty, see *Political Anatomy of Ireland, 1672*, ed. C. H. Hull, Cambridge, 1899; *Treatise of Ireland, 1687*, ed. C. H. Hull, Cambridge, 1899.

18. This section is based mainly on Young, A., *Tour in Ireland, 1776-1779*, ed. A. W. Hutton, London, 1892. Two works on the social and economic life of the eighteenth century are Maxwell, C. E., *Dublin under the Georges*, London, 1936; *Country and Town in Ireland under the Georges*, London, 1940.

19. Lewis, S., *Topographical Dictionary of Ireland*, London, 1837, vol. 2, p. 263.

20. Connell, K. H., 'The Population of Ireland in the Eighteenth Century,' *Economic History Review*, vol. 16, 1946, pp. 111-124.

APPENDIX

THE DIOCESES OF IRELAND

The division of Great Britain and Ireland into diocesan units has received little attention in geographical literature, though Mackinder¹ gives a map of the pre-Reformation dioceses in England. In Ireland the territorial organisation of the church shows a division of the country which antedates the county organisation by several centuries, and the boundaries shown in Fig. 17 are those of the Church of Ireland dioceses which have, in many cases, been altered comparatively little since mediaeval times, though there are records of other dioceses that have existed at various dates: among these are the dioceses of Mayo and Annaghdown, both of which were absorbed by the archdiocese of Tuam in the sixteenth century. Many of the dioceses are of monastic origin, and remarkable ruins in remote places recall the Christian worship of more than a thousand years ago: Glendalough diocese, for example, already had a long tradition of scholarship and missionary enterprise when it was united to Dublin in 1216, but it has now no Cathedral church.

Episcopal organisation is normally but not inevitably associated with sees in towns, but at the time of its growth in Ireland there were few towns that could establish their right to be the sees of territorial bishops. By the end of the eleventh century the Norse people in Dublin, Wexford, Waterford and Limerick were Christians, and their churches had bishops who apparently ministered only to the towns themselves and to their immediate hinterlands. There are still dioceses, comparatively small in extent, based on Dublin and Waterford, though the Limerick diocese was apparently large from its first beginnings and has since been reduced rather than extended: the Wexford diocese has disappeared, though there is still a diocese of Cork. These foundations provided only for a very small part of Ireland, and outside them the church was still primarily monastic in the early twelfth century, though there was already some form of diocesan organisation in Meath, probably around several centres such as Trim, Kells, Dunshaughlin, Clonard, and possibly also Clonmaoise. In addition, there were archiepiscopal sees at Armagh and Cashel, of which the former has remained supreme to this day. In 1110, at the Synod of Rathbreasal, an attempt was made to divide the country into twenty-four dioceses, twelve in the north and twelve in the south: in 1152, at the Synod of Kells, four archbishoprics were established, at Armagh, Dublin, Tuam and Cashel. The choice of Dublin was a recognition of its position as the most important town in the country, and its

¹ Mackinder, H. J., *Britain and the British Seas*, p. 210.

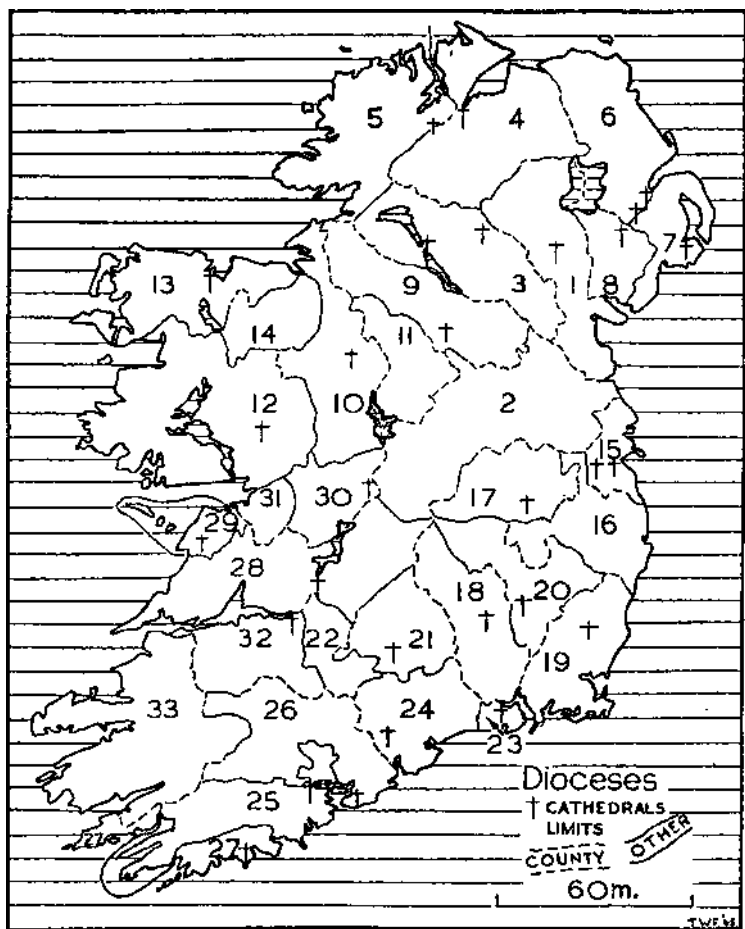


FIG. 17.—DIOCESES IN THE CHURCH OF IRELAND (*see Opposite*)
 (IN EACH CASE THE LOCATION OF THE CATHEDRAL IS INDICATED)

PROVINCE OF ARMAGH

Diocese

Armagh, archdiocese.
 Meath.
 Clogher.

Derry.
 Raphoe. United to Derry, 1834.
 Connor. United to Down, 1450: separated from
 Connor and Down, 1945.
 Down.
 Dromore. United to Down and Connor, 1842.

B. There is a cathedral for the dioceses of Down, Connor and Dromore in
 Belfast.

Kilmore.
 Elphin. United to Kilmore, 1854.
 Ardagh. United to Kilmore, 1692-1751; to
 Kilmore, 1751-1839; to Kilmore from 1839.
 Tuam, archdiocese to 1839.
 Killala. United to Tuam, 1834.
 Achonry, to Killala, 1622.

Cathedral

Armagh.
 No cathedral.
 Cathedrals at
 Clogher and Enniskillen.
 Londonderry.
 Raphoe.

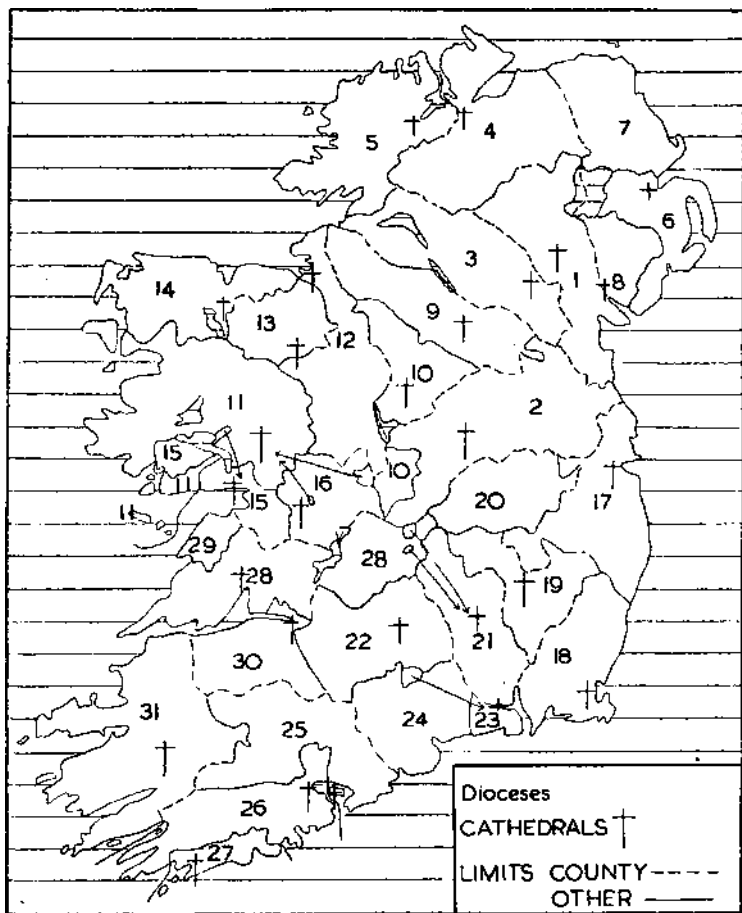
Lisburn.
 Downpatrick.
 Dromore.

Kilmore.
 Elphin.
 No cathedral.
 Tuam.
 Killala.
 No cathedral.

PROVINCE OF DUBLIN

5. Dublin, archdiocese. Dublin (Christchurch).
 St. Patrick's Cathedral, Dublin, is a national cathedral.
16. Glendalough. United to Dublin, 1211. Christchurch, Dublin.
117. Kildare. United to Dublin, 1846. Kildare.
118. Ossory. Kilkeny.
120. Ferns. United to Ossory, 1835. Ferns.
121. Leighlin. United to Ferns, 1597. Leighlin.
122. Cashel. Archdiocese to 1839. Cashel.
123. Emly. United to Cashel, 1562. No cathedral.
124. Waterford. United to Cashel, 1832. Waterford.
125. Lismore. United to Waterford, c. 1358. Lismore.
126. Cork. Cork.
127. Cloyne. United to Cork, 1835. Cloyne.
128. Ross. United to Cork, 1617. Rosscarbery.
129. Killaloe. Killaloe.
130. Kilfenora. United to Tuam, 1661-1742; to
 Clonfert, 1742-1752; to Killaloe, 1752. Kilfenora.
131. Clonfert. United to Killaloe, 1836. This diocese
 is in the Province of Armagh. Clonfert.
132. Kilmacduagh. United to Clonfert, 1627-1836;
 to Killaloe, 1836. No cathedral.
133. Limerick. Limerick.
134. Ardfert and Aghadoe. United to Limerick, 1661. No cathedral.

Other dioceses absorbed include Clonmacnoise, to Meath c. 1560; Mayo, to Tuam
 1573*. Annaghdown to Tuam in the mid-sixteenth century; and a diocese of
 Ardmore, to Lismore in the late twelfth century.



HG. 18.—ROMAN CATHOLIC DIOCESES (see *Opposite*)

PROVINCE OF ARMAGH*Diocese*

1. **Armagh, archdiocese.**
2. Meath.
3. Clogher.
4. Derry.
5. Raphoe.
- j 6. **Down.**
- \ 7. **Connor.**
8. Dromore.
9. Kilmore.
10. Armagh and Clonmacnoise.

Cathedral

Armagh.
 MulUngar.
 Monaghan.
 Londonderry.
 Letterkenny.
 Belfast.
 Belfast.
 Newry.
 Cavan.
 Longford.

PROVINCE OF TUAM

11. Tuam, archdiocese.
12. Elphin.
13. Achonry.
14. Killala.
15. Galway and Kilmacduagh (and Kilfenora in the province of Cashel).
16. Clonfert.

Tuam.
 Sligo.
 Ballaghaderreen.
 Ballina.
 Galway.
 Loughrea.

PROVINCE OF DUBLIN

17. Dublin, archdiocese.
18. Ferns.
- | 19. **Kildare.**
20. **Lcighlin.**
21. Ossory.

Dublin.
 Wexford.
 Carlow.
 Carlow.
 Kilkenny.

PROVINCE OF CASHEL

22. Cashel, archdiocese.
- (23. Waterford.
- \ 24. Lismore.
25. Cloyne.
26. Cork.
27. Ross.
28. Killaloe.
29. Kilfenora (with Galway).
30. Limerick.
31. Kerry (Ardfert).

Thurles.
 Waterford.
 Waterford.
 Cobh.
 Cork.
 Skibbreen.
 Ennis.
 Limerick.
 Killarney.

See the *Catholic Encyclopedia*, New York, 1910, vol. 8, p. 114, and the annual Irish Catholic Directory and Almanack, Dublin. Comparison of Figs. 17 and 18 will reveal both the interesting similarities and differences, of which the location of cathedrals should be noted.

burgesses had already claimed metropolitan status in the civil sense in 1074. Dublin alone had been in some senses submissive to Canterbury, but it acknowledged the primacy of Armagh in 1152.

The dioceses are equal in number to the counties but their boundaries correspond only to a limited extent, though they show some of the country's major regional divides, such as the Shannon above lough Derg, the river barriers of the Nore, Suir and Barrow, and of the Bann valley in the north. Some later subdivisions of the country are at least suggested by the diocesan units: the diocese of Ardferd and Aghadoe bears a strong resemblance to the county of Kerry and the Dublin diocese is closely similar to the county of Dublin. But there are also dioceses that spread amorphyously across the Central Lowland, where the Shannon alone forms any effective regional divide; Meath diocese, for example, spreads from the Irish sea to the Shannon and Elphin extends from the Shannon to Donegal bay. The diocese of Killaloe has its centre at an ancient crossing place of the Shannon and includes most of Co. Clare with part of the Central Lowland. The dry limestone country of north Clare, with the Aran islands, forms the small Kilfenora diocese, remote and thinly populated, but rich in early Christian ruins. Perhaps the most curious of all is the Ross diocese, which had a bishop in the sixteenth century and consists of two separate parts of southwest Cork.

Many dioceses were at first associated with the *tuaths*: one of these, Raphoe, corresponds fairly closely with modern Donegal, except for the Inishowen peninsula, and was probably the land of the Cinel Connail. Several of the dioceses have changed their boundaries; the Derry diocese is based on the territories of a people around the Carnatogher mountains, who pushed their enemies eastwards to the Bann from the Roe valley. The Clogher diocese, which now lies partly in Eire and partly in Northern Ireland, was at first very small and perhaps merely titular, but during the twelfth century the present Monaghan and Louth counties were added and the see was placed in the village of Louth. At a later stage the Louth area was added to the Armagh diocese, and the Clogher diocese spread westward almost to Donegal bay. The remotely placed cathedral of Clogher occupies the site of a monastery whose traditions date back to the end of the fifth century, and some twenty years ago the parish church of Enniskillen was raised to Cathedral status in the Church of Ireland. Armagh diocese extends from the Boyne to the northern limit of lough Neagh, but was much larger in its earlier form: the dioceses of Down, Connor and Dromore now have their main population centres in the Lagan valley, but their original cathedrals were in remoter places, Downpatrick, Connor and Dromore (see Fig. 17).

NOTE

Maps of the dioceses are given in the Catholic Encyclopaedia, and in the *Report of Her Majesty's Commissioners on the Revenues and Condition of the Established Church (Ireland)*, with appendix, 1868: see also the annual Catholic Directory and the Irish Church Directory. There are various references to particular dioceses in Phillips, W. A., *History of the Church of Ireland, 1533-4* and numerous studies by Lawlor, H. J., in the *Irish Church Quarterly* and in the *Louth Archaeological Journal*. Also of particular interest is a lecture by H. J. Lawlor on 'The Irish Reformation in the twelfth century,' in *Ad Clerum*, Dublin, 1918, pp. 136-177. See also Day, J. G. F., and Patton, H. E., *The Cathedrals of the Church of Ireland*, London, 1932.

CHAPTER VI

POPULATION

THE REDUCTION of Ireland's population by one-half during the past hundred years is as significant a social revolution as the herding of millions into the great industrial cities of Europe during the same period. It is commonly estimated that the Irish communities abroad number some sixteen millions, of whom at least half are in the United States of America and some two millions in Great Britain: naturally, many of them have been absorbed into the populations of the countries where they now live, but the Irish vote is still a significant element in the politics of some American cities and several of the large industrial towns of Great Britain have Irish quarters, for the Irish in dispersion are found mainly in towns. At home, emigration has become a recognised phenomenon in social life and organisation, and from almost every family some son or daughter has gone away to make a living, as the farms cannot absorb all the family, and the rural population is declining rather than increasing. The Irish towns take only a small fraction of those leaving the countryside. Between 1936 and 1946 the net emigration from Eire was 190,000, but the net decrease was only 15,000, as Ireland has a natural increase, through excess of births over deaths, of 5-6% in each ten years. Normally, females outnumber males among the emigrants, but between 1936 and 1946 only one-third were women, as the demand for men in the Forces or as navvies and labourers was particularly strong. But recent emigrations from Ireland, though sufficiently heavy to be the subject of frequent comment, are slight in comparison with those of fifty or a hundred years ago. A review of population history is given in this chapter to show how revolutionary are the changes of the past century; then follows a discussion of the present distribution, with an account of the present balance between rural and town populations together with some comments on the unusual demographic features of the country as compared with others. Population problems enter so deeply into the fabric of Irish life that they are also noted in various other chapters of this book.

POPULATION TRENDS FROM *c.* 1700

The year 1845, when the Great Famine began, marks the end of one era and the beginning of another in the social history of Ireland. Similarly the date 1891 has considerable significance, for the full tide of emigration

had settled down into a gentler stream which is, as already noted, still in flow. The first Census of Ireland, in 1821, recorded a population of 6,802,000, and there were 8,175,000 twenty years later, with many thousands more by 1845. The pre-Census estimates give less reliable material, though it is fairly clear that the population rose slowly through the early and middle part of the eighteenth century and then, from around 1770, much more rapidly to its summit in the Famine years. No single cause is adequate to explain so sharp a rise, though one commonly mentioned is the relative prosperity of the early nineteenth century up to 1815, when the demand for agricultural produce was exceptionally heavy, particularly during the Napoleonic Wars, and the population were able to feed themselves on potatoes while exporting their crops, cattle and dairy produce. It was not due to any great advance in industrialisation, but was a rural increase and therefore sharply different from that of Great Britain. Even while the population was rising, as many as a million people left Ireland and laid the foundations of the large overseas Irish communities of later years.

The first notable population estimates were made by Sir William Petty in 1672, who calculated that there were some 200,000 families, and a total population of 1,100,000: in 1687 he revised his estimate to 1,300,000. These figures were based on the hearth money returns, from which there were various omissions, and in all probability the number of people in each household was greater than the 5.5 average on which Petty worked: possibly the total population was considerably greater. Various estimates made during the eighteenth century ranged from 2,099,000 in 1712 to 2,846,000 in 1785, but in 1788 a Commissioner of Revenue, Mr. G. P. Bushe, suggested a figure of 3,750,000: he said that as the people making the return were either tax-collectors, magistrates or clergy, understatement was inevitable because many people had good reasons for evading the attentions of any one of these groups, and some all three of them. At some time in the eighteenth century the population began to rise sharply, probably around 1770, a few years before the famous tours of Arthur Young, who took the view that the happiness of a man and wife was in direct proportion to the number of their progeny (see p. 109). K. H. Connell, in a careful study of the available data, suggests that the population had risen from 2,791,000 in 1712 to 3,584,000 in 1772, after which came the sharper increases that brought the total to its maximum in the Famine years. Young, in 1778, speaks of rising rents, more trade, large families, universal marriage, land reclamation and expanding settlement, all of which suggest an increasing population. The hearth money returns were used twice more, in 1791, when the figure was 4,207,000, and in 1805, to give 5,395,000, a total of special interest for comparison with the

1821 Census, when the population was stated to be 6,802,000. If these figures are reliable the rise in population was about 17% in each decade.

The Census of 1821 cannot be regarded as a completely satisfactory count of the population, as although the enumerators were instructed to make their enquiries in the Widest and most inoffensive manner possible' they found 'determined hostility/ which was only partly removed by the conciliation of the clergy. The 1831 Census, which gave a total of 7,767,000, was regarded as even less satisfactory, because many of the enumerators were paid according to the number of persons they returned, so the figures were perhaps inflated. If true, they represent an increase of 14% in ten years, at a time when emigration was increasing, yet this increase is less than that postulated for 1770-1821. A figure which incurs particular suspicions in 1831 is an increase of 21% for Connacht against 9% in Leinster, but possibly some areas in Connacht had been missed in the 1821 count. The 1841 figure is more reliable than either of its two predecessors, and shows an increase of 20% over 1821 but only 5% over 1831: probably the increase should be spread more evenly over the twenty years, though emigration was heavier after 1831 than before. No figures of births or deaths are available, but a natural increase of 8 per 1,000 per year (which errs on the conservative side) would give a population of 8,570,000 in 1845: an allowance for emigration would reduce this to 8,300,000, which is almost twice the population now.

Ireland stands alone among the countries of Europe as one with a declining population during the last hundred years: it has shared with all other European countries in the oceanic migrations to the New World. Emigration has been, and still is, an easy way out of difficulties, financed in many cases by the Irish already abroad and ranging among individual migrants from a 'hunger drive' to the carefully balanced weighing of the relative possibilities of making a career inside Ireland or outside it; people of every class, including those armed with a University education, emigrate. In the Famine period from 1845 onwards the desperately poor sought any ship that could convey them across the Irish Sea or the Atlantic; in the mid-twentieth century, most emigrants had to obtain an official permit to proceed abroad. Within Ireland the density of population from one area to another is determined partly by the relative appeal of emigration through the years, though areas of apparent poverty do not of necessity have the greatest number of migrants, still less the lowest densities of population. Thus Meath has lost more heavily than Donegal or Kerry, and many of the poorest western districts have shown a high degree of resistance to emigration. In all, at least 6,000,000 people have left Ireland since 1845 ^ d, unlike the Italians, they rarely come back

except for short holidays. The population of Ireland from 1841 was as follows:

	<i>Total.</i>	<i>% Decrease.</i>	<i>% Increase.</i>
1841	8,175,124		
1851	6,552,392	19.5	
1861	5,798,564	11.5	
1871	5,412,377	6.5	
1881	5,174,836	4.6	
1891	4,704,750	8.8	
1901	4,458,775	5.1	
1911	4,390,219	1.6	
1926 (15 years)	4,228,553	3.4	
1936-1937	4,204,476	0.5	
1946-1947	4,289,275		2.0

The rate of decrease between 1841 (but in reality 1845) ^and 1851 was 20% over the whole country, and reached fantastic proportions in some counties; thus, every county in Connacht lost over 27%; the decreases in Munster counties were 26% in Clare, 24% in Cork and Tipperary, but only 16% in Waterford; in Leinster the decreases ranged from 16% in Louth to 29% in Longford, but Co. Wexford lost only 11%; all the Ulster counties lost heavily, except for Donegal, with 14%. Vast numbers of people, estimated by some at 750,000, died before relief came from the outer world or before they could reach the ports and towns, which had their populations inflated by those looking for shelter in hospitals and charitable institutions, or awaiting a passage. Already in 1851 there were 962,000 Irish-born people in the United States, 727,000 in Britain, and 227,000 in Canada. There was no count of the emigrants at the ports before 1851, but it was estimated that in 1847 alone more than 250,000 landed at Liverpool as part of a great human tide received not only at the great ports but also at remote villages along the Welsh coasts. Many of these emigrants ultimately reached America, but the majority settled in the growing factory towns of the north of England, herded into the slums where their descendants remain to this day.

The decade 1851-1861 saw a decline of 12% in the population of Ireland, unevenly distributed through the country, with losses of more than 20% from some of the richer counties such as Kilkenny, Meath, Wexford, Tipperary and Clare, but of less than 10% from Kildare and several of the poorer counties, including Donegal and the whole province of Connacht except for Galway. In Ulster, Belfast had become a magnet for immigrants as it was now in the heyday of its growth, but Dublin was by contrast practically stationary. Of the 2,500,000 people who left

British ports during these ten years, half were Irish, going to join the now considerable community of 1,611,000 Irish-born people in the United States with another 286,000 in Canada. In Britain there were 806,000 Irish-born people: these figures are interesting only for the early phases of the migration, as they indicate the first generation immigrants only, and not their children born in the new country.

Between 1861 and 1881 emigration was still heavy, but much less acute than in the previous fifteen years. The loss of 7% in the first ten years was spread fairly evenly through the country, but in the second decade, with a net loss of nearly 5%, Connacht's population decreased by only 3%, and Kerry even recorded an increase of 2%. In 1879-1880 severe food shortages due to crop failures stimulated migration on a large scale, and there were similar disasters during the decade from 1881, a time of heavy outward movement which lowered the population by 9% to 4,706,000. Schemes of assisted migration were initiated by the charitable: one such was organised by Mr. Tuke, a social worker, under which 10,000 people, known as the Tuke emigrants, left Galway in the years 1882-1885 to settle in St. Paul. This and similar schemes aimed at sending people from the same neighbourhood so that they could begin their new life with contacts already made. There were 'near-famines*' in 1885, when the potato crop was deficient in West Mayo, Galway and islands off the coasts, and cattle fetched low prices, and again in 1890, when the potato crop gave only one-quarter to one-half its normal yield along the entire western seaboard from Donegal to Kerry. Obviously private charity alone could not cope with such a problem, but it helped to focus attention on the poorest parts of Ireland, which from 1891 formed the Congested Districts of Connacht and Munster.

The establishment of the Congested Districts Board is a landmark in the economic history of modern Ireland, and the years around 1890-1900 form a turning point between two great waves of emigration. The first, dated for convenience as 1845-1891, was a mighty flood in the first few years and a large river of hopeful but sometimes destitute humanity afterwards. The second, from 1891 onwards, was a more gentle but still appreciable flow, quickened under the stimulus of two world wars. But only a fraction of the emigrants came from the Congested Districts, and the ameliorations planned and partly achieved there form only part of those shared, in one way and another, by the whole of the country, of which not the least important was the transference of the land to its occupiers under various land acts (see pp. 186-188).

The Congested Districts were defined as those areas having a rateable valuation of less than £1 10s. per head, and covered the areas shown in Fig. 19. The reports of the inspectors showed that poverty was of varied

incidence; in Donegal, for example, the gap between income from the farms and the income needed was met by seasonal labouring in Britain, combined with domestic industry. Seasonal labourers also went in large numbers from Mayo and Galway but not from Kerry, where the men and women relied rather on intermittent work nearer home or on fishing. In effect, the Congested Districts were those areas where the population had an inadequate amount of land to maintain life except at

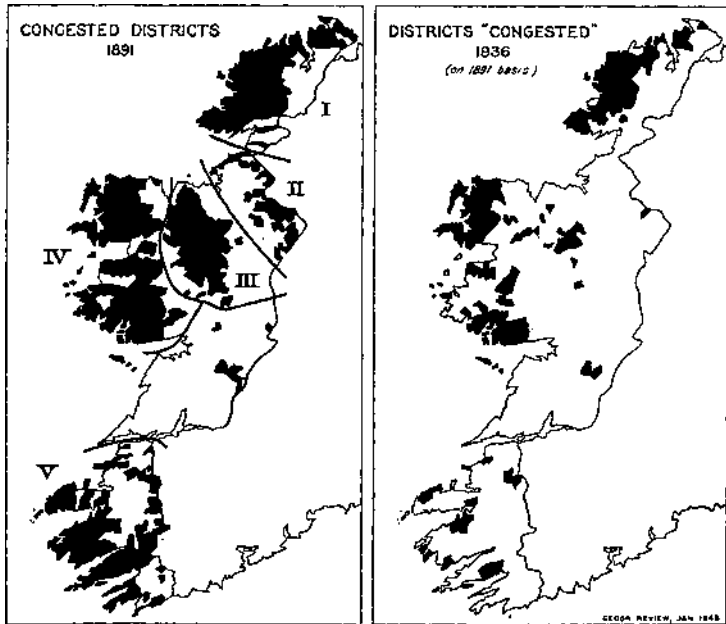


FIG. 19.—THE CONGESTED AREAS, 1891 AND 1936

The Congested Districts of 1891 were the poorest in the land, with an average valuation of less than £1 10s. per head: by 1936 the decline in population has resulted in a substantial decline in the congested area.

First published in 'Geogr. Rev.,' vol. 23, 1943, p. 5.

a very low standard: at first, hopes centred around the enlargement of holdings, the encouragement of domestic and small factory industry or the improvement of fishing, but while all these have materialised to some extent, emigration has been the major palliative: the population of the Congested Districts, as defined in 1891, has since declined by 32% from 541,000 to 367,000 (1936). This loss is, however, very unevenly spread from one area to another, for some have declined by as much as 60%

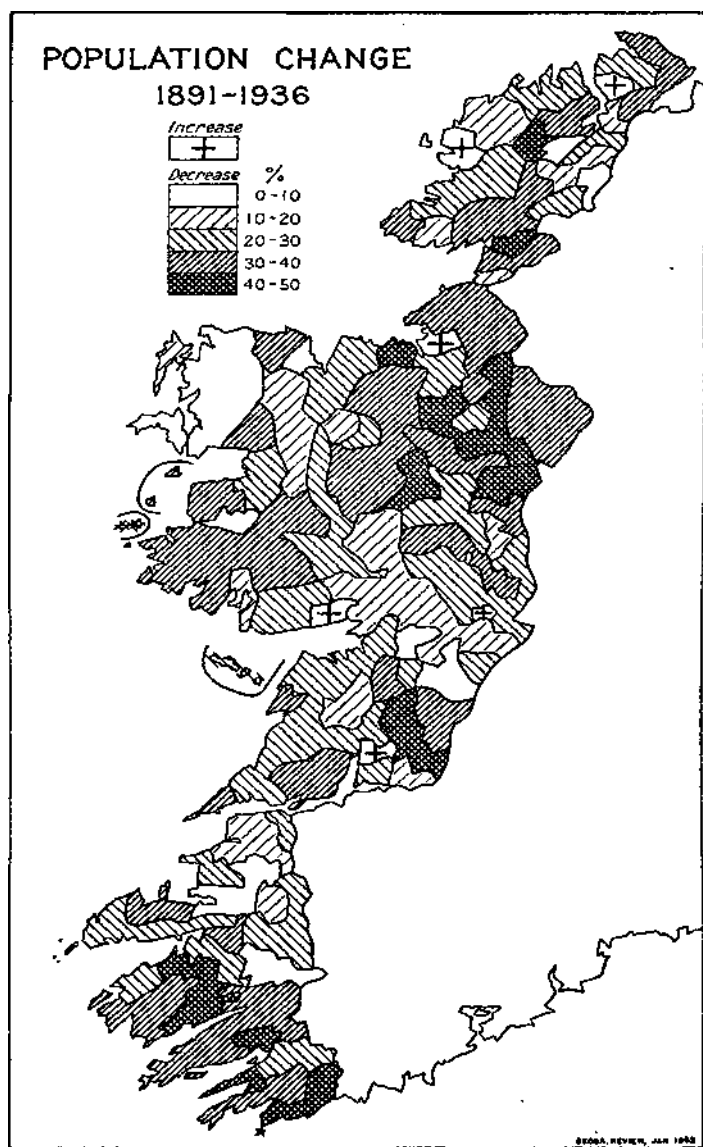


FIG. 20.—POPULATION CHANGES IN THE CONGESTED WEST, 1891-1936

The variations in the rate of decline are considerable: compare this map with Fig. 81, p. 436, and Fig. 84, p. 454-

First published in 'Geogr. Rev.', vol. 23, 1943, p. 5.

since 1891 and others hardly at all. But if there were a reassessment on the 1936 population and rateable valuation, the area included would be little less than one-third that of 1891: in other words, the standard of living has risen, and those still left have benefited by the withdrawal of migrants (see Fig. 20).

Even though the rate of emigration slackened after 1891, over 2,000,000 people have left Ireland during the past fifty years, of whom seven-eighths have gone from what is now Eire. In Northern Ireland, Belfast was a city of 256,000 people in 1891, since when it has added another 200,000, partly by natural increase and partly by immigration from the countryside. Other towns in Northern Ireland have also increased during the same period, but the net gain is only 8%, owing to the heavy drain from the countryside. In Eire, Dublin has grown markedly since 1891, and especially since 1922, but most of the other towns have increased only slightly or even declined, so there has been a decrease of 15% since 1891. Throughout Ireland the rural decrease since 1891 has been 25-30%. As population units Eire and Northern Ireland differ only in the extent to which their people live in towns: excluding those of less than 1,500 people the towns had, in 1936-1937, 53% of the population of Northern Ireland and 36% in Eire (but 38% in 1946). It will therefore be more convenient to review the developments since 1891 for the two political units created in 1921 (see Fig. 21).

Eire had a population of 3,469,000 in 1891, and now (1946) 2,953,000, and its net loss of 15% was spread thus from Census to Census: — 7%, 1891-1901; — 3%, 1901-1911; — 5%, 1911-1926; -0.1%, 1926-1936; and —0.5%, 1936-1946. While the population is still declining and emigration has averaged 19,000 per year since 1936, the losses are quite minor in comparison with those experienced as recently as the early years of the twentieth century. This is partly due to the revival of many towns under the stimulus of industrialisation and increased trade; nevertheless, all Connacht, except Co. Galway, lost more than 5% between 1936 and 1946, and there were similar losses in Clare, Cavan and Monaghan and the west (but not the east) of Donegal. Almost all the rural areas of Eire are still losing workers from the land; even a condition of stability means that an area has failed to absorb its natural increase through excess of births over deaths, and also that people of working age are leaving the area.

The greater strength of the towns in Northern Ireland masks the fact that many features of its population history, not least the drain from the countryside, are precisely similar to those of Eire. The six counties had 1,237,000 people in 1901, a mere 1,000 more than in 1891, but the net loss by emigration was 70,000, which is, as previously explained, the

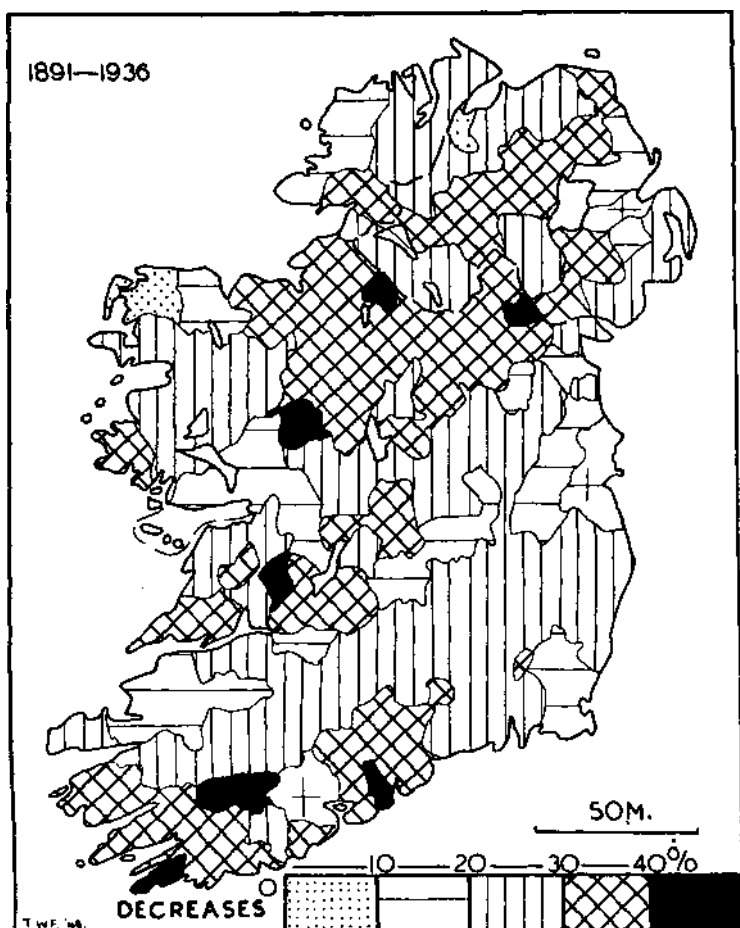


FIG. 21.—INCREASES AND DECREASES, 1891-1936

Figures for each rural district in 1891 and 1936 (1937 in Northern Ireland) have been compared: the only rural increases, due primarily to the outward spread of towns, are around Dublin, Cork and in the Lagan valley. Elsewhere most rural districts show a decrease of between 20% and 40%, though a few have a decline of less than 20%, and two, Belmullet and Londonderry, less than 10%. As far as possible, town populations have been excluded; in effect this map gives a highly generalised statement of the changes in rural Ireland and should be compared with Figs. 20, 81, 84, 93.

unabsorbed natural increase. In the same ten years the rural areas lost 105,000 people and the towns gained 106,000. Most of this gain was in Belfast, which had 256,000 people in 1891 and 349,000 in 1901, an increase of 37%. From the turn of the century there were signs that the population of what is now Northern Ireland was relatively stable, or likely to increase slightly through gains in the towns greater than the losses from the countryside. The population in 1937, 1,236,000, was almost exactly the same as in 1891, but the distribution differed markedly, for in 1891, 811,000 were in the rural areas, and in 1937 only 606,000. The emigration averaged 60,000-90,000 in each decennial period.

Heavy emigration during the 1914-1918 war and the years that followed was due to various causes, of which some are common to the whole of Ireland and some apply to Eire only. The number of men who joined the forces is not available, though it is known that a number of the survivors remained outside Ireland afterwards; 27,405 Irishmen below the rank of commissioned officers and an unknown number of officers died on active service, a loss that cannot be distributed between the two parts of Ireland. During the war emigration to America virtually ceased, but Britain took its place as there was a heavy demand for factory workers as well as service personnel. Migration movements that affected only the new Irish Free State of 1921 included the withdrawal of the British forces, who, with their dependants, numbered 34,000, the departure of some of the Royal Irish Constabulary, some of the civil servants, and also of other people unsympathetic to the new regime. The changes were more significant socially than numerically, and one result was a striking reduction in the Protestant population of Eire (see pp. 174-177).

The years between 1926 and 1936 saw the closing of doors to Irish immigrants in the United States and the British dominions: in 1930 the overseas emigration, apart from Great Britain, showed a sharp decline, and from 1931 to 1935 there was an inward balance, the first ever recorded. The experience of Eire and Northern Ireland was exactly parallel: between 1926 and 1930 the overseas emigration, chiefly to America, was 48,000 from Northern Ireland, and 108,000 from Eire: between 1931 and 1935 the net inward movement from overseas was 7,000 to Northern Ireland and 8,000 to Eire: there was thus a net loss by movement overseas (outside the British Isles) of 41,000 from Northern Ireland and 100,000 from Eire. The total loss from Northern Ireland in the eleven years 1926-1937 was 58,000, which figure is acquired by subtracting the recorded increase of population from the higher figure of natural increase: of this number 17,000 went to Britain, and the remainder chiefly to America. Similarly Eire, in the decade 1926-1936, lost 100,000 by American and dominion emigration, and another 67,000 to Great

Britain. There is comparatively little movement of people as settlers between Eire and Northern Ireland.

This phase of emigration movements is of particular interest, as it shows that there is a quick reaction to economic circumstance overseas: it is also interesting as the twilight of the American emigration which had long been a feature of Irish life. Before 1914, according to Walshaw, only 10% of the Irish emigrants went to Britain, but by 1931-1937, 94% went to Britain, and now virtually all go to Britain. Irish men and women went there even in the worst years of the depression of the thirties, and the improvement in employment from 1935 so stimulated immigration that over 32,000 entered in 1936, and almost as many in the following years. In some cases the persistence of Irish immigration into Britain is due to a need for special classes of labour, among men for navvying and other heavy jobs or on the farms, and among women as nurses or domestic servants.

The net emigration from Eire during the decade 1936-1946 was 190,000, a figure acquired by adding together the natural increase of 175,000 by excess of births over deaths to the decrease of 15,000: in this emigration there were 67 women to 100 men, a ratio which differs sharply from that of the previous decade, when there were 129 women to 100 men. In the war years the demand for men was especially heavy, notably as labourers and navvies, though the number of women migrants was also high. The British Permit Office in Dublin issued 229,000 permits to people taking up employment in Great Britain or Northern Ireland between September, 1939, and April, 1946: this figure does not include permits granted to people for short visits of various kinds, and is therefore a useful indication of the strength of the outward movement. A number of these permits for workers were of a temporary character, and some of the people who received them have now returned to Ireland. 1942 was the year of the greatest outward movement, and 1944 of the least, as for some months before the invasion of Normandy all traffic between the two countries ceased except for a few people in special circumstances: instead of travelling on a crowded boat to Holyhead and back, one crossed the sea on a kind of ghost ship, which ran only three times a week and generally had hardly more than a score or two of passengers. In 1945 emigration became considerable once again and the male excess was still in evidence, but in 1946 a remarkable change came, for of the 30,000 emigrants, over 19,000 were women, mainly domestic workers and nurses. Among the men, the majority were either labourers or agricultural workers, the latter consisting mainly of those seasonal migrants who have been represented among the travellers for more than a century. In the face of the evidence from the war years it is impossible to resist the inference that Eire is a reservoir of workers on which Britain may draw more or

less at will. The exact information available has been summarised in the table given below; unfortunately no such analysis is possible for Northern Ireland in the same years.

TABLE I.—MIGRANTS FROM EIRE IN THOUSANDS, 1940-1947

N.B.—Only those going to employment are included in these figures (see text).

<i>Year,</i>	<i>Grand total.</i>	<i>Total males.</i>	<i>Unskilled workers.</i>	<i>Agriculture.</i>	<i>Total females.</i>	<i>Domestic.</i>	<i>Nursing.</i>
1940	260	171	59	54	89	5.3	16
1941	35.2	31.9	21.0	1.8	3.3	1.3	0.8
1942	51.8	37.3	23.8	4.8	14.5	6.0	2.2
1943	48.3	29.3	18.3	3.6	19.0	9.1	2.8
1944	13.6	7.7	4.3	1.4	5.9	2.8	1.1
1945	23.8	13.2	6.2	3.1	10.6	4.7	3.5
1946	30.0	10.8	5.9	2.4	19.2	12.1	3.9
1947	31.2	12.5	5.6	4.6	18.7	13.2	2.5

DISTRIBUTION OF POPULATION

The balance of country and town population has been materially changed within the past hundred years. Less than 20% of the population lived in towns in 1841, but in 1936 over 40%: 1,733,000 people were in towns as compared with 2,516,000 in the rural area. Although the last figure includes those in small towns and villages with less than 1,500 people, it demonstrates, even if on a slightly exaggerated basis, the significant place of the rural community. It is therefore appropriate to think of Ireland as a land of farms and fields studded with market towns at intervals of a few miles, and a few industrial centres, rather than to think first of the towns and then of the countryside. Excluding the areas of rough pasture, approximately three-quarters of Ireland remains as occupied farmland, having a density of population which ranges from less than 50 to more than 400 per square mile: there is little meaning in the figure of average rural density, 70 per square mile in Eire (1946) and 116 in Northern Ireland (1937). It is the disparities in density that are the most interesting and important feature of the rural population: Fig. 22 shows that the densities are higher north of a line drawn from Dundalk to Galway bay than in the lowlands of Leinster and Munster. The disparities are surprising enough in themselves, but still more remarkable in the light of a century of emigration through which almost every rural area has lost at least 50% of its population and some as much as 70%. The emigration has not removed the disparities, but left them there with a

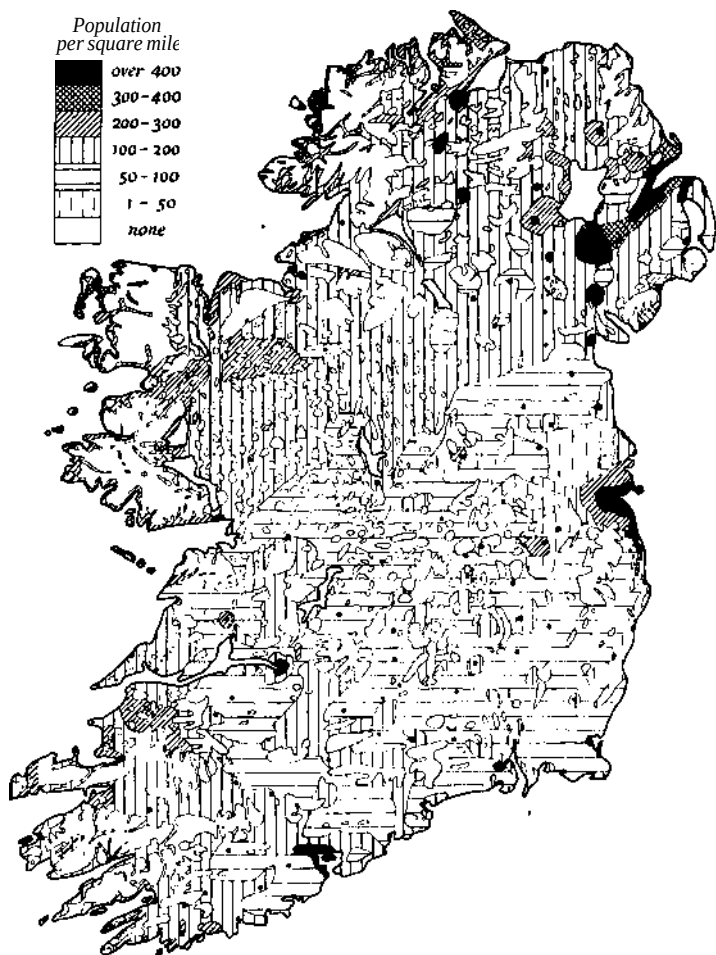


FIG. 22.—DENSITY OF POPULATION

This map is based on the dot maps of Chapters 12-23** in the rural areas the density per square mile ranges from under 50 to more than 400, and is generally higher in the north and west than in the south and east.

First published in 'Geogr. J.,' vol. no, 1947, p. 52.

different scale, for in 1841 the density of the rural population probably ranged from around 100 to 700 per square mile. It would be illuminating to plot the figures of the 1841 Census area by area, and produce a map comparable with Fig. 22, or those in Chapters XII-XXIII of this book. A population map to show density was prepared in 1837 for the Second Report of the Railway Commissioners, and there is also a map dated 1849 by Petermann in which he uses the 1841 Census, though he makes the curious mistake of calculating an increasing population to 1849 instead of 1845. On both these maps an effort is made to avoid the tyranny of densities of administrative areas by isolating out mountains and bogs, and the actual densities are brought out by a stipple shading with figures of the town populations in the Railway map and coloured circles in Petermann.¹

The uninhabited areas of Ireland are of two main types, mountains and lowland bogs, with a few limestone karsts around Galway bay. The common assumption of an altitudinal limit of settlement around 600 ft. is erroneous, for in the west settlements in mountain valleys and on hillsides, if they exist at all, are generally separated from the coastal ribbon of settlement by extensive lowland peat bogs; in the Central Lowland many of the bogs are sufficiently large to make negative areas on the population map, but in the east, from Co. Down southwards and around the Leinster chain and in the south, around the Armorican ranges of Munster, bogs are far less frequent.

Throughout the west, excluding Clare, there is merely a thin ribbon of settlement extending at the most a few miles from the coast, but generally little more than one mile, and penetrating a few valleys. Much of the land has been 'made' by careful manuring and even by collecting together any possible load of soil and moulding it with infinite toil into a field. The limit of settlement is perhaps the limit of endurance, for so much labour goes into each field, especially when all the manure has to be brought up from the shore, that only a small area can be maintained as cropped land. It is here, under an agricultural regime designated 'cottage farming' (see p. 199), that the density of population in the area occupied reaches its highest limit, with over 400 in northwest Donegal and 200-400 in southwest Donegal and in West Connacht, in all of which the farm-houses are often so close together that those on the roads resemble a village street. The average size of a farm in Dunfanaghy rural district is 8 acres, in Glenties 14 acres, and in Belmullet, 11 acres. Assuming five persons per household, one square mile of 8 acre farms would 'support,' but in theory only, some 400 persons on eighty farms, and the other

¹ For a copy of the Railway map see *Geogr.J.*, vol. 85, 1935. P- H4\ there is a copy of Petermann's map in the Department of Geography, Trinity College, Dublin.

200-300 per square mile: in practice, many of the people in these areas have other resources such as seasonal labour, fishing, domestic industry, occasional work as labourers on roads or the larger farms, or emigrants' remittances. The high densities indicate pressure on the land rather than intensity of cultivation throughout the west, and also in certain inland districts such as that to the south of the Ox mountains or in the lowland north of Kerry, all of which were included in the Congested Districts. There are equally heavy densities in Northern Ireland of more than 200 per square mile; some of these include people living in rural areas but working in factories and mills, and many of the farms are intensively cultivated with flax and other cash crops and a considerable head of live-stock and poultry in proportion to their size. While there is not the extreme pressure of the west in these northern landscapes, the density of population is remarkably high in many small-farm countrysides, but, not infrequently, now declining. Around Dublin and Belfast there are areas of high density through the spread of outer suburban settlement into adjacent rural areas.

The areas with 100-200 per square mile are mainly those with a substantial proportion of small farms—that is, of less than 30 acres—which are prominent in the landscape north of the Dundalk-Galway bay line. In the provinces of Leinster and Munster medium-sized farms, especially those around 50-60 acres, are a more usual element in the landscape, together with a number of large farms and some smaller ones: here the density of population is around 60-120 per square mile. Strangely enough, the areas of very large farms, such as parts of Meath, Kildare and even North Wexford, have less than fifty people to the square mile, a surprisingly low density due to the fact that most of the large grazing farms employ very few labourers: thus a farm of 160 acres may be run by a household of five or six, and two or three unmarried labourers: four such farms cover a square mile, all actively farmed but supporting hardly more than forty persons. But a dozen medium-sized farms will have some sixty or seventy people in the farm households with perhaps another six to ten labourers, of whom a minority will be married: in all, the labourers and dependants will account for perhaps twenty or thirty people, and the resultant density will be 60-100 per square mile. The contention here is that in the rural landscapes the density of population is fairly directly related to the size of the farms; further, the middle-sized farms of 30-100 acres give a density that has neither the congestion of the 'cottage' farms nor the sparsity of occupation of the large farm areas. As there is still population pressure in parts of Ireland, it is frequently said that the large farm areas should be broken up into smaller holdings in order that more people may be provided with land.

Only in parts of Northern Ireland has industry entered to any significant extent into the life of the countryside, chiefly in the form of mill villages not unlike those of Lancashire or Yorkshire. The co-operative creameries of Munster and parts of Ulster are an asset to the neighbourhoods from which they draw their supplies, but do not themselves give a large amount

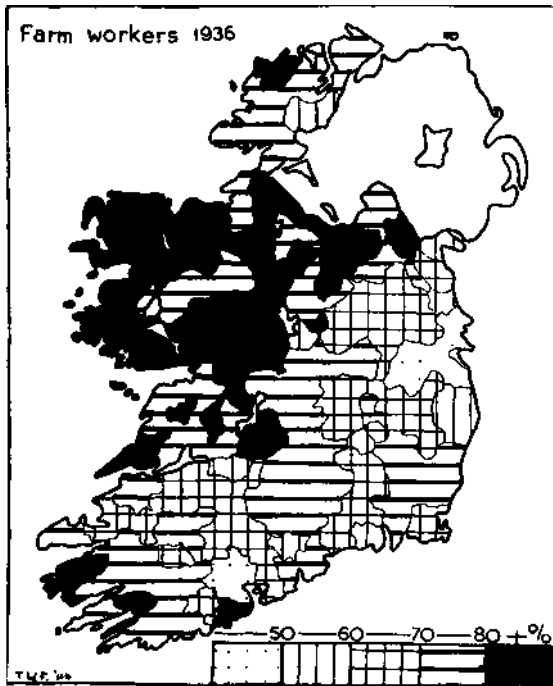


FIG. 23.—PERCENTAGE OF EMPLOYED POPULATION WORKING ON FARMS, 1936

The proportion working on the land is higher in the west than in the east; the figures are those for the rural districts, and the towns are not included.

Based on data in 'Eire Census' 1936, vol 2, Occupations, pp. 132-165.

First published in 'Muintir na Tire' Handbook, Tipperary, 1946, p. 98.

of employment. Small workshop industries are normally found only in the towns and in those small centres which are villages in size but towns in function. There are, however, a considerable number of people providing goods and services/ to use the Census term, in the richer farming areas, but they are mainly domestic workers, shopkeepers or dealers, with

a few professional people, all of whom are ministering very directly to the needs of the farming community. At the poorest end of the agricultural scale almost the entire population is working on the land; thus in Clifden rural district, Co. Galway, 94% (1936) of the population is so employed. As a comparison, Dunshaughlin rural district, Co. Meath, though equally rural, has returned only 61% of its workers as 'on the land/ The Clifden figure indicates cottage farming, the Dunshaughlin figure that of a specialised grazing area of large farms giving cash returns to support a considerable amount of domestic labour, shopkeepers and dealers, and others providing professional and commercial services (see Fig. 23).

Villages are a rare phenomenon in the Irish landscape; most of the older villages date from the seventeenth century and were the creation of the squirearchy rather than an indigenous growth, though a few have older roots and possess traditions dating back to the Anglo-Norman phase. In the foundation of villages the Tudor and Stuart plantations were of considerable importance as many of the settlements then established have remained to this day, especially in Ulster, in some cases preserving attractive eighteenth- or early nineteenth-century houses, for the Georgian tradition lingered on into the nineteenth century in many places. Even now, however, there is in some districts no sign of a village within a radius of several miles, though there are churches, shops, inns, a post office, and schools somewhere along the roads. The problem of what is, and what is not, a village has been solved by the Eire Census by the ruling 'a cluster of twenty houses or more.' This cuts out many of the small groups of homesteads, or *clachans*, which appear to have been more numerous in Ireland a century ago than now. It also leads to the curious result that each Census returns a different set of 'villages/ as some will fall below the statistical limit through decay and others will rise above it. In the Dingle peninsula, for example, nine Villages' were recorded in 1936 and 1926, eight in 1911, seven in 1901, and six in 1891. The general, but not universal, practice is to build new houses near an existing settlement, so there is a slight increase in nucleation which has not, however, so far altered the general plan to any marked extent. In 1936 there were in Eire 386 villages or 'towns/ as they are commonly known, of less than 200 people, with a total population of 48,000, and another 215 'towns' of 200-500 people, with a total population of 67,000: these centres, which have 4% of the total population, are the smallest units in the commercial life of the country, though they are inhabited mainly by farmers whose houses are in the main street along with the shops and inns. Many are centres of a 'dispensary district* served by a state-paid medical doctor. In Northern Ireland, only those centres having at least fifty

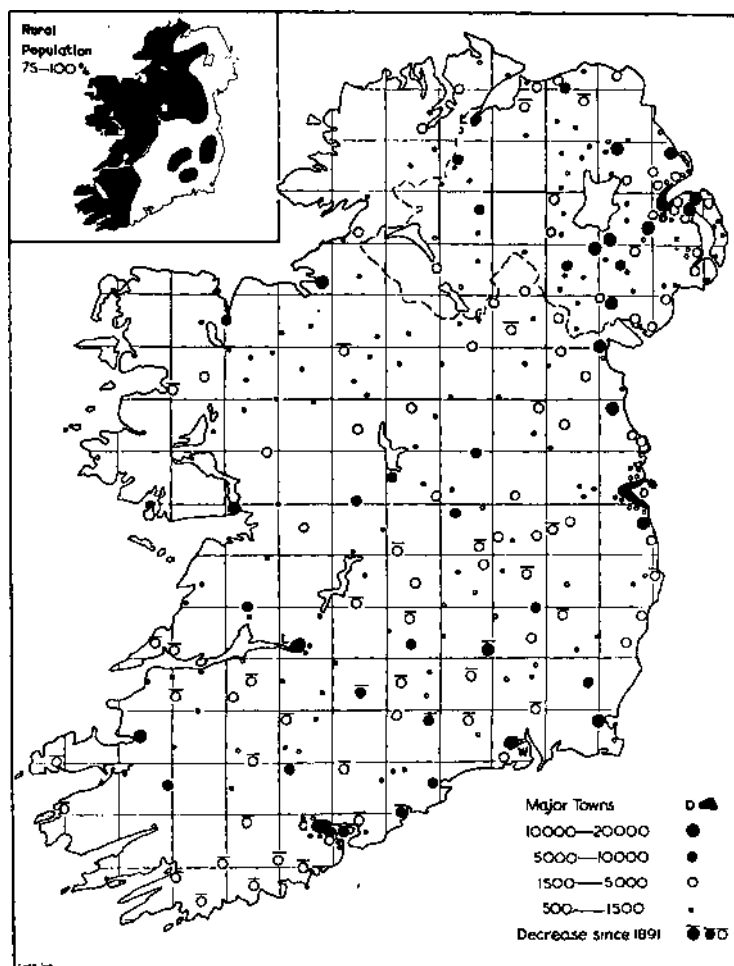


FIG. 24.—THE TOWNS OF IRELAND, 1946-1947

The figures are for 1946 in Eire and 1947 in Northern Ireland.

Leinster, the east of Ulster and the east of Munster have more towns than the remaining area of Ireland. Many of the towns were established in Anglo-Norman, Tudor and Stuart times, though not all those shown on Fig. 16, p. 96, are still important. Attention is drawn to the large number of very small towns with less than 1,500 people.

Each square covers 250 square miles.

houses are included as villages, so exact comparison with Eire is difficult; in 1937 there were one hundred places having less than 500 people, which numbered in all 30,000, or 2% of the total population.

A type of settlement intermediate between the village and the market town is the centre of 500-1,500 people, which has qualities associated with both the smaller and the larger places. On the one hand, many of its residents are farmers, and on the other it is actively commercial and normally has an assured position as the market centre for an area of several square miles. Without such places, which generally regard themselves as towns, the commercial life of the country could not exist at all, for they have monthly fairs, a number of shops, and some form of public transport: there are generally resident doctors and visiting lawyers and even hotels as well as inns. Life is strongly personal in these centres, for some have a few enterprising families who develop social amenities, build cinemas and dance halls, and in many cases make a surprisingly large amount of money. They figure in the settlement pattern very much as towns of approximately twice the size do in England, even though they may appear to be somewhat lowly members of the urban hierarchy. Closely in tune with the life of the countryside, they are for the most part neither growing markedly nor declining sharply, though some are decaying, and a few are rising to a higher status. In Eire there were 121 such centres in 1936, with a total population of 99,000: in Northern Ireland, 54 (1937), with a total population of 40,000. In both units of Ireland, the number of these places is far larger than that of the market towns having more than 1,500 people (see Figs. 24 and 25).

Many readers outside Ireland will notice that extremely small places are regarded as 'towns' in the country, but the author feels that in such matters he must respect the local use of the term 'town,' partly because it reveals the shallow imprint of village life, as known in the English lowland or the Paris basin, in Ireland. A further remarkable feature is the small proportion of people who live in towns of 1,500 upwards over the major part of the country: the inset map of Fig. 24 indicates those areas where at least three-quarters of the population is outside any form of clustered habitation. Fig. 24 also shows that the majority of the larger towns of Ireland lie within a belt stretching from East Ulster through Leinster into Munster, and that elsewhere the towns are in a wider network with smaller, but socially not less important, nodal points. Many of the towns are ports which still keep their commercial strength, though their quays are visited by fewer ships than fifty years ago. Such figures as a town population (including places over 1,500 only) of 38% in Eire and 53% in Northern Ireland are illusory in some ways, for they include the major cities of Dublin and Belfast, a number of regional capitals,

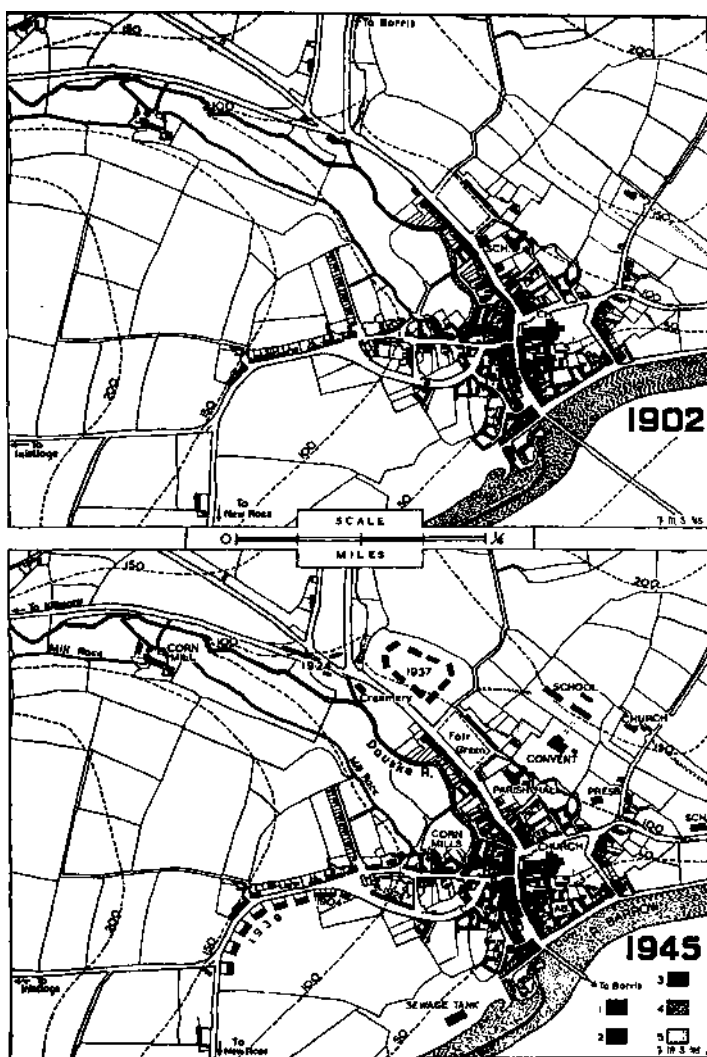


FIG. 25.—GRAIGUENAMANAGH, CO. KILKENNY, 1902 AND 1945

1902, all buildings in solid black: 1945, key, 1, Public buildings, including shops; 2, Substantial houses; 3, Cottage type houses; 4, Vacant buildings; 5, Barns and sheds. Population in 1936, 845.

Note that the town has spread outwards and has become less congested.

Based on the Ordnance Survey, 25* to one mile, by permission of the Minister for Finance of Ireland.

Drawn by F. M. Synge and first published in 'Irish Geography,' vol. 1, p. 73.

some manufacturing towns other than the great cities or regional capitals, all of which belong to the industrial life of the country and to its international commerce rather than to the day-to-day routine of the countryside. To give perspective, one may note that in Connacht only 12% of the population live in towns (over 1,500), and in the three Ulster counties of Eire only 8%; these figures show how slight the urban imprint may be in a landscape and underline the point already made that very small places of only a few hundred people are quite essential to the rural community. Yet in most parts of Leinster, which has larger farms than either of the two areas just mentioned, and also has a tradition of town life dating back to Norman times, one-third of the population is in towns, which are mostly strong market centres with a certain amount of industry. Similarly, Munster has as much as one-third of its population in towns, except in Kerry, though many of them are declining, partly because they are less industrialised than the Leinster towns and partly because in many cases the last survivors of the old garrisons have gone. Throughout the country, numerous towns have lost population in the last fifty years, or have grown very slowly, except in the case of Dublin and certain industrial centres in Northern Ireland.

There are seventy-two market towns of 1,500-5,000 people in Eire, but only seventeen in Northern Ireland, where they are found mainly in the less industrialised parts of the province: almost all these are market centres, though a few, such as Donaghadee, Ballycastle and Warrenpoint in Northern Ireland, are also holiday centres. For the most part, these towns show little sign of expansion, except where they become residential centres or have attracted some industry, and in many cases they are sinking down towards the lower status of the places called 'towns' only by usage and courtesy. But their very frequency in the landscape makes them important: placed at a distance of a few miles one from another, they are banking, shopping and general commercial centres, galvanised into great activity at the monthly fairs but extremely restful at all other times. A few have weekly markets, especially in the north, but these are pale shadows of those in many English towns as most of the produce not reaching the fairs is sold direct to dealers on the farms or to shops and agents in the towns. In Northern Ireland some small towns have industries, mainly linen or milling, and in Eire a number of the various factories sponsored by the government as part of the re-industrialisation plan are in quite small centres. The vitality of such towns depends largely on the enterprise of a few families, though most of them have a market area of at least fifty square miles, and some considerably more. They generally show more signs of sophistication than 'towns' of less than 1,500 people, as their shops have a wider range of goods, and there are

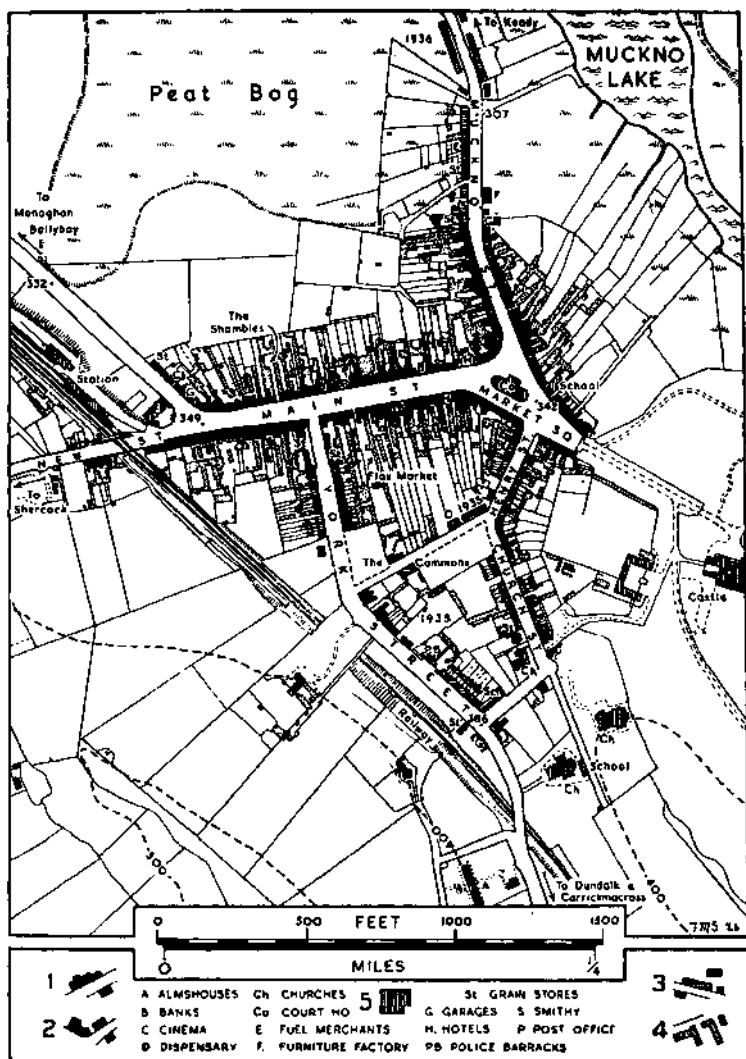


FIG. 26.—CASTLEBLAYNEY, CO. MONAGHAN, 1946

1, Shops, including licensed premises; 2, Substantial houses; 3, Smaller houses and cottages, with dates of recent additions; 4, Outbuildings; 5, Public buildings.

Castleblayney is a compact town (population in 1946, 1,765) much less changed by recent building than many small Irish towns.

Based on the Ordnance Survey, 25" to one mile, 1909-1910, by permission of the Minister for Finance of Ireland.

Drawn by F. M. Synge and first published in 'Irish Geography' vol I, p. 121.

usually three or four banks, a new cinema and even a technical school (see Fig. 26).

Only twenty-three towns of 5,000-10,000 exist in Ireland, of which six are in Nordiern Ireland. These are the more successful, and generally slightly industrialised, of the market towns: some, such as Carlow, Tullamore (Offaly), Ennis (Clare), Mullingar (Westmeath) and Omagh (Tyrone), are county towns. All of these have factories, and a number of others, such as Clonmel, Thurles and Enniscorthy, are also 'good' towns (to use a local expression) having a well-developed commercial life with some measure of industrialisation. There is every sign that many of these towns are growing and will graduate up into the next group of towns, those over 10,000, though a few, such as Cobh, Co. Cork, an old British naval station, continue to decline. Some of these towns have a venerable history and began as Anglo-Norman strongholds or strong points in the Tudor and Stuart plantations, and not a few of them still have an ancient church or vestiges of the mediaeval walls; in some, the imprint of Georgian building survives to this day (see Fig. 27).

Ireland has only twenty-two towns with more than 10,000 people, of which Belfast and Londonderry in Northern Ireland, and Dublin, Cork, Limerick and Waterford in Eire, are ports and major regional capitals: of these, Belfast (438,000 in 1937, and 448,000 in 1947) and Dublin (with Dun Laoghaire, 513,000 in 1936, and 551,000 in 1946) are in a class by themselves. Belfast dates back to the seventeenth century as a market centre, but became a great industrial town and port in the nineteenth; Dublin was founded by the Norse people and has been the acknowledged capital for nearly* a thousand years. Londonderry (48,000 in 1937, and 49,000 in 1947) is, like Belfast, a Stuart plantation town: the three others in Eire are, like Dublin, creations of the Norse traders. Their populations are: Cork, 81,000 in 1936, but 75,000 in 1946 (though around 100,000 including the outer suburbs), Limerick, 41,000 in 1936, and 43,000 in 1946, and Waterford, 28,000 at each Census. There are thus two major commercial capitals, comparable in size yet different in other ways, and four others, widely separated one from another and owing part of their strength to distance from the two capitals. Of the regional capitals, Londonderry has perhaps been the least fortunate, as part of its natural hinterland, the county of Donegal, is now cut off by a customs frontier.

Some of the remaining towns of Eire within the 10,000 + group are also regional capitals having an importance in the life of the country far greater than their modest size would suggest. Galway, of Anglo-Norman origin, and for many generations an outpost of urban life in the west, is the largest town of essentially rural Connacht, and has grown in



FIG. 27.—TULLAMORE, CO. OFFALY, 1947

1, Substantial houses; 2, Smaller houses and cottages; 3, Outbuildings; 4, Shops and licensed premises; 5, Industrial premises; 6, Public buildings.

This town is more thoroughly industrialised than most provincial centres, and a distillery is prominent. The nucleus is compact, but housing is spreading in ribbons along the various roads

Based on the Ordnance Survey, 25" to 1 mile, 1912, by permission of the Minister for Finance of Ireland,

Drawn by F. M. Synge and first published in "Irish Geography," vol. 1, p. 145.

population from 14,000 (1926) to 20,000 (1946) through industrial expansion and increased trade. Dundalk (19,000 in 1946¹) and Drogheda (16,000) are growing towns on the east coast, at once market centres, factory towns, and, more obviously in the case of Drogheda, ports. Sligo (13,000), Wexford (12,000), Kilkenny (10,000) and Tralee (10,000) are all market towns with some industries, practically stationary in population during the last fifty years, but yet important for their wide commercial contacts. Bray (11,000), near Dublin, is a more recent growth than any of those just named, and is partly a residential and holiday centre and partly a market town on a site of particular beauty, with hills at either extremity and the Leinster chain in the background. The town is, however, less attractive than its situation.

Eight towns in Northern Ireland have 10,000-20,000 people, of which Bangor, a holiday and residential town near Belfast (16,000 in 1937, and 19,000 in 1947), is the largest. Of the remainder, only Newry (13,000) is outside the industrial complex which has Belfast as its nucleus. In the eighteenth and early nineteenth century it was a prosperous port and market centre, but, like many of the smaller ports, it has seen its trade drawn away to the larger centres and has remained virtually static in population during the past fifty years. The six other towns of this class—Lisburn (13,000 in 1937, and 14,000 in 1947), Lurgan (14,000 and 15,000), Portadown (12,000 and 13,000), Larne (11,000), Newtownards (11,000) and Ballymena (13,000 and 14,000)—are all within a radius of thirty-five miles from Belfast and have grown since the linen industry left the homes of the farmers in the mid-nineteenth century for the factories.

There is little likelihood that any new towns will arise in Ireland, as most of those already in existence are eager to add to their population by providing more work in factories, both in Eire, where the government's industrial planning has been especially welcome in the provinces, and in Northern Ireland, where the industries depend fairly closely on world markets and the fear of a slump is always present. Dublin, on the other hand, has shown since 1922 a revival in its fortunes, and has grown with a rapidity due in part to its substantial share in the re-industrialisation, to its expanding trade, and to the increase in its professional and commercial population after it became the capital of a self-governing state. There are complaints in the provinces that too much of the country's wealth is drawn to Dublin by the increasing centralisation of the times, especially as by far the greater part of the shipping is drawn to its large and expanding port. Already Dublin, with its wide range of industries, has almost one-fifth of the population of Eire; but, with 300,000, had only one-twentieth a century ago: Belfast, with its complex of industries based on

¹ Figures are for 1946 in Eire, 1947 in Northern Ireland, unless otherwise stated.

linen and shipbuilding, now has one-third of the population of Northern Ireland, but a century ago, with 70,000, had only one-twentieth.

The only type of town that has increased without exception in Ireland is the holiday and residential centre, but there are no large parasitic growths such as Brighton or Blackpool, or even the string of resorts on the coast of North Wales: apart from Dun Laoghaire, which is in effect a line of Dublin suburbs, the only large residential places are Bangor and Bray. But a number of other towns, such as Warrenpoint, Donaghadee, Portrush, Ballycastle and Portstewart in Northern Ireland, and Greystones, Tramore, Buncrana and Bundoran in Eire, draw at least part of their living from visitors. None of these towns has more than 5,000 people. Killarney (6,000), the most famed of the Irish tourist centres, lives for the greater part of the year as an ordinary market town, with its hotels waiting for summer visitors. Many of the famous tourist centres, especially in the south and west, are remote and isolated places, with attractions centred on sport rather than on the varied forms of entertainment provided by English resorts. The 'holiday camp' with its highly organised days and nights has only just penetrated Ireland, at Skerries, Co. Dublin. In essence, the population of Ireland is not sufficient to support more than a limited number of 'parasitic' towns, to use a term of E. W. Gilbert for such places in England. One development of recent years has been an extraordinary increase in the number of holiday visitors to Dublin and its suburbs around the bay: the city has some of the attractions of London for visitors from the provinces, combined with sea and mountain pleasures; it has also, now as for past generations, great residential attractions.

A statistical summary showing the place* in the population distribution of the various groups of towns is given below. It will be seen that exact comparisons are impossible, as there was a Census in Eire in 1936, and in Northern Ireland in 1937: in 1946 there was a Census in Eire, but not in Northern Ireland, though the National Registration figures for 1947 are used. Over the past fifty years certain major trends appear:

1. The growth of towns has been greater in Northern Ireland than in Eire.
2. The increases in the towns of Eire are more marked in the larger than in the smaller centres.
3. The rural population has declined by approximately one-quarter in both political units since 1891.
4. Emigration has been approximately equal to the natural increase from almost all the classes of towns in Eire except Dublin, with the result that many towns have fluctuated little during the past fifty years,

and even the past century. In Northern Ireland, however, several towns have increased by industrialisation.

5. The increasing proportion of the people in the towns does not indicate any considerable immigration from the countryside, except in the case of Belfast and Dublin, but shows rather that the towns have not shared in the general decline of population. In the life of Ireland as a whole the towns are now more significant than ever before, and the rural-urban balance is now not unlike that of France: in the nineteenth century it was similar to that of Finland at the present time.

STATISTICAL SUMMARY

In the following tables, which are intended as a commentary on the text, the recent trends of population are analysed in the case of large towns (over 25,000), medium-sized (over 10,000 and 5,000-10,000), and small towns (1,500-5,000). The still smaller 'towns' and villages are included in the rural population which, as explained above, has been declining markedly for the past century, though there are now signs in Northern Ireland, though not in Eire, that this rural decline is arrested.

A NOTE ON DEMOGRAPHIC PROBLEMS

Ireland is a law to itself demographically, with three remarkable features that may be ascribed partly, if not primarily, to the influence of emigration: first, an excess of males in the population; second, a late marriage age (in Eire, 35 for men and 29 for women); and third, a high proportion of bachelors and spinsters of all ages. Some of these features are found in other countries, but for quite other reasons than those relevant in Eire. In Canada, Australia, New Zealand, the United States and the Union of South Africa there is a male excess of population, but all these were countries of immigration until recently. In Eire, the male excess was first noted in the Munster province of 1891, in Connacht and the three Ulster counties of Eire, with Tyrone and Fermanagh, in 1901: but in Leinster the ratio is almost even. The excess of males is a phenomenon of rural areas only; in Eire, 1936, there were 1,111 females per 1,000 males in the towns, but only 875 females per 1,000 males in the rural areas. There is only one female worker to five males on the land, and while this figure does not include those who work in the farm-houses, it explains to some extent why women have figured so prominently as emigrants. Since 1939, however, there has been more demand for men in Great Britain than for women, and so for Eire the sex ratio has changed towards parity: in 1936 there were 952 females per 1,000 males, but in 1946, 976 females.

TABLE H.—POPULATION, 1891-1946

EIRE

	1891.	% Total Population.	1926.	% Total Population.	1936.	% Total Population.	% Change 1891-1936.	1946.	% Total Population.	% Change 1891-1946.
Dublin, Cork, Limerick, Waterford	518,063	14.9	610,601	20.6	699,040	24	+36.2	739,719	25.1	+43
Other towns over 10,000	81,142	2.3	84,834	2.9	92,806	3	+ 13.3	100,177	3.4	+25
5,000-10,000	89,091	2.6	86,359	2.9	90,191	3	+ 1.2	92,531	3.1	+4
1,500-5,000	183,292	5.3	171,001	5.6	175,702	6	-4.0	181,216	6.1	— 1
Rural areas	2,597,106	74.9	2,019,197	67.9	1,910,681	64	—26.5	1,839,622	62.3	- 2.9
Total	3,468,694	100	2,971,992	100	2,968,242	100	-14.4	2,953,265	100	-14.9

Note (1) The Dublin 'conurbation' is here taken to include the city, Dun Laoghaire, Howth (now included in the city of Dublin) and Bray urban district. So defined its population was 362,000 in 1891, 442,000 in 1926, 523,000 in 1936, and 562,000 in 1946. See also p. 294.

(2) The Cork 'conurbation,' or the humble relation of a conurbation, includes the southeast and southwest suburbs, as denned in the 1936 and 1946 Census reports, Blackrock, Cobh, and Passage West. The 1891 population of these areas is estimated at 92,500; 1926, 102,000; 1936, 107,000, and 1946, around 106,000. Unlike the Dublin area, Cork now shows little sign of a continued growth of population: Limerick and Waterford are also virtually stationary.

(3) Many of the smaller towns are declining: on this see Fig. 24, p. 139.

TABLE ffl.—POPULATION, 1891-1947

NORTHERN IRELAND

	1891.	% Total Population.	1926.	% Total Population.	1937-	% Total Population.	% Change 1891-1937.	1947.	% Total Population.	% Change 1891-1947.
Belfast conurbation, Londonderry	312,891	25*4	495,599	39*6"	524,187	40-9	+ 67	542,836	40-6	+ 73
Other towns over 10,000	56,696	4'6	70,614	5 6	73,519	5-8	+ 30	76,752	5'8	+ 35
5,000-10,000	28,849	2-3	30,611	2-4	33,225	2-7	+ 15	35,940	2 7	+ 24
1,500-5,000	32,419	26	36,276	2 9	40,530	3-2	+ 25	45,901	3'4	+ 41
Rural areas	805,201	65-1	621,342	49 5	605,856	47*4	- 25	634,394	47-5	—22
Total	1,236,056	100	1,256,561	100	1,279,745	100	+4	1,335,823	100	+8

Note (1) The Belfast conurbation is here taken to include the city, Holy wood, Bangor, Carrickfergus, and Lisburn: a revision of the city boundaries would show that the city has a greater increase than these figures suggest. As defined here, the conurbation's population was 280,000 in 1891, 450,000 in 1926, 477,000 in 1937, and 494,000 in 1947. In effect there are at least half-a-million people living in Belfast and its immediate vicinity. The point has been made elsewhere (p. 144) that the city of Belfast developed later than Dublin; on the other hand, the growth of Dublin and its immediate satellites has been much greater than that of the Belfast conurbation in the past twenty years.

(2) The increases in the remaining groups of towns are in every case larger than those of the similar groups in Eire, and in general this may be taken as an indication of a greater degree of industrialisation.

(3) While the rural decline since the end of the nineteenth century is notable, there are signs that it may be arrested, though many areas in which little industrial employment was available were declining in numbers between 1926 and 1937, and in all probability still are.

The late marriage age was noted by Oldham in 1913, who observed that only one-third of the women in Ireland between the ages of 15 and 45 were married and that 'the young people in the rural parts ... never think of marrying* until all hope of emigration to America had faded. About one-quarter of the men and women in Eire never marry at all, against one-tenth in England. This tendency to delay marriage has arisen gradually during the last hundred years; in 1841 only one-tenth of the population died unmarried. The possibility of emigration is only one of many factors involved: the many others include the celibacy of the clergy, monks and nuns, the tendency of adult families to remain together on farms until an elderly parent dies, the lack of suitable farms for young couples to occupy, the presence on farms of resident domestics and labourers who remain single, the fact that single people find others similarly circumstanced, and the diminishing readiness to accept standards of life that would have been normal even fifty years ago. Although the proportion of single people is so high in Eire and in Northern Ireland, the natural increase of c. 5-6% in each ten years is due to the high birth-rate of around 20 per 1,000: in Eire, the ratio of children per 100 married women under 45 years of age in 1930 was 123, nearly 20% more than in Portugal, the closest competitor, and twice as many as in England and Wales. Though a country of late marriages and having a remarkably high proportion of single people, any fear of population decline comes only from emigration, as the net reproduction rate is above parity.

Every student of population problems asks himself whether a country is, or has been, over-populated, and this is clearly a pertinent question in Ireland. Poverty is an obvious criterion of over-population and readiness to emigrate among a large section of the community is commonly taken to be at least symptomatic, if not decisive. But the vital factor is whether one considers over-population in relation to the present use of resources in town and countryside, or in relation to a society organised or reorganised on different economic lines; that is, things as they are or things as they might be. Since every country is constantly changing its use of resources from year to year, every judgement must refer to conditions at one moment of time, such as the Census dates, or of the late summer of 1845, when the potatoes had been ruined by blight. Calamities create a problem that can be met on a short-term basis by palliatives and on a long-term basis by reconstruction. There can be no doubt that in the Ireland of 1845 so many people were so desperately poor in any case that a bad season meant catastrophe: the population of 1945, half that of a century earlier, was better off economically, but still included some communities of very poor people obliged to seek resources other than their own land. At the same time, there are fears of under-population,

especially in some of the large farm areas, as a scarcity of labour is already felt by many farmers, particularly in the dairying districts. Labour shortage is a new phenomenon in Ireland and may indicate that too many people, or at least that too many with certain types of skill, are leaving the country. It may therefore prove that the mid-twentieth century will be a time of labour shortage, and that its problems will be exactly opposite to those of the mid-nineteenth century, and that the real necessity of the future will be so to limit emigration that the country's economic and social advance shall not be vitiated by the lack of sufficient people to work the land, to develop industries, to supply skilled labour and to provide the professional services on which progress depends.

REFERENCES

The main statistical sources are the reports of the *Census of Ireland to 1911*, the *Census of Northern Ireland, 1926 and 1937*, and the *Preliminary Report of the Eire Census of 1946*. The Census reports are arranged by counties in Northern Ireland, and in Eire by subjects, such as the population of each administrative area, occupations, religion and birthplace, language: all the information is summarised in an excellent General Volume which appears, however, several years after the Census. The *Ulster Year Book*, 1925, 1939, 1932, 1935 and 1947, also has general information: the 1947 figures used in the text are taken from this source.

Historical works include Young, A., *Travels in Ireland*, ed. Hutton, 1892, which has a number of interesting comments on the time at which, apparently, the marked rise of population was beginning. Conditions in the early nineteenth century are treated in many books and papers, of which two are of special interest: Adams, W. F., *Ireland and Irish Emigration to the New World*, New Haven, 1932, and Hansen, M. L., *The Atlantic Migration, 1607-1860*, London, 1940. The various pre-Census estimates are discussed in the *Saorstat Eireann General Report of the Census of 1926*, Dublin, 1934, and the evidence has recently been reassessed with new material in Connell, K. H., 'The population of Ireland in the eighteenth century,' *Economic History Review*, vol. 16, 1946, pp. 111-124. The circumstances of the times and the use of the potato as a dietetic staple were the subject of a Finlay Memorial Lecture, published as Salaman, R. N., 'The influence of the potato on the course of Irish history,' Dublin, 1943.

Emigration has been discussed by many writers in terms of its effects at home and abroad. For Ireland itself, see O'Brien, W. P., *The Great Famine in Ireland and a retrospect of the fifty years, 1845-1895*, London, 1896, and Carruthers, W. A., *Emigration from the British Isles*, London, 1929: the article by C. H. Oldham on 'Town and country life in Ireland,' in *Oxford Survey of the British Empire*, ed. H. J. Herbertson and O. J. R. Haworth, London, 1914, vol. 1, chapter 17, is an interesting period piece. The works by Micks, W. L., Arensberg, C. M., and Kimball, S. T., and the Gaeltacht Commission (see bibliography on p. 184) all comment on the social effects of emigration. Contemporary material is available in the *Irish Trade Journal*, published quarterly in Dublin, the annual *Statistical Abstract of Eire*, and future historians will find interesting material in the newspapers, including the *Irish Review and Annual*, published at the beginning of the year by the *Irish Times*, Dublin. Regional studies by the author of this book are printed in the *Journal of the Statistical and Social Inquiry Society of Ireland*, Dublin, vol. 16, 1939: 'Migration movements and the distribution of population in Eire' (abstract in *Geogr. Rev.*, vol. 29, 1939, pp. 507-508); 'The changing distribution of population in County Donegal,' vol. 16, 1940-1941, pp. 31-46;

'The changing distribution of population in Kerry and West Cork/' vol. 16, 1941-1942, pp. 28-43; 'The changing distribution of population in County Mayo,' vol. 17, 1942-1943, pp. 85-106; 'Population distribution in County Sligo,' vol. 17, 1943-1944, pp. 254-268. General papers by the present author are 'The congested districts of western Ireland,' *Geogr. Rev.*, vol. 33, 1943, pp. 1-14; 'Emigration and Rural Ireland/' *Journal of the Statistical and Social Inquiry Society of Ireland*, vol. 17, 1944-1945, pp. 404-422, and 'The agricultural regions and rural population of Eire,' *Bulletin of the Geographical Society of Ireland (Irish Geography)*, vol. 1, No. 2, 1945, pp. 21-30; the density of population in relation to agriculture is discussed in 'Farming in Irish Life/' *Geogr. J.*, vol. no, 1947, pp. 38-56. Population problems are also discussed in numerous papers in the *Journal of the Statistical and Social Inquiry Society of Ireland* since it first appeared in 1847: one of particular importance is Geary, R. C, 'Irish population prospects from the viewpoint of reproduction rates/' vol. 16, 1940-1941, pp. 91-122.

All these papers bear on the question of the effects in Ireland: few writers deal with the Irish abroad, but two of special interest are Handley, J. E., *The Irish in Scotland, 1708-1845*, Cork, 1943, Handley, J. E., *The Irish in Modern Scotland*, Cork, 1947; see also Walshaw, W. S., *Migration to and from the British Isles*, London, 1941, and *Migration to and from Mersey side Liverpool*, 1938 (University, Social Science Department: Statistics Division). Many of the works listed in the bibliographies for chapters 5, 7 and 8 also comment on population: this list of references is necessarily only a skeleton of the whole.

CHAPTER VII

SETTLEMENT AND SOCIETY

PHRASES SUCH as 'unhappy Ireland' are frequently found in books dealing with the history of Great Britain, and the tragic muse has frequently presided over the country's life. Henry VIII hoped to make Ireland prosperous and happy, and others, before and since his day, have believed that its problems could be solved by an arrangement of economic life which would ensure an adequate livelihood for everyone: in addition, some of the more enlightened have seen that freedom of choice, both political and religious, was also necessary. In fact, economic, political, social and religious aspects are so intertwined that there is no single key to the problems of Irish life, though it is possible to separate out certain factors as crucial. The first of these is the dominance of the agricultural scene in the landscape, and the fact that possession of land is the main desire of the rural population. The second major factor is that work on the land cannot provide a living for more than a comparatively small proportion of the people brought up on the farms, and the rest must go elsewhere, either to the Irish towns or overseas, so that there is a permanent reserve of manpower (and womanpower) on which employers may draw. The third factor is the lack of large-scale industry in Ireland except in East Ulster, the only area with an industrial complexion like that of Clydeside or Tyneside: there is, however, a measure of re-industrialisation in Eire through deliberate planning which, though providing work for thousands of people, cannot stem the outgoing tide of emigration.

It would be possible to argue, as many do, that Ireland is under-farmed and under-industrialised, and could in fact support a much larger population than its present four and a quarter millions, given wiser planning (if planning is really the key to all social problems) and increasingly close economic relations with other countries. No attempt will be made here to romanticise the life of rural Ireland, still less of the towns: instead one must recognise that many problems and tensions centre around the use of land, religious allegiance, and the political outlook of the inhabitants. The picture is not entirely dark, for since 1870 the land has gradually been transferred to the people who farm it, a more tolerant spirit has developed on religious differences among some sections of the population (though not all), and the division of Ireland into two political units has proved at least a partial solution of vast problems; though there are

still wide divergencies of outlook among the people of Ireland, with roots lying deep in an historical past that frequently becomes an historical present. On the one hand, there are Irishmen who are determined to see the six counties as an integral part of the United Kingdom; on the other, those who desire a completely independent republic of thirty-two counties: all gradations of opinion lie between.

This chapter deals with five main topics: (a) the people and the land, (b) settlement types, (c) social factors, (d) distribution of religions and (e) the Irish language. The story of the revolutionary change in land tenure achieved during the past eighty years is told in Chapter VIII, as it is naturally closely connected with the agricultural life. But all the various factors are closely related and separated out only for the sake of clarity in a situation of great complexity: obviously the material in this chapter can only be understood in relation to historical development (Chapter V), the economic aspects of agriculture (Chapter VIII), and population problems (Chapter VI). It is important to realise that the distinctive qualities of Irish life, which make it essentially different from its nearest neighbour, Great Britain, are not of recent origin, but have existed in one form or another throughout recorded history.

THE PEOPLE AND THE LAND

Ireland's main resource is the land, and its prosperity depends very largely on the maintenance of good prices for agricultural produce in the export market. Although the governments in both Belfast and Dublin are conscious of the need for maintaining and improving the industrial output, they have to rule a country that resembles France rather than Great Britain in its balance between town and country, factory and field. Thus, 48% (1936) of the employed population of Eire and 26% (1926) in Northern Ireland were working on the land as against 7% in Great Britain. These figures bear an obvious relation to the estimates that in Eire three-fifths, and in Northern Ireland two-fifths of the population live in the rural areas, for many people depend indirectly on the land while not actually working on it. Gradually during the past eighty years the farmholder has become the owner of the land, or else possesses every prospect of ownership. The days of the wealthy absentee landlord are past, and the *rentier* class have seen most of their demesnes turned into farmlands or forestry plantations. The surviving rural aristocracy can retain their land only if they put it to profitable use; otherwise they will see the earthen banks of the Land Commission built between new fields or their woodlands incorporated in new plantations. In many parts of the

country there is 'land hunger',* which leads to a traffic in land known as 'conacre'* letting, by which some farmers let off fields on an eleven months' tenure for grazing, meadow or crops to the highest bidder. This normally means that the land is exploited to the full, in some cases ruthlessly so, in order to gain a quick return.

The housing standards of the rural population have been vastly improved by various government schemes, and the poor cottages, thatched and attractive in appearance but inadequate as dwellings, have in countless cases been abandoned in favour of new cottages with pebble-dash walls, manufactured tiles or imported slates. These new cottages are perhaps aesthetically alien to the landscape, yet they are already part of it. They are occupied either by farmers of a few acres or by labourers: each cottage has a patch of ground for the cultivation of vegetables. Some of the old cottages are used as cowsheds or stores, but unfortunately many of them are left to moulder into decay with the result that some villages appear to have suffered from war devastation on a substantial scale. In many parts of Ireland, both in the countryside and the towns, a demolition squad charged with the job of removing all derelict and useless remains of buildings would be a great social asset. Each county normally has its own cottage design: in Co. Dublin and Co. Wicklow, the cottages have white walls, but in Co. Meath the walls are salmon pink and the roofing materials also are varied, though red tiles are frequent; in Co. Kilkenny there are also asbestos slates. It is sometimes possible for the traveller along the roads to mark his passage from one county to the next by the change in cottage design, and by the variations in the quality of the road surface: a sudden jolt to the cyclist may mean that he has arrived in another county.

On the whole the farm houses correspond in size fairly closely to that of the farms around them. The medium-sized holdings, of 30-100 acres, generally have two-storey houses and farm buildings grouped around a yard. While every part of Ireland has farms of large, medium and small size, the medium-size farm, with its two-storey house, dominates most of the Central Lowland and almost all the south from Wexford to Kerry. The holders of small farms generally live in one-storey cottages, some of which cover a sufficient ground space to give the family several rooms. Co. Meath and Co. Dublin have some of the largest farms in Ireland, around houses correspondingly substantial; here, too, cottages are numerous, for a considerable number of labourers are in regular employment. The Irish rural scene still has a wide range of standards, both in housing and in economic organisation, though the extremes of wealth and poverty characteristic of the eighteenth century are no longer general: far from being inhabited by a standardised peasantry, the country shows

contrasts similar to those between the farmers of the rich country around Aberdeen and the crofters of the Western Isles.

The capital possessed by a farmer consists of his land, his house and farm buildings, his equipment and stock and, most important in the estimation of many, a sum of money deposited in a bank. The outlook of the farmer is conditioned largely by the possibilities of emigration for some of his family, or of acquiring income from some outside source. The investigations of Arensberg and Kimball in West Clare showed that the farmers there cannot provide for the whole family, and therefore some 'must travel.' A son, not necessarily the eldest, will succeed to the farm, a daughter will be given a dowry, frequently of a surprisingly large amount, and the rest will join the emigrant stream as various types of workers. A similar pattern of life was revealed in the Graiguenamanagh area, Co. Kilkenny, where the farms are two to three times as large as those of West Clare and give a much greater financial return. The actual crisis in the affairs of the family appears at a different time in the two areas under discussion: in Clare the old people retire when around seventy years of age, and live on the old age pension which they regard as comparative affluence, and meanwhile the farm is made over to a married son. In Graiguenamanagh, however, there was little evidence that the farmer ever retired, and he or his widow generally remained the 'farmer' until death. In a third region, around Castleblayney, Co. Monaghan, near the present border between Eire and Northern Ireland and within the historic province of Ulster, many farmers of a thrifty nature steadily accumulate farms for the eventual use of their sons, in the meantime using them as extra land or letting them out as 'conacre' (see p. 156). The more intensive farming characteristic of the Ulster province gives greater financial returns than those, acquired elsewhere, and the purchase of land is frequently possible.

There are in Eire (1936) some 260,000 farmers, of whom 213,000 are men and 47,000 women: 35,000 of the latter are widows, more than half of whom are over sixty-five years of age. The farmers are assisted by 147,000 sons and 45,000 daughters working on the land, and by many more engaged in the households. Almost all these people are single, whatever their age. As retirement is the exception rather than the rule, the sons of farmers rarely acquire the land until they are at least thirty-five years of age: thus, only 6% of the male holders of land are less than thirty-five, but 27% are more than sixty-five years of age. The dominant position held by elderly people in Ireland has been brought out by Arensberg and Kimball in their study of Clare: the farmer's son is a 'boy' in common parlance, and not least in the estimation of his venerable parents. The strong family ties characteristic of the country tend to

perpetuate this social attribute and the family worker, son, daughter or relative, is found on almost every farm throughout the land. Few farms can be divided without making uneconomic holdings, few new farms can be made by land reclamation, and few farms are worked on a partnership basis, but the holders and their assisting relatives are as deeply rooted to the soil as the peasantry of France, and it is to them the good earth that the family will till for generations to come.

The adjustment necessary when a farm passes to the next generation will be achieved suddenly or gradually; in some cases, the heir will not be known until the will is produced after the funeral. Two women farmers interviewed near Graiguenamanagh revealed that they had not chosen their successors from among their sons: one favoured 'the most careful member of the family/ another 'the one with the least brains/ Many sons and daughters will have left the farm long before retirement or death of the farmer compels them to do so: they will generally seek work near home, probably without success unless there is a factory in the neighbourhood, but the majority must find an occupation suited to their capabilities and education in Dublin or abroad. The Irish maid and labourer come from the humbler home, the professional worker from the larger farm household in which the cash income has been sufficient to provide some preliminary education in the secondary schools and universities. Compulsory education to the age of fourteen has removed illiteracy from Ireland, though as recently as 1911, 12% of the population were unable to read or write, and in 1841 72% of the population were illiterate. Education is often regarded as the passport to emigration, and many of the farmers withdraw their sons from school at the age of fourteen if they are destined for farming. A considerable proportion of the Roman Catholic farm families have a son in the priesthood and a daughter in a convent either in Ireland or abroad. While the view of the family is in many ways strongly parochial, the universality of emigration implies that almost every home has a link with some distant place.

Dependence on seasonal labouring jobs varies according to the status of the farm. In East Clare, for example, many of the farmers contract with the County Council to maintain the by-roads or to work on the main roads at a rate of six shillings a day for an unskilled labourer and nine shillings for a farmer bringing his own horse and cart. The gangs on Irish roads are generally recruited from the local labourers or the farmers of small patches of land, and in many parts of the country all the heavy roadwork is done during the winter, when farm work is slack. The Reports of the Congested Districts Board in the last decade of the nineteenth century drew attention to the virtual idleness of the people from November to February in many parts of the West of Ireland, but **road**

work now fills these months for many of the men. The farmers' sons who earn money in this way generally hand it over to the father. The humbler farmers will also give part-time service on many of the larger farms on jobs such as winter ploughing, harvesting, hedging or turf cutting. In addition, they help one another by lending tools for mowing, spring sowing, harvesting, hedging or turf cutting, or by providing helpers at any time of special pressure on the farm. The 'boy*' (farmer's son) goes round to sow and reap on other people's farms and paid labour circulates in much the same way without any money transaction, but with the obligation of returning the service in due course. Women will combine to make up a firkin of butter or will 'lend a girl' to help in another household when needed. In times of distress, neighbourly assistance takes the form of a collection or even presents of actual cattle for the unfortunate. There are, in fact, many signs of traditional co-operation, some of which are common to many rural communities. Unfortunately the obligations of hospitality are a severe drain on many of the poorer households, and particularly large sums are spent on weddings and funerals: at the latter whiskey and other refreshments must be provided for those who 'keep the wake'—that is, watch over the dead day and night. The clergy have, however, discouraged wakes by encouraging the removal of the body to the church as soon as possible, and it is the custom for the funeral to take place only two days after the death. The clinching of deals at fairs also involves some expenditure on drink, though some of the farmers belong to the Pioneers, a total abstinence movement founded in 1898: this organisation has an adult membership of 360,000.

SETTLEMENT TYPES

The arrangement of the farmhouses is normally dispersed, though it has recently been argued that in parts of Donegal, and possibly elsewhere, there were numerous clustered settlements a century ago, and that the scattering of farmhouses is a recent development. E. E. Evans sees in the *clachan*, or group of farms, the survival of larger settlements; now, however, the farmed landscape is dotted with houses spread in what normally appears to be a completely haphazard fashion over the cultivated land. A rough track, or *bohreen*, leads to the lanes, which in turn lead to the main roads. In those parts of the country where cultivation is restricted to patches of ground moraine surrounded by bogs, or where the farms are themselves clearings in the bogs, the houses in many cases line the roads. The new farms made in some of the land settlement schemes in former demesnes are also situated mainly along the roads, and many of the new cottages are similarly placed. Dispersion has such variety that no single controlling influence may be recognised, though

the appearance of a landscape is naturally affected by the intensity of the human occupation (see especially pp. 135-136).

Villages in the English or continental European sense are rare in Ireland, though the Census of Eire separates out clustered settlements as 'groups of twenty houses or more/ Consequently, some Villages' will appear for a Census or two and then disappear: a more useful indication of dispersion is that in 1936, 57% of Eire's population lived outside all towns and villages. The rehousing programme has in most cases fitted into the pattern of dispersion, though there are complaints that too many new cottages are built far from water and lighting: some authorities now favour building near to existing villages when possible. The planned village or town associated with the manor house is rare but not unknown in Ireland, though some villages grew up around a castle, a church or a fairground. As a rule several miles separate any town or village from the next, and the resultant pattern of nucleated settlement is a mere skeleton of that in many parts of the English Lowland or the Paris Basin. Places with a few hundred people in Ireland are generally towns in function, for their monthly fairs and their shops may serve an area of fifty to one hundred square miles. Many of the farmers who are in remote districts visit the towns only on fair days and rely for their immediate sales and purchases on the travelling merchant, and part of the avowed aim of the government-sponsored transport combines is to bring commercial facilities within easy reach of every farmhouse in Ireland, however remotely placed.

Towns in Ireland have four main functions: they provide commercial contacts between the rural community and the outside world; they are centres of banking, education and professional services; they manufacture part of the agricultural output, and they have factories which manufacture goods for the home market or for the export market, most notably in the case of the linen industry. The first two functions are common to all towns, but the third and fourth imply a more advanced stage of economic organisation in which agriculture has passed from primary production into processing and industry has entered deeply into the life of the countryside. The aim of the social planner is to produce a well-cultivated agricultural scene with towns sufficiently large and enterprising to maintain a vigorous social and intellectual life, an ideal rarely met by the Irish towns, as they are for the most part excessively dull except on fairdays, and many of them are of unattractive appearance, with the majority of their population housed in poor cottages. In common speech, they are known as 'good*' and 'poor.* A 'good*' town is one which possesses a well-established trade with the countryside, one or more hotels, a few workshops or even a factory providing employment, and some amenities. It

may be small or large: thus Graiguenamanagh with 845 people and Clonmel with 10,000 are both regarded as 'good.' Some towns have been successful and others have not and their fortunes have been conditioned largely by the enterprise of the people living in them. There are generally a few prosperous traders whose shops, in the smallest towns, cater more obviously for the sowing of fields and the care of cattle than for the furnishing of homes and the stocking of larders. In the larger provincial towns, however, the shops are frequently of a surprisingly high standard and carry enormous stocks, as their trade covers a wide radius. Many towns possess an extremely large number of very small shops, most of which have their own links, often on a family basis, with a particular rural neighbourhood or with a group of families: Arensberg and Kimball ascribed this to the owner's marriage with a farmer's daughter, after which he acquires the trade of her relatives and friends. Individuals of enterprise may achieve an extraordinary range of commercial power in some of the smaller towns. One such was described on his billhead as an 'auctioneer and valuer, family grocer, corn and seed merchant, corn buyer'; in addition he kept an hotel, had a farm immediately behind it, and sold agricultural machinery.

The proportion of town dwellers to rural population is highest in the richer parts of the country: thus in most parts of Leinster and Munster one-third of the whole community is urban as against one-sixth in Munster and the three Eire counties of Ulster. On the other hand, Co. Leitrim and Co. Roscommon, with a total area of 1,500 square miles, have only 11 % of their population in towns and villages, and in many parts of Ireland there is a degree of dependence on agriculture that recalls eighteenth-century conditions. Many of the Irish towns have decreased very considerably during the past hundred years, and the efforts to revive them by industrialisation based on electric supply have arrested their decline rather than added to their population in any considerable degree. As most of the new industries depend on imported raw materials, the natural advantages possessed by the ports are obvious, and in the absence of government planning most of Eire's new industries would probably be placed mainly, indeed almost entirely, around Dublin, or else in the three other regional capitals, Cork, Limerick and Waterford, all of which have a long-standing industrial tradition. The Georgian facade in each of these four towns shows that they are not industrial creations of yesterday, but the well-established ports, commercial centres, Cathedral cities and manufacturing towns of a country depending primarily on the land. Unfortunately they all possess severe housing problems which are due to two main causes: first, the decay of some of the Georgian property into one-room tenements, particularly in Dublin, and second, the heritage

of wretched cottages built from the eighteenth century onwards to house an increasing number of families.

Dublin's slums are justly notorious: in 1936, 35% of its population were 'overcrowded,' or living at a density of more than two to a room. The corresponding figure for Belfast was 8*5% and for Glasgow, 42%: Glas gow is a city of tenements, but Belfast has small working-class houses comparable with those of English industrial towns. There were 84,000 people in Dublin city and county living in one-room tenements, and one ward, Mountjoy, had almost half its population living at a density of more than four persons to a room, mainly in houses that belonged to the gentry in the eighteenth century. The problem is accentuated by the fact that many people come to Dublin in search of work, fail to find it, and drift into the slums. Courageous efforts have been made to deal with these problems along three main lines: first, the entire reconditioning of tenement houses near the city centre; second, their replacement by blocks of modern flats; and third, housing schemes in the suburbs. A further problem is provided by the large number of small cottages, some of them behind the fairest Georgian squares and streets, built at various times in Dublin and long since decayed: many of them have been pulled down and some, indeed, have fallen down of their own accord. On the other hand, the city has also strong residential attractions. Georgian houses of the same date and style are tenements in Mountjoy Square and homes of the wealthy in Fitzwilliam Square, though flats and hotels are spreading through most parts of the eighteenth-century city. The Georgian tradition of spacious road planning and building, frequently in long terraces, continued on into the nineteenth century, with the result that most of the older suburbs have a dignity not found in many towns of later origin. The outer suburbs are more like their English equivalents, and consist mainly of neat labour-saving homes entirely lacking the external dignity of the older basement houses. Dun Laoghaire, a second urban focus, still independent of Dublin in its administration, is now joined to it by continuous building along the road south of Dublin bay.

SOCIAL FACTORS

The social diversions of the wealthy in Ireland are not unlike those of the English, and it is among the farmers and the poorer sections of the population that a more distinctive type of social life is to be found. Religion enters deeply into the fabric of existence, but most people derive as much enjoyment as possible in the journey through life, though the people of the centre and south generally regard the 'northerner' as an earnest, indeed a grim, type. Mere efficiency makes very little appeal to many people in Ireland, who realise that 'a man's life consisteth not in

the abundance of the things that he hath/ The assessment of this sense of values will vary according to the reader's inclinations, but its origin is not difficult to see: having risen from poverty and intermittent destitution a few generations ago, many Irish farmers find themselves relatively comfortable on incomes that would be scorned in England. Then, again, as shown earlier in this chapter, many of the family workers on the farms have no income at all, except in the form of 'pocket money,' for a great part of their lives and their normal pleasures have to be cheap, if also abundant.

Social life centres around frequent meetings, such as those after church services, or regular activities including games, dances, and gatherings for conversation or cards, or visits to inns, or else around occasional special events such as the monthly fairs, big athletic meetings, horse races and even traditional gatherings such as the 'Pattern.' The present social phase in Ireland is one of transition, for many of the older and more traditional forms of association, such as the farmhouse gatherings for conversation, the roadside dancing or the 'Patterns,' are now regarded as slightly archaic by some of the youth, whose minds turn more naturally to the cinema or the dance hall. It may well prove that the increasing sophistication of the times will remove much of the ancient folklore from the memory of men and women, though happily the Folklore Commission is collecting the rich material before it is too late. It is at least certain that religion remains more deeply rooted in Ireland than many conversant with conditions elsewhere will realise.

There are various local games played in Ireland, such as skittles in Co. Kilkenny, which may be seen on country roads, especially on Sunday, and at various skittle alleys. Another game widely played is 'handball,' in an open court not unlike a fives court: many villages and most towns have their handball alleys, but the game is not commercialised. Hurley, noted by Arthur Young in the late eighteenth century, is a hockey-like orgy in which the ball may be hurled through the air: Gaelic football bears some resemblance to both the Association and the Rugby codes. Both the English forms of football are popular, and boxing is also enthusiastically supported in many parts of the country. There are curragh races in the west, and boat races on most of the rivers, though swimming has only recently become a widespread accomplishment. None of these sports demands a large outlay, but the periodic special occasion will attract large crowds willing to spend a considerable amount of money. The Rugby and Association matches in Dublin and Belfast or the finals of the hurley and Gaelic football county championships in Dublin will attract tens of thousands from all parts of the country. On the other hand, tennis and cricket are not games played by the masses in Ireland, though tennis is established in most towns and cricket in a few. The love of a horse is

natural enough in a country breeding some of the finest in the world, and race meetings vary from sophisticated functions in the Phcenix Park, Dublin, to the country point-to-point, and even to informal affairs on the strands (beaches) of the west of Ireland. Betting flourishes, and the premises of the Irish Hospitals Sweepstake in Dublin resemble a large factory and employ several hundred people.

Cinemas have spread gradually into rural Ireland and have been very successful in the larger market towns: the smaller 'towns* of a few hundred inhabitants generally have a combined cinema and dance hall, often of extremely modern design. While the cinema is undoubtedly a potent influence among the population as a whole, in some places it is not as popular as one might expect, for some of the country people prefer a more social form of entertainment, such as a 'social/ concert or drama, where they see their friends among the audience and as performers: entertainments of this character, where they exist at all, have an obvious social value. Everywhere dancing is popular: through the country there are a number of roadside platforms which are gathering-places for the young on summer evenings, and there are both Irish and ballroom dances in various halls. A dance with Irish jigs and reels is known as a Ceilidhe, and Radio Eireann broadcasts suitable rhythmic music each evening: the traditional dances are of a more athletic character than the conventional products, and in many ways comparable with the Scottish national forms. Entertainments, dances, the cinema are all in the nature of occasional treats for many of the country people, and are commonly held to be one of the many town attractions that draw people away from their homes as migrants.

Periodic rural gatherings are an essential element in the country's life. A fairday galvanises many a small town or village into life and attracts farmers from a wide area with their cattle, sheep and pigs, which line the streets and lanes from an early hour. The fair is, however, surrounded with abuses as a system of buying and selling for the prices are varied and unpredictable, and depend very much on the persistence of the buyer and seller. An enquiry in Northern Ireland showed that returns to the farmer were liable to vary from fair to fair, and it was suggested that auction sales would bring great advantages to both buyer and seller. In many cases farmers will bring cattle into the fair from a radius often miles, driving them along the roads; they have already lost in value as a result of their long journey and sale is almost imperative, as few owners will be willing to take them back. But the fair is an historic feature of Irish country life, far more important and far older than the weekly market, which, where it exists at all, is of minor economic importance and consists only of a few carts or stalls from which pigs, chickens, feedstuffs and

vegetables are sold. The fair antedates many of the towns, and there are still fairs in the heart of the country, though the general tendency is towards centralisation.

One of the oldest forms of festival is the 'Pattern,' a gathering of a social character associated with the feast of a patron saint of a church. At St. Mullins, Co. Carlow, on the Barrow, the Pattern is held on the last Sunday in July; a travelling 'fair' with swings, roundabouts and the like appears, stalls are set up, dancing proceeds and the youth of the neighbourhood climb up a local rath, which is the centre of the show. Great mirth and play attends the efforts to climb the steep sides of the rath. The religious element of the Pattern is a commemoration of the departed members of a family by their relatives, who come from far and near to visit the graves in the churchyard, over which they weep and pray for the repose of the souls. Matchmaking proceeds in various quiet corners, and even in the churchyard itself. On the fringes of the crowd there are numerous beggars and the 'tinkers,' the gypsy-like nomads of Ireland who roam the countryside and live by various means, including the mending of tinware. The 'Pattern*' is now counted a somewhat old-fashioned gathering by many of the youth, who are becoming more conscious of sophistication. Two miles from St. Mullins, in Graigueanmanagh, interest is now centred in a Regatta and a Carnival, both of recent establishment; in many places an agricultural show or a race meeting will be favoured.

Ireland in the middle of the twentieth century still retains many ancient customs, now threatened by imported sophistication very much as similar survivals are menaced throughout the world. Even Ulster, the most industrialised of the four provinces, is particularly rich in such survivals, and as the life of Ireland is overwhelmingly rural there is a reasonable prospect that many old traditions will remain, at least in the homes of the people. It is difficult to imagine an Ireland of 'Vills,' or planned settlements grouped around neat community centres, as envisaged for rural England by Professor C. B. Fawcett.¹ In Ireland, social life is a natural growth grouped around the family and the farm, and powerfully woven by a tradition in which each son and daughter has his or her duties and responsibilities. Family solidarity is strong and the modern tendency to think primarily of the community and then of the family should be reversed in Ireland. The small towns are mere projections of the rural community, designed to attract its trade but possessing little in the way of an urban proletariat, though providing various opportunities of social life. Only at the higher stages in the urban scale is sophistication at all obvious, chiefly in the form of a modern cinema showing, in

¹ Fawcett, C. B., *A Residential Unit for Town and Country Planning*, London, 1944.

most cases, quite well-worn films, and a number of shops and bars reminiscent of the city street.

The stage Irishman, invariably comic, foolish and using expressions such as 'Begorra' in almost every sentence, bears little resemblance to the reality, as Shaw demonstrated in *John Bull's Other Island*. But there are some legitimate generalisations that can be made. As noted above, efficiency is not always a god, nor is great achievement necessary for the happiness of most of the people, and therefore the ambitious Irishman is the more noticeable. At his best, he is a great servant of society, at his worst, a scheming racketeer ready to batten on his own people and those of other lands. Very often he is a middleman in a country as yet only partially influenced by co-operative enterprise: as Sir John Russell has said of the smallholders of continental Europe, 'Without some form of (co-operative) organisation, the small producer is at the mercy of the middleman, and is likely to be hopelessly crushed.'¹ In the days of the Congested Districts Board, from 1891 onwards, the power of the gombeen' man, able to control all the commerce of many of the poorest communities, was a severe menace to almost every home.

The Irish people have not lost their religion, and devotion appears so natural as to be almost spontaneous. One cannot presume to assess the fruits of so widespread a practice of religion, but courtesy and charity are not the least among them. In the south of Ireland, at least, pleasant conversation is valued so highly that a round of shopping resembles a series of social calls rather than a number of minor commercial transactions: the speed of commerce is rather brisker in the north. The humour of an Irishman is generally quiet and kindly, but his wit is devastating and even malicious. A love of beauty, so characteristic of many Mediterranean peoples, is hardly obvious in Ireland for most of the towns are ugly except where the Georgian imprint remains and even the Churches are, with some significant exceptions, surprisingly unattractive both within and without. But the triumph of a materialistic outlook in Ireland seems unlikely as her people keep, in one way or another, the spiritual values that they have preserved through centuries of strife: their ability to pursue an ideal may produce saints and martyrs or desperate gunmen and plotters, according to inclination and circumstance.

DISTRIBUTION OF RELIGIONS

Ireland is the only part of the British Isles to list the religious allegiance of its population at each Census. A religious count has been taken since 1861, and is of considerable value in assessing general educational needs in a country where education is largely in the hands of ecclesiastical

¹ In 'Farmers and Peasants of Europe,' *Geogr. Rev.*, vol. 35, 1945, p. 11.

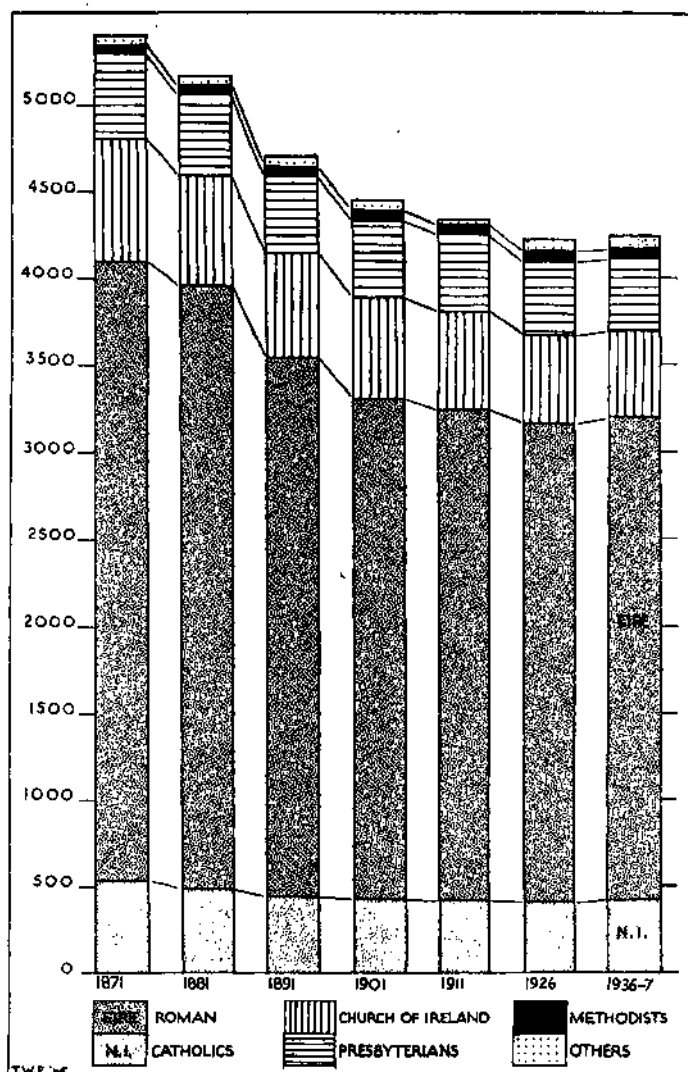


FIG. 28.—REUGIOUS ALLEGIANCE IN IRELAND, 1871-1936-7

This graph includes the whole population of Ireland, and the number of people belonging to each communion is shown: for the Roman Catholics, the number in Eire and Northern Ireland is separately distinguished.

Based on the Census Reports of Ireland to 1911, of Eire 1926 and 1936, and of Northern Ireland 1926 and 1937.

authorities. It has also a political significance and shows the effect of a complicated history of plantations, internal migrations and industrial developments. In this chapter it is impossible to consider all the reasons for the present distribution, though attention will be called to some of the significant changes of recent years. Quite obviously Ireland, as a country of heavy emigration, has fewer people of every religion now than in 1861, but the figures for the whole country show that the proportion of Roman Catholics and Protestants have remained fairly stable

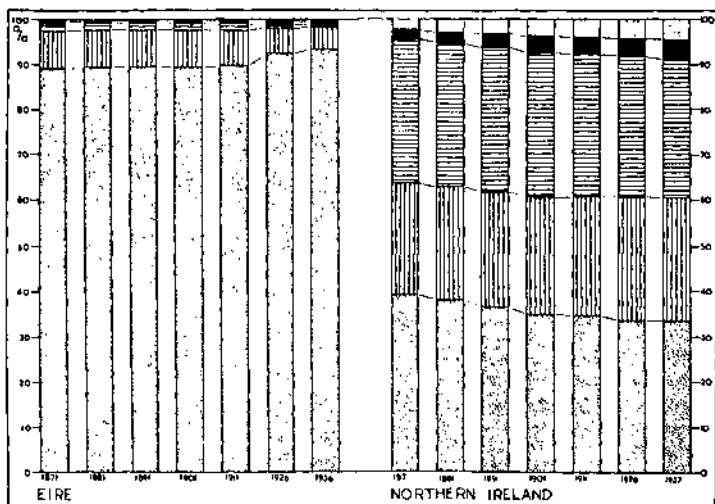


FIG. 29.—PERCENTAGE OF PEOPLE OF EACH RELIGION, 1871-1936-7

(For symbols and sources, see Fig. 28.)

In Eire, the Roman Catholics numbered c. 90% to 1911, but c. 93% in 1926 and 1936: in Northern Ireland, the proportion of Roman Catholics declined to 1901, but since then has been fairly stable. The main increases shown in Northern Ireland are those of Church of Ireland and Methodist communities.

around 75% and 25% respectively. In 1871 and 1881, the proportion of Roman Catholics at 76.7% was actually higher than in 1936, with 75.5%. It is also worthy of note that in the six counties of Northern Ireland the number of Roman Catholics fell from 534,000 (39%) in 1871 to 420,000 (33.5%) in 1926 and 428,000 (33.4%) in 1937 (see Figs. 28 and 29).

A religious label in Ireland is frequently taken partly, if sometimes unjustifiably, as a measure of political allegiance. It is also reasonable to remark that many people regard themselves as allied to some church organisation and yet never attend its services, though the professed atheist or agnostic is rare in Ireland and one of the most interesting social

features of the country's life is the very large attendance at church everywhere. Apart from its unassessable religious significance, the gatherings on Sundays and on various holy days at least helps to preserve the solidarity of many communities in the rural areas. In the cities, the number of worshippers at most churches is so large that such gatherings lack the direct social importance of Sunday morning services in rural areas, except through the demonstration of a common disposition towards the spiritual life. Minority groups, such as the Protestant bodies in Eire, are particularly conscious of their solidarity, and the Sunday congregations in the rural areas may include almost the whole community. This frequently gives visitors a fallacious impression of the numerical strength of the minorities, though their social cohesion extends deeply into the web of daily life through marriage, sports clubs and organisations of all kinds, education and general outlook. It is perhaps not too optimistic a comment that many ancient barriers are being broken down to some extent, especially in Eire, where the disparity in numbers between Roman Catholics and Protestants makes the political power of the minority quite negligible under the present regime. But mixed marriages are generally regarded as undesirable by both sections.

The territorial distribution of Roman Catholics and Protestants is shown in Figs. 30, 31. Roman Catholics are a majority of the population over the whole of Eire except in two small districts near Dublin (see pp. 175-176) and in a very few areas near the Border in Cavan, Donegal and Monaghan, the three Ulster counties of Eire. There is also a Roman Catholic majority over approximately one-third of Northern Ireland, but it is spread through an area so discontinuous that no new political boundary could be drawn without leaving Roman Catholic majorities in a truncated Northern Ireland or Protestant majorities in an enlarged Eire. If the assumptions made in 1923 by the writers of the *Ulster Handbook* that Protestants in the Ulster province wished to be governed from Belfast and Roman Catholics from Dublin are true, the problem could be solved only by wholesale resettlement of minorities. There are mixed populations everywhere in Northern Ireland, and no rural district had less than 7% or more than 72% of Roman Catholics in 1937. But in Eire only two rural districts (Clones and Letterkenny) had less than 70% of Roman Catholics, and about one-fifth of the state had an almost exclusively Roman Catholic population. In Clare and Galway about half and in Mayo and Kerry about one-third of all the district electoral divisions are entirely devoid of Protestants. In every county of Eire, except Wicklow, there are exclusively Roman Catholic areas, though these are few in the Dublin hinterland, in east (but not west) Donegal, in Cavan and in Monaghan,

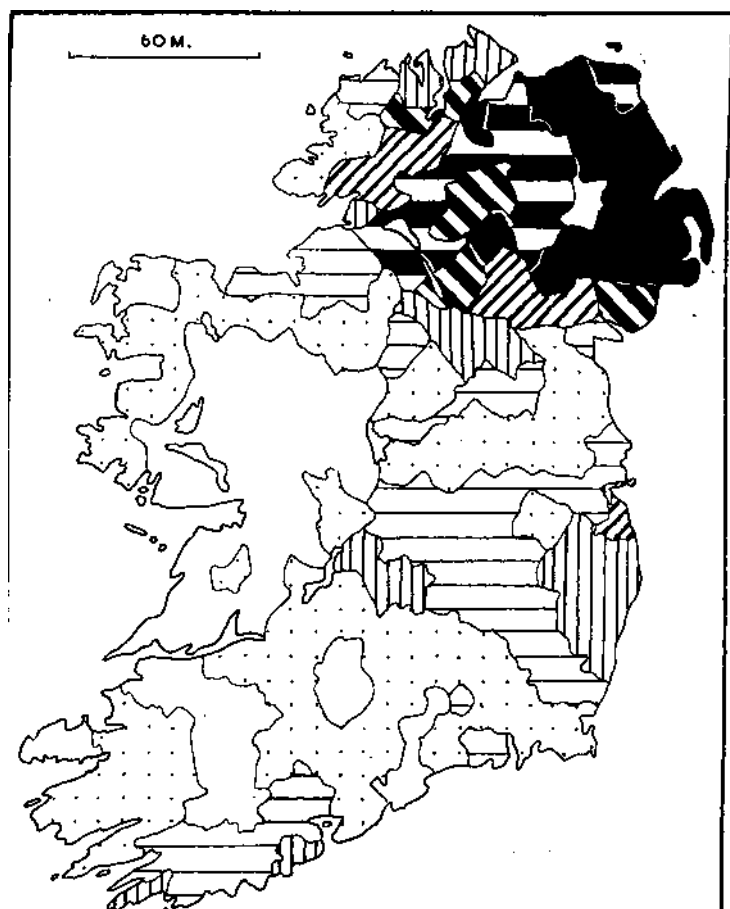


FIG. 30.—PERCENTAGE OF PROTESTANTS IN EACH RURAL DISTRICT,
1936-1937

There is a clear Protestant majority in parts of Ulster, substantial minorities in most of the remaining rural districts of Ulster, and a significant representation in Dublin, Co. Wicklow, West Cork and a few other areas. Over approximately half the country, the population is almost exclusively Roman Catholic.

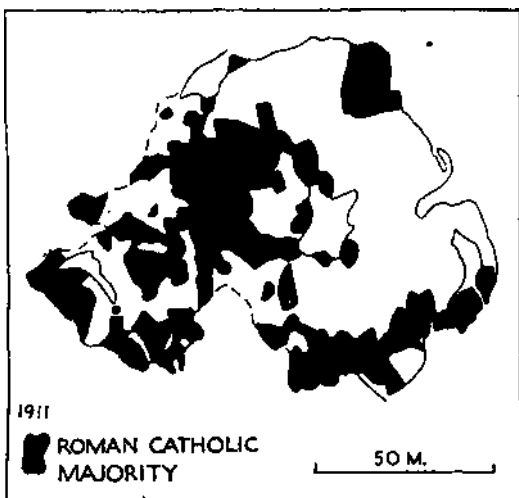
In many parts of Eire the surviving Protestant population consists only of a single family or even of one person: of some congregations it has been written (not unkindly), 'How proudly the five maiden ladies hymn their defiance/ In most parts of Eire, except in a few places near the Border, Church of Ireland people are more numerous than Presbyterians, but there are also small Methodist societies scattered through the country, many of which trace their existence back to the days when John Wesley made his tours through Ireland. All these bodies minister assiduously to their people, however small their numbers: the Methodists, for example, maintain several hundred preaching places, many of which are supplied on weekdays only, and also hold services in the open air at various fairs. In fact, the McthoSists are the only Protestant body who have added to their numbers in the last seventy years: in Northern Ireland they have advanced from 27,000 in 1871 to 55,000 in 1937 (4·3% of the population), though in Eire they have declined from 17,000 in 1871 and 19,000 in 1891 to less than 10,000 in 1936 (0·3% of the population). The Presbyterians, on the other hand, have declined steadily in both parts of Ireland from 498,000 in 1871 to 419,000 in 1936-1937, though they remain about 10% of the entire population. The Church of Ireland adherents now number n·5% of the whole population, as against 12% in 1926, 13% from 1891 to 1911, and 12·3% in 1871 and 1881, but they have increased from 313,000 in Northern Ireland in 1891 to 345,000 in 1937, and have declined in Eire from 339,000 in 1871 to 145,000 in 1936. Until 1911, they formed 8% of the Eire population, but they are now reduced to 5%, so that their once significant representation over the greater part of the country is now a thing of the past, and they have steadily become a Church with its main strength in Northern Ireland and a few parts of Eire. The small group belonging to 'other religions' includes people with a wide variety of views, significant among whom are the Baptists and Congregationalists (or 'Independent Presbyterians' in Northern Ireland), and small Quaker communities in the major towns and a few smaller centres. The latter group are strongly represented in the commercial life of Dublin and other towns, and are also distinguished for their zeal in social service. Jews have never been numerous in Ireland, and there were 3,750 in Eire and 1,470 in Northern Ireland in 1936-1937, of whom the vast majority were in Dublin and Belfast.

A religious Census inevitably reveals a large number of divisions, but the Irish population is fairly clearly divided between Roman Catholics and the three major English and Scottish forms of Protestant worship. In 1870 the Church of Ireland was disestablished, and no religious communion is established in either division of Ireland today, though the Eire Constitution of 1937 stressed the 'special position' of the Roman Catholic

Church in its territory, while at the same time recognising the Church of Ireland and other bodies and maintaining the general principle of liberty of conscience in such matters. It now remains to consider the three main groups separately, with some indication of its general social position in the community as a whole.

THE ROMAN CATHOLIC CHURCH

Dominant over the whole of Eire, and including 93*4% of the population in 1936 against 89.2% in 1871, the Roman Catholics alone are now



HG. 31.—ROMAN CATHOLIC MAJORITIES IN NORTHERN IRELAND, 1911

Since 1911, the returns have not been available for the district electoral divisions in Northern Ireland, but only for rural districts (see Fig. 30). This map shows the mixture of Catholic and Protestant west of the Bann, and also the substantial Roman Catholic communities of south Down, south Armagh and northeast Antrim.

increasing in numbers. Whatever the future effects of emigration may be among each section (and Protestants are just as likely, perhaps more likely, to emigrate than Roman Catholics), it is clear that the Roman Catholics are relatively in a very strong demographic position as, in 1936, 38% of the Protestant community was over 45 years of age, compared with 29% of the Roman Catholics: again, in 1936 the ratio of children per 1,000 women in Eire aged between 15 and 44 was 446 among Roman Catholics, but 269 among Protestants. Up to the 1911 Census, or more accurately until the war of 1914-1918, the numerical strength of the two major groups was fairly stable, but since then the tide has turned.

Before 1914, the Protestant community was constantly replenished by immigrants entering Ireland, largely as army, police or workers in commerce and professions, but only the last come now, and in small numbers. It is impossible to assess the extent to which individual changes of religious allegiance have affected the general position, though mixed marriages generally, but not invariably, mean a change of faith. In Eire there are more than 20,000 people in the direct service of the Church, which is, in fact, one-third of the professional classes: they include over

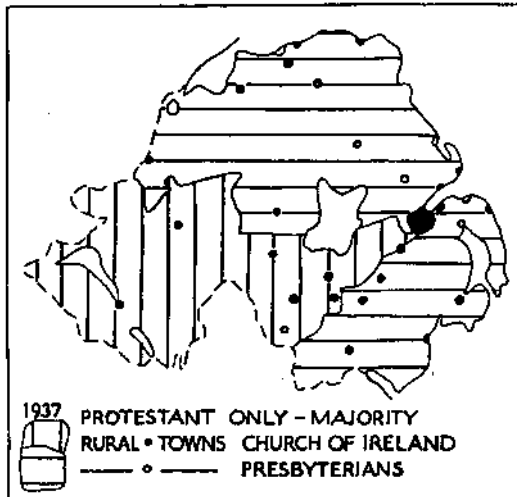


FIG. 32.—CHURCH OF IRELAND AND PRESBYTERIAN COMMUNITIES IN NORTHERN IRELAND, 1937

Among the Protestants, Church of Ireland people predominate in the Lagan valley and an area stretching from lough Neagh to the western Border; Presbyterians are in a majority elsewhere. In some cases, the town populations differ in their relative allegiance from the surrounding countryside.

Based on Census Reports.

11,000 nuns, postulants and lay sisters who minister to almost every imaginable social need, some 6,000 clergy and monks, and a remarkably large number of male theological students, over 3,000, many of whom will ultimately leave Ireland for service among the Irish in dispersion or in the widespread foreign missionary organisations.

In Northern Ireland the Roman Catholics commonly regard themselves as in a less fortunate condition than their co-religionists in Eire. They form more than half the population in the counties of Fermanagh

and Tyrone which, some people urge, should therefore be united to Eire. They also predominate in the south of Antrim and Down where also, it is said, a boundary adjustment should be made. In Co. Londonderry they are in a majority over half the area, and especially in the city of Londonderry. Finally, they predominate in the Glens of Antrim and in a number of other districts as far east of the Foyle as the Bann valley, and also around Lough Neagh. They are in a minority in the densely settled Lagan valley, with the north part of Co. Down, and in a block of country extending from Belfast Lough to the mouth of the Bann, which is mainly Presbyterian (see Figs. 31, 32). But the position is even more complicated than these general statements suggest, for such 'Roman Catholic towns' as Londonderry (61% in 1936), Strabane (76% in 1936), and Enniskillen (57% in 1936) are almost, if not quite, surrounded by rural areas that have Protestant majorities, and there is a mass of social and political complications with which it is impossible to deal here. However, the marked numerical decline of the Roman Catholic population from 534,000 in 1871 to 420,000 in 1926 reduced their proportion of the population from 39.3% to 33.5%, and their increase to 428,000 in 1937 is not more than their share of the general increase in the population of Northern Ireland in those years.

In Belfast the proportion of Roman Catholics declined from 34% in 1871 to 23% in 1926, though their numbers grew from 41,000 to 96,000, with a further increase to 104,000 (24%) in 1937. They are less numerous than either the Church of Ireland or Presbyterian groups, but include over 90% of the population in the Smithfield and Falls wards and 40% in the centre of the city.

THE CHURCH OF IRELAND

The Church of Ireland possesses a diocesan and parochial organisation that covers the whole country, but in 1936-1937 nearly 70% of its members resided in Northern Ireland compared with 50% in 1871. In 1937 there were 345,000 Church of Ireland people in Northern Ireland (27%) against 329,000 (24%) in 1871, but in 1936 only 145,000 (5%) in Eire against 339,000 (11%) in 1871. The sharp decline in Eire is a development of the past thirty years and an indicator of many political and social changes, yet the Church of Ireland may justly claim to be more deeply rooted in Eire than the Presbyterian communion, partly because it includes among its members many more people who are not recent immigrants. While its members are few in many parts of the country, there are at least some in all the towns and in every rural district, with strong minority groups in three major areas:

i. Dublin city and county, Co. Wicklow and the north (but not the south) of Co. Wexford, with scattered communities of some numerical strength in a belt extending across the Central Lowland to the Shannon, but not beyond it.

2. Eastern and southern Donegal, Cavan and Monaghan—i.e., part of the old province of Ulster, with some local extensions into Sligo and Leitrim.

3. In south and southwest Cork. Here no area has a Protestant majority, but in some parts as much as one-third of the population is Protestant, mainly Church of Ireland.

1. *Dublin and its hinterland*

The Protestants in Dublin city and county number 68,000, 11.5% of the whole population (1936), among whom 50,500 belong to the Church of Ireland. There is some relation between this figure and the return of 40,000 people born outside Eire, many of whom are Protestants: in many cases Protestants marry people of British extraction. The distribution through the city is significant; in favoured south Dublin suburbs such as Rathmines, Rathgar and Terenure, and along the coast to Dun Laoghaire and Dalkey, they are one-quarter of the whole population, but in the more industrial centre of the city and in the north side suburbs they are far less numerous, though from Clontarf to Howth and Malahide they are almost as strongly represented as in the south Dublin suburbs. The location of these communities is clearly related to their occupations, as such suburbs are the normal choices of the professional and commercial classes: from one-quarter to two-fifths of all the accountants, civil engineers, dentists, solicitors and clerks of all kinds are Protestants. There is also a substantial Protestant representation among the retired population living in and around Dublin. At the same time, the Dublin Protestants include people at every financial level, and as a community they may perhaps be compared with the members of the Episcopal Church in Scotland. In Dublin there are also Methodists and Presbyterians, a small but well-known Quaker element, but very few Baptists or Congregationalists: not unnaturally, the Presbyterians have closer relations with Northern Ireland and Scotland than the other groups.

The main strength of the Protestant community in Wicklow and North Wexford lies among the holders of large farms. Outside Dublin and Dun Laoghaire there are very few Presbyterians and Methodists, but most districts have Church of Ireland communities including as much as one-quarter of the total population. The only majorities are in Greystones, a residential area (see p. 285), and Calary, a farming district, but 48% of the population are Protestants, exclusively Church of Ireland in an essentially

rural division covering part of the Glen of Iniaill. The rural districts of Baltinglass I, Shillelagh and Rathdrum in Co. Wicklow, and Gorey in Co. Wexford, all have 12-16.5% of Protestants, whereas the towns of Wicklow, Arklow and Gorey have only 7-10%; here the Protestants (mainly Church of Ireland) are stronger outside the towns. One-quarter of the farmers in Co. Wicklow are Protestants, and they occupy three-fifths of the 224 farms covering more than 200 acres, and over one-third of the 611 farms of 100-200 acres. They also have more than one-third of the largest farms in Co. Wexford, but become an increasingly small minority towards the south, where they number only 2% of the population in Wexford town and 4% in the adjacent rural district.

There are similar Church of Ireland groups, with a very few Presbyterians and Methodists, in some parts of Carlow, Kildare, Leix and Offaly, in all of which they are widely represented among the holders of the large farms of more than 100 acres, and also among the occupiers of 50-100 acre farms. They number 10-15% of the farmers and 5-8% of the total population, and, characteristically enough, are stronger in the rural areas than in the towns. There is every reason to believe that their place in the community is similar, though their numbers are generally insignificant, in all the remaining areas east of the Shannon, excluding those not treated in the following paragraphs. In Munster 10% of all the farmers but only 2% of the labourers are Protestants.

2. The Ulster counties of Eire

The significant Protestant minority in the Ulster counties of Eire forms a social cross-section of the population to a much greater extent than elsewhere and includes people at all income-levels. Twelve rural districts with Protestant minorities of 14-37% had in 1936 a total population of 187,000, of whom 147,000 were Roman Catholics and 40,000 Protestants. The latter included nearly 20,000 Church of Ireland people and nearly 17,000 Presbyterians. Although Protestants number only 17-23% of the farmers in these twelve Ulster counties they are proportionally more numerous among the farmers of larger holdings: for example, in Co. Monaghan they have about one-tenth of the farms of 1-30 acres, nearly two-fifths of the medium-sized farms of 30-100 acres, and more than half the few large farms. However, 14% of the agricultural labourers are Protestants. As a whole they form well-integrated groups, strong here and weak there, but generally more significant among the rural population than in the towns. The eleven small market towns that serve the rural areas considered above had a Protestant minority, two-thirds Church of Ireland, of 14% in a population of 25,000. These three Ulster counties of Eire (Donegal, Cavan, Monaghan) show something of the religious

mixture characteristic of the rest of Ulster, but their Protestant minorities are declining both absolutely and relatively: in 1936 they included only 17% of the population, as compared with 23% in 1926 and 26% in 1911.

3. *South and southwest Cork*

The Cork group of Protestants is spread through the southern part of the county only from Cork city westwards; they include 4% of the population of Cork city and 5-10% of most of the rural districts near the south coast, with 16% in Skull rural district. Five-sixths of them belong to the Church of Ireland, though there are small Methodist and Presbyterian communities in the area. Outside Cork city they include a few relics of the landed gentry, but are mainly farmers; 6-4% of all the farms in Co. Cork are in Protestant hands, while they form only 5% of the population. Their decline in comparative numbers since 1911, when they formed 9% of the population, is partly due to the withdrawal of the British military, whose departure decimated the Church of Ireland congregations in some towns and reduced the Methodists and Presbyterians almost to extinction (see pp. 353, 358). However, the Protestants still form fairly stable communities in many rural parts of south Cork, and include in places a quarter of the population. Near Cork city they hold medium-sized and large farms; farther west small farms. There are among them a certain number of 'soupers,' or people who became Protestants after the Famine in order to qualify for soup and work, though most of the descendants of the 'soupers' have returned to the original faith of their families. A Cork rector has commented: 'I still have a number of parishioners bearing the Roman Catholic names of O'Connell, O'Donovan, Coughlan, etc.' The phrase, 'a Roman Catholic name,' needs no explanation for Irish readers: those outside Ireland may regard it as an implication of origin, as the Protestants are drawn mainly from successive immigrants over several centuries.

PRESBYTERIANS

The Presbyterians in Ireland are traditionally associated with Scottish settlement, and they form an absolute majority of the whole population in the whole of Co. Antrim (except in the Lagan valley and the Glens of Antrim) and in the northeast of Co. Down. They form a majority among the Protestants around Belfast (but not in Belfast city, where the Church of Ireland had, for the first time, more adherents in 1937), in central Down around Banbridge, and in the predominantly Roman Catholic parts of south Down and south Armagh. They are also more numerous than other Protestants in the whole of Co. Londonderry and an adjacent area in north Tyrone. But several towns in these areas have

Church of Ireland majorities, and in almost every case the Presbyterian dominance is more complete in the rural areas. In Eire the Presbyterians are more numerous than the Church of Ireland people in northeast Donegal and in the rural districts of Monaghan and Castleblaney, Co. Monaghan, all of which have Roman Catholic majorities. They have shown a slight relative decline in Northern Ireland with a numerical drop from 436,000 in 1871 (32.1%) to 391,000 in 1937 (30.5%), whereas in Eire they numbered 62,000 in 1871 (1.5%) and 28,000 in 1936 (1.0%). Their main strength lies in a fairly clearly defined part of Northern Ireland (Fig. 32), and they become statistically insignificant even in Co. Fermanagh, but yet have at least one representative in over four-fifths of the hundred-odd towns in Eire and in most of the rural districts, where their members include many people of Ulster extraction and some descendants of Scottish gardeners brought over to work on estates.

SUMMARY

This cold summary of the actual distribution of religious allegiance in Ireland has taken little note of the many problems that arise from religious differences, deeply ingrained as they are in a past frequently continued into the present. Nor is that all, for some of the problems of Belfast have emigrated to Liverpool and Glasgow. But it is quite obvious that the position of the 'two Irelands' is changing, and only in Northern Ireland is the present numerical strength of the Roman Catholics, Church of Ireland and Presbyterian groups likely to remain fairly stable: in Eire, the Roman Catholics are more thoroughly dominant than ever before. Yet the power of survival possessed by a small community is considerable, especially if it is well represented among the intelligentsia, the professional classes and holders of substantial farms, and if it also exists mainly in a number of locally strong groups. The future of the Protestant community in Ireland depends partly on the possibilities and attractions of emigration in the post-war world, and therefore no forecast can be made for a community that survived in some strength after the shocks of 1914-1922 but also includes among its members many able young people who may prefer, or be compelled by circumstances, to seek their life work outside Ireland.

THE IRISH LANGUAGE

The radical difference between Irish and English ways of life has been recognised from the Anglo-Norman period, if not longer, and some of those who wish to preserve the cultural apartness of Ireland from England feel that a linguistic difference is necessary. A 'Gaelic-speaking Ireland' is the aim of many people who view with regret the anglicisation

of past generations, look back to an age when the majority of the population spoke Irish and look forward to a time when Irish will be the habitual medium of speech among the whole community. The Eire government is committed to an educational policy of teaching, to the maximum extent possible, through the medium of Irish and records at each Census the number of people conversant with the language: no mention was made of the possibility that anyone might know Irish at the Northern

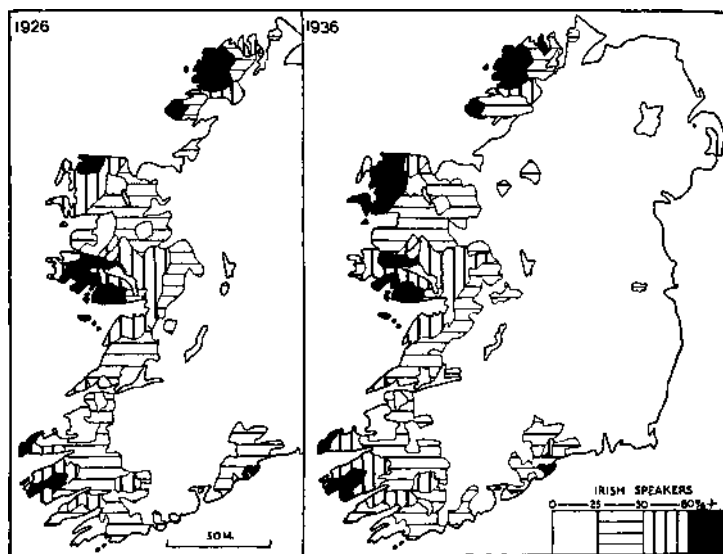


FIG. 33.—DISTRIBUTION OF IRISH SPEAKERS, 1926 AND 1936

The *Fíor-Ghaeltacht*, or area with more than 80% of its population Irish-speaking, is shown in solid black and the remaining shaded areas are the *Breac-Ghaeltacht*. The original delimitation of these areas was achieved by a special enumeration in 1925: see Report of the Gaeltacht Commission, Dublin, 1926.

Based on the Census Reports of Eire; no data for Northern Ireland.

Ireland Censuses of 1926 and 1937. The opinion is often given that at the beginning of the nineteenth century one-half of the population were Irish-speaking, but at the first Census count in 1851 one-quarter only (1,500,000) knew the language, and by 1911 this proportion had been reduced to one-eighth (580,000). The nineteenth-century decline is ascribed to the spread of education through English, the indifference of the clergy to the language and the lack of organised propaganda. This came later from the Gaelic League, established in 1893 to revive not only

the language and literature but also the distinctive games such as Gaelic football and hurling and Irish dancing. On the academic plane, Irish is a study sought by a number of scholars, several of whom are compiling a standard dictionary; on the more popular level, Irish is a subject deeply entrenched in school education in Eire, and an expression of national consciousness to a large number of people.

From 1921 the government of the Irish Free State began to encourage the use of Irish, and railway stations, town and street names were printed in both languages: laws, Census and income tax forms are also bilingual. In 1925 the Gaeltacht Commission was appointed to enquire into the condition of the areas in the west of Ireland, where the language survived among a substantial proportion of the population. The areas with which the Commission dealt were similar to those studied by the Congested Districts Board some thirty years earlier, and admitted to be the poorest in the land. The Commission reported that all the alleviations already achieved had not removed poverty, but felt that the maintenance of a substantial Gaeltacht population was essential, as it was an Irish-speaking area from which the language might expand eastwards. The Commission distinguished two types of Gaeltacht: (a) the *Flor-Ghaeltacht*, where at least 80% of the population speak Irish, and (b) the *Breac-Ghaeltacht*, in which 25-80% speak Irish. The maps given in Fig. 33 show the extent of each area in 1926 and 1936.

THE *Fior-Ghaeltacht*

This is predominantly rural in character and includes only one town, Dingle, population 1,800 in 1936, a market and fishing centre in the peninsula of the same name. The *Flor-Ghaeltacht* is an area of isolated farms which are, however, so close together in some places, such as the west of Donegal around the Bloody Foreland, that they form an almost continuous line of settlement along the roads. But in most of the *Fior-Ghaeltacht*, isolation is the salient characteristic of life, for vast bogs separate small groups of farms located near rivers, along roads, or on the coast. This is especially true in some parts of Mayo and Kerry, though all possible transitions between the two extremes will be found.

The population of the *Fior-Ghaeltacht* declined from 190,000 in 1911 to 168,000 in 1926 and 156,000 in 1936, of whom 81% 77% and 83% respectively were Irish speakers. The proportion of children aged 3-9 able to speak Irish increased from 57 to 70% between 1926 and 1936, which may be due partly to the encouragement given in the schools and partly to the fact that a substantial proportion of the children learn the language at home. On the other hand, 82% of those aged 30-39 spoke Irish in 1926, and 77% of the same group in 1936, and the proportion of

those over 40 years of age speaking Irish also showed a slight decline in the same ten years. The loss through disuse between the school ages and those of young adults has been carefully estimated by the statisticians of the Census office, who have suggested that the 'lapse rate' between 1926 and 1936 was only 2% in Galway, 7% in Mayo, and 10% in Donegal, figures which may seem serious enough but yet are much smaller than those for the *Breac-Ghaeltacht* or the non-Ghaeltacht areas. It is clear that the most favourable chances of building up an Irish-speaking population exist in the *Fíor-Ghaeltacht*: this population will, however, be bilingual. Monoglot Irish are now so few that the Census Reports of 1936 give no detailed information on their distribution, though in 1926 the main monoglot areas were the extreme west of the Dingle peninsula, including the Blasket Islands, and the coastal lowlands west of Galway, around Lettermore and Spiddle.

Effective maintenance of Irish in the *Fíor-Ghaeltacht* depends on a number of social factors. It is difficult to assess the extent to which Irish is the ordinary medium of speech, in work or at play. The Churches have no firm policy and much depends on the choice of individual clergy, though pamphlets appear from time to time complaining that Irish is not used sufficiently in sermons and notices. The cinema is perhaps a vehicle of anglicisation or Americanisation only to a limited extent in an area so predominantly bilingual. The factors favouring the spread of English are chiefly those connected with emigration, as English is essential even if a man or woman seeking a job only proposes to go as far as Dublin. The seasonal migrant, who leaves the area for a few months each year to labour in the more fertile fields of the east of Ireland or Great Britain, is probably a more potent agent of anglicisation than the migrant who leaves the area permanently. So far, the tourist trade has only touched the *Fíor-Ghaeltacht* to a very small extent, though there are complaints that many of those who come to learn Irish also succeed in spreading English in, for example, such places as the Aran islands or even the Blaskets.

THE *Breac-Ghaeltacht*

The *Breac-Ghaeltacht* was originally defined as the area having 25-79% of its population able to speak Irish. Fig. 33 shows that the area with this proportion of Irish speakers is steadily expanding; continuous with the *Fíor-Ghaeltacht*, it covers part of the counties of Donegal, Mayo, Galway, Clare and Kerry, with West Cork, and also a large area near the south coast between Cork and Waterford, where one district around Ardmore has a sufficient proportion of Irish speakers to be regarded as a *Fíor-Ghaeltacht*.

Many types of landscape and grades of productivity are represented in the *Breac-Ghaeltacht*. In Donegal, it corresponds largely to the former

Congested Districts and does not include the richer lands of the east towards the Foyle. In Mayo it also covers a large part of the Congested Districts, but in Galway it stretches eastwards to the richer sheep-rearing lands around Tuam. Similarly, in west Clare, from Galway bay to the Shannon, the *Breac-Ghaeltacht*, though hardly wealthy in natural resources, is yet not at the poorest level represented in the country. The part of Kerry included in the *Breac-Ghaeltacht* consists mainly of the old Congested Districts, but the areas of Co. Cork and Co. Waterford are in much richer regions.

The population of the *Breac-Ghaeltacht* declined from 341,000 in 1911 to 308,000 in 1926 and 294,000 in 1936, and the proportion of Irish speakers was respectively 48%, 40% and 41%. Closer investigation shows that the language lost ground among the people over 30 years of age between 1926 and 1936: 31% of those aged 30-39 could speak Irish in 1926, but only 25% of the same group ten years later, and similarly, 55% of those over 40 could speak Irish in 1926 against 42% in 1936. Among young children of 3-9 years the proportion of Irish speakers rose from 17 to 29% in the same period, and of those aged 10-14 there was a rise from 45 to 67%, obviously the result of school education. The 'lapse rate' through disuse between the school ages and young adults was high, 15% in Kerry, 28% in Clare, 28% in Cork, and 32% in Waterford (excluding the cities of Cork and Waterford). The chances of permanent maintenance or acquisition of the language depend very largely on its practical value in the home and elsewhere, but the small proportion of young children speaking Irish suggests that very few homes are Irish-speaking.

Emigration and urban influence are two factors likely to influence the future of Irish in the *Breac-Ghaeltacht*. These two factors interpenetrate to some extent, for many of the towns provide the nearest opportunities of employment for the intending migrant. This is especially true of Galway, a town which has risen steadily in population during the past twenty years and now, with 20,000, is one of the largest provincial centres in Ireland. It may, in fact, claim to be the metropolis of Irish-speaking Ireland, though only 40% of its population spoke Irish in 1936, against 37% in 1926; appropriately enough, the constituent college of the National University of Ireland teaches largely through the medium of Irish. Most of the other towns in the *Breac-Ghaeltacht* are small market centres, though a few have seen recent minor industrial developments. Only two, Killarney and Dungarvan, have a population of more than 5,000; the remainder have 1,500 to 5,000, and include Castlebar, Tuam, Kilkee, Kilrush, Cahersiveen, Skibbereen and Macroom. The population of the towns increased from 14% of the whole in 1926 to 17% in 1936,

and they probably absorbed one-tenth of the emigrants from the rural areas: the proportion of Irish speakers in the towns (excluding Gal way) increased from 23% in 1926 to 27% in 1936.

If the towns within the *Breac-Ghaeltacht* are potent instruments of anglicisation, the towns immediately outside it are even more likely to exert such an influence. These include a number of important market centres, such as Waterford, Carrick-on-Suir, Clonmel, Kinsale, Clonakilty, Bandon, Youghal, Loughrea, Westport, Ballina, Letterkenny and Buncrana. Irish speakers in these towns numbered 13% in 1926 and 19% in 1936.

THE 'NON-GAELTACHT'

The real aim of the Irish enthusiast is that the *Fíor-Ghaeltacht* shall spread into the *Breac-Ghaeltacht*, which in turn shall cover those areas now having only a small proportion of Irish speakers. By 1936 almost every rural district in Ireland had at least 10% of its population able to speak Irish, and almost two-thirds of those knowing the language were outside the Gaeltacht. But the acquisition of the language is largely a matter of school education, for only 2% of the children aged 3-4 in Leinster and only 4% of those in Munster were Irish-speaking. On the other hand, of those at the school ages, 10-14, the proportion varied from 48% in Co. Wicklow to 63% in Co. Roscommon and, in the county boroughs of Dublin, Cork, Limerick and Waterford, from 42 to 46%. Yet among the people over 45 in the non-Gaeltacht, only 8% could speak Irish. Although encouraged so strongly in the schools, it is obvious that many people forget their Irish within ten years, and the 'lapse rate' is 33% in Leinster, which has no Gaeltacht, 29% in Munster, with one-fifth of its population in the Gaeltacht, but only 17% in Connacht, with one-third of its population in the Gaeltacht. The possibility of restoring the language to effective use is greatest in the *Fíor-Ghaeltacht*, less in the *Breac-Ghaeltacht*, and still less again in the non-Gaeltacht, where the press, the cinema, the theatre, the Church, commerce and industry are all English-speaking, and school education through Irish is not normally followed up by conversation in the language outside school. One cannot help wondering if those who have forgotten the Irish they learned at school have retained much knowledge of the subjects they learned through Irish: it may be, however, that persons losing the language* are merely those from schools where most of the instruction was in English.

The prospects of the Irish language in the non-Gaeltacht areas may not be quite as unfavourable as some of the comments or figures given above suggest. Assuming that the present official encouragement continues, a considerable proportion of the population in the non-Gaeltacht areas may

become effectively bilingual, and Irish will be spoken to an ever-increasing extent on the playing-fields as well as in the classroom. In certain occupations the proportion of Irish speakers is remarkably high: 98% of all teachers in training, 79% of all monks, 48% of all nuns were Irish speakers in 1936, and on a wider basis 52% of all the professional people in Eire claimed to be bilingual. Many of the monks and nuns are teachers who are obliged, like the lay teachers, to qualify in Irish if they are to receive government increments. By contrast, the number of Irish-speaking farmers in the whole of Eire declined from 26% in 1926 to 21% in 1936, of whom most were in the Gaeltacht. As almost half the employed persons in Eire work on the land, the future strength of the Irish language in the rural areas and indeed throughout the country depends primarily on the efforts of the farming community, or upon their sons and daughters, aided by the small professional class that the country is able to support.

REFERENCES

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Religion.—The Census volumes give very full statistical information: data have also been drawn from the *Catholic Yearbook*, the *Church of Ireland Directory*, and the *Methodist Handbook*, all published annually in Dublin. The distribution of religions around the Northern Ireland boundary receives full treatment in North-eastern Boundary Bureau, *Handbook of the Ulster Question*, Dublin, 1923, a work of considerable interest as an indication of the views of the time. For Belfast, see Evans, E. E., 'Belfast, the Site and the City,' *Ulster Journal of Archaeology*, series 3, vol. 7, Belfast, 1944, pp. 25-29. The author is indebted to a number of Church of Ireland rectors in Co. Cork for local data.

Language.—The Eire Census reports are the main source: see also *Comislun na Gaeltachta* (Report of the Gaeltacht Commission), Dublin, 1926. Various newspaper comments, pamphlets and speeches, all of them less guarded in their treatment of the subject than the present author, have provided 'atmosphere': the author is indebted to various friends for comments and suggestions.

CHAPTER VIII

AGRICULTURE

AS MORE than one-third of the population of Ireland depend on agriculture for a living, and the landscape is primarily rural rather than urban, it is reasonable to regard farming as the key to the country's social geography. One underlying source of the political tension of the nineteenth century was the division of the land in such a way that the gentry had too much and the populace too little, but since 1870 the land has been gradually transferred to the people who farm it. In 1913 C. H. Oldham, writing in the *Oxford Survey of the British Empire*, said that 'the pitiful 11.1% devoted to plough land offers no adequate basis for the employment of the agricultural population ... in the arts of using a most fertile soil in the business of agriculture. Ireland is but a ruined land, wasted and withered by the fifty-years-old struggle to settle the question of land tenure.' An overstatement perhaps, but land hunger is an old feature of Irish life and still exists today, as many of the holdings are still too small to provide a living for the families who live on them.

In the war of 1939-1945 Northern Ireland was economically more favourably placed than Eire, for it shared in the intensification of agriculture that was so marked a feature of British life. In Eire, on the other hand, there was an attenuated transport service, a quickening of emigration from rural areas through the appeal of war work in Britain at high wages and of service with the Irish and British forces, and a diminished supply of fertilisers: the farmers were urged to grow more wheat, sugar beet, and other crops demanding labour and fertilisers to maintain the home food supply, and were even told by a government spokesman to 'draw on the inherent fertility of the soil.' This distinction between Eire and Northern Ireland may be temporary, especially if international trade revives and supplies of fertilisers become adequate throughout Ireland. There is, however, an older distinction between the Ulster province and the rest of Ireland, for in Ulster the right of continued occupation of a farm, combined with that of selling the interest in a holding, gave a security unknown elsewhere. Arthur Young comments unfavourably on the farming standards of Ulster (see pp. 106-107), but through the nineteenth century the improvement was so marked that Northern Ireland now ranks very high in the Irish farming scale. In this chapter, consideration is given first to land tenure, then to farm size and general agricultural

production. Some of the social aspects of life on the land are discussed on pp. 155-159, and the relation of farming to the general distribution of population on pp. 133-138; in addition, there are various comments on the historical aspects of farming in Chapter V.

LAND TENURE

At the end of the eighteenth century many landlords were eager to increase the number of small farms, as by a law of 1793 each holder of lands valued at more than .£2 was given a vote, so the landlords made as many holdings as possible to increase their political power and income. The demand for crops remained good until 1815, but depression followed and many of the tenants were evicted, especially after 1829, when a law was passed raising the voting qualification to .£10 per annum. The evicted, martyrs in the eyes of their fellows, emigrated to America, Britain or the growing town of Belfast, or squatted on a patch of waste land, or else swelled the already formidable army of casual labourers and beggars. Many of the landlords were becoming more and more extravagant and overspent their resources, with the result that the number of 'encumbered estates' increased: in short, the landlord and tenant relationships of the eighteenth century were obsolete, but a major Famine and many years of political agitation were to occur before a solution of the problem was in sight. There was some recognition of the possibility of removing temporary difficulties by employing people on public works, a feature of Irish life from the late eighteenth century, and in the Famine years these included various schemes of land reclamation, drainage, the building of river embankments and, most needed of all, farm premises. But evictions still continued, as many farmers either would not or could not pay the rent.

The first Land Act was passed at Westminster in 1869, at which date the land was owned by some 19,000 proprietors, of whom one-fifth possessed 80% of the cultivated area. There were five classes of tenant under the landlords—leaseholders, middlemen, annual tenants, cottiers and labourers. The leaseholders, in all numbering 135,000, held the land in perpetuity, or under an agreement defined by the duration of two or more lives, and were mainly Protestants, as the Penal Laws abrogated in 1827 had forbidden long leases to Roman Catholics; the descendants of these leaseholders survive as farmers of substantial holdings. The middlemen were the agents of the landlords and let off land to the remaining three classes. The annual tenants, some 525,000, formed the typical 'small farmer' class settled mainly on lands valued at less than £15 per year, and were liable to eviction on six months' notice. The cottiers lived in poor cottages generally located on someone else's land, and had very

little land of their own, though they normally hired a patch of Conacre¹ to grow a crop of potatoes or pasture their stock. Least fortunate of all were the labourers, who had no land at all, though they too would commonly hire a patch of conacre: incidentally, the distinction between the labourer and the small farmer has always been very difficult to draw in Ireland, as one class grades into the other. In many parts of the country land was so severely subdivided that some of the holdings were in a large number of microscopic patches, separated one from another in a 'rundale' pattern of great complexity: the efforts to reorganise some of these rundale areas has been difficult and costly.

The 1870 and 1881 legislation did not succeed in transferring large areas of land, as the legal procedure was too complicated for a people of whom one-third were illiterate and who possessed very little money to meet mortgage payments. A more successful early effort was the transference of the glebe lands in 1869 on the disestablishment of the Church of Ireland: three-quarters of the holders became owners by paying one-quarter of the purchase price and the remainder on a thirty-two year mortgage. The Land Acts dealt only with some 1,600 holdings averaging 60 acres (1870) and 42 acres (1881), and no widespread distribution was achieved until the Acts of 1885 and 1891 provided all the purchase money as loans and made the annuities less than the rents. Under these new laws nearly 47,000 holdings covering in all 1,500,000 acres were bought, and the average size of the farms transferred was 32 acres. The Wyndham Act of 1903 was even more successful, as it made nearly 220,000 tenants into purchasers, and the Birrell Act of 1909 added another 50,000.

Meanwhile, the Congested Districts Board had shown that there was acute pressure on the land in the west of Ireland and expressed the view that large areas of 'untenanted' land could be allocated to those having too little land. 'Untenanted' land meant those areas of demesnes that were used only for pasture and pleasure grounds and not let to tenants. Various methods of allocating land were evolved, of which the most successful was the sale through Estates Commissioners, who acquired over 6,000,000 acres, one-fifth of the area of Ireland, in 190,000 holdings. In some cases the Commissioners sold back parts of the estates to the former landlords, and then sold the rest to the existing tenants or to new buyers, and they also added patches of land to 'uneconomic holdings.' This scheme covered a further 1,000,000 acres.

After 1922, land was allocated to owner-occupiers in both Northern Ireland and Eire: in the former, 800,000 acres were allocated to 38,000 holders, an average farm size of only 21 acres, between 1922 and 1935,

¹ This land is let annually on an eleven-months' tenure to the highest bidder (see p. 156).

by which date over nine-tenths of the land was owned by the occupiers. In Eire the Land Commission was established to do the work of the Estates Commissioners and the Congested Districts Board, and under the Fine Gael (Cosgrave) administration some 6,000 estates of 3,000,000 acres were allocated to 100,000 holders. The Commission also acquired some 420,000 acres of 'untenanted' land, which was distributed between 19,000 landless men who were unemployed labourers, evicted tenants, farmers' sons, ex-service men or holders of previously uneconomic holdings. In 1932 the Fianna Fail (De Valera) administration replaced the Fine Gael government and suspended the payment of annuities to Great Britain, an act which led to the 'economic war' between the two countries under which Britain placed a tariff on agricultural produce from Eire and Eire a tariff on British coal and iron. This was settled by agreement in 1938: meanwhile, the Eire government had cut the annuities to one-half, and certain arrears had been wiped out.

The old problems associated with land tenure are apt to rear their evil heads, but the Eire government has placed its hopes of final solution in the work of the Land Commission. This body, in considering the claims of applicants for parcels of 'untenanted' land either for addition to uneconomic holdings or for new holdings, has to be satisfied that the prospective farmers are competent to work the land and do not intend to 'let, sell or assign' it to others. The allottees are on probation for several years, and the land is not 'vested' in them as purchasers for seven years. This probationary period over, the Land Commission cannot reacquire the land for a further seven years without the consent of the owner. If there is default in the annuity the Commission can sell the land in the open market, a feature sometimes held to be a revival of the old insecurity, and an incentive to speculation that may lead to the creation of a new landlord class potentially as nefarious as their defeated predecessors of past generations. The power of subdivision and subletting exists only with the consent of the Land Commission while the annuities are being paid off, but afterwards as the owner sees fit.

Certain special schemes are of considerable interest as social experiments. The Land Commission has waged active war on the 'rundale' system, especially in the old Congested Districts where it was most acute. One townland in Co. Mayo, to the west of the Moy estuary, covering one square mile and consisting of some good, moderate and poor land, was a famous type case. Fifty-six families owned 1,500 plots of land, some of them covering an acre or more, but others merely a few square yards: one farmer had two acres in eighteen plots, another fourteen acres in thirty-five plots. Readjustment began under the Congested Districts Board in 1918 and was completed by the Land Commission in 1942 under

a succession of Inspectors. The number of holdings was finally reduced to thirty-two, and the remaining families migrated to Meath and Kildare under a resettlement scheme, or to land near Ballina. The final benefaction of the government was a grant of £150 and a loan of £50 to every family to build a house.

Resettlement of Irish-speaking families from the Gaeltacht in compact colonies in the east of Ireland has been the concern of the Land Commission for several years. Apart from the relief of congestion, the constant aim of the Land Commission, this scheme has the purpose of preserving and extending 'the use of the Irish language, which is the habitual speech of the migrants but not as yet of the inhabitants of the Midlands.' The migrants are given a course of preliminary instruction to enable them to adjust their tillage methods to the very much richer type of soil. They are settled on former 'grazing ranches,' or cattle-fattening farms taken over by the Land Commission. The scheme has been expensive, but 'it is considered that the end justifies the cost.' A less ambitious and more usual form of migration is the settlement of a few Gaeltacht families on land in the east of Ireland.

The Gaeltacht has a very special place in the affections of the Eire government and the reclamation work already achieved there continues that begun by the Congested Districts Board. But some of the schemes have proved expensive, and it is doubtful whether they can be justified on an economic basis, though they may be highly desirable for other reasons. At Cloosh, Co. Gal way, six farms of 30-40 acres with houses, roads and some common land were provided at a cost of £8,000; at Ballycroy, Co. Mayo, ten holdings of 50 acres with common grazing, cost £6,000, while two holdings in Co. Donegal cost £2,200. Other schemes include grants to farmers reclaiming land on their own initiative or with the help of the Land Commission and some fixation of sand dunes threatening tillage and pastoral lands. One of these, at Horn Head in Donegal, is described on p. 488, and there are others in Mayo and Donegal. Out of nearly £3,000,000 spent by the government on estate improvements and relief works between 1923 and 1935, one-half was spent in the Gaeltacht. It is recognised that the problem of congestion cannot be solved solely by such works alone, and home industries have therefore been fostered (see pp. 209-210) along with the sponsored migration to areas outside the Gaeltacht discussed above.

The achievement of the past seventy-five years has been remarkable, as all save a small fraction of the land in Eire has been transferred from the landlords to purchasers who are becoming owners. Holdings have been improved in countless cases, and a more economic use is made of some of the demesnes that existed a hundred years ago. The unification of all the

various agencies concerned in land purchase and improvement into the Land Commission has helped to bring the schemes nearer completion. The welfare of the rural community, especially of the 'congests/ is a matter of constant concern, and here at least economic considerations are not always regarded as necessarily the most important. Given years of reasonable prosperity the schemes should be successful, and evictions through failure to pay annuities may become merely of historical interest. But the possibility of ultimate subletting survives and some of the new holdings allocated by the Land Commission may prove too small for economically successful farming. Between 1923 and 1936 the average size of the new holdings was only 25*5 acres, and the charge has been made at times that some of the rural rehabilitation schemes are merely adding to the number of actual or potential 'congests/. One of the greatest contributions to the welfare of the rural community has been the housing programme inevitably associated with the changes in land tenure (see pp. 156-157) which, together with the redistribution of land, has changed the landscape of rural Ireland, and especially of the poorer parts, to an extraordinary degree within the past seventy-five years.

FARM SIZE AND ECONOMY

There are three classes of farm commonly recognised in Ireland, small, medium and large, consisting respectively of those having 1-30, 30-100 and over 100 acres. This classification will seem strange to readers outside Ireland accustomed to expect larger units: nevertheless, 56,000 out of 88,000 holdings (63% in 1946) in Northern Ireland and 186,000 out of 327,000 in Eire (57% in 1936) are of less than 30 acres. In many cases a farmer will have more than one holding: thus *in* Eire at the 1936 Census the number of farmers recorded was 256,000, and the statistical disparity of 70,000 is due to several factors including cases of farmers possessing more than one holding, the inclusion of sports grounds or grounds around houses, and, on the other hand, to the ownership or actual working of the land by people who do not return farming as their main occupation. This was shown in a detailed study around Graiguenamanagh, Co. Kilkenny, where 15% of the area was owned and worked by people who were not primarily farmers, but shopkeepers and others. These considerations do not invalidate the conclusion that a considerable proportion of the rural population, both in Northern Ireland and in Eire, are living on small farms. Fig. 34 gives a general view of the prevalence of each farm type through the country, and has been so compiled that the uninhabited areas are left blank as far as possible. In Eire the 1936 statistics of the number of farmers of the small, medium and large units have been plotted for each rural district, and therefore the map covers the area

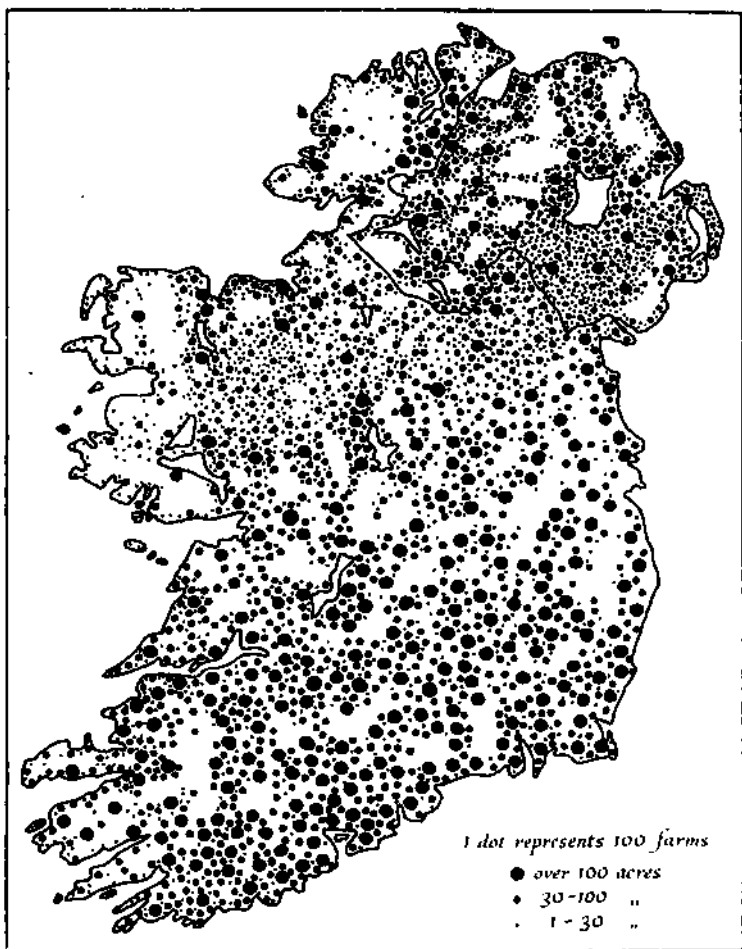


FIG. 34.—DISTRIBUTION OF FARMS BY SIZE

The dots have been placed as far as possible in the areas actually fanned: gaps include the major uplands and lowland peat bog. Note that there are statistical discrepancies between Eire and Northern Ireland (see pp. 190-191).

First published in **Geogr. J.**, vol. no., 1947, p. 42. Based on Eire, *Census, 1936*, vol. 2, pp. 214-153 and Northern Ireland, *Annual Report upon the Agricultural Statistics, 1929-1930*, Belfast, 1931.

actually farmed whether in one unit or more: in Northern Ireland, statistical exigencies have resulted in the mapping of the actual holdings, and it has unfortunately not been possible to use rural districts as a basis, as figures are available only for counties. In spite of all these limitations certain general conclusions emerge: first, the prevalence of small farms in the north and west of the country; second, the admixture of farm units of all sizes over the greater part of Eire south of a line from Galway bay to Dundalk (see Figs. 34 and 35).

The two major areas dominated by small farms, the north and west, differ markedly in their productivity and standard of life. On the one hand, the northern farms are intensively cultivated with as much as half their land in arable crops, such as flax, grass seeds and potatoes for seed and the market. On the other hand, the farms of the western seaboard and some neighbouring areas such as central Mayo are little more than subsistence holdings on which many workers have to find some additional source of income such as labouring, either locally or elsewhere in Ireland, seasonal migration to various parts of Britain, or remittances from relatives abroad. Fifty years ago, when the Congested Districts Board began its work and gathered material on the poorest areas of the land, a state of near-subsistence was revealed not only along the Atlantic coasts but also in the almost equally closely settled districts of Co. Mayo, Co. Sligo and Co. Leitrim, all of which still have an unenviable reputation for poverty. Now, however, almost every farm has a considerable quantity of produce for sale, and therefore in Fig. 38 the term 'cottage farming*' is suggested for the admittedly poor and somewhat overcrowded districts which correspond to the 'crofting*' areas of Scotland.

The smallness of the Ulster farms is due partly to the traditional dominance of flax cultivation combined with home processing of the crop before the linen trade became a factory industry in the middle of the nineteenth century. To this day, flax retting troughs are a frequent feature of the Ulster scene and many mills, some still in use, exist to begin the complex heated processes that are necessary before the flax reaches the spinning mill. Formerly the farm family derived nearly all its income from linen and needed only a small area to grow the flax, with some foodstuffs and feedstuffs. At present flax growing is liable to rapid expansions and contractions according to prices: large quantities were grown during both the wars of the twentieth century, much less between them. The general intensity of production makes the northern farm profitable and many of the holders acquire extra land, in some cases with a view to allocation among their sons when they reach manhood. In Ulster, also, the sale of land is more frequent than in the other provinces.

Farming in the Congested Districts is far less specialised than in Ulster,

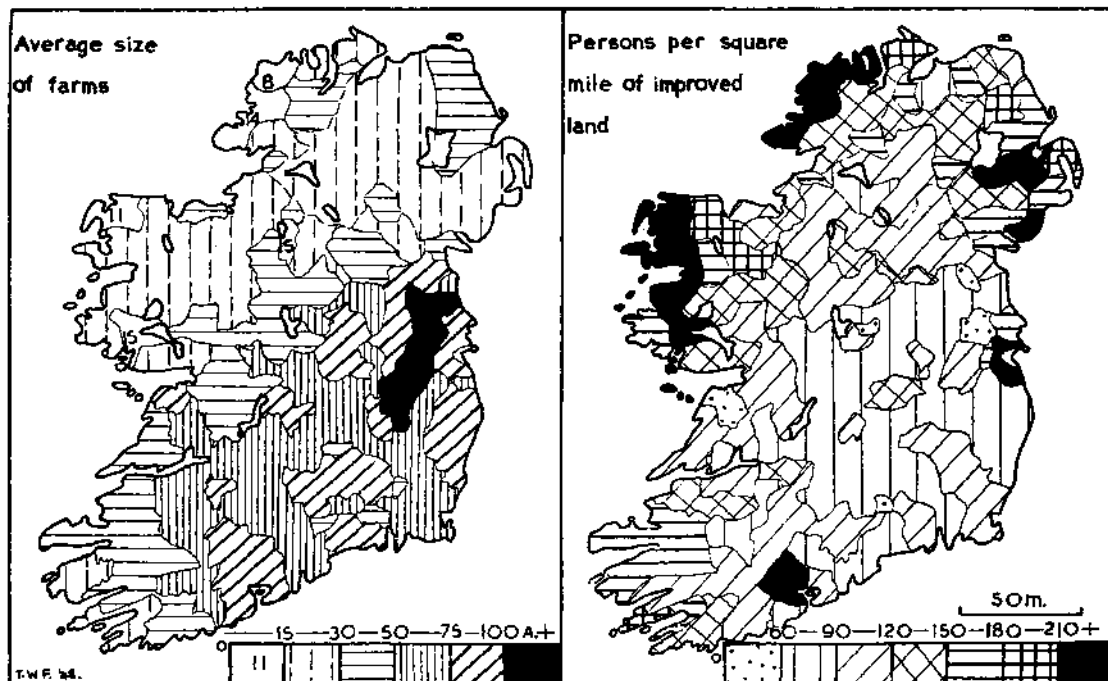


FIG. 35.—AVERAGE FARM SIZE: PERSONS PER SQUARE MILE OF IMPROVED LAND, 1936
 The smaller the farm unit, the greater the density per square mile. *Based on the Census Reports of Eire.*

and at its poorest gives a standard of living humbler than that found anywhere else in the British Isles, except possibly the western highlands and islands of Scotland. In the extreme northwest of Donegal the average farm size is only 8 acres, in southwest Donegal 14 acres, in West Connacht, 10-20 acres. The few fields are pastures, meadows, or patches of oats and potatoes, and the stock consists of one or more cows and sheep, a few pigs and a surprisingly high number of poultry. All the rough pasture is used as far as possible, even for pasturing cows, and in addition it

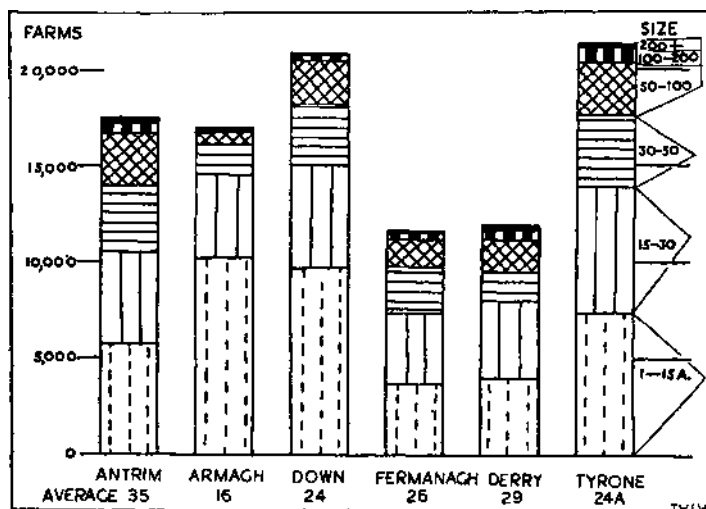


FIG. 36.—FARMS IN NORTHERN IRELAND

For source, see note under Fig. 34.

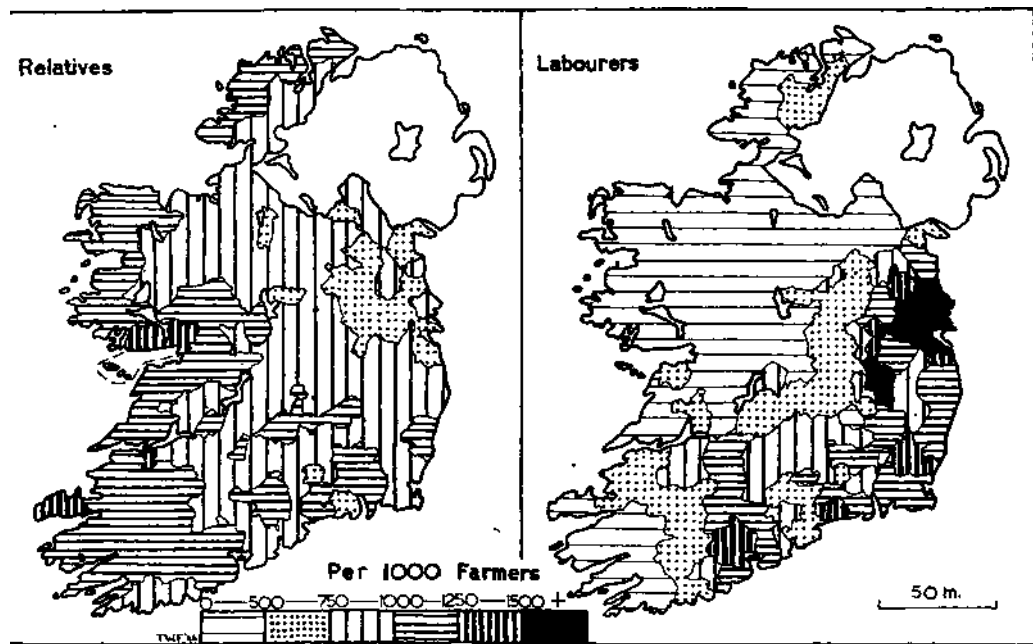
Returns are available only for counties: this diagram indicates the dominance of the smaller farm units in all the six counties, though the present tendency is to unite or enlarge holdings.

provides fuel for the homestead and cattle bedding. The lowland south of the Ox mountains and a belt of country stretching from Donegal bay into Co. Leitrim also have similarly small farms whose holders concentrate mainly on young cattle, poultry, pigs and butter making. The apparent poverty is alleviated dietetically by the heavy consumption of butter and bacon at home, and the prevalence of seasonal migration, to which a certain amount of home industry, chiefly knitting and embroidery, is added in Donegal. But in spite of all the improvements of the past fifty years, which include the enlargement of holdings, the

provision of better roads and transport facilities and the increased returns from seasonal labour, the long-recognised 'congestion' survives.

Small farms were never as dominant in Kerry as in West Connacht or West Donegal, but yet cottage farming is typical of the entire western seaboard, including Clare. Fishing is only of very local importance, though many farmers on or near the coast fish for their households. In a few places, such as Dingle, Co. Kerry and Valencia Island, herring fisheries bring profit at times, especially during the war scarcity periods, but normally transport costs prove inimical to success. The resources of the shore are generally more important than those of the sea, for the farmers collect quantities of sand and seaweed to manure their lands, carrying them to the fields on their backs in basket-work creels or in pannier baskets on a donkey. The amount of labour needed to cultivate even one acre with a spade and a manure supply thus acquired is so great that the decline of cultivation is not surprising. Some of the people living inland have to bring manure so much farther that the struggle is even harder: the decline of the improved area in the seaboard counties since 1871 is as much as one-third, and large areas may legitimately be regarded as submarginal land. The actual declines from 1871 to 1946 in counties along the western seaboard are: Donegal 36%, Sligo 8%, Mayo 20%, Galway 24%, Clare 13%, Kerry 31%. It was around 1871 that most counties recorded their maximum extent of 'improved land,' which is officially defined as 'under crops and pasture.' Most of the more favoured counties in the Central Lowland and the south still have as much improved land as in 1871, and it is the less desirable areas that have been abandoned.

Every rural area of Ireland has its small farms, which grade upwards from the holdings of men who are really labourers to those of families who regard themselves as comparatively affluent, even though they cast envious eyes on the larger farms and the demesnes, and hope that their land hunger may eventually be satisfied. Here one may see the gradation into the middle-sized farm group of 30-100 acres which, with an admixture of large farms, characterises the landscape in most of the Central Lowland south of the Galway bay-Dundalk line and is equally prominent in the mountain-studded lowlands that extend from Wicklow through the south to Limerick. The medium-sized farm is generally worked by the farmer, one or more sons and other relatives with, in some cases, employed labourers. Its economy is normally mixed, and the output includes foodstuffs and (except in the west) wheat, and feedstuffs such as oats, potatoes, turnips and mangels. Wheat production was greatly stimulated during the 1939-1945 war, and the crop is sold to the corn mills. Barley and sugar beet, where grown, find a ready sale with brewers and the four sugar factories of Eire, at Carlow, Mallow, Tuam and



HG. 37.—MANPOWER ON THE FARMS, 1936

These maps show that 'assisting relatives' are as numerous as farmers on almost the whole of the western seaboard **but** less numerous elsewhere: the labourers are found chiefly in Leinster and Munster within the areas having a high proportion of medium-sized and large farms. *Based on the Census Reports of Eire.*

Thurles. In Northern Ireland, flax and grass seed are also important: to some extent, these prevail throughout the old Ulster province. The amount of land given to these crops varies from year to year: high during the 1914-1918 war, it fell to a low level in the early nineteen-thirties and then rose in response to government propaganda, which became compulsion after 1939. But the holder of a medium-sized farm is able to turn his attention to a variety of crops according to circumstance, and is therefore in a central position in Irish farming between the small farm production and that of the large farms, which are in many cases highly specialised, as they prepare cattle for meat markets or provide grazing for stores before trans-shipment. As a group, however, the large farms include a number with a mixed economy, some dairy farms and, especially near the various uplands, some specialising in the rearing and fattening of sheep.

Population distribution in rural Ireland bears a very close relation to the type of farming practised: at one end of the farming scale parts of Meath have only 50 to the square mile, and at the other, parts of Donegal 400 to the square mile. In other words, a square mile of a congested area may have as many as 60-80 farm households, but Co. Meath only 4-6, with a few labourers depending on them. In between lie the middle group, of medium-sized farms, with 10-20 farm households, a few labourers on the more prosperous farms, and a population density around 80-120 per square mile (for a fuller treatment of rural density, see pp. 133-138). Every gradation lies between, but the correlation between farm size and rural density is generally applicable over all the areas where there is no industry or other cause for concentration of population. Here an important contrast with England and Wales emerges: the Agricultural Census of 1925 showed that the number of workers was 24-26 per 1,000 acres, whatever the size of farm, but the following table shows that in Eire there were 141 workers per 1,000 acres on very small farms and 18 per 1,000 acres on the largest farms. In effect, the whole standard differs between the two countries (see Fig. 37).

The trend of the times is that the holdings are gradually enlarged and the small farms becoming less numerous: thus in Eire there were 75,000 farmers having less than 15 acres in 1926, but only 63,000 in 1936, and during the same ten years the number of farmers having 30-100 acres increased from 92,000 to 97,000. Yet the small farm is still to some extent a social problem, though co-operation has been hailed as its salvation: so far, with a few exceptions, co-operation has been more successful among the holders of medium-sized farms, which do not constitute a social problem as the areas they occupy neither have congestion nor the sparsity of population associated with the 'grazing ranches' of Meath.

TABLE IV.—LAND DISTRIBUTION AND THE AGRICULTURAL POPULATION IN EIRE, 1936

All figures in thousands in columns 1-5.

<i>Farm Size:</i>	1-½ Acres.	½-30-	30-500.	500-1000.	1000-2000.	Over 2000 Acres.	Total.
1. Farmers	62.7	73.1	53.7	43.1	17.5	5.8	256.0
2. Relatives	48.3	66.1	54.5	48.5	20.1	5.8	243.2
3. Labourers	4.0	8.2	14.3	27.2	23.8	19.7	97.2
4. Total	115.0	147.4	122.5	118.8	61.4	31.3	596.4
5. Area in acres ..	819.4	1,812.2	2,086.6	2,900.6	2,269.0	1,781.0	11,668.8
6. Percentage of total farmed area	7	12	18	25	19	15	100
7. Workers per 1,000 acres ..	141	82	59	41	28	18	51

NOTE.—This table shows (a) the proportion of the improved land in Eire that is in farms of different acreages, (b) the number of farm workers per 1,000 acres, according to size of farm, and (c) the actual number of farm workers, whether holders, their relatives, or employed labourers, in each size-group. Women farmers are included in the totals, but not housewives, daughters, or other female helpers belonging to the family or employed by the farmer unless they are returned as working on the land. It will be seen that the relatives, who for the most part are not paid wages, are more numerous than the labourers except on the largest farms (see also Fig. 37).

Based on Saorstat Eireann, *Agricultural Statistics, 1927-1933** Dublin, 1936, for area of land improved, and Eire, *Census*, vol. 2, Occupations, pp. 214-253, Dublin, 1940, for personnel.

AGRICULTURAL PRODUCTION

The farmers of Ireland feed themselves, their stock, supply the home market and sell the surplus abroad: estimates for Eire show that before the 1939-1945 war the total agricultural output was absorbed almost equally into these three channels. During the war, however, the export trade fell to one-fifth of the output by value, and the remaining produce was consumed in approximately equal proportions on the farmsteads and in the home market. No such figures are available for Northern Ireland, though there, too, it is known that the farming families rely largely on their own produce for the support of their own produce and stock and that the home market consumes the greater part of the remainder. The non-agricultural population has increased steadily in

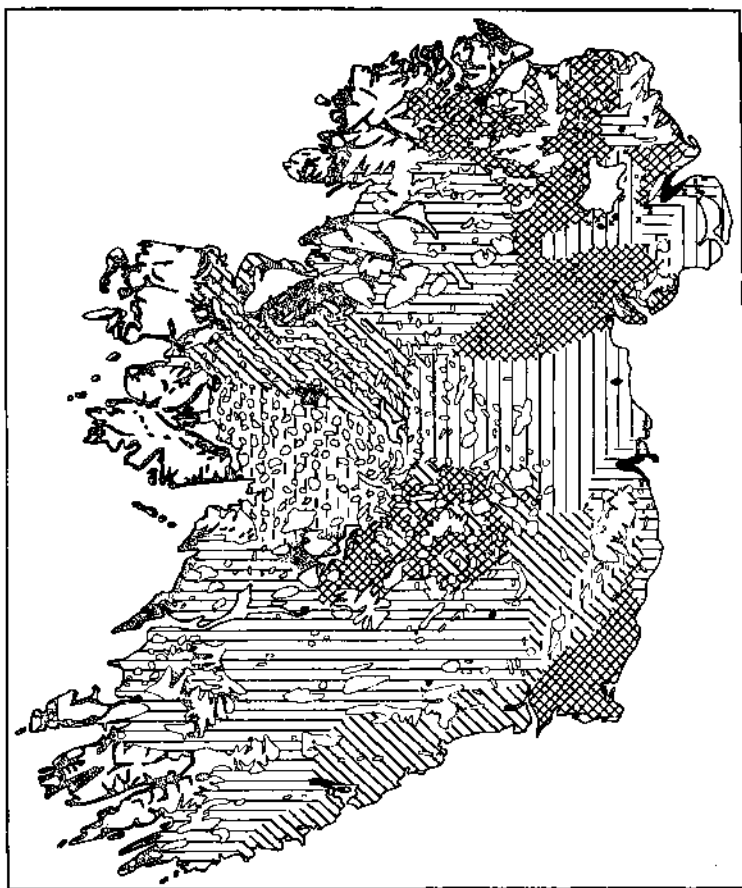


FIG. 38.—FARMING TYPES IN IRELAND .

-  Mixed farming with considerable tillage.
-  Mixed farming with stock-raising and feeding for the store cattle trade.
-  Grazing and fattening country with some highly specialised large farms.
-  Dairying predominant, mainly for creameries, milk supply near towns.
-  Sheep raising and fattening with some stock-raising.
-  Cottage farming.
-  Peat bogs and mountain pastures, mainly uninhabited.
-  Market gardening.
-  Towns with over 10,000 people.

First published in 'Geographical Journal,' uoL no, 1947, p. 45.

Northern Ireland and to a smaller extent in Eire, and the standard of living has so improved that the consumption in Ireland of meat, butter, bacon, eggs and vegetables has expanded. Yet the prices of vegetables remain high in Eire and market gardens are surprisingly few in a country well suited to produce bountiful crops. Similarly, tomatoes, apples and soft fruit are grown in very small quantities; only in a few areas around the major cities and in an area to the south of Lough Neagh is there any concentration on this type of farming. Individual ventures have proved successful: thus, a jam factory in Dublin, finding it difficult to acquire adequate supplies, established fruit farms near the city, each of which employs several times as many people as the cattle farms that preceded them. In a country adapted to produce excellent fruit and vegetables, the vast majority of the orchards are decayed, vegetable growing is limited to potatoes or cabbage, and soft fruit is scarce. Lack of capital or the diversion of capital from agriculture explains the paucity of these developments to some extent, but it remains clear that the greater part of Ireland is farmed far below its capacity. At the same time, wheat gives 20-21 cwts. per acre (Eire, 1941) against 13-17 cwts. in 1850, potatoes 8.5 tons against 3.5 tons, and turnips 16 tons against 11-14 tons. The yield of hay remains around 39-45 cwts. per acre (see Fig. 38).

Cattle production in Ireland shows an economic integration made possible by the strength of the export trade to Britain. Both in Northern Ireland and in Eire the small farms produce more calves than they can bring to maturity, and the surplus is sold to the holders of the medium-sized farms, who feed them for a few months and then pass them on to the holders of the larger farms, who prepare them for the meat markets of the Irish towns or for export. Most of the cattle exported spend the last few months of their lives on some of the richer British pastures; Ireland's position in the store and cattle trade is comparable with that of Wales and Scotland, for all supply cattle to replenish dairy herds or to stock fattening pastures. In Northern Ireland the 'producing' and 'feeding' areas have been distinguished in the markets reports, which also revealed that most of the cattle born on the smaller farms passed through two or three medium-sized holdings, staying on each for a few months, before reaching the larger farm from which they proceeded to the abattoirs or the ports (Fig. 39). A similar movement is characteristic of Eire: the destination is the large farms of Co. Meath and Co. Kildare and, to a lesser extent, the comparable areas around Cork, Waterford and Limerick. An animal may be sold two or three times in its lifetime at various fairs, in which dealers figure prominently, prices fluctuate sharply and various abuses exist. One enterprising family has circumvented all these disadvantages by establishing a chain of farms from the

Shannon eastwards, through which they move their cattle towards Co. Meath and the Dublin market. Store cattle normally account for one-half of the entire export trade, but only one-tenth of that from Northern Ireland, which has a greater home market and is famed chiefly for its industrial products. In most years the exports of fat and dairy cattle together are valued at hardly one-quarter of the store cattle overseas trade (see Fig. 40).

Dairying in Ireland interpenetrates with store cattle raising on many farms, but has become the main specialisation of certain areas, notably the Munster lowlands and the lowlands stretching inland from Donegal bay. It is also important around Belfast and Dublin for local milk supplies. Like the store cattle trade, however, dairying is associated with the vast majority of the farms in the country and depends partly on the supply of calves from the small farms. The degree of specialisation achieved depends partly on the success of the creameries in the areas they serve. Dairying is closely linked with the export trade in butter, which was already well established in the eighteenth century and was valued at £2,000,000 per annum early in the nineteenth. The original export was of home-churned butter in 'firkins' of seventy pounds weight sent mainly from Cork, but as the firkins were generally filled by several farmers and the quality was unpredictable, Dutch and Danish competition was felt very severely in the seventies and eighties. The first creameries were established between 1885 and 1890 in the Golden Vein, and many more were established, both in Munster and Ulster, before the end of the century. At first the flavour of the creamery butter was compared, perhaps maliciously, to 'a raw swede turnip cut in two/ but opposition to their development failed and the old firkin trade is now practically extinct. Three types of butter are made in Ireland: farmers', or 'country* butter, factory and creamery; farmers' butter is sold, if at all, locally or to the factories. Factory butter is defined as 'butter which has been blended, reworked, or subjected to any treatment, but which has not as a result ceased to be butter.' Most of the butter factories in Cork and Limerick now make creamery butter.

The original inspiration of the creamery movement came from Denmark and is associated with the names of the Rev. Fr. Finlay, S. J., and Sir Horace Plunkett, whose work is carried on by the Irish Agricultural Organisation Society. Essentially co-operative in action, the creameries provide a means of processing raw materials, and have therefore carried industry into the countryside. Their strength is greatest in such areas as Limerick, Tipperary, northwest Cork and north Kerry, where almost all the farmers supply them with milk, and their extension eastwards into Kilkenny and Waterford is perhaps a sufficient tribute to the

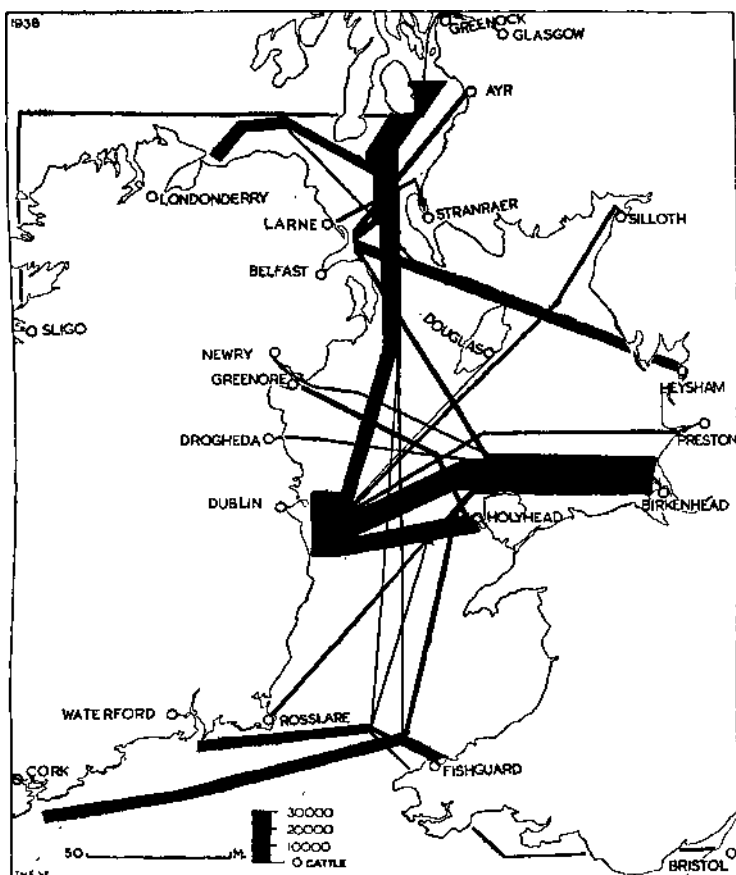


FIG. 40.—CATTLE EXPORTS FROM IRELAND TO GREAT BRITAIN, 1938

The thickness of the lines is in proportion to the number of beasts (whether store, dairy or fat) sent and received. The dominant position of Dublin is clearly shown, but Londonderry, Belfast, Waterford and Cork are also significant exporting centres. Birkenhead and Glasgow are the main reception ports.

Based on figures in the 'Irish Trade Journal,' Dublin, June 1939, p. 122.

economic advantages they bring to a farming community. They have not, however, been conspicuously successful in attracting the allegiance of the small farmer, as he generally has too few cows to guarantee a daily milk supply. In addition, the lack of winter feedstuffs under a predominantly pastoral regime makes the milk supply seasonal; many publicists on Irish agriculture wish to encourage winter dairying on Danish lines and hope that milk production will ultimately dominate such areas as the 'tillage districts' of the Midlands (*i.e.*, to the west of Co. Meath, chiefly Co. Leix and Co. Offaly) and also Co. Wexford, which also has a considerable arable acreage.

Pig rearing is mainly a small-farm concern in Ireland and is associated with many of the poorest holdings, but also to some extent with the creamery districts. The pigs are fed on skim milk from the creameries or left-over from home butter making, cooked potatoes and imported maize meal. As the last was unobtainable in Eire during the later phases of the 1939-1945 war, the number of pigs declined by three-fifths, the bacon factories had no surplus for export and the home market was inadequately supplied. The pre-war bacon trade was, however, expanding both in Eire and Northern Ireland, where a successful marketing scheme initiated in 1931 led to an increase in the number of pigs from 220,000 to 627,000 in 1939: imports from Eire ceased and the export trade with England increased in value to £1,000,000 per annum. Feeding difficulties caused a gradual decline to 237,000 in 1944, but the number rose to 314,000 by 1946. The pre-war export trade of Eire, half the output of the factories, was valued at c. £2,400,000 per annum. The chief factories are at Waterford, Cork, Limerick, Tralee in Eire, and at Belfast, Portadown and other provincial towns in Northern Ireland. The British demand is for 'Wiltshire*' bacon from well-ribbed and long-side animals (Large White 'Irish* Yorkshire) reared in Munster, Leinster and Connaught. The Large White Ulster pig, which gives 'Irish roll' bacon, has been supplanted in the north by the potentially Wiltshire animal, but not without grumbles from the farmers, as the Ulster pig ate less and took a shorter time to rear.

Poultry rearing has increased threefold in Ireland during the past hundred years and is of special economic importance on most of the small farms of the country: there are few poultry farms. In 1939 there were some 20,000,000 poultry in Eire and 10,000,000 in Northern Ireland: one-third of all the eggs from Eire and half those from Northern Ireland were exported. During the war of 1939-1945 the number of poultry was halved in Eire and doubled in Northern Ireland. Table poultry are also remunerative and turkey production for the British market is heavy, especially around Christmas: turkeys are, however, regarded as

a sporting or speculative venture by most farmers' wives, as they are difficult to rear, but they may be seen foraging for food in most farmyards or even in country lanes, and are much less intensively and expensively fed than Norfolk turkeys. Other birds bred for sale include ducks, geese and even guinea fowl. The fowls produced are of two types—surplus male birds and retired hens. By custom, the profits of poultry keeping are given to the women for their personal expenses and household requirements. In 1939 the eggs exported from Northern Ireland were valued at more than £2,000,000 and the poultry at £500,000; the eggs from Eire brought in more than £1,000,000, and poultry half this sum. By 1946 the proceeds had been very substantially increased: in this year, the total value of the eggs produced in Northern Ireland was £6,740,000, and of poultry £2,500,000, but no export figures are available.

Sheep are reared in all the uplands of Ireland and are brought to the lowlands for fattening; the fat lambs and sheep are sold in the local meat markets or exported to England, particularly (before the 1939-1945 war) to the industrial towns and the holiday resorts during the summer months. In 1947 there were 654,000 sheep in Northern Ireland, where the number kept was increasing rapidly up to 1939, when it approached one million: during the war, however, cattle rearing was favoured and consequently the number of sheep declined. In Eire the number of sheep fluctuates around three to four million. The main fattening areas of Ireland are the lowlands and valleys of East Ulster, including those around the Mourne mountains and the Antrim plateau, and also the hilly drumlin and drift country extending from Co. Down to Co. Meath. Damp lowlands, such as the Bann and the Shannon valleys and many parts of the Central Lowland, have very few sheep, but in East Connacht, where the Carboniferous limestones are thinly covered with drift and even form actual karsts, sheep are reared in considerable numbers: the pastures developed on the thin limestone soils are nutritive, though the frequent outcrops of rock give the country a somewhat desolate appearance. In all the areas where sheep rearing and fattening figure prominently most of the farmers also possess catde and grow some crops for the support of their household and stock.

As a whole, Irish farming is a mixed economy in which most of the farmers have a small arable acreage, a considerable area of pasture and meadow, and depend chiefly for their living on some form of livestock, with occasional cash crops. The store cattle trade and the creamery dairying have become well-recognised specialisation of certain areas, but the core of the agricultural system is the economy of the medium-sized farms, whose holders have a variety of stock and change their production

from year to year according to circumstances. With these medium-sized farms must be grouped some of the smaller farms in Northern Ireland which have demonstrated the ability of their workers to increase the arable acreage and the number of stock almost beyond expectations. On the other hand, the 'cottage farms' have so limited a quantity of arable land that they remain dependent on pigs, poultry, calves and sheep: lying outside the creamery area, they cannot profit from daily milk sales. The most specialised of all the Irish farms are the large holdings which, in Co. Meath and Co. Kildare, provide the final grazing and fattening pastures for stock drawn from the medium-sized farms. Hardly less specialised are some of the medium-sized farms, especially in Co. Limerick and Co. Tipperary, where some of the farmers normally have less than one-tenth of their land in crops and rely on the rich pastures and meadows.

The very richness of the Irish pastures, especially on good drift soils with a lime admixture, under heavy rainfalls (everywhere over 30" per annum, except in a small seaboard area near Dublin), combined with the possibility of leaving the cattle in the fields for as long as ten months of the year, has militated against the intensification of agriculture on Danish lines, for the farmer has no need to grow large quantities of crops to support his stock as the grass grows so luxuriantly. The real contrast between Ireland and Denmark is that in the former one-quarter of the land is tilled, in the latter three-quarters: Denmark exports agricultural staples such as butter, bacon and eggs that have been processed or graded, and Ireland's main agricultural export is live cattle with butter, bacon, eggs and poultry as subsidiary lines. It is frequently urged that Ireland's economic development could be similar to that of Denmark if the creameries and factories were more numerous and if more crops were grown. A greater concentration on crops would, for example, enable cattle to be more adequately fed during the winter months, so that the butter manufactured in the creameries and factories would be available for export throughout the year and not merely during the summer months from April to October. All these developments seem desirable, but at the present time there is every sign of a labour shortage on the land through the drain of emigration to Irish towns and to areas outside Ireland, so there is no reason to expect any marked change in Irish agricultural production in the near future. In fact, there are grave fears that in some areas the reduction in manpower may have serious repercussions on the output, an inevitable development if too many acres are farmed by too few people.

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CHAPTER IX
TRADE AND INDUSTRY
THE AGRICULTURAL BASIS

THE IRISH landscape is characteristically agricultural, yet the country has its own well-established manufacturing tradition, dating back far beyond the Industrial Revolution and canalised into the craftsmanship of the workshops in the towns and villages. To this day, many of the factories conceal themselves so successfully that in Dublin and other towns it is not difficult to capture the atmosphere of an eighteenth century when broad streets and stately homes made the foreground of the picture and the workers hid themselves and their activities somewhere in the background. The industrial town or village, utilitarian rather than beautiful, is a phenomenon almost unknown to the majority of Irish people outside the northeast: many a young Dubliner, viewing Manchester or Leeds for the first time, wonders how people could live happily in such conditions, though the visitor from Belfast would find an English industrial city not unlike his home environment.

This contrast between Ireland and Great Britain has led many people to assume that the two kingdoms were designed by nature to be complementary, the one agricultural, the other industrial, but it is now realised that Britain must maintain her agricultural production and that Ireland must develop her industrial life. A hundred years ago, Sir Robert Kane, in his *Industrial Resources of Ireland*, said that the Irish, 'dazzled by the wondrous facilities for industrial activity which the structure of the sister kingdom presents, had gradually sunk under the stupefying impression that Ireland was not suited for any manufactures, and the phrase currently ran, " We are an agricultural people, the English are a manufacturing people: our soil and climate fit us for producing corn and cattle, whilst her mines of coal and iron, the source of her machine power, make her the workshop of the world. The position of the two islands is, therefore, correlative and mutually advantageous: she sends us clothing, and we send her food: from her crowded factories we receive all the products of complex manufacture, and in return she takes our corn and cattle, the raw production of our soil." ' Only one year after Sir Robert Kane forecast a rapid improvement in the condition of Ireland through the application of science to agriculture and a strong measure of industrialisation, the Famine spread through the country and, to quote Kane in 1885,

'made such a profound alteration ... in the condition of the people that the subject of industry fell out of view/¹ But in spite of the emigration of millions, political unrest and years of economic stringency when famine appeared to be imminent, the social and financial desirability of industrialisation was constantly urged in Ireland during the latter half of the nineteenth century. Hopeful signs were the developments in the northeast, where flax processing had become a factory industry having an increasing hold on the export market, and shipbuilding based on imported coal and iron ore was acquiring fame: on a smaller scale, the creameries were spreading through the dairy country through the efforts of the Rev. Fr. Finlay, S.J., and Sir Horace Plunkett.

In 1841, 66% of the Irish population lived by agriculture and 24% by trade and manufacture, but at present 40% live by agriculture and 33% by trade and manufacture: in Northern Ireland in 1926 (the last full Census), 40% of the employed population were in manufacturing occupations against 17% in Eire (1936), and the number employed in commerce was 13% in Northern Ireland against 10% in Eire, a difference easily explained by the relatively simpler economic complexion of Eire, still largely agricultural. The tendency in recent years has been for industrial employment to increase in Eire, where the 1936 Census showed an addition of 40,000 since 1926, and the expansion continued until 1939» when it was partly checked by the difficulty of acquiring industrial raw materials. In Northern Ireland, on the other hand, the war stimulated industry, as the linen mills, the shipbuilding yards and heavy engineering works, and the aircraft factories all provided material needed for actual hostilities or valued as exports: hardly less important were the bacon factories, the creameries (now partly supplanted by central depots supplying liquid milk, butter and dried milk). Northern Ireland, as a belligerent in the war, received many imports that were in short supply in Eire. On the other hand, the northeast is extremely vulnerable to slumps in international trade, and in the early thirties as much as one-quarter of the entire insured population was unemployed: in 1932 and 1933 almost three-fifths of the shipyard workers were out of work and only six vessels, of some 20,000 tons, were launched; and there was a similar depression in the building industry. Like Tyneside or Clydeside, the northeast looks forward to industrial planning in which the range of factory occupations will be wider than before 1939.

Irish industry is rooted in various crafts carried on in the homes of the

¹ See Wheeler, T. S., 'Sir Robert Kane—his life and work,' in *The Natural Resources of Ireland*, published by the Royal Dublin Society in 1944, p. 22. The remark of Kane in 1885 was made to the Select Committee on Irish Industries; the passage quoted on the relation of Ireland and Britain is from Kane, R., *Industrial Resources of Ireland*, 1844 and 1845, p. 251.

people and in various small workshops, together with the supply of goods to the rural population from workers in the towns. There are still some traces of home industry in the west, especially in Donegal and Mayo, where tweeds are made from wool woven, spun and dyed by the women of the household. The people of the Aran islands and other parts of the western fringe still manufacture most of their own clothing and make their own boats by traditional methods, and some forms of peasant industry have been the foundation for a small factory development. Nowhere is this more marked than in Donegal, where there are several factories providing woollen goods, including knitted garments and tweeds, and the old 'sprigging' (hand embroidery) is continued in workshops making altar cloths and other articles: to some extent, also, the factories act as collecting centres for work done in the homes of the people. In many cases the profit of home industry was so meagre that it was, in effect, sweated labour, but the factories are subject to inspection and wage regulation, so the change seems socially healthy.

Agriculture is a natural basis for various industries in Ireland, and bacon, milk, cereals, potatoes and cattle may all be regarded as raw materials for factories. But most of the cattle are exported as stores, and the comparison, or more accurately the contrast, between Ireland and Denmark is that Danish live cattle exports to Britain were prohibited in 1892, with the result that the Danes were obliged to concentrate on butter, eggs and bacon, the 'breakfast table staples'. The Irish creamery and factory development has been far less complete than that of Denmark, though it has some elements in common, for many of the bacon factories have been associated with export trade since their foundation early in the nineteenth century. The creameries were the answer to the challenge of the Danish and Dutch competitors in the last quarter of the nineteenth century: previously the Irish butter was sent out in 'firkins' of 70 lbs. weight from Cork or 'crocks' and 'lumps' of small content from Northern Ireland. Agriculture is also the basis of the famous distilling and brewing enterprises, which use home-grown as well as imported barley and support a number of malt works. There is every reason to believe that the processing of agricultural raw materials can be extended farther, for already Irish 'stewed steak' is popular in Britain, and there is a demand for soups, stews and vegetables. Again, leather making has been expanded recently, and a number of industrial alcohol plants use local supplies of potatoes.

Supply of the home market has always been an important feature of the industrial life. When Kane wrote his book in 1844, there were nearly 7,000,000 people depending directly on the land, but the majority were backward, illiterate and living at a level hardly raised above subsistence,

with a very slight purchasing power. Fifty years later the inspectors working for the Congested Districts Board found that the majority of the people had very small cash incomes and in 1891 as in 1844 the essential need was to increase the buying power of the population, which could be made possible only through opening up the country by road, canal and railway. While the population has halved in a hundred years, the home demand for manufactures has increased, for once a farm family rise above the mere subsistence level they become potential consumers of goods produced in workshops and factories. Machine-made ropes replace those of straw, iron ploughs those made largely of wood, and the manufactured churn or the wooden beehive supplants the home-produced article: cattle remedies and patent medicines, sheep dips and potato sprays appear in the chemists* shops, and town-manufactured clothes are sold with the resultant decline of home spinning and weaving. There is more sale for groceries and drinks, and even bread is bought by many farmers as their incomes increase. Today there is a considerable sale of goods even among the holders of small farms, and naturally much more among those who have medium-sized and large farms, who buy more groceries and even luxuries: their state of comparative affluence helps to explain the commercial strength of many provincial towns and the prosperity of Irish manufactures such as clothing, footwear and agricultural implements. The re-industrialisation programme of Eire since 1932 has been planned largely to meet such home demands rather than to supply the export market, and its future is bound up with the standard of living on the farms of the land.

THE LOCATION OF INDUSTRY

Minerals, especially coal and iron, were the essential attraction for industrial enterprise in the nineteenth century, but in Ireland the search for deposits, zealously carried out by the Geological Survey since its inception, has not revealed any resources sufficient in themselves for great industrial developments, though some metalliferous minerals such as copper and lead were more extensively worked in the middle of the nineteenth century than now. The recent restriction of imports has made possible, at least for a time, the economic working of phosphates in Clare (see p. 400) and pyrites at Avoca (p. 287), but Ireland's poverty in minerals remains marked. Wartime stringency, continued into the subsequent peace, has led to a concentrated attack on the peat bogs for fuel, and a power station using peat will be in operation at Clonsast, near Portllington, by 1950.

The lack of minerals is frequently mentioned as one of the causes of the slight industrial developments of Ireland: yet the northeast managed

to attract both the coal and the steel necessary for its shipbuilding, and the long-established industries of Dublin also depend largely on imported coal. As long ago as 1844, Kane saw the possibilities of water power supplemented by steam power for use when the water level was low. The Shannon hydroelectric station, constructed between 1925 and 1929, was the beginning of modern power development in Eire and helped to make possible the scattering of new factories through the country: two-fifths of the Shannon supply is now used as 'industrial motive power.' The Dublin power station, working on imported coal, has been retained as a supplementary source, and the demand for electricity has risen so markedly that other sources of water power are now used: these include the Poulaphouca station on the west side of the Leinster chain (p. 280) and the new Erne station near Ballyshannon (p. 37). Most of the small power electricity undertakings have been incorporated into the national scheme under the Electricity Supply Board. In Northern Ireland, electricity development has also been marked, and is controlled mainly by the Electricity Board from the Harbour Power Station in Belfast and from a recently added generating station at Ballylumford, Island Magee: the Antrim Electricity Supply Company and a subsidiary company supply current to most of Co. Antrim and to the east part of Co. Londonderry. There are still a few independent concerns.

The programme of re-industrialisation in Eire since 1932 was based partly on the desire to make the country self-sufficient in years when international trade was declining and autarchy became a catchword. Many new factories were established between 1932 and 1939, after which the expansion became difficult owing to the lack of raw materials: some of the factories closed down, others went on short time, and much less was heard about the possibilities of self-sufficiency, though it was pointed out that Eire now had its own electric power from the Shannon, its own supplies of sugar, more clothing factories than ever before, and, in effect, suffered much less from wartime shortages than might have been expected. Northern Ireland, differently placed economically and politically, never desired self-sufficiency, for its interest lay in the closest possible co-operation with Great Britain.

Eire's industrial planning belongs to an age in which industry is regarded as a social as well as an economic aspect of life. In the Britain of the inter-war period, the new industries were concentrated mainly in or near the London area or in the Midlands, especially near Birmingham and in various other towns including, ironically enough, Oxford: few industries were added in the coalfields, as the advantages of suitable factory sites and available building land lay elsewhere, and it was proved by experience that in a world of unemployment, labour could be attracted

to the vicinity of a new factory. In Eire, government planning has achieved a scattering of industry that is even more marked than anything contemplated or forecast in post-war England. Having few strongly industrialised centres apart from the larger towns, but an abundant labour supply almost everywhere, social desirability can weigh heavily in the location of factories producing goods for the home market and heavily protected from foreign competition. If the choice of location had been left entirely to the owners of the new factories, almost all would have gravitated to Dublin, Cork, Limerick, Waterford or a few other major towns such as Drogheda and Dundalk. Instead, many small towns have been revitalised, some conspicuously so: not all the factories have been successful, but a considerable proportion are already well established. Some of the places chosen for new industries, such as Tullamore, a country town in the Central Lowland off the main railway lines, already had successful factories developed by local enterprise. The triumph over obstacles by various able families has been a remarkable feature of Irish industrial life for more than a century, in some cases for at least two hundred years, and the foresight of nineteenth-century business men in Belfast is matched by that of men who made the city and county of Cork famous for its woollen mills, Dublin renowned for its stout, biscuits and poplin, Limerick the centre for bacon curing, Clara the home of jute manufacture, or Tullamore a town supplying whiskey. No single controlling influence has ever operated in Irish industrial life, and therefore the modern planning is perhaps not as incongruous as it might seem, as it is based partly on the desire to give employment that was so manifest in both the works of Kane in 1844 ^{and} the Reports of the Congested Districts Board fifty years later.

Although the industrial policy of Northern Ireland and Eire respectively has differed markedly since their separation in 1921, their industrial life rests on the same foundations of individual enterprise triumphant over discouraging circumstances. In the remainder of this chapter, Eire and Northern Ireland are treated separately: as the neutral part of Ireland has been rather less reserved about its industrial activities since 1939 a somewhat fuller treatment is possible here.

EIRE

EXPORTS AND IMPORTS

The total value of imports per annum from 1932 to 1939 was around £35,000,000-£44,000,000: in 1945 it was £41,000,000. The import trade was, in 1939, shared out as follows: Britain 54%, Northern Ireland 2%, United States 8%, Argentine 5%, and all others 31%. The search for raw

materials tended to spread the import trade over a wider range of commodities in 1939 than in 1932, when Britain supplied 68% of the imports and Northern Ireland 9%. Through the war the most significant developments were the heavy fall in the quantity of imports, the maintenance of Britain's considerable share (54% in 1942, 45% in 1945) and not less, of the smaller but important contribution from the United States (10% in 1945) and from Canada (13% in 1945). Eire has received many goods from Britain during and since the war which were not available in Britain itself, as it is technically an export market: from the British point of view this policy is far-sighted, as otherwise the Irish shops would be flooded with American goods, as they have been from time to time. Again, the British trade with Eire, though somewhat changed in character by the development of Irish industries, remains remunerative, and is not unlikely to increase if the buying power of the Eire population rises.

The exports of Eire are normally valued at £27,000,000-£39,000,000 and consist almost entirely of agricultural produce, sent out as cattle, horses, sheep, pigs, poultry and eggs, or in the processed forms of bacon, butter and drinks, chiefly whiskey and stout. The proportion of exports sent to Britain and Northern Ireland has always been at least 90%, and during the 1939-1945 war all save a tiny fraction of the exports were absorbed by Britain. The imports from and exports to Britain are approximately equal in value: as the British demand, with that of Northern Ireland, alone matters, Irish agricultural production shows a quick reaction to the needs of its one consumer. Store cattle, foodstuffs and drink, the three main items, cover almost 90% of the exports: the remainder consists of a few manufactured goods and, in wartime, of various products such as flax, rabbits and even wild berries.

Live animals account for half the export trade in most years, and the rare outbreaks of foot-and-mouth disease are an almost unimaginable disaster: in 1941, the outward movement of cattle was prohibited for some months. In addition, dairy produce, poultry, bacon, rabbits and fresh meat form in value at least one-quarter of the exports in most years; but during the war the butter and bacon exports ceased as the supplies became inadequate to meet even the demands of the home market: conversely, the trade in poultry, eggs and tinned beef became more remunerative, though the quantity exported declined. In effect, the agricultural community has gained through the rise in prices, but lost in commercial strength through the contraction of output; for owing to the scarcity of imported feedstuffs such as maize, bran, cottonseed and Unseed it has been impossible, even with an intensive tillage campaign, to prevent a decline in pig production and in dairying. But whiskey

manufacture has been maintained at the 1939 levels, though the stout trade has faced a shortage of imported hops and consequently has been slightly reduced: drink, chiefly stout and whiskey, normally accounts for 10-15% of Eire's export trade.

During the 1939-1945 war, flax production revived in Eire, many small scutching mills were reopened, and the produce was bought by firms in Northern Ireland. Another wartime development was the revival of fishing in a Catholic country that, oddly enough, has a very small home demand; as much as three-quarters of the freshwater fish (salmon, trout and eels), and inshore fish such as herrings and mackerel, were exported; even periwinkles and mussels became a remunerative item. Wartime scarcity demands in Britain also induced people to collect large quantities of blackberries and bilberries: and children's school holidays were arranged accordingly. Rabbits suddenly rose in price: in 1941 the exports were valued at £915,000, but in 1945 only £306,000. All these developments, which may be of a temporary nature, have brought profit to certain families, in many cases to those not normally affluent: but the fishermen may experience a slump similar to that of the years after 1918, the bilberry and blackberry pickers lose their market, and the rabbit trappers may find that people really prefer authentic chickens after all. Even dog breeding for greyhound racing has become highly profitable: in 1945, 7,500 of these animals, valued at £733,000, were exported.

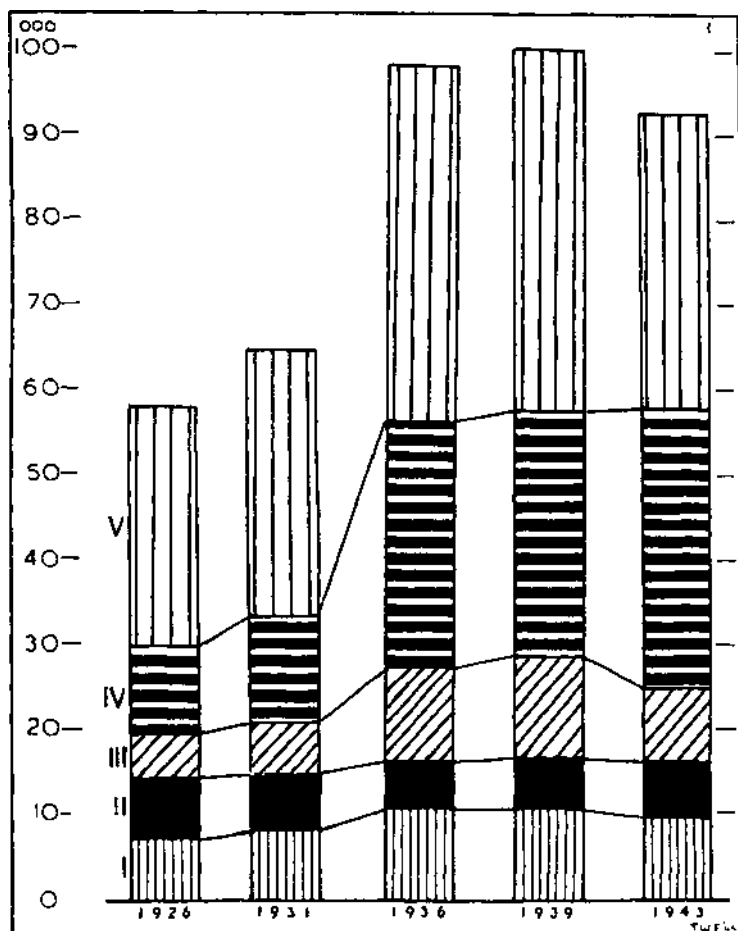
The non-agricultural export of Eire is remarkably small and some famous Irish manufactures such as Irish poplin, though originally associated with Dublin, are now centred chiefly in Belfast; similarly stout is manufactured in Liverpool, and a famous Dublin biscuit firm has a branch in Liverpool for the supply of British and overseas markets. On the other hand, a large number of British firms have associated factories in Eire: thus, large quantities of tobacco are imported by the Imperial Tobacco Company and made into cigarettes or pipe brands in Dublin, and several Leicester hosiery and boot firms now have works in Eire. While a few famous Irish products are now no longer of significance in the export trade, a large number of British firms have been compelled to alter the form of their Irish activities and give employment to local labour. It is difficult to assess the rival claims of efficient production at the cheapest possible rate and the social value of providing useful work to a population needing it. Some of the compromises reached during the war have been of a curious nature: thus, a famous cycle firm with a works in Cork was given large quantities of rubber to make motor and bicycle tyres, on condition that five-sixths of the output were sent to Northern Ireland. Consequently tyres 'made in Eire' were plentiful in the six

counties and extremely scarce in the country where they were made, with the result that smuggling and black market activities developed.

Wartime trends in the export market are perhaps so transitory as to be hardly worthy of note, yet there is no such thing as a 'return to normality,' for the world of 1950 cannot be an economic replica of that of 1939. Eire in the post-war world has an industrial life weakened by the temporary extinction of its butter and bacon export markets and, ironically enough, too much money in the banks. The 'adverse' balance of trade up to 1940 was around £16,000,000-£17,000,000: this was met by interest on British securities held by Irish residents, pensions paid to Irish people by Britain (chiefly war veterans of 1914-1918, and retired civil servants), remittances from emigrants to their relatives, and on the receipts of the tourist trade. Through the heavy reduction of imports, however, this 'adverse' balance was transformed into a 'favourable' balance by 1941, and meanwhile emigrants' remittances came into the country at a vastly increased rate as many thousands of Eire's population were in the British forces or engaged in war work. But in the post-war years the 'adverse' balance has appeared again, largely through heavy buying of goods in short supply during the war years. In 1947 exports were valued at £39,000,000 and imports at £131,000,000!

THE INDUSTRIAL EXPANSION

The re-industrialisation of Eire gave work for almost 40,000 extra people in factories between 1926 and 1936, a number almost equal to the loss from agriculture. There were some 58,000 people in factories in 1926, 97,000 in 1936, 100,000 in 1939, since when there has been a drop to 93,000; these figures include only about half those classed as 'producers and repairers' in the decennial Census, and are in fact those of people making 'transportable goods,' or factory workers in a strict sense of the term (see Fig. 41). Taking the quantitative output for 1936 as a norm of 100, the factory production was 64 in 1926, 104 in 1939, and 80 in 1943: the cash value of the output increased steadily during the war, and the amount of employment remained high (93% of the 1939 figure), but the output per man declined. Unemployment was less severe than anticipated during the war years, though naturally Eire did not share the experience of the belligerents who had full employment: the number of factory workers unemployed in 1939 was 17%, and in 1944 13%. Many employees retained their jobs, though their output was lessened, but large numbers went into the Eire Defence forces, emigrated, or else were absorbed by the various 'emergency schemes,' which, by 1944, provided work for over 20,000 men, notably on the peat bogs, which have been exploited on a scale never equalled before.



HG. 41.—INDUSTRIAL EMPLOYMENT IN EIRE, 1926-1943

This diagram, based on data in the *Irish Industrial Yearbook*, Dublin, annual, shows the number of persons working in factories: the five industrial groupings shown here are indicated on p. 218.

The industries of Eire fall into five classes:

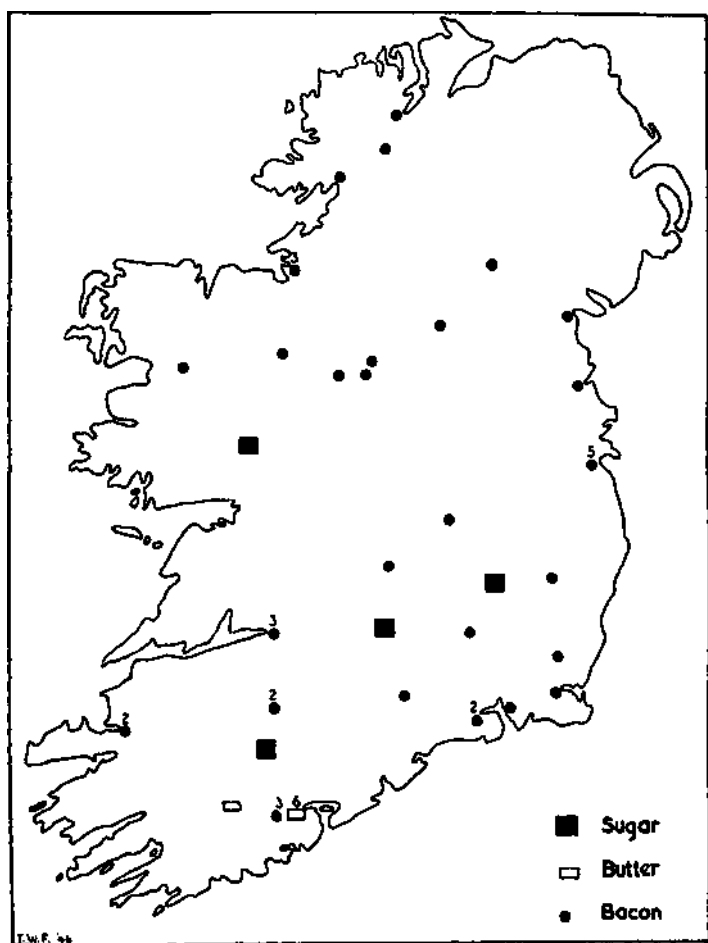
- i. Processed agricultural staples: butter, bacon, tinned meat and sugar.
2. Drinks, some of which are made from agricultural produce: distilling, brewing, malting, cider and mineral water manufacture.
3. Those serving the farmers: milling, farm tools, machinery and fertilisers.
4. Leather and clothing.
5. Miscellaneous, chiefly for home supply.

Fig. 41 shows that the number employed in four of the groups increased sharply between 1926 and 1939: the drink industries remained fairly stable. The advance of the leather and clothing trades was particularly marked and the miscellaneous industries also showed a considerable expansion to 1939, after which there was a decline due to the scarcity of imported raw materials.

1. AGRICULTURAL STAPLES (FIG. 42)

Only a small part of the agricultural produce enters into industry, as live cattle remain the chief staple of the country's farms. Factory production is connected mainly with dairying and its natural associate, pig production. There are bacon factories in the four chief towns, Dublin, Cork, Limerick and Waterford, and also in a number of provincial centres. Some of the larger bacon factories date back to the early part of the nineteenth century, and are well-established concerns having various sidelines such as meat and vegetable canning, soup manufacture, or sausage making. Efforts have been made to spread bacon factories throughout the country in order to provide a market for pigs, which are important sources of profit to masses of the smaller farmers. During the war years the scarcity of imported grains, such as maize, has so reduced the pig population that the export trade has been extinguished and bacon or ham has been short on the home market. In the thirties, however, some $\text{^}4,000,000$ worth of bacon and ham was consumed at home, and the remainder, valued at $\text{^}1,600,000\text{--}\text{^}3,000,000$, exported. The main centres of meat canning are Dublin, Waterford and Roscrea.

The distinction between factory* and 'creamery* butter is explained on p. 202; the factories have turned increasingly to the production of creamery butter. In 1926 the output of factory butter amounted to more than a quarter of the creamery butter, but by 1943 less than one-twelfth. The dominance of Cork in the butter trade is made clear in Fig. 42: until 1939 approximately one-third of the butter output was exported. The cheese industry is of minor importance, though it forms a sideline at



HG. 42.—FACTORIBS PROCESSING AGRICULTURAL STAPLES

Cork has its traditional hold on the butter trade; the four sugar beet factories are at Carlow, Thurles, Mallow and Tuam, and bacon manufacture is scattered through the country.

various creameries, and there is a large factory at Mitchelstown, Co. Cork. The condensed milk trade, centred in Limerick with various branches in the Minister dairying country, shows signs of expansion, as already its exports are valued at about £750,000 per annum.

Sugar beet growing has been zealously fostered to supply the large works at Carlow, Thurles, Mallow and Tuam (Fig. 42). Sugar production has been developed since 1925, and is claimed to be 'an outstanding example of successful co-operation between agriculture and industry.... The country is now within sight of complete self-sufficiency in sugar supplies, due equally to the efforts of the farming community and the existence of a manufacturing industry offering them a large and assured market and substantial cash benefits as a reward for their support.'¹ Along with the advance in sugar production the manufacture of jams, confectionery and chocolate has progressed, chiefly in Dublin but also in Cork, and some jam-making firms have established their own fruit farms in the vicinity of Dublin.

2. DRINKS MADE FROM AGRICULTURAL STAPLES (FIG. 43)

Whiskey, stout, porter and beer all use home-grown barley and depend on several malting plants. Irish whiskey and stout are exported in considerable quantities, but the beer produced is consumed in the home market. There are distilleries in Dublin, Cork, Tullamore and Kilbeggan (Westmeath): the breweries are located in Dublin, Cork, and some of the provincial towns in the east, such as Waterford, Dundalk, Drogheda, Wexford, Enniscorthy and Kilkenny, and by far the largest and most famous is Guinness, beside the Liffey, in Dublin. Both brewing and distilling belong to those parts of Ireland in which barley is grown: mineral-water production has a more scattered distribution for approximately eighty works exist, many of which are in small provincial towns. The soft drinks manufacture owes its success partly to an intensive total abstinence campaign, preached by Father Mathew in the nineteenth century and later continued by the Pioneer Association. At one time, long since forgotten, the campaign was so successful that it threatened to extinguish distilling altogether; today a considerable minority of the population are total abstainers. Cider making has been developed recently at Clonmel in association with the manufacture of soft drinks.

3. INDUSTRIES SERVING THE FARMERS

Mills, works making tools and agricultural implements and fertiliser factories all have a close relation to agricultural activity in Ireland, though they depend partly on imported raw materials. Milling is widespread

¹ *Irish Industrial Yearbook*, Dublin, 1945, p. 70.

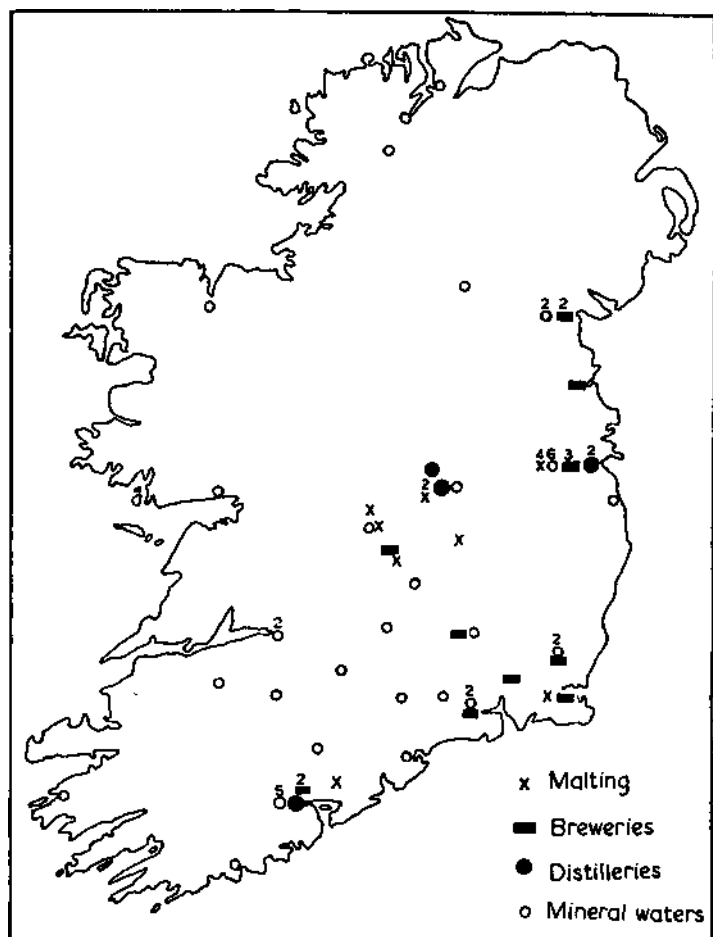


FIG. 43.—MANUFACTURE OF DRINKS

Dublin, Cork, Drogheda and Tullamore are the main centres: mineral waters are manufactured in various towns.

and varied: most towns and even some villages have an old mill grinding wheat, oats and barley, which is supplied by the farmers and, in many cases, returned to the farm after grinding. Some of the mills also import wheat and maize and a few in Dublin, Cork, Limerick, Waterford and various smaller towns have become large-scale concerns. The output of milling, valued at £7,000,000 around 1929, was almost doubled by 1939, partly through the encouragement of home cereal production: by 1940 over one-third of the wheat ground for flour was home-grown, and the import of barley and oats for milling had almost ceased. Maize, naturally enough, was entirely imported and the normal annual purchase was around six million cwts. valued at over .£2,000,000. The range of products from individual mills is wide; some deal in wheat, oats and maize exclusively, some in several lines. The effect of maize shortage on pig production has been extremely serious during the war of 1939-1945.

Agricultural machinery and tools are manufactured at several centres in Ireland, including Cork, Wexford, Waterford, Limerick, Wicklow, Maryborough and Bailieborough. While the production of implements has increased considerably, hardly one-third of the demand is met from home manufacture. The fertiliser firms deal mainly in superphosphates and compound manures, and depend chiefly on raw materials imported from North Africa. During the war years some phosphate deposits in Co. Clare were used (see p. 400), but the cost of mining is so high that permanent exploitation is unlikely. The main works are in Dublin and Drogheda: the scarcity of fertilisers has been acutely felt during the war years.

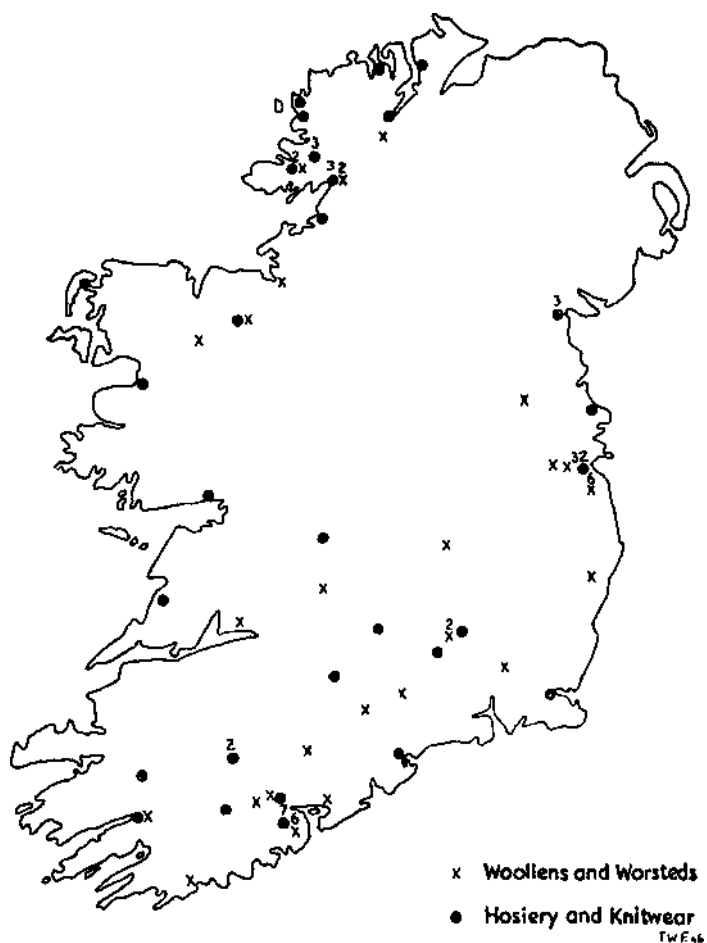
4. LEATHER AND CLOTHING INDUSTRIES

The advance of the leather and clothing industries has been particularly marked since 1922; both have some roots in the country, and both have seen the expansion of their market through a steady rise in the standard of living. The clothing industry began on a domestic basis, with home spinning, weaving and dyeing in Donegal, West Connacht and Kerry. The wool of mountain sheep was collected, spun, woven and dyed with local ingredients made from berries, seaweed and even soot. The Irish Homespun Society collects recipes of local dyes and stages exhibitions in the cities from time to time; and their workers claim that the use of home-made dyes gives a greater range of shades than factory dyes can possibly provide. The tweeds from the west still command a commercial sale for sports coats, suits and costumes; there is also a demand for rugs, blankets and hosiery. While the 'homespun' cloths are still made by many individual workers in the west, there are also several

factories making rugs, blankets and tweeds: one such, in Foxford, Co. Mayo, has been remarkably successful with blankets and rugs and now employs several hundred people. Flax growing became the basis of the linen industry in the northeast, though it was originally spread throughout the country. Leather-making, with boot and shoe manufacture, was strongly decentralised in the early part of the nineteenth century when the majority of the population was too poor to buy boots and shoes at all, and the gentry bought footwear of good quality from firms in the towns. As the standard of living began to rise in the latter half of the nineteenth century the market was flooded by footwear from highly organised British firms in Leicester, Northampton and other centres. But since 1922 tariff protection made possible the rapid extension of all these industries connected with clothing and footwear, and the employment given has multiplied by three in less than twenty years (see Fig. 41), and is likely to expand still further, especially through the development of the cotton trade.

There are a number of old woollen mills, some dating back to the eighteenth century, in rural places such as Blarney, Co. Cork, Poulmounty, near New Ross, Co. Wexford, founded respectively in 1750 and 1770. Other mills dating back more than a century include those at Sixmilebridge, Co. Clare, Navan, Co. Meath and Midleton, Co. Cork: some of the mills in Donegal were founded towards the end of the nineteenth century and the Foxford mills, Co. Mayo, began their successful career in 1891. The manufacture of wool and worsteds is also well established in Dublin, Cork and Kilkenny. The mills, which employ nearly 4,000 persons, use home-produced wool and consumed over 2,000,000 pounds by weight, valued at £107,000 in 1938, and double this quantity in 1940. Their products include rugs, blankets, 'sports' tweeds, and, in a few cases, fine-woven tweeds for suitings. The ready-made clothing industries use large quantities of imported worsted and shoddy cloths but could, it is claimed, use more home-produced textiles: a large mill with 700 workers, at Tullamore, now manufactures woollen and worsted yarns for the trade (see Fig. 44).

Cotton and linen factories in Eire are few in number compared with those of Northern Ireland, but are firmly established in Dundalk, Drogheda and Dublin, with Balbriggan in north Co. Dublin. Some of the linen mills are outposts of the linen industry in the northeast, especially in Drogheda and at Ravensdale, near Dundalk. The numerous factories, many of them quite small, in Co. Donegal have a domestic foundation of hand embroidery and lace making, especially for church goods at Donegal town and Mountcharles, and shirt sewing in the east of the county close to Londonderry, notably at Buncrana. Cotton mills have



HG. 44.—WOOLLEN INDUSTRIES

Dublin, Cork and Co. Donegal are prominent, but numerous other towns and villages have woollen industries. Tullamore (see p. 145) has a large yarn factory.

recently been established at Athlone and Naas to meet the demand for piece goods.

Clothing industries, having increasing supplies from textile mills available, have expanded so considerably that they now employ nearly 20,000 people against 8,000 in 1930. They still depend to some extent on imported materials, but their advance under government protection has favoured the rise of ancillary industries: thus, a firm at Westport, Co. Mayo, makes all the sewing cotton produced in Eire. The imports of clothing were valued at more than £6,000,000 in 1930 but at little more than £1,000,000 ten years later. Though there are still considerable imports of materials and of luxury articles already made up, the expansion of the clothing industry has been planned to meet the needs of all types of trade. The industry is centred in Dublin, Cork, Limerick, and the other towns of importance, though shirt-making is concentrated in Co. Donegal, and hosiery manufacture (see below) is scattered through the country with much the same locational pattern as woollen milling. Limerick and Cork both have a strong position in the ready-made clothing trade. One of the most recent additions to this complex group of industries is hat-making for ladies at factories in Castlebar and Gal way: all the other main works producing men's and women's headgear are in Dublin or Cork.

Hosiery and knitwear industries now employ over 4,000 people, five times as many as in 1930. Their location reveals many interesting features, including a not unnatural concentration in Dublin and Cork with their hinterlands, a remarkably large number of enterprises in Co. Donegal which have risen up on the basis of domestic industry and a few factories scattered through the country, of which some are in towns such as Dundalk, Kilkenny, Wexford and Galway: a few have been established during the post-1932 industrial drive at, for example, Ballyshannon, Co. Donegal, Westport, Co. Mayo and Callan, Co. Kilkenny (see Fig. 44). The particular strength of Co. Cork in the hosiery industry should be noted: the actual effects on population distribution are discussed on Pp. 350, 353-

Boot and shoe industries now employ more than 5,000 people, compared with a mere thousand around 1930: the number working in tanneries has increased from 300 to 1,700 in the same period. The oldest tanneries, which date from 1830, are in Limerick, with branches at Cork and Tralee (see Fig. 45): in the nineteen-thirties tanneries were founded or, in some cases, re-established at Gorey and New Ross, Co. Wexford, Portlaw and Dungarvan, Co. Waterford, and Carrick-on-Suir, Co. Tipperary. Without these tanneries the footwear factories would probably have been obliged to close down during the war of 1939-1945* with them, output has been steadily increased. The home output is now valued

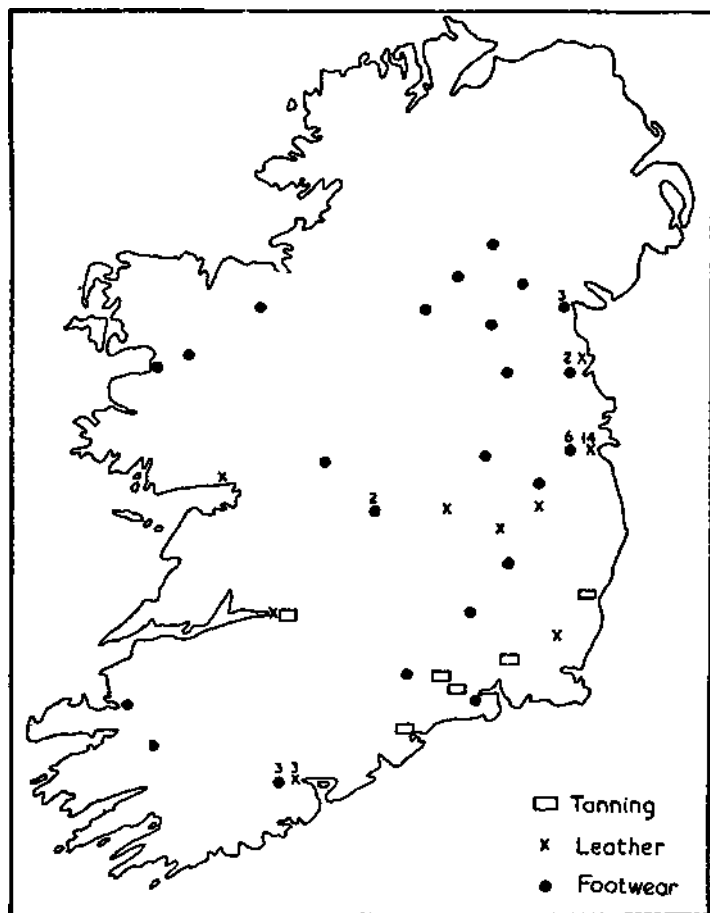


FIG. 45.—LEATHER INDUSTRIES

In these industries there has been a marked advance during the past twenty years not only in the major towns such as Dublin, Cork, Drogheda and Dundalk, but also in many smaller towns and villages.

at £2,750,000, the imports at less than £1,000,000, so the country has become almost self-sufficient in footwear. While the products are varied, heavy boots figure prominently: one firm advertise their wares as 'gluttons for punishment... made for heavy duty—the toughest, roughest, hardest slogging work on the farm, the road, the mountain, the bog/ The factories are located mainly in Dublin, Cork and other provincial towns, including Waterford, Drogheda, Dundalk (three important works), Carlow, Kilkenny and elsewhere. Boot and shoe manufacture is likely to expand still further if the standard of living rises, for even today many of the children in Ireland have no shoes and not a few of the adults are too poor to buy footwear adequate for the needs of their outdoor work in a damp climate. Gumboots provide a useful substitute for boots among large numbers of the farmers and labourers.

The success of the clothing and leather industries has not been achieved without certain discontents among consumers, who complain that they cannot always buy what they want and that, in the absence of export competition, they are sometimes obliged to purchase an inferior article and pay more for it: on the other hand, the expansion of employment is impressive, and the new factories have revived, at least partially, a number of towns.

5. INDUSTRIES FOR HOME SUPPLY

A wide variety of industries intended for the supply of the home market remain to be considered: together they employed 42,000 people in 1939 as compared with 28,000 in 1926. This advance could not have been achieved without the assistance of government planning, nor can it be maintained without a substantial import of raw materials. The industries fall into five main groups: (a) bread and tobacco; (b) paper, printing and publishing; (c) timber with furniture; (d) extractive, mines and quarries; (e) engineering and metal trades. The first of these categories is indispensable under modern conditions: bread and confectionery are made in all the towns and some firms in the provinces serve a remarkably large area by vans. One of Dublin's largest factories makes biscuits and chocolates, and some of the British chocolate firms now have works in Dublin. Tobacco manufacture is centred in Dublin, Dundalk and Drogheda, and 3% of the raw material is home grown, chiefly in Co. Meath.

Paper making is localised in and around Dublin, and employs over 2,000 workers, four times as many as in 1926. A recent addition is a wallpaper factory at Kildare, typically modern in appearance: a comparable development, also of the post-1932 era, is a works making carbon papers, typewriter ribbons and die like at Trim, Co. Meath. The printing

trade depends chiefly on the supply of the country's eight daily newspapers and more than sixty weekly newspapers published in provincial towns throughout the land, together with a number of journals. There are no large-scale publishing houses, though a number of firms produce books from time to time. During and since the war of 1939-1945 the newspapers of Eire have suffered an attenuation comparable with that of papers in Great Britain.

Timber reserves in Ireland are slight, as hardly 2% of the country is forested, yet sawmills are among the most widespread of all industrial enterprises and already the forestry plantations are making useful contributions. Normally, however, most of the timber is imported and war scarcities have affected the furniture and building trades adversely, though the rehousing of a considerable proportion of Eire's population is the aim of the government. Firms at Dublin and Portarlinton make sports goods: the furniture industry is concentrated mainly in Dublin and Cork.

Mining has been stimulated in wartime by scarcities, with the result that temporary booms may occur in certain areas (see pp. 337, 338, coal, p. 287, pyrites, p. 400, phosphates), but there are also developments of more permanence, such as the cement-making factories of Drogheda and Limerick, which supply the home demand, and brick-making on the Triassic clay area near Kingscourt, Co. Cavan. Other clays, some of glacial origin, are used for making bricks in Dublin and elsewhere. The two main earthenware factories are at Arklow, on the site of a munition factory used in the 1914-1918 war, and at Carrigaline, Co. Cork.

The advance of the engineering and metal trades has been perhaps the most remarkable feature of the recent industrial revolution: in 1939 these industries, with more than 8,000 workers, employed four times as many people as in 1929, and there was every sign of continued expansion, though war scarcities of raw materials caused a drastic reduction in output, especially in the motor industry. Metal working is centred largely in old-established enterprises, such as the Wexford firms who make agricultural machinery, and the firms at Clones and elsewhere providing various types of spades, of which there is an extraordinary variety from one area to another. Again, various metal works already existed in Dublin, Cork, Limerick, Galway and other towns long before the modern re-industrialisation, though it was only in 1938 that steel-making was established in Eire. The site chosen was Haulbowline island, part of the former British naval base in Cork harbour, near Cobh (Queenstown). The island has deepwater berths available at any state of the tide, and its adaptation to use for steelworks followed closely on the evacuation of British naval forces under the agreement of 1938. Cork already had the

Ford motor works, which began production in 1919, together with a rubber factory and a number of minor engineering works. Many of the older metal works are located in Dublin, but several of the recent additions have been scattered through the provinces. Thus, razor blades are made at Carlow and Enniscorthy, enamelware at Tralee (as well as Dublin), aluminium utensils at Nenagh, cutlery at Newbridge, Co. Kildare, electric cables at New Ross, and electric bulbs at Bray. Tractors and trailers are assembled at Athy, motor bodies built at Clonmel, tin boxes at Castleknock, Co. Dublin: in the regional chapters several references will be found to various small industrial undertakings scattered through the land. But as yet these metal trades meet only part of the country's needs: in 1938 the net output of the engineering trades was c. £600,000, and the imports £780,000, and in the remaining metal trades the net output was £930,000, and the imports over £3,000,000. Even if the metal and electrical group of industries expands rapidly, the imports of manufactured goods as well as of raw materials are likely to remain considerable for many years.

NORTHERN IRELAND

No complete survey of occupations has been made in Northern Ireland since 1926, when the last full Census was taken, although the numbers of insured persons in various trades are available: these show an increase from 350,000 in 1939 to 372,000 in 1946, with a decline in agriculture from 30,000 to 23,000, partly through transference to other employment. This figure does not include the farmers, and the indications of the 1926 Census are therefore still of interest: in that year some 40% of the population was engaged in manufacturing and building, and 27% in agriculture. While the number on the land has certainly declined, the position in 1947 is still at least comparable with that in 1926: quite clearly industry is far more important than in Eire, and advancing rather than declining. Even so, Northern Ireland is primarily an agricultural area in which the Industrial Revolution has overlaid a veneer of manufacturing and town life, and the produce of the farms was the basis of the flax industry, organised first in the homes of the people, and later in the factories of the towns. Belfast, like Manchester, began as a market town: it gradually became the economic hub of a large part of Ulster, having in time no effective rival as port, factory town, commercial centre or, in short, regional capital.

Almost nine-tenths of the overseas trade of Northern Ireland passes through Belfast, though Londonderry figures as a minor shipping centre. The figures of exports and imports, available from 1924, include a certain quantity of goods for re-export (partly to Eire), and except in 1944 and

1945 show a slight adverse balance of trade, made up by the 'invisible exports' of the tourist traffic, remittances from those overseas, dividends on investments in Britain and abroad, and pensions paid from Britain. In 1945 the imports were valued at £107,100,000, and the exports at £113,200,000; but in 1937 at £57,100,000 and £54,400,000, and in 1932, a depression year, at £43,600,000 and £36,400,000 respectively: part of the difference lies in the lower prices of the pre-war years, and the volume of trade did not increase as markedly as its value. The 1945 exports included manufactured goods valued at £63,200,000, of which linen accounted for two-fifths, and cotton, including shirts, for one-fifth. The ships made in the Belfast yards were sold for £25,000,000, so in all industrial produce accounted for four-fifths of the export income. The remaining exports were food and drink, at £13,400,000, of which one-third was from eggs and bacon, and £3,300,000 worth of raw materials, which included flax and grass seed grown for the British market. Live-stock, sent 'on the hoof/ were sold for £7,700,000, more than in any previous year.

The imports in 1945 were valued at £107,100,000 and consisted mainly of manufactured or semi-manufactured goods valued at £62,200,000, among which cotton goods accounted for £8,500,000, cotton yarn for £3,100,000 and woollen goods for £3,800,000. Raw materials, at £13,500,000, included coal bought for £7,000,000 and flax for £3,000,000, and the food, drink and tobacco group of imports at £26,000,000 included wheat at £3,000,000, and tobacco at £5,700,000: there was also a small import of livestock, partly from Eire, at a cost of £5,400,000. A study of this catalogue of figures shows:

First, that the total value of Northern Ireland's export trade is far greater than that of Eire (p. 214).

Second, that in the economic structure of the province, the profit from the linen factories and the shipyards is of very great importance.

Third, that the imports in the food, drink and tobacco group are greater than the exports.

Fourth, that the import of manufactured foods and raw materials is almost equal in terms of cash to the export of the finished products.

Fifth, that Northern Ireland has no pretensions to autarchy and has not aspired to a re-industrialisation programme on social and political grounds similar to the Eire experiment discussed on pp. 216-229, though the present aim is to attract a wider range of industry.

The new factories already established (1947) or in prospect manufacture artificial silk, hosiery, drawing instruments, carpets, toys, prams, optical goods, fur goods, vacuum cleaners, electric cells and jewellery.

Any industrial expansion to counteract depression in the major trades, such as shipbuilding and linen during the inter-war period, can most suitably lie in the provision of a varied range of factories, and also in the expansion of the trades connected with agriculture. These include such lines as the substitution of a dead meat trade for the export of live animals, the establishment of more plants for making condensed or dried milk, and vegetable or fruit canning. The authors of the Babington Report, 1946, urge that 'if methods of processing agricultural produce can be developed successfully, a whole range of employment hitherto unknown will be opened up.' Significantly they add that 'of no country is it truer to say that agriculture constitutes the basis of economic life/ At present it is not easy to see exactly how the agricultural side of industry will develop: most of the fifty creameries are closed, and the milk is sent to seven large milk depots, which have pasteurising plants, equipment for butter-making, and drying plants for skim milk. In addition, a famous firm has factories for making milk products at Ballymoney, Co. Antrim, and at Coneywarren, near Omagh, Co. Tyrone. Meanwhile the creameries not now used are maintained by grants from the Ministry of Agriculture, so that they may be able to resume operations when the post-war trends of trade become clearer.

It is certainly true that agriculture was the primary basis of industry in Northern Ireland, as even in the time of Arthur Young the flax spinning in the homes from the crops grown in the fields had made the northeast a significant contributor to the export trade of Ireland. Young looked forward hopefully to the days of linen mills in towns, but it was the cotton industry that first used steam power when in 1789, only a year after the first steam engine reached Lancashire, one was installed in a mill at Lisburn, as no water power was available. The imports of cotton wool and cotton yarn into Ireland showed a steady increase from 1783 onwards, and by 1811 there were, in the neighbourhood of Belfast, fifteen cotton mills driven by steam, six by horses and hand, and twelve by water. Apart from the workers in the mills, there were numerous outworkers who were either employees of the factories or of agents from Scottish firms who took advantage of the lower wage rates paid in Ireland. Not a few of these home workers were linen-weavers who changed over to the easier task of cotton-weaving; and some changed from one to the other as the demand for each warranted. In the early part of the nineteenth century, cotton-weaving spread through a large part of northeast Ireland, but the slump after the Napoleonic wars led to its restricted localisation in Belfast and neighbouring centres such as Bangor and Donaghadee, and others in the Lagan valley, such as Lisburn and Hillsborough. Although in 1838 the weavers were said to have 'fallen from a most respectable to

a very distressed and humble class¹ there were still some 10,000-15,000 within ten miles of Belfast, and the final decay of domestic cotton-weaving came only in the eighteen-sixties, when most of the surviving home workers turned their energies to linen-weaving once more.

The linen industry of the northeast was largely an eighteenth-century growth, though its foundations were laid by Scottish pioneers who settled during the late sixteenth and the seventeenth century, and by various Huguenot refugees who came during the seventeenth century. Ireland already had a reputation for fine spinning by the eighteenth century and the farmers of Ulster, more secure on their holdings than those in the other provinces, launched out into the domestic production of linen. This linen, once spun and woven, was sold to bleachers, at markets in the streets of various towns, or, in the more important Ulster towns, in the linen halls that survive to this day. The Ulster Custom, by which a tenant had security on his holding, is often regarded as the main reason for the success of the linen industry in the northeast, but was only one of several contributory causes which included the presence of a naturally industrious people, partly Scots in origin, the steady increase in the number of towns and market villages founded by landlords eager to encourage industry, and finally the provision of effective marketing and transport facilities by canal, road, and later railway, with suitable ports such as Newry, Belfast, Coleraine and Londonderry.

Domestic in origin, linen weaving remained a home craft in some cases throughout the nineteenth and even into the twentieth century, but domestic spinning did not survive long after 1825, when James Kay of Preston discovered that a thorough soaking in cold water made the fibres sufficiently slippery to be drawn by machinery into a really fine yarn. Already in 1820, the famous York street mill in Belfast was founded, first for cotton-spinning and later for linen: it is now the largest in the world. The English trade triumphed in cotton but the Irish in linen, and while the changeover from cotton to linen spinning or weaving caused considerable hardship in many cases, it was a fortunate development for Ulster, as it provided a sure source of employment for which the people, having so long a tradition of flax working, were eminently suited. The 'middlemen' bought yarn from the spinners *in* bulk and supplied it to the weaver, then collected the webs, which were sold in the linen markets. As the production increased, handloom weaving declined in Ireland, and linen manufacture in England was almost extinguished: in Yorkshire it was replaced by the woollen, worsted and clothing trades, and in Lancashire by cotton. The Scottish linen trade ceased to be

¹ Sir Robert Bateson, quoted in Green, E.R.R., 'The cotton hand-loom weavers in the north-east of Ireland,' *Ulster Journal of Archaeology*, vol. 7, 1944, p. 39.

a rival as the factories began to work in the coarser fibres, such as jute and hemp, though some damasks are made in Dunfermline.

Outside the northeast, flax-spinning in Ireland gradually declined, as it never reached the factory stage except on a small scale at Dublin, Drogheda and Dundalk. Everything combined to favour Ulster, for a regular cargo service from Belfast to Liverpool was established in 1824, and within a few years there was a substantial import of coal from Ayrshire and Cumberland for the new steam-driven mills as well as for domestic consumption. The construction of Belfast harbour began around 1840, and its shipyards came into production a few years later, with the result that there was a demand for male labour in shipbuilding and female in the mills. Belfast, with its satellite towns, was able to attract labour in abundance from the surrounding countryside, as the marked drift to the towns or overseas had begun in earnest about the middle of the nineteenth century. There was also a great development of banking, especially between 1825 and 1865, and many of the bleachers, who had risen to power as buyers of brown linen, became powerful manufacturers and exporters, steadily accumulating more capital, which has often been difficult to acquire for Irish industrial developments. The earlier advance of cotton to the factory stage left, in its decline, a useful reserve of capital, buildings, and industrial tradition. Although many towns in Northern Ireland have a sad legacy of mid-nineteenth-century housing for the working classes, it was in this phase that parts of Ulster were revived, while the rest of Ireland was facing an acute population problem: of the textile workers elsewhere in Ireland it has been said, 'The destitution of those who had once been spinners and weavers merely increased the mass of social misery, which reached its climax in the Great Famine.'¹

The linen trade, with hemp, normally employs some 60,000 workers, of whom two-thirds are women, approximately one-sixth of all the insured persons in Northern Ireland. The distribution of factories is discussed on pp. 503-504; many combine spinning and weaving around Belfast, and the shirt and collar section of the industry is prominent around Londonderry. The growth of flax in Northern Ireland shows a very quick response to prices and normally the deficiency is made up by flax imported from Belgium, the main supplier and the producer of the finest raw material, Holland, Latvia, and the U.S.S.R. In the years before 1940, flax was grown on 20,000-30,000 acres, and even less in some years, with the result that nine-tenths of that required for manufacture was imported, but by 1944 flax was grown on 125,000 acres, more than in 1918 or any other recorded year. There was, however, a swift

¹ Gill, C, 'The rise of the Irish linen industry,' Oxford, 1925, p. 324.

decline from the 1944 peak to 80,000 acres in **1945** and **36,000 acres** in **1946**, partly owing to uncertainties about the price **available** for the growers. The linen industry, so prosperous during the war years, may have reached its peak of production so that no great expansions, and even contractions, are probable as the post-war economic trends become clear. In the middle of the nineteen-thirties, approximately one-fifth of the insured workers in the linen trades were unemployed, and almost one-third in 1930.

Shipbuilding is as closely linked with the rise of Belfast as the linen trade, and is associated with two famous firms, Harland and Wolfe, constituted in 1863, and Workman Clark, founded in 1879. By the time these firms were established Belfast was already a rising port, and the reclamation of land in the Lagan estuary combined with the construction of deepwater channels made possible the building of large liners and the provision of several hundred acres of level ground for the shipyards. The number of people in the shipbuilding and engineering trades was 23,000 in 1937, but in times of heavy demand as many as 30,000, and at times considerably more, of whom all save a small fraction are men, though the linen trade is a useful social complement, as it employs mainly female labour. On the other hand, unemployment reached 57% in 1931 and 1932, though it was only 17% by 1937.

Many trades are linked with shipbuilding, of which engineering and rope-making are perhaps the most obvious: Belfast has a ropeworks which employs several thousand operatives. There are also various enterprises dealing with imported commodities such as tobacco, and a number of agricultural processing trades, such as bacon curing, with derived trades such as brewing and distilling. In 1939 there were in Northern Ireland 350,000 insured persons, and in 1946 372,000, of whom the percentages in the various industrial groups were (1939 figures first): building, 8%, 7%; transport and distributive trades, 19%, 17%; flax, linen and hemp, 18%, 13%; food and drink, 13%, 11%; shipbuilding and engineering, 11%, 16%. In all these categories the 1939 incidence of unemployment was high, but in 1946 it was only 9%. There was practically full employment in Northern Ireland during the middle and later phases of the war owing to the expansion of shipbuilding, both for the Forces and the Merchant Navy, to the heavy demand for clothing in the civilian and Services markets, and also the use of linen for parachute harness and other military equipment. A number of munition and similar factories were located in the Province, and two of special note were the boat-building yards at Belfast and Warrenpoint, at which landing craft for the Normandy invasion were made.

Trading interests in both parts of Ireland lie with Britain, the source of

coal, many raw materials and manufactured goods provided either from her own resources or the London market, and the main consumer of Irish agricultural produce. But Eire's policy is protectionist within its boundaries, in order that its small industries may be preserved, and Northern Ireland's policy is imperial, as there is both a desire and a need for co-operation with the eastern neighbour. It is difficult to resist the impression that the two units draw farther apart in their economic life year by year: it is even more obvious that the appeals for a United Ireland are normally made on non-economic grounds such as historical and geographical unity, and national pride, and that if Ireland ever becomes one governmental unit, hard thinking will be necessary to provide satisfactory economic arrangements among people whose interests have become so diverse.

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CHAPTER X

COMMUNICATIONS

THE BASIS of the Irish communications system is the road, and the modern highways are fed by a network of lanes which reach back to remote farmsteads. The main roads exist for the traffic between towns and the minor roads for the day-to-day movement of the farming population, who travel by farm-cart or donkey trap to the shops, fairs and churches. The dispersion of settlement, the small size of many holdings, and the dependence on peat supplies by large numbers of the agricultural population all combine to multiply the number of tracks through the countryside, but the footpath through fields is less frequent in Ireland than in England, though the walker can generally go straight through the fields except at times when precious crops have to be guarded against cattle, and the hedges are reinforced with gorse, hawthorn and similar deterrents. Ireland's road pattern is the accretion of many generations, with a veneer of modernity in its trunk roads, which are of excellent quality in most counties but not all: except in a few areas, mainly around Dublin, and *in* the more densely peopled parts of Northern Ireland, they carry very little traffic.

The canals of Ireland were constructed in the pre-railway age and have not entirely outlived their usefulness: the Grand Canal is still used by cargo boats from Dublin to Waterford and through the Central Lowland to Limerick, and the Lagan Canal is also used, though elsewhere there is now very little traffic. The railways which spread through Ireland in the latter half of the nineteenth century have now been shorn of many of the branch lines and resemble a somewhat withered tree with a number of limbs already removed and more about to go, for in this petrol age the bus has filled gaps in the general pattern of communications. This rationalisation in Eire has been achieved by a government-sponsored combine, Coras Iompair Eireann, which controls all rail and road services, except those of the Great Northern Railway, and claims to integrate them into a single system adequate for the economic structure of the country. The air routes reaching Ireland centre on three main aerodromes, Nutts Corner (Northern Ireland), Collinstown, near Dublin, and Rineanna on the Shannon. There are direct services to London, Glasgow, Manchester and Liverpool, and continental connections through

Paris and Amsterdam have been established. Rineanna has already developed an important position on the Atlantic air routes, and there is every sign that Ireland will be able to maintain its position in world air routes for which it is well adapted by its westerly location. As yet, however, the number of people who travel across the Irish sea by air is small in comparison with the number who go by sea.

THE IRISH ROADS

Once off the main roads of Ireland it is not difficult to see the relics of a more leisured age than the mid-twentieth century, as most of the traffic is by farm-cart and bicycle. In 1776 Arthur Young commented favourably on most of the secondary roads, though not the main turnpikes: 'For a country so very far behind us as Ireland, to have got suddenly so much the start of us in the article of roads, is a spectacle diat cannot fail to strike the English visitor exceedingly. It is a common complaint that the tolls of the turnpikes are so many jobs, and the roads left in a state that disgraces the kingdom.* The turnpikes were not numerous, diough they included such highways as that between Dublin and Belfast, along which various old tollgates may still be seen. In Young*s day the turnpikes were worn down by coaches with teams of several horses, and Young advances the argument that one-horse carts were more suited to the country's roads than the large coaches.

In 1760 all compulsory road work was removed by law, and the building of 'presentment* roads was made possible: any person wishing to make such a road presented maps, plans and estimates to the magistrates, who passed them on to the Grand Jury, and the road was then built by the petitioner, who was reimbursed out of the County Cess. The roads so built had to be at least 21 ft. wide, of which at least 14 ft. was to be stone and gravel on an earthen foundation. Naturally it was mainly the gentry who planned such roads, sometimes to provide work for their poor relations or to make a profit for themselves. Arthur Young thought well of the presentment system, and notes that it was an effective means of producing roads, however great the possibilities of graft. The roads generally spread like rays from the demesnes, but yet 'in a short time, those rays, pointing from so many centres, met and then the communications were complete.... I found it perfectly practicable to travel upon wheels by a map. I will go here; I will go there; I could trace a route as wild as fancy could dictate, and everywhere I found beautiful roads without break or hindrance. . . . What a figure would a person make in England who should attempt to move in that manner, where the roads ... are almost in as bad a state of repair as in the time of Philip and Mary.* Not all the evidence is quite so favourable, but at least the presentment roads

made a substantial contribution to the communications of the country. In time the Board of Works took over their powers and built such famous highways as the Antrim coast road in the middle of the nineteenth century, which was seen by W. M. Thackeray: mention must also be made of the employment of many men on roads in various relief schemes, especially in the Famine years of the eighteen-forties.

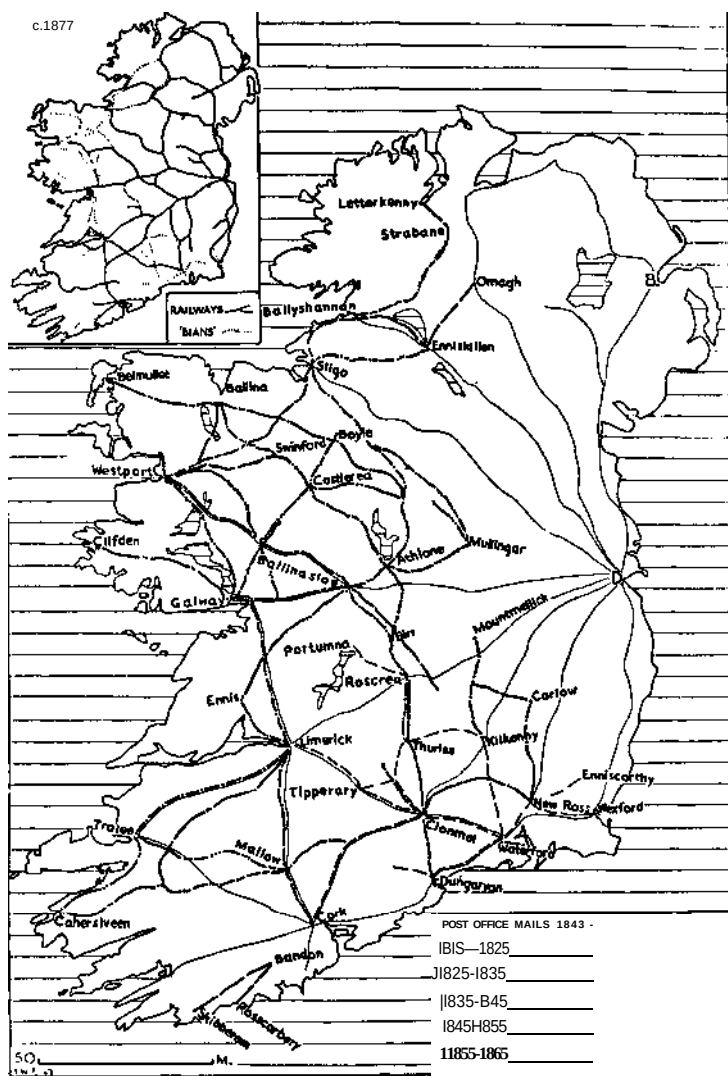
The crux of the road problem in Ireland has always been to provide access to remotely placed farmsteads and to peat bogs. Most of the older roads go over a hill rather than round it, and any smoothly graded trunk road in, for example, the drumlin country, is a recent addition. Many roads follow the outer walls of a demesne, so that travellers are taken along two sides of a triangle. Some roads were built for strategic reasons, notably the famous Military Road in the Wicklow mountains, constructed after the Rebellion of 1798, which runs on the east side of the mountains between a series of derelict barracks: having an altitude of more than 1,200 ft. for fifteen miles, it is the longest stretch of high-level road in Ireland. Several factors have contributed to the growth of the present road pattern, but the country lane remains the most dominant element. In Northern Ireland, for example, there are some 13,000 miles of roads, of which 1,300 miles are main trunk roads, 1,900 miles roads connecting the smaller towns, and the remainder country lanes. Heavy traffic keeps almost entirely to the major roads, and carts or traps drawn by a horse or a donkey, according to the economic status of the farmer, provide most of the traffic on the minor roads. But even on the main roads traffic has to contend with groups of cattle or sheep on their way to the fairs, though the number of cars and buses is normally small by British standards.

At the present time, long-distance buses supplement the attenuated railways services of Eire, but many villages and closely settled country-sides still have no public transport of any kind, and depend exclusively on carts and bicycles. The long-distance buses of the twentieth century had their forerunners in the 'Mans' of the nineteenth. Stage coaches ran on the major trunk roads which, then as now, were focused on Dublin so that Ireland's communications resembled 'a wheel with a hub and spokes but no rim/ Some of the traffic was carried by water, but this was slow, both for passengers and goods. Clonmel, described by Wakefield in 1812 as having 'more internal commerce than any other town in Ireland/ was linked to Waterford by long river-boats which carried flour, corn, pigs and firkins of butter to be exported, and brought back coal, sugar, and tea. These boats took a day and a night to reach Waterford. It was at Clonmel that Charles Bianconi, an Italian print-seller, began to operate his 'cars' known as the 'bians.' In 1815 he used the

jaunting-car, with one horse, to link Clonmel with Cahir, eight miles away, and within ten years he was operating services on more than 1,000 miles of road, at first in the lowlands of Munster, but in time throughout the land. By 1835 the 'Hans' ran on more than 2,000 miles of road, and by 1845 ^{on} more than 3,000; meanwhile the seating capacity of the cars increased from six to ten, and later to twenty, as the original two-wheeled vehicle was transformed into the 'long car' with four wheels. The passengers sat back-to-back facing the hedges, unprotected from the weather or from the beggars roaming the countryside, but contemporary accounts suggest that the journeys were enjoyable, at least to those possessing a sense of humour. When Bianconi began his services in 1815, artillery horses left over from the Napoleonic wars were available, but later two horses were needed to do the same amount of work. Throughout the period of the 'bians' smaller cars were kept for the less important routes.

In the middle of the nineteenth century, Bianconi's cars extended to Sligo, Clifden, Tralee, Wexford, and Longford (see Fig. 46), filled gaps in the stagecoach routes, and carried mails beyond the places reached by the Post Office. But the railway era was beginning, though with several false starts, and Bianconi recognised that 'it was as foolish to try to prevent the establishment of railways as to try to stem the Liffey.' He therefore bought railway shares and became a Director of the then Waterford and Limerick railway, and also adapted his 'bian' services to feed the railways so that as late as 1865 he still had cars running on some 2,500 miles of road, over three-quarters of their extent in 1845. The 'bians' survived longest in the extreme west of Ulster and in Connacht, where they remained until the dawn of the petrol age at the end of the century. In all, the work of Bianconi was of inestimable benefit to the country, for his cars helped to remove the isolation of many rural communities. Railways run on a commercial footing can be remunerative only in certain parts of Ireland, and a less expensive form of transport, such as the 'bians' a century ago and the bus or lorry now, are needed to fill the gaps in a rationalised railway system.

Many interesting forms of transport are still found in Ireland, but it is impossible to study each in detail here. At the poorest end of the social scale people carry seaweed, sand, or peat on their backs in a basket-work 'creel' not unlike that used by the Swiss peasantry on their journeys up and down the mountains. A similar contrivance is the pannier baskets fitted on either side of a donkey, who can negotiate poor tracks, and is entirely composed on the seashore. Both the creels and the panniers are common in the extreme west of Ireland, especially among the poor communities who depend for their manure supplies largely on materials



HG. 46.—THE BIANCONI ROUTES, 1815-1877

The decade in which each of the routes was established is shown and the inset map indicates the position in 1877, when the 'bians' had become feeders to the railways.

collected from the seashore. The slide-car, which survives in the remoter parts of Ireland, has no wheels but two shafts connected by cross-bars on which an open box made of wood or basket-work is supported: dragged along by a horse or donkey, it is so ruinous on the roads that it has been banned by Act of Parliament, though it is of particular value on the bogs and heathlands. The farm-carts are of various sizes and colours, according to local custom, but a general feature is detachable sides, which are made of slats not unlike a gate. These can be added when peat, calves, pigs or sheep are carried, and removed at other times. When the railways began to carry peat during the war of 1939-1945, a wagon with side-pieces like those of the farm-carts was designed for the purpose. Some of the farm-carts have the surprising addition of pneumatic tyres taken from some worn-out car. Traps are also a frequent sight on the Irish roads, especially on Sunday mornings: then, too, several jaunting-cars will be seen, though they are not as frequent in the cities as the visitors suppose, as they appear with the tourists and disappear as abruptly. The last relic of the post-chaises and coaches is the horse-cab, now seen mainly at funerals, though a few survive at the stations in Dublin. Every farmer, apart from the very poor, has some form of cart or trap, but only the select few have cars, though very considerable numbers have bicycles.

CANALS

Canals in Ireland seemed to offer economic salvation in the middle of the eighteenth century, as it was hoped that the barges would bring in the raw materials needed for industry and commerce and take away manufactured goods to Dublin and the export markets, all at very low cost. The country's Central Lowland, together with its ramifying lowland corridors between the hills, offered gently graded courses for the new waterways, and in addition many of the major rivers, such as the Shannon, the Boyne, the Suir, the Nore, the Barrow, the Bann and the Foyle, had long navigable reaches which could be incorporated in a system of water transport. The optimistic views expressed around 1750 were hardly borne out by experience for the canals took much longer to build, proved more costly, and attracted less traffic than was anticipated. The Grand Canal from Dublin to the Shannon, with a branch to the Barrow, was begun in 1756, reached Athy on the Barrow in 1791, and the Shannon in 1804. This canal still has a considerable barge traffic. Not so the Royal Canal, which runs from the north side of Dublin to Mullingar and Termonbarry and Longford: built between 1789 and 1817, this canal was later acquired by the Midland and Great Western Railway Company, and the line runs beside it to Mullingar. Both these canals had passenger services from

1780 to 1852, and 'express' boats, drawn by teams of galloping horses, reached a speed of 10 m.p.h. Along the route a number of handsome hotels were built, for example at Portobello Bridge (Dublin), Sallins, Tullamore, and elsewhere, and these, with the dignified warehouses beside the various quays, still show that the prosperous days of water transport coincided with an age of good building. The Grand Canal was obviously far more likely to succeed than the Royal, as it connects Dublin with both the Shannon and the Barrow and was, in the pre-railway age, an important link between various provincial towns and ports, including Waterford and Limerick; but the Royal Canal runs through thinly populated country and touches few villages and towns, except Mullingar and Longford.

In Northern Ireland, the canal system supplements the navigable reaches of the Bann and the Lagan, with a ship canal from Newry to Carlingford lough and a link from lough Neagh to the Erne. All these were constructed before the railway era, but as long ago as 1837 the cost of transport on the Lagan Canal, due to high tolls and its winding course, was reported to be greater than that of road transport. Though not entirely derelict, the canals in Northern Ireland now carry very little traffic, and are of interest chiefly as survivals, especially at Newry, which has some substantial mansions and warehouses dating from the eighteenth century, when the town was an important commercial centre. The Newry Canal was completed above the town in 1741 and below it in 1761; in 1834 there were substantial exports to Liverpool and Glasgow of linen cloth, butter, wheat, barley, oats, flour, oatmeal, flax, eggs, cattle, pigs and horses, and imports of tea, sugar, iron, salt and general merchandise. Since then Belfast has become the one dominant port of East Ulster.

Various other small canals were made between the middle of the eighteenth century and the Famine period of a century later, when the railways were hailed as the source of economic and social salvation in Ireland. Galway was linked to lough Corrib by a channel three-quarters of a mile long, and a second 'canal' connected lough Corrib to lough Mask, but only in theory, as it was constructed through porous limestone and holds no water at all. The Slaney has been canalised for nearly twenty miles from Wexford, and the Boyne for a similar distance from Drogheda. The Foyle, with Londonderry as its port and main market centre, was used for navigation and has a canal connection with Strabane, thirteen miles away: here river traffic was sufficiently favoured, around 1847, to prove a serious threat to the new railway. Kane, writing in 1844, recognised that the railways were likely to prove of great benefit to Ireland, but also suggested that steamships on the lakes and rivers, with connecting canals, could provide much-needed transport, especially in

parts of Connacht. Kane was contemplating the permanent problem of the isolation of many rural communities, which was partly solved by railway building some fifty years later and now, a hundred years later, by lorry and bus services.

RAILWAYS

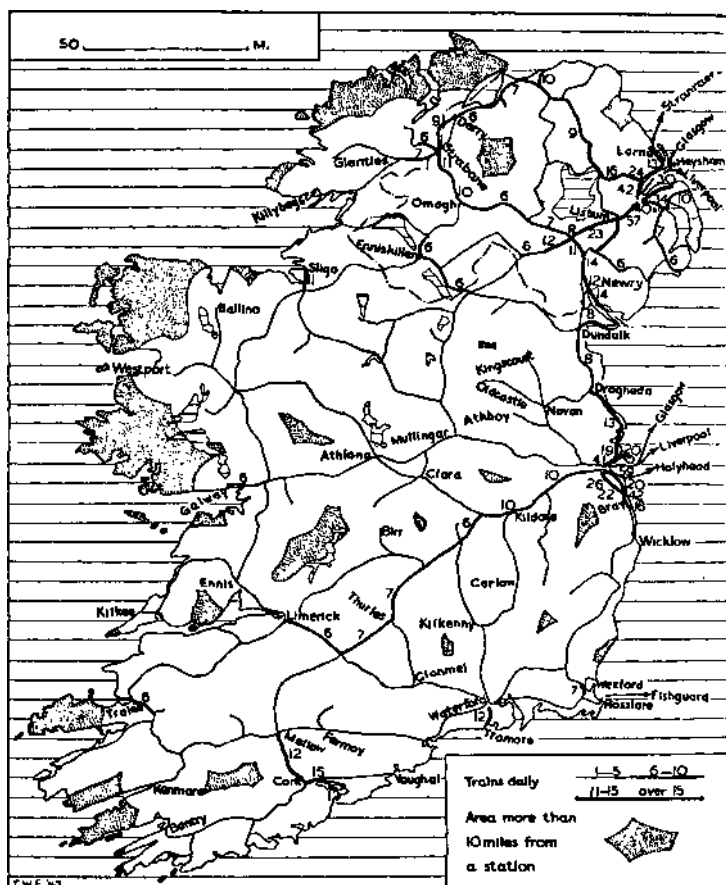
In Ireland, as in England, the forerunners of the railways were the timber trackways laid down to transport coal and other minerals from the mines and quarries to the roads and ships: these were found at collieries in Armagh and Tyrone, and at Dun Laoghaire, where the granite blocks used to construct the piers were brought from Dalkey hill along a route still known as the 'metals/ Dun Laoghaire, then Kingstown, became the packet-station used by ships from Holyhead in 1826, and was connected to Dublin by rail in 1834. This, the first railway in Ireland, was rightly hailed as an epoch-making addition to the neighbourhood, though some of the inhabitants regarded it as an expression of the increasing vulgarity of the times: not so the *Dublin Penny Journal*,¹ which welcomed it in the following words:

'Hurried by the invisible but stupendous agency of steam, the astonished traveller will now glide, like Asmodeus, over the summits of the houses and streets of a great city—presently be transported through green fields and tufts of trees—then skim across the surface of the sea, and taking shelter under the cliffs, coast along the marine villas and through rocky excavations, until he finds himself in the centre of a vast port which unites in pleasing confusion the bustle of a commercial town with the amusements of a fashionable watering-place.'

What could be more delightful? A less romantic view is taken by the many people who use this line today for their journeys between the suburbs and Dublin or to and from the Mail Boat.

Meanwhile, Belfast commercial interests had sensed the possibilities inherent in railways and in 1839 the Ulster Railway Company opened the line from Belfast to Lisburn, but not without opposition to the running of Sunday trains in which, it was said, 'souls are sent to the devil at the rate of sixpence apiece' (first class, one shilling), and 'every shout of the railway steam whistle is answered by a shout in hell.' Capital for extensions appeared reluctantly and the railway promoters were obliged to seek government aid, with which the line was extended to Portadown by 1842. The line from Dublin northwards was begun in 1840 and reached Drogheda by 1844, having skirted Dublin bay on an embankment and crossed wide estuaries at Malahide and Donabate: not until 1852 was

¹ Quoted in Joyce, W. St. J., *The Neighbourhood of Dublin*, Dublin, 1912, 1939, p. 45.



HG. 47.—RAILWAY SERVICES, 1940

In 1941, the number of trains was drastically reduced: this map shows the pre-restriction services. As a result of the closing of various light railways many areas, especially in the west, were at least ten miles from a station: some areas were never within ten miles of a station, such as the country around lough Derg.

there a complete railway link between Dublin and Belfast, and even then passengers had to walk through the town of Drogheda as the viaduct and bridge, almost 100 ft. above the river level, was not built till 1855.

Two major controversies had marked the earlier years of the railways, the course of the Belfast-Dublin line and the gauge to be used. Brunel favoured the 7 ft. gauge used by the Great Western Railway in England, and Stephenson the 4 ft. 8½ in. standard which eventually triumphed on the British railways, but Ireland adopted its own gauge of 5 ft. 3 in. in 1846. The Dublin-Belfast coastal route was fixed by a parliamentary commission in 1836, but there were strong advocates of an 'inland* route through Navan and Armagh. In the discussions it was said that the population of the seaboard was 'almost industrial in its density* by some and 'merely that of a few villages and fishermen's huts' by others. Of the inland line, some said that there were 'a large number of communities, small individually, but in total substantial,' while others said that the route must fail as there was 'a view of beggary on every side,' with 'thatched cabins and nothing but misery.' The inland route was never completed.

The year 1852 saw the completion of the Belfast-Dublin line, except at Drogheda, and the lines from Dublin to Cork and Galway were already completed. The Midland and Great Western Railway had bought the Royal Canal, and constructed their line beside it as far as Mullingar, where the line leaves the canal on its journey to Athlone, an easy crossing-place of the Shannon with 'dry ground' on both sides. Having crossed the Shannon at Athlone and the Suck at Ballinasloe, the line runs across undulating country to Galway. The line to Cork is one of the most attractive in the country, as it passes through the lowland corridors between various Armorican ranges and finally crosses a ridge between Mallow and Cork through a narrow pass at 460 ft. O.D.: the gradual rise from Dublin to the 200 ft. level so widely developed in the Central Lowland emphasises the prevalence of this peneplane level. Two other lines were also completed by 1852, those from Limerick to Clonmel, and from Kildare to Kilkenny: Clonmel was a town of some note in the estimation of a century ago and Kilkenny also figured as one of the major provincial towns.

Railway building continued actively in the years following 1852, and by 1863 many of the larger country towns were connected with the trunk railways to Dublin and Belfast. Waterford was linked with Limerick through the Suir valley, and also with Kilkenny; the important branch line from Mallow to Killarney and Tralee was also built, partly in the expectation of a considerable tourist traffic to Co. Kerry. The Galway line was joined by two important affluents, one to Castlebar, Co. Mayo, and the other to Sligo from Mullingar. At Inny Junction, a few miles

north of Mullingar, one of the most desolate railway staations in the world, another line diverges to Cavan and Clones; there is also a line from Athlone to Maryborough. In Co. Meath, a branch line from Drogheda reached Oldcastle, still a terminus, in 1863. It took from 1845 to 1859 to build the line from Dundalk to Enniskillen, but only from 1847 to 1854 to reach Enniskillen from Londonderry. The two main lines from Londonderry to Belfast were completed by 1863; the first to Portadown, Omagh and the Foyle valley, and the second through Antrim and Ballymena to Coleraine and around the edge of the basalt scarps to the Foyle. Each line serves a number of important provincial towns, and this is the only example of competing routes in Ireland.

After 1863, the main development on the railways was the extension to a few additional towns, such as Bundoran, Ballina and Westport on the Atlantic seaboard, the provision of a few more branch lines, and, in effect, the completion of the railway network already foreshadowed by 1863. Not all the branch lines were successful, and two survived only for ten years, the line from Portumna to Birr, 1868-1878, and that from Armagh to Castleblayney, 1914-1924. The railways were comparatively prosperous immediately before the 1914-1918 war, and the system reached its zenith by 1920, since when a variety of circumstances have led to its decline. The political disturbance of 1921 and 1922 interfered with the running of the trains, and in places tracks were cut, but a more permanent menace to the railways came with the motor buses and lorries of the middle twenties. In 1927 the power of running road services was granted to the railways both in Eire and Northern Ireland. The most recent development is the traffic merger in Eire, Coras Iompair Eireann, and a similar combine is likely in Northern Ireland, where the lack of co-ordination between various transport services has been a source of complaint for some time. The position of the Great Northern Railway is made complicated by the fact that 332 miles of its total length of 562 miles is in Northern Ireland, and the lines cross the Border at fifteen separate points, with seven customs stations. The railway works are at Dundalk, and provide a vital source of employment in the town. In any case, it is necessary to save die railways from extinction, as they give efficient and comfortable transport for long-distance passengers, and are able to deal equally well with freight. They also have a considerable suburban traffic around Dublin and Belfast.

LIGHT RAILWAYS

Light railways appeared to offer great economic advantages to Ireland in the latter years of the nineteenth century, and at the maximum development there were eighteen such lines extending over 562 miles: but only

seven are working at present, and some of these may be closed in the near future. Mixed motives of social desirability and economic advantage actuated the promoters of light railways: it was declared that such lines would remove the isolation of many communities in the west, and the Government were prepared to guarantee as much as half the cost, and finally all of it, in the various Light Railways Acts passed between 1860 and 1896. The gauge used was 3 ft., and the rolling stock was in many cases of strange design, though adequate for its purpose. On some railways in the West, such as the West Clare railway (still operating) and the Tralee-Dingle line, occasional gales were a severe menace. In Donegal on January 30, 1925, a train was blown off the Owenacurra viaduct and most of the passengers were either killed or injured. Subsequently, an anemometer was installed at Dunfanaghy Road station and train services were suspended when high gales were recorded. Similar precautions were taken on the West Clare railway, which has an anemometer at Quilty (see also pp. 51, 250-251).

Seven of the light railways are in Northern Ireland, which has a closer network of railways than Eire: two of these lines, from Ballymena to Larne and from Ballymena to Retreat, were originally built in the eighteen-seventies to carry iron ore from mines in Co. Antrim, and the Ballymena-Larne line was also used by passengers from the Stranraer boat. The Retreat line never had much traffic, and was closed in 1930, but the Larne line still carries freight between Larne and Ballyclare, though all passenger services ceased in 1942. The Ballymoney-Ballycastle railway still has four passenger trains daily: not far away, the Giant's Causeway tramway runs from Portrush through Bushmills to a point one mile from the Causeway. This line, famed chiefly as the first electric tramway in the world, was opened in 1883, when the power was derived from a waterfall at Bushmills supplemented at peak periods in summer by steampower. There is a frequent service in the summer months, but only two cars daily in winter from Portrush to Bushmills. Another short line of tramway, built in 1885, connects the town of Newry with Bessbrook, three miles away, where the mills employ some 3,000 people, many of whom reside in Newry: the power is drawn from a fall of 29 ft. on the Camlough river, and an hourly service is maintained.

The Clogher Valley railway, opened in 1887 and closed in 1941, ran through agricultural country with small market centres such as Aghnacloy and Fivemiletown, each of which has a population of less than a thousand, in Co. Tyrone and Co. Fermanagh. It was connected at either end with the Portadown-Enniskillen railway and followed the Belfast-Enniskillen road for most of its course, though in places it ran through

the adjoining fields. Worked by steam locomotives, it resembled many continental tramways: its progress through Fivemiletown was celebrated in the verses sung at fairs and markets, of which one may be quoted:

**'This new tramway three times a day she runs both up and down,
The most mistakes I'm sure they make is at Fivemiletown.
She clears the streets of all she meets, it is the whole vexation,
Going up and down, through the town, to and from the station.'**

By 1930 the financial position of the railway had become precarious and the deficits were increasing annually owing it was said to the unfair competition of the Northern Ireland Transport Board, which ran three buses daily from Belfast to Enniskillen and also conveyed livestock in lorries. About 1935, however, the cattle and pig trade on the railway increased considerably around Augher, which is a short distance from the Eire border, here lying on the Slieve Beagh, a desolate line of uplands, but more efficient patrolling of the frontier led to a decrease in the number of animals illegally imported from Eire.

The light railways of Donegal and the Foyle valley date back to 1863 and were gradually extended so that by 1905 they provided at least a skeleton network for transport in Co. Donegal. There are two separate railways, the Londonderry and Lough Swilly in the north, and the County Donegal Joint Committee in the south. The L.L.S.R/s first line ran from Londonderry to Farland Point, where ferry boats crossed lough Swilly, in 1863, and reached the town of Buncrana, also on lough Swilly, in the following year. In 1883 the line to Letterkenny was opened; in 1901 the extension to Carndonagh, a small market centre in the north of the Inishowen peninsula, was added, and in 1903, that from Letterkenny to Burtonport. In all, the L.L.S.R. had 100 miles of track and was regarded as an asset to the countryside, but the financial returns were inadequate to maintain the line on a commercial basis. The company therefore decided to run buses instead, and the whole line is to be closed, though trains were run during the war from Londonderry to Buncrana and Gweedore. The line from Buncrana to Carndonagh was closed in 1935, and that from Burtonport to Letterkenny in 1940, but not without opposition as the people attempted to prevent the removal of the lines at Crolly Bridge on November 8, 1940, and were persuaded to disperse only on the promise that the government would investigate the situation. Nevertheless, the railway was closed.

In South Donegal the railway has clung tenaciously to its services and shows every sign of maintaining the trains from Londonderry to Strabane, and thence to Glenties, Letterkenny and Killybegs, with a branch from Donegal town to Ballyshannon. There are steam trains and railcars, and the company has acquired some of the rolling stock from extinct railways

such as the Clogher Valley, the short Castlederg-Victoria Bridge line (in the Foyle valley, closed in 1933), *md.* the Blessington-Dublin railway, which existed from 1882 to 1932. The C.D.J.R.C. began its career at Strabane, and the first line reached Stranorlar in 1883, Donegal in 1889, Killybegs in 1893 and Glen ties in 1894. Later extension included a line to Londonderry in 1900 parallel with the main line from Dublin, but on the other side of the river, the Donegal-Ballyshannon branch in 1905 and the Letterkenny line in 1909. In all, the company runs trains on 125 miles of railway and has the longest stretch of narrow-gauge line in the British Isles still in working order. While hopes of a deep-water port at Killybegs seem remote, and although the crossing of the Border in the Foyle valley adds to the difficulties of working, the railway has adjusted its methods to the needs of the neighbourhood. The railcars are worked by one man, who issues the tickets, deals with parcels, and stops for passengers to alight or enter at various road crossings very much as a country bus service does. In addition, the company maintains road services in South Donegal.

The Cavan and Leitrim railway serves the upper parts of the Erne and Shannon basins, one of the least-visited parts of Ireland, and is now used chiefly for the transport of coal from the Arigna mines near Lough Allen. In 1887 the line from Belturbet to Dromod was opened and in the following year the section from Ballinamore to Arigna was completed, but the line never carried more than three trains a day, and after 1921 the traffic declined sharply. At one time there were hopes of fostering tourist traffic on the Shannon, and from 1897 this line ran cars from Dromod to Roosky, where boats sailed on the river to Killaloe via Athlone and Banagher. This service was discontinued in 1914 and never revived. The Arigna extension mineral line, added in 1920, saved the railway from extinction, and in recent years some 1,000 tons of coal per week have been transported, but this may be only a temporary boom due to world fuel shortages, and the line is not likely to survive for many more years.

The West Clare railway has almost all the attributes of an Irish light railway: it is celebrated by a song, 'Are ye right there, Michael?' describing the leisurely progress and frequent crises of the trains; it has an anemometer, a speed limit of 25 m.p.h., was never remunerative at any time, and has been saved only by the emergency conditions since 1939. In its early days, animals strayed on the line and were occasionally run down by a train, so their infuriated owners retaliated by placing stones on the rails or even hurling them through the carriage windows. The first section of the line, from Ennis to Milltown Malbay, was opened in 1887 and the remainder, to the towns of Kilrush and Kilkee, was completed by 1892.

Until 1914, a steamer ran from Limerick to Kilrush, but this service was not resumed after the 1914-1918 war, The line had its services reduced to three in summer and one in winter during the nineteen-twenties.

Two light railways in Co. Kerry are of special interest.

(a) The Listowel-Ballybunion 'monorail*' line was opened in 1888 and ran on a single rail, 3 ft. 6 in. off the ground, on either side of which a carriage was suspended, and there was also a double engine to draw the train. The wheels ran on the central rail, the noise was deafening, and as the weight on either side had to be equalised the actual arrangement of the passengers and goods was complicated. The hopes of transforming Ballybunion from a small seaside resort into a busy port never materialised, and the traffic receipts in winter never paid the expenses, so the line was closed in 1924.

(b) The Tralee-Dingle railway covered the thirty-two miles between the two towns and had a branch line to Castlegregory, a village on the north side of the Dingle peninsula. The main difficulty was the steep gradients, in one case 1 in 35-40-31 on the climb through the Anascaul pass, and as a result of accidents the speed on this section of the line was cut to a minimum. The railway was opened in 1891 and closed for passenger traffic in 1939, though one freight train runs between Dingle and Tralee daily.

Cork city had its light railways, built to attract the outer suburban and tourist traffic but now dismantled. The earlier in date was the Cork-Passage railway, of which the first section was built in 1850: this line was worked in connection with steam ferry services on Cork harbour. In 1902-1904 the line was extended to Crosshaven, a small holiday resort near the outer entrance to Cork harbour, but the traffic declined even before the 1914-1918 war and, after a number of vicissitudes, the whole system was closed in 1932. The Cork-Muskerry railway, on the west side of the city, was constructed between 1887 and 1893, and penetrated the pleasant hilly country north of the Lea valley which, it was hoped, would become residential in character, and it was also expected that there would be tourist traffic to Blarney and other villages. The city did not grow as fast as the builders of the railway hoped and on some parts of the line, such as that to Donaghmore, there was never much traffic; it was closed in 1934.

Finally, mention must also be made of the Skull-Skibbereen railway, in the extreme southwest of Co. Cork, which was opened in 1886, but never profitable. In its heyday it carried two 'mixed* (*Le.*, for both passengers and goods) trains a day, with an extra service on market days: the line was closed in 1944.

The short life of most of the light railways is only too clearly apparent: like the canals, their day appears to be finished, though in one case, South Donegal, enterprise and adaptation to changing circumstances will at least prolong the period of usefulness of a light railway. To some extent the story of the light railways is one of broken hopes, in which schemes such as the Shannon navigation by steamers, or possible new ports, figure prominently: hardly less significant is the failure to begin many industries that, it was said, would arise once a railway was built. The position of these light railways was financially precarious even before the buses took the roads, though they were an essential public service. Once road transport could replace them, their work was done. Even so, their extinction has caused regret and even disturbance, not least in North Donegal in 1940, and the closing of branch lines on the broad-gauge system generally raises a comparable storm.

CURRENT TRENDS IN IRISH TRANSPORT

During the war of 1939-1945 the train services on the Great Southern Railway were reduced to one daily, and even two to four trains per week, except on the suburban lines. The Great Northern Railway reduced its services, but not to the same extent; its cuts were comparable to those on the British railways. Fig. 47 shows the number of passenger services daily in 1940, before the coal shortage caused so great a reduction, but it does not attempt to show the present position, still less to forecast the future. It will be seen that apart from the suburban services few railways had more than five trains a day, except in the northeast and on the lines to Londonderry. Five trains ran from Belfast to Dublin, and there were also slow services between the various towns on this main line. There were also the expresses to Cork and Limerick, which used the same line to Limerick Junction, near Tipperary. Goods trains are run in addition, but many of the branch line trains are 'mixed' (both passengers and goods).

Already in 1940 a considerable part of Ireland was more than ten miles from a railway, and the closing of the branch lines will increase the area lying far from a railway station. But there is reason to hope, perhaps to believe, that road services will bring the remoter communities closer to their markets than ever before. North Mayo, which never had a railway, was chosen by Coras Iompair Eireann as the scene of experimental services in 1941, and the claim is made that under conditions of petrol shortage only such a unified scheme could succeed, as the private lorry services would have failed to maintain themselves in an area of many isolated communities, separated by long distances from towns or even other settlements of any description. If, as now claimed, the lorry and bus services can take the place of the branch railways and, what is more,

penetrate into the depths of the countryside, Coras Iompair Eireann may solve the old problem of providing transport for everybody.

The passenger traffic across the Irish sea is carried by steamers, most of which also take cargoes, and by goods services, some of which call at various ports and are general coasters. From Belfast there are night sailings to Glasgow, Heysham and Liverpool, and there is also a short crossing from Lame to Stranraer: from Dublin there are night sailings to Glasgow and Liverpool, and the Irish mail route, normally run both by day and night, from Dun Laoghaire to Holyhead, a passage of three hours. British Railways run a night crossing (once G.W.R.) from Fishguard to Rosslare and, less frequently, to Cork. During the war of 1939-1945 most of these services were reduced in frequency, and some, such as the sailings from Dublin to Glasgow and Liverpool and from Rosslare to Fishguard, abandoned altogether, but they are now being revived again on pre-war lines. One service that now exists for cargo only, from Greenore to Holyhead, formerly took passengers also.

Air services are potential competitors for passengers, and the place of Ireland on world air routes is a source of constant discussion. The two main airports in Eire, at Rineanna (Shannon) and Collinstown, already have American connections and a number of continental services in addition to those to Glasgow, Manchester, Liverpool and London. The Belfast airport also has services to Glasgow, Manchester, London, Liverpool and various other centres. It is too early to see how far these services, so far government subsidised, will attract goods and passengers from the sea routes, and as yet the number travelling by air, though considerable, is a small fraction of the number travelling by sea.

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PART II

REGIONAL GEOGRAPHY

CHAPTER XI

THE REGIONAL DIVISIONS OF IRELAND

IRELAND is itself a natural entity, differing in its social geography from even its nearest neighbours, in spite of its long-continued contacts with them through invasions, trade and population movements. The clearest claim to uniqueness that Ireland possesses is its population history: alone of European countries it has had a declining population for a century and emigration is still proceeding *in spite of* industrial developments. In the formation of the regional scheme, structure, landforms, climate, vegetation, agriculture, industry, population, even political and social factors, may all be seen as territorial distributions in the landscape: all the subjects discussed in Part I of this book (Chapters I-X) are contributor) to the regional treatment of Part II.

The territorial boundaries worked out through the centuries have a dual interest, first as an indication of conditions at the time when they were made, and second as a recognition, unconscious perhaps, of more abiding contrasts within the land: among the latter one may note in passing the character of the Shannon as a natural barrier rather than as a waterway for many centuries, or the place of several mountain masses as refuges for outlaws or the homes of predatory groups at war with the people of the lowlands. The oldest of all political units is the *tuath*, of which no mapping is possible, but the periodic aspirations of strong rulers led to some kind of provincial organisation which is probably the foundation of the four provinces, Leinster, Munster, Connacht and Ulster. The counties superseded the *tuaths* and were formed gradually from the thirteenth to the seventeenth centuries; earlier divisions, still extant, are the dioceses which appear to have survived with only minor changes from the latter half of the twelfth century. Obviously a county and diocesan system worked out afresh would differ markedly from that actually existing, but those who made such units were in some ways the regional geographers of the past.

In Part I of this book, the physical, economic, social, political and diocesan divisions have been mapped whenever possible; in Part II an effort is made to assess the regional divisions as they now appear with the

essential stress on the conditions of today, though with some veneration for a past which lives on into the present. The remainder of this chapter is therefore given to a summary of the main features that emerge in Part I, and an indication of the quality of each region discussed in Part II.

THE BASIS OF REGIONALISATION

Structurally Ireland is the western continuation of Britain and possesses clearly marked Caledonian and Armorican fold mountains, each with their distinctive trends. Caledonian mountains and hills, aligned from northeast to southwest, are a striking feature of Donegal and neighbouring parts of Tyrone, of West Connacht, of the 'Newry axis' country and of the Leinster chain. The Armorican east-west lines appear in the long ranges of Munster, which reach the coast of Kerry in mountainous peninsulas separated by rias, the drowned ends of deep valleys. Central Ireland, between the Caledonian north, the Armorican south and the Caledonian southeast, has a number of ranges consisting of Devonian and Carboniferous beds folded over a Caledonian floor. Armorican in structure, they show the Caledonian trend; many of them are insignificant as features of the landscape and fail to break the generally undulating lowland surface, but others, such as the Slieve Bloom, stand up as ranges comparable with those of Munster.

More than half Ireland is covered with Carboniferous strata, which appears in the Central Lowland and the many valleys and corridors that provide easy passage-ways between the Armorican ranges. There are also several residual uplands of Carboniferous rocks, now standing as plateau-like masses formed of sandstones, shales, limestones and Coal Measures. Some of the uplands rise to a height of 2,000 ft.; conspicuous among diem are the hills of Sligo and Leitrim, the Castlecomer coalfield and the desolate line of uplands that extends northward from Killarney to the Shannon estuary and on into west Clare. But over most of Ireland the rockfloor of lower Carboniferous strata, chiefly limestone, though folded into numerous anticlines and synclines, exists as a smoothly planed surface beneath a variety of drifts and glacifluvial deposits.

These three morphological elements, the Caledonian and the Armorican mountains, the Carboniferous lowlands and residual plateaus, have been etched out by long ages of denudation. They present a fundamental basis of regionalisation as they are definite features of the landscape. In addition, ice has been a moulding influence: in the west, a wide belt extending north and south from Galway bay is practically driftless and possesses limestone surfaces of a karstic character, but in the east the drifts reach a thickness of as much as 200 ft. Swarms of drumlins are developed across the whole lowland from Dundalk in the east to Clew bay in the

west, and also in many parts of the northeast. Again, in the heart of the Central Lowland there is a magnificent series of ridges which are generally termed 'eskers,' but may include a considerable number of moraines. Finally the endless variety, both in form and content, of the ground moraine has produced innumerable local contrasts in soil and drainage. In most of the lowland corridors of the south, the drift is a thin rind through which the underlying limestones appear here and there; in the Central Lowland well-tilled patches of ground moraine alternate with flat expanses of bogs through which eskers stride. While, therefore, the major structural regions stand out with some emphasis, the local diversities are so considerable that they form one basis for a more detailed local regionalisation.

Climatically, Ireland has the epitome of what is commonly called the West Maritime type. Sufficiently far from continental Europe to escape many of the cold spells that mark most winters in Great Britain, Ireland also fails to experience many of the heatwaves that extend to the English Lowland in summer. The country's weather is dominated by depressions, which bring liberal supplies of rain diroughout the year with a winter maximum that is universal but more marked in the west than in the east. Relief rain adds to the total precipitation in the mountains, where some falls of 100" per annum are recorded. There is a gradual climatic transition from the mean winter temperatures of 44° in the west to 41° in the east; in July the averages vary from 61° in the south to 57° in the north. The rainfall on the lowlands is 50"-60" in the western peninsulas, but less than 30" in a lowland belt between Dublin and Dundalk; while the rainfall decreases gradually from west to east, the number of raindays is everywhere high. The contrasts in natural vegetation and agriculture are considerable; in the west, relics of a Mediterranean flora survive in strength through winters of such mildness that there is little check to plant growth, but in the east and centre winter has a sharper tang, expressed occasionally in spells of cold weather with sleet or snow. An evergreen flora, both native and introduced, is luxuriantly developed in the west, especially in the valleys that are sheltered from the powerful winds which, along some sections of the coast, prevent trees from growing at all. The east of Ireland has splendid stretches of deciduous woodland, seen especially in some of the demesnes around the Leinster chain and in Meath. The main crops of Ireland, oats and potatoes, are grown throughout the country; while the east is more suited than the west to arable cultivation, the overriding influence of the cattle trade is such that Ireland lacks anything comparable with the arable farming belt of the east of England. Climatic factors affect the agricultural life closely but somewhat indirectly; they are only one criterion among many in any delimitation of agricultural regions.

Non-agricultural land in Ireland consists largely of woodland and peat bogs. In spite of the efforts of the Forestry Commissions, Ireland is still the least wooded country in Europe: only in a few areas, chiefly mountainous, are 'natural* or planted woods an important feature of the landscape. The bogs, however, still survive in spite of centuries of active cutting for fuel. Not only do they cover most of the uplands, but they spread like a blanket over many of the lowlands in the damper west where, it is said, one's dining-room table would accumulate a bog if left outside for a sufficient length of time. The 'blanket bogs' of ecologists are best developed in the western peninsulas; in the centre of Ireland the 'raised bogs' are *seen* in hollows separated from one another by 'dry ground,' which frequently consists of drift-covered Carboniferous limestone. In the east and south lowland bogs are few and small. But both the blanket bogs of the west and the raised bogs of the centre are sufficiently extensive to be a vital feature in the building of a regional scheme.

The land use pattern in Ireland has been worked out by a population who have always lived primarily by farming: even now the only large urban concentrations are those around Dublin and Belfast. Negative areas of settlement such as peat bogs and mountains are used as rough pastures or for turf supplies over the centre and west of Ireland: in the east and south there are continuously occupied lowlands in many areas, without even belts of woodland between the fields. The limit of agricultural occupation has not been constant: it has been pushed up the mountain sides, then allowed to retreat once again, and recession is typical of the present age. There is no single statistical limit of cultivation: south of Dublin cultivation climbs above 1,000 ft. on fertile drifts, but in Connacht most hills have never been settled at any time. Nor is the present limit a straight line, but rather a series of farm boundaries oscillating around a level that is, in effect, the limit of human patience. But on the lowlands land is added to the farms rather than subtracted from them, as some of the soils revealed by bog clearance will support crops of potatoes or oats. In addition, some of the demesne lands have been divided between new holders who are settled in cottages built recently under government schemes. The idea of change, even decay, enters into the regional scheme here; many of the local changes are associated with population declines of some severity.

Heavy decreases in population have made possible many adjustments that seemed improbable a century ago. The agricultural Ireland of 1845 was an overcrowded country, with too much land in the hands of a small group of people and too little in the hands of a vast residue of poor labourers. The agricultural Ireland of 1945 is mainly in the hands of the people who farm it with the help of their families and a much-diminished

force of labourers. Over most of the country the holdings are, by English standards, small, and they are still, in the main, larger on the better than on the poorer lands. This factor enters into the regional scheme; there is an obvious difference between the farmer of 100-200 acres in Meath and the holder of 5-10 acres in Donegal. The former is a producer of cattle for slaughter or a grazier of cattle for export, but the latter is little removed above the subsistence level, though he may sell a few calves, some butter, eggs or poultry. The two extremes still remain, with endless economic shades in between them; and in Irish farming no uniformity exists. Local specialisation rises out of a mixed farming economy, with some arable cropping, but a prime dependence on pastures and meadows. The land division into farms of different sizes is, therefore, rather more important in a regional classification than the actual land use, which tends to be mainly a revelation of the local form of a cattle trade that is essentially one unity over the whole country.

The present population distribution in Ireland is most remarkable for its wide disparities between one area and another. Leaving aside the few patches where town populations are overflowing into the surrounding countryside, the density of population per square mile bears a direct relation to the average size of the farm unit: some areas in Meath have a mere 50 per square mile as compared with 100 or more in areas of smaller farms. If the densities are assessed on a basis of improved land only, some western districts have as many as 400 people to the square mile! Nothing could be more fallacious than to regard population density in rural Ireland as an indication of the relative wealth of the soil in each area; rather is it an expression of the particular type of farming evolved. The rural density of population is a valid criterion in the regional division of the country; great as the adjustments of the past fifty years have been, one may still recognise congestion, or something not very far removed from it, in parts of the west.

In this book the actual distribution of population is illustrated by dot maps for each region. These show the prevalence of dispersion: the farm village of the English type is almost unknown in Ireland. Another factor of some importance is the relative strength of town and rural populations throughout the country: some of the poorer regions have only one-tenth of their numbers in any form of nucleated settlement. At the other end of the scale the richer regions have larger market towns, many of which have some indigenous industry and have recently profited by the addition of one or more government-planned enterprises. In a few areas, conspicuously the historic province of Ulster, there are also survivals of various home industries: the linen industry of the northeast developed from the flax growing, processing and spinning on individual farms.

Only in a few areas, however, is there still this natural balance between agriculture and home industry, as the latter has been supplanted by factory production, both in the larger towns and in some much smaller centres. In every region the balance between the town and the rural populations is significant; as a general rule the poorer areas depend most completely on agriculture and are the least industrialised, though such exceptions as Donegal are of particular interest.

Administrative divisions in Ireland, civil and ecclesiastical, provide at least some evidence of natural barriers within the country, though their evolution has been conditioned by the relative strength of various native and immigrant rulers at different periods. The modern counties developed gradually through the Anglo-Norman phase, which reached its maximum strength in the fourteenth century, and the Tudor and Stuart periods, when large sections of the country were granted to English and Scottish settlers, the 'planters' of historic and sometimes hated memory. The Tudors extended the English Pale to the Shannon and settled the counties now called Offaly and Leix but formerly named King's and Queen's after Philip and Mary. Scots settled in Armagh and Down, and, under James I, Derry became Londonderry through its plantation by the Livery Companies of London. Cromwell finally systematised the county organisation, which had grown slowly through five centuries of conquest, and established the landlords for the next two hundred years. Geographically, the most interesting features of the counties as a whole are first, their relation to some of the major topographical lines in Ireland and second, their grouping into four 'provinces,' which are still recognised in Ireland to this day.

The Shannon, like the Thames, is a county boundary for almost the whole of its course; unlike the Thames it is still a barrier marked by bogs and water meadows (callows) with infrequent bridges. The Bann, with its wide floodplain, is also a county boundary except near its mouth, and the Lagan still divides Down and Antrim, even in the centre of Belfast. In the south the Barrow and the Suir are boundaries for several miles above the tidal reaches, but the Nore valley between them is the heart of Co. Kilkenny. One could multiply such illustrations, but these will at least serve to show the varied nature of the counties as they exist today. The grouping of counties into provinces implies a broad recognition of fundamental regional differences in the country as a whole. Ulster covers the north, Leinster the east and southeast, Munster the southwest and Connacht part of the west. The Ulster province is essentially the four river basins of the Foyle, Bann, Erne and Lagan, together with the Tirconnail country in Donegal; Connacht is the country of mediocre resources west of the Shannon; Munster the uplands and lowlands that

stretch from Waterford to Kerry and Clare; and Leinster the country around the great mountain chain that extends in unbroken Caledonian line from Dublin southwest wards. Meath, a fifth but now vanished province, is the Mercia of Ireland, a kingdom that spread through the east part of the Central Lowland almost to the Shannon, but was ultimately truncated and absorbed into Leinster.

Even more venerable in origin, the dioceses of Ireland are exactly equal to the counties in number but sharply different from them in shape. The monastic complexion of the early Irish church tended to produce a singularly large number of dioceses, many of which were linked at first with some remotely placed centre of sanctity. In time, however, such Norse places as Dublin, Waterford, Cork and Limerick became Cathedral cities. The dioceses were delimited at the Synod of Kells, 1152, and in spite of numerous changes since that date their boundaries still show significant geographical influences. The Shannon is a diocesan divide except at Killaloe; the Meath diocese reveals in its history the same lack of natural frontiers that has been noted in the history of the Meath kingdom, and is still much larger than the county of the same name; the Ferns diocese corresponds almost exactly to the county of Wexford, the fertile lowland of the southeast between the Leinster chain and the sea. In 1152 the country was also divided into four ecclesiastical provinces, ruled from Armagh, Dublin, Cashel and Tuam; these are comparable but not identical with the political provinces of Ulster, Leinster, Munster and Connacht.

While both the counties and the dioceses, combined respectively into civil and archiepiscopal provinces, have originated to some extent from the natural regional framework of the country, their full interpretation must take account of the life of the centuries in which they were formed. They are more closely linked with the regional geography of, say, the fourteenth century than with that of the twentieth, even though they still remain part of the fabric of Irish life. While the four provinces still have their distinctive characteristics, the one administrative boundary now of consequence is that between the six Ulster counties and the twenty-six of Eire. The Border, a series of county boundaries running mainly through cultivated lowlands, is an economic divide between the areas focused on Belfast and Dublin respectively; the duality of economic organisation has been accentuated year by year, and not least by the divergent policies of the two governments in the war of 1939-1945. While the Border is in no sense a morphological divide over most of its course, the regional geographer cannot neglect this separation within Ireland as he makes his division of the country into a number of units.

Ideally, natural regions are clearly marked entities, each possessing

distinctive qualities that mark them off from their neighbours. These qualities are derived from the morphology, climate, past and present space relations, natural vegetation, land use, industry and population distribution. Uplands and lowlands, cultivated farmlands and bogs form contrasting environments in every part of Ireland, often within a few square miles; even the Central Lowland is saved from monotony by the presence of low hills, many of them miniature Armorican ranges, which break the generally even line. Everywhere, therefore, the major natural regions include many subregions, to which such names as *tract* have been given by some workers. The element of transition is evident throughout and small-scale differences are frequently much more obvious than the larger ones, yet there is, for example, a marked general contrast between the east, with its cattle-grazing farms and its industrial towns, and the west, still partly congested and revealing a small farm economy little removed from the subsistence level. Again there are marked differences between those areas which were effectively planted by immigrant settlers and those only partially occupied or ignored. And much of the history is expressed in the division of the land among its holders.

Two factors stand out as of supreme importance: first, the physical features; and second, the type of farming evolved through the centuries. The first is in the widest sense the natural physical environment, including climate, soils and natural vegetation, and the second the use made of that environment by the people who have lived in it. But at this moment in time, after a century of heavy emigration and land agitation, never was so much land farmed by so few.

THE TWELVE REGIONS

AU the twelve regions of Ireland show some distinctive traits, both in their physical features and their agricultural regime, and also in their towns and industries, yet none possess in their boundaries such clear lines as that which separates the irrigated ribbon of cultivated land along the Nile from the surrounding desert. Only rarely in Ireland can one find a line of demarcation comparable even with that between the English scarplands and the clay vales: so often one finds what has been called an 'agricultural gradient' between one region and the next. Lines have therefore been drawn on the maps (Folder II, at end) with the reservation that they do not, except in a few special cases, indicate striking changes in the actual landscape. The regional boundaries, so often transitional, will at least help the reader to locate each area under discussion, but the writer is in sympathy with those who refuse to draw such lines at all in case they suggest a local individuality more distinct than that shown in the actual landscape.

Each of the regions is subdivided into a number of subregions, so that the whole country is covered in a discussion of some ninety units; to facilitate reference, the extent of these units has been indicated in Folder IIa. Much of the more detailed material will be interesting only to those needing guidance on local features, and the main qualities of each of the twelve regions are discussed in the earlier parts of the chapters. In many cases, the materials are far from adequate and little more than a tentative treatment can be given: it was found, for example, that the climatic data did not warrant division into twelve sections and that the information on soils was even sparser. On the other hand, the physical features, agriculture, population and general economic aspects are capable of more extended treatment. The first six regions (Chapters XII-XVII) cover most of Leinster and all Munster, the next two (Chapters XVIII-XIX) two contrasting but related sections of Connacht, and the last four the old Ulster province and its borderlands (Chapters XX-XXIII).

1-6. LEINSTER AND MUNSTER

1. *The Leinster Chain*.—This Caledonian range is surrounded by drift-covered lowlands, divided mainly into medium-sized and large farms concentrating on cattle production, with sheep rearing in the uplands.

2. *Dublin and the East Central Lowland*.—In the east there are large farms specialising in cattle-grazing to the virtual exclusion of arable cropping; near Dublin there is some dairying and fruit cultivation. Farther west, cultivated land and bogs are mingled in the landscape, the farms are smaller and have more tillage than in the east, but cattle, received from districts west of the Shamion, are fed for a year or more and then passed on to their final destination in Meath. The rural density of population is remarkably low in Meath and higher towards the Shannon: there are several prosperous market towns, some of which have industries of considerable significance.

3. *The Suir, Nore and Barrow Basins*.—These basins, mainly lowlands, are diversified by Armorican ranges and Carboniferous plateaus. They have mixed farming and medium-sized holdings with varied types of production, but an increasing emphasis on dairying to the west. Waterford is a port, industrial centre, and to some extent a minor regional capital.

4. *The Cork Uplands and Lowlands*.—Composed of parallel east-west ranges and valleys of Armorican structure, this region has medium-sized farms specialising in dairying: Cork, its regional capital, is a port with a variety of agricultural industries.

5. *Kerry and West Cork*.—The Armorican ranges terminate in peninsulas, and there are Carboniferous plateaus in the north. The cultivable area is limited by blanket bogs on the lowland, and the farms, though generally small, are larger than those of West Connacht or Donegal, and the region is therefore less congested. Young cattle, butter, eggs and poultry are the main products, though creameries have spread into parts of the region from the great Munster dairying belt to the east.

6. *Limerick and Clare*.—Carboniferous limestone lowlands, partly bare rock in Clare but drift-covered in Limerick, provide varied soils used mainly for pasture: the Carboniferous beds form desolate expanses around 1,000 ft. in the west, and Armorican ranges of equally dreary aspect around Lough Derg in the east. The creameries of Limerick use almost all the available milk supply, but in Clare the farmers' main products are butter, poultry, eggs and young cattle. Limerick, a bridge-head town and regional capital, is the one important industrial centre.

7-8. CONNACHT

7. *East Connacht*.—This lowland to the west of the Shannon has small farms, very few towns, hardly any industries, but so high a density of population in 1891 that considerable areas ranked as congested. The main development since then has been heavy emigration, the enlargement of farms and an increasing specialisation in sheep farming in the bare limestone areas, with cattle rearing elsewhere.

8. *West Connacht*.—Though primarily a lowland, West Connacht has some magnificent lines of hills composed of quartzites or of Ordovician and Silurian beds, strikingly exposed in bluffs around Killary harbour. The lowlands are covered with blanket bog except where the inhabitants have made farms, mostly of a few acres only, along a coastal fringe one to three miles deep. There is very little settlement away from the coast with its many islands and peninsulas.

9-12. ULSTER AND ITS BORDERLANDS

Two of the regions (Nos. 11, 12) included in this section cover the six counties of Northern Ireland, another is Co. Donegal, and a fourth the borderland country, part of the great drumlin-drift belt, which lies both in the old Ulster province, and also in neighbouring areas of Leinster and Connacht.

9. *The Drumlin-drift Belt*.—Drift, generally of considerable depth and frequently moulded into drumlins, covers most of the lowlands north of a sinuous line drawn from Pundalk to Clew bay. Small farms are

characteristic of this belt (and of its natural continuation across the border in Northern Ireland), and it may be conveniently divided into two main sections.

9<J. *Leitrim and Sligo*.—Plateaus of Carboniferous strata and the Ox mountain ridge of Caledonian structure break up the lowlands, which have cultivated land on drumlins and ground moraine, but also considerable stretches of peat bogs: large parts of the lowland have poor soil and were regarded as congested in 1891. The loss of population has been remarkably high.

gb. The Eastern Hills and Lowlands.—Hilly country of Ordovician and Silurian strata prevails in this eastern region, though lowland corridors with a Carboniferous rockfloor lead through the Erne valley and through central Monaghan. The farms are generally small, but the soils are more fertile than farther west: home flax weaving was widespread in the pre-factory stage of the linen industry. The rural population has declined very heavily, but the market towns have remained stable: the largest of them, Dundalk, has a number of important factories, some of which have been established quite recently.

10. *Donegal*.—The west of Donegal is an environment comparable to that of West Connacht, with intense occupation of restricted areas but a more active development of home industries and a greater emphasis on seasonal migration. In the east the farms are medium-sized and given mainly to cattle production with home growing of feedstuffs, most of which are milled locally. There are no large towns.

11. *East Ulster*.—The Bann and the Lagan lowlands are the heart of Ulster, and from them lowlands penetrate in every direction. The farms are small, averaging 35 acres in Antrim and only 16 in Armagh, and the traditional association with flax growing has proved a basis for the modern industrial activity focused on Belfast, which has a wide range of industries connected both with the port and with the agricultural hinterland.

12. *West Ulster*.—The Border limits the region on the west and south: on the east it is bounded by the river Bann. The lowlands, largely drumlin-covered, are surrounded by hills 1,000-1,300 ft. high and by the Sperrin mountains, a Caledonian range with peaks over 2,000 ft. high. Agriculture is the main occupation in this area, though Londonderry is a port and industrial town: the farms are mainly small with a considerable arable acreage and cattle, sheep or pigs are the main specialisations.

CHAPTER XII

THE LEINSTER CHAIN

THE LEINSTER mountain chain runs in a southwesterly direction for over sixty miles from Dublin to the neighbourhood of New Ross, and is an anticlinal fold having a granite core, with varied Cambrian and Ordovician rocks penetrated by igneous intrusions on its margins. Best developed as a mountain range in the north, it narrows farther south into the sharp ridge of the Blackstairs mountains and finally appears only in isolated hills of which the chief is Mount Brandon, a few miles north of New Ross. The coastal lowlands are nowhere more than five miles wide between Dublin bay and Wicklow head, south of which they widen into the fertile lowland of Wexford, sometimes called the 'garden of Ireland.' As a barrier the Leinster chain is important only to the north of the Slaney, which rises on the west side of the mountains and then cuts through them in a well-defined gap near Newtownbarry. The dominance of the Caledonian trend is the salient topographical feature of southeast Ireland: it is seen in the lines of hills and of valleys and even in the Wexford lowland, and is followed in the pattern of roads and railways, settlements and farms.

Much of the topographical detail is derived from the moulding influence of two icesheets and two (or perhaps three) mountain glaciations, with important glaciifluvial phases. The soils are varied, but among them are many that are well-drained and of considerable fertility, developed from the morainic accumulations of hummocky drift and the lake clays or sands. The southeast is mainly an agricultural area, economically well placed with relation to Dublin's market and port facilities: there is sheep farming on the mountains and cattle rearing for stores, meat and dairying on the lowlands. The land use is varied, but approximately seven-eighths of the farmland is in grass near Dublin, though arable crops are more prominent in Wexford. There are several small market towns such as Wicklow, Gorey, Enniscorthy, New Ross, Arklow and Wexford, and a number of market villages which help to canalise the economic life of the region. In the north the outer suburban fringe of Dublin stretches along the coast to include Bray and Greystones.

STRUCTURE AND LANDFORMS

The great Caledonian anticline is a granite batholith (or laccolith) flanked by lower Palaeozoic sediments with associated igneous rocks. The major topographical features in the core of the mountains are rounded

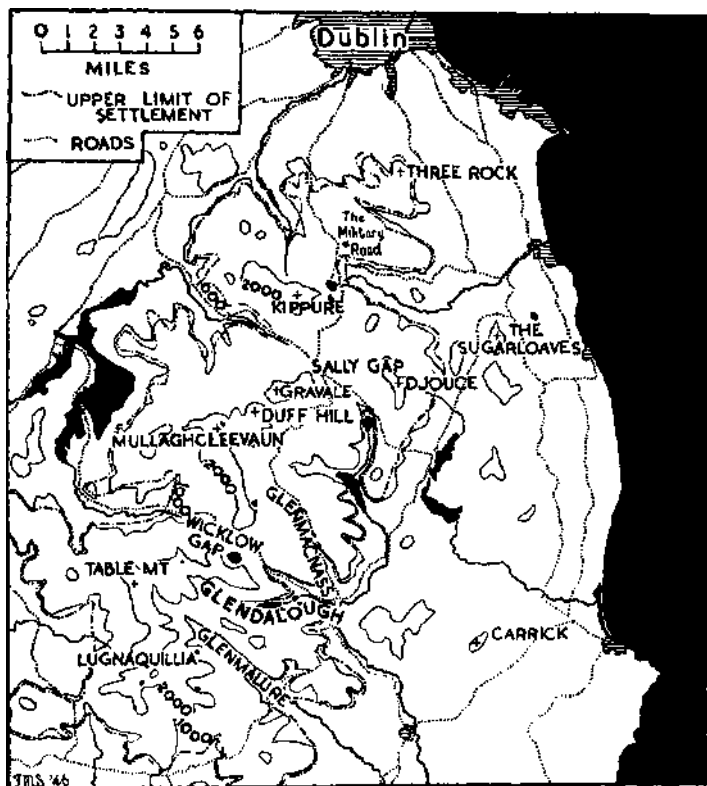


FIG. 48.—THE WICKLOW MOUNTAINS

This is the northern part of the Leinster chain, though Three Rork and other hills are commonly called the Dublin mountains. The limit of cultivation and settlement ascends in places to 1,000 ft.

Based on the Ordnance Survey by permission of the Minister for Finance of Ireland.

Drawn by F. M. Synge.

granite domes with wide open valleys modified in places by glaciers to U-shaped trenches. The mica-schists form sharper hills along the margins of the upland, but the Ordovician slates and grits have weathered into plateau-like expanses with a few quartzite knobs, notably Bray Head, the Little and the Great Sugar Loafs. The Wicklow mountains are nowhere crossed at an altitude of less than 1,000 ft. and the Military road through the mountains, built after the 1798 insurrection in an effort to control the inhabitants, runs at a height of more than 1,000 ft. for more than twenty miles. But the Leinster granites, though forming the highest parts of the uplands, are also found in many places at low altitudes, notably around Dun Laoghaire and Dalkey, where they reach the shores of Dublin bay, in the Glen of Imaal, a large depression immediately to the west of Lugnaquilla (3,039 ft.), around Hacketstown, to the south of Lugnaquilla, and on the west around Carlow and Bagenalstown (see Fig. 48).

Remnants of former surfaces of erosion are a striking, if as yet incompletely interpreted, feature of the Wicklow mountains. Two of the most striking are the Vartry peneplane on the east and the Blessington basin on the west, both of which slope from c. 1,000 to 500 ft. The former is underlain by Ordovician and Cambrian grits and slates, the latter by Ordovician beds and granites. The recognition of the various surfaces is made difficult by the presence of glacial and glacialfluvial deposits that vary from a thin rind to a covering as much as 200 ft. deep, but the evidence summarised in Fig. 49 shows that level and gently sloping areas are by no means a negligible element in the present topography. There are indications of surfaces around 1,300-1,400 ft. and perhaps also at 2,000 ft. in the mountains; the subdued and generally rounded form of the granite hills themselves suggests yet another surface around 2,500-3,000 ft.

South of Lugnaquilla the Leinster chain ceases to be a significant barrier, but the granite core of the anticlinal ridge appears in several isolated hills between Lugnaquilla and the Slaney and appears also in the Blackstairs mountains between the Slaney and the Barrow. On the east side of the range Ordovician slates and grits, which have a continuous extension from Killiney bay to Waterford harbour, are pierced by two lines of igneous intrusions of varied character and hardness which form two lines of hills. The first of these extends from a point southwest of Wicklow town through Croghaun Kinsella (nearly 2,000 ft.) into the northern part of Co. Wexford, the second extends from Arklow head southwest for eighty miles across Wexford and Waterford to the coasts near Dungarvan (see also pp. 315, 316). Where these intrusions form hills, they break the monotony of the lowland and imprint upon it the Caledonian trend in unmistakable emphasis.

The glaciation of southeast Ireland has been more completely studied

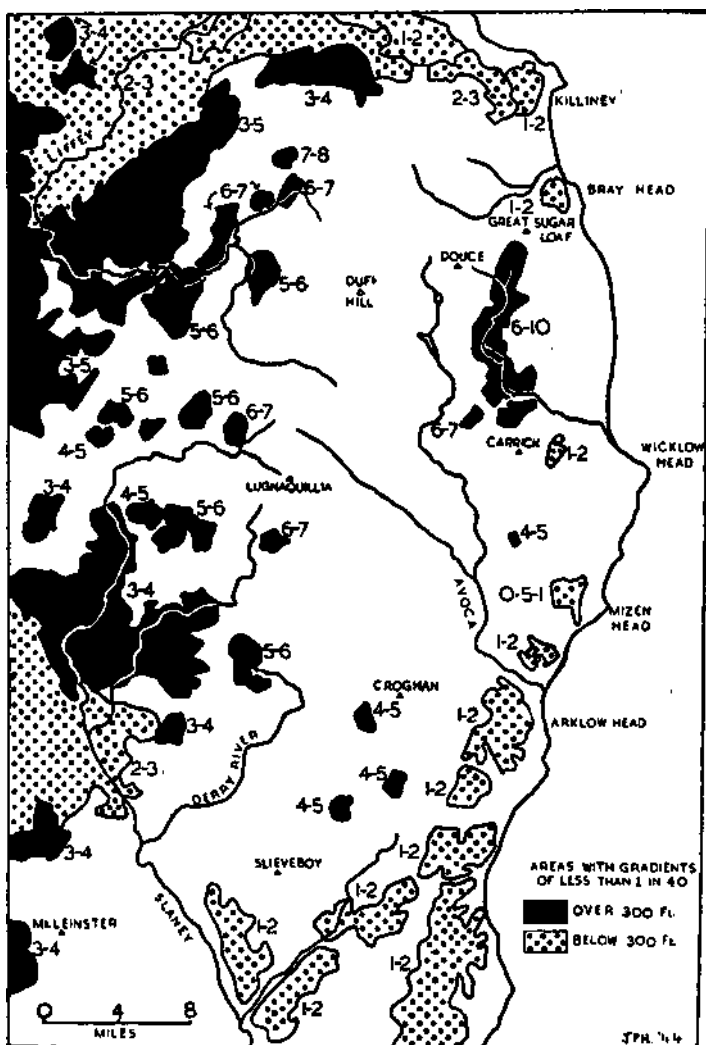


FIG. 49.—DISTRIBUTION OF AREAS WITH GRADIENTS OF LESS THAN 1 IN 40, WICKLOW MOUNTAINS

The figures indicate hundreds of feet above sea level: the division on the map into level areas above and below 300 ft. is arbitrary and does not necessarily mean that the surfaces begin or end at that height.

Based on the Ordnance Survey by permission of the Minister for Finance of Ireland.

Map drawn by J. P. Haughton and published in 'Irish Geography,' vol. 1, p. 35.

around Dublin and the Wicklow mountains than elsewhere. There were two general icesheets from the north which have left limestone-bearing drift: the older is generally a tough clay with a varied stone content, including rocks of Scottish origin, though limestone pebbles are the most frequent of all. The newer drift has left much sharper topographical features, but the icesheet extended only to the margins of the Leinster chain on the west, though it penetrated some of the northern valleys to an altitude of at least 1,700 ft.: its morainic deposits are also a very clear feature in many parts of the coastal lowland, especially to the south of Cahore Point, where there is a jumble of hills and ridges, with many kettleholes, rising to a height of 350 ft. and extending to a point only three miles north of Wexford harbour. The moraines of the later glaciation and the morainic deposits of the earlier icesheet (which probably cover a wide area but are less easily recognised) have proved vital influences in the land use of the region. In some valleys, such as those in the northern part of the Leinster chain (locally known as the 'Dublin mountains'), the past or present limit of improved land corresponds almost exactly with the upper limit of the drift. In general, the moraines themselves and the flanking outwash deposits provide varied conditions of soil and drainage, but there are some particularly fertile soils on natural loams.

Two, or possibly three, mountain glaciations have left drift, largely granite debris, in the Leinster chain. The first of the three, cautiously advocated by Farrington in 1944, has been suggested by various deposits around Enniskerry; the second, or Brittas Mountain glaciation, was probably an icecap that extended to the present coast on the east side of the mountains, though its limits on the west are not known: the deposits are so strongly weathered that the drift is often little more than rotted boulders of granite in a matrix of gritty clay; the third, or Athdown mountain glaciation, was much less extensive and was heavier on the east side of the mountains, where valley glaciers were fed from a large snowfield lying in the heart of the Wicklow mountains on a remarkably smooth surface, now partly traversed by the Military Road. Glaciers passed down the eastern valleys, and also formed a piedmont glacier on the Vartry peneplane, which has a remarkable series of moraines and drift deposits from more than one glaciation. There were also glaciers in the western valleys, but typical U-shaped forms are more clearly developed in the east, notably in the four valleys converging at Laragh, and also in Glenmalure. Striking morainic accumulations occur in many of the valleys, especially around Annamoe at the southern end of the Vartry peneplane, around Rathdrum, and also in Glendalough and in Glenmalure. Some of these valleys are spanned by terminal moraines and have

almost undisturbed lateral moraines covered in places with indigenous oak-birch woodland or with new forestry plantations. There are also some corries with block moraines; two very fine corries at the head of the Glencree valley are divided one from another by an arete-like wall, and occupied by lakes (upper and lower Lough Bray) dammed by block moraines.

The present rivers are moulding their courses in valleys that are mainly plastered with drifts and lacustrine deposits and have reached solid rock only in a few places. As a whole, they are in a youthful stage of development, contrasting strongly with the mature outlines of the granite mountains. An interesting case of a post-glacial stream cutting its course in boulder clays is seen in the Dodder valley, where a youthful valley with an actively cutting stream is so sharply incised that it is quite invisible from many points above it. Incidentally, this valley has two small reservoirs originally constructed as the Rathmines and Rathgar waterworks. In many of the valleys erosion is particularly active, and almost every flood brings some readjustment both on the valley floors and on the hillsides. At such times, the number of tributary streams is suddenly multiplied and there may also, on rare and unexpected occasions, be 'bog-flows' (see p. 70), in which part of the upland peat is suddenly poured down the hillside, in some cases submerging useful farmland and causing considerable havoc. At present the peat is accumulating, if at all, at so slow a rate that a remarkable natural wastage is in progress and all the rivers are coloured brown. When the granite is reached, it is turned into the gravelly deposit so frequently seen in the channels intersecting the upland peat bogs. Further, the clearing of many upland peat bogs for wartime fuel needs will accelerate erosive processes by the removal of a temporarily protective cover; on the other hand, the afforestation of many Wicklow hillsides will help to preserve them against erosion, though there are many very steep and unstable slopes above the forest level on which soil creep is very active.

Many problems invite investigation in the Wicklow valleys, where sufficient research has been done to open the way for more. The streams, for example, are aligned from northwest to southeast, with subsequent reaches at right angles, and the valleys have varied exposures to insolation and other elements of climate. The southward-facing slopes have generally less steep sides than those facing north and there is a widespread tendency to asymmetrical forms. The settlements are mainly on the south-facing slopes, as would be expected, but it is not clear why the drift deposits should be thicker on the same side. Microclimatological research together with soil surveys may offer some explanation of this phenomenon.

LAND USE

Approximately one-half of Wicklow, but little more than one-tenth of Wexford, is rough pasture or non-agricultural land. There is a wide stretch of open country in the Wicklow mountains, where the 1,000 ft. contour encloses an area of 205 square miles, and similar but much smaller moorlands exist on the Blackstairs mountains and on the many uplands that flank the Wicklows or break up the Wexford lowlands. The sand dunes and shingle ridges along the coast at intervals from Greystones to Bannow bay (Co. Wexford) are also negative areas for agricultural settlement: some of these dunes enclose freshwater or salt marshes, such as the Murrough to the north of Wicklow town. The main agricultural resource lies in the soils derived from the glacial and glaciﬂuvial materials on the lowland, and to some extent also in the uplands.

The frontier between the farmlands and the moorlands has oscillated during the past hundred years through an intermediate or hill-pasture belt (see Fig. 50), mainly between 600 and 1,300 ft., which has gorse and bracken plentifully spread through it. The low-growing *Ulex Gallii*, dominant on the higher ground, is moulded into rounded bosses separated by sheep walks; the tall *Ulex europceus* is found mainly on the lower ground. Comparison with conditions in 1904 shows that several farms have been abandoned and the hill pasture belt therefore extended. The belt is, in fact, a frontier of agricultural settlement in which the enemies, gorse and bracken, are perpetually on the offensive and already possess a 'bridgehead' on the margins of fields now ranking as improved land. Broken stone walls are widespread features of this marginal belt, but its decline in status is not necessarily recent, for many upland farms were abandoned from 1870 onwards. Nor is the belt useless, for the present farmers graze their sheep wherever they can. The field worker is constantly shown fields at an altitude of as much as 1,000 ft. which 'grew wheat' a century ago, and while the past productivity is perhaps exaggerated, the frontier of settlement has been pushed back, though one family will maintain a high-lying farm and another will not: in many cases, a remote upland farm is abandoned on the death of the holder, especially if all the sons and daughters have emigrated and the family is, to quote an old woman living in Glencree, 'worn out/

Although the hill-pasture belt has been closely studied only at the northern end of the Leinster chain, it occurs at similar altitudes in other Irish uplands. The tide of decay has been arrested in some places by the planting of woods, some of which reach an upper limit of 1,000-1,500 ft., which must correspond fairly closely to the climatic limit of trees in this area. Already the afforestation has altered the appearance of several

valleys, generally by the addition of contrasting colours, especially in the larch belts, and the headquarters of the Forestry Commission is Avondale, once the home of Parnell, near Rathdrum. As yet, the afforestation has not submerged all traces of the sub-spontaneous or natural woodlands,

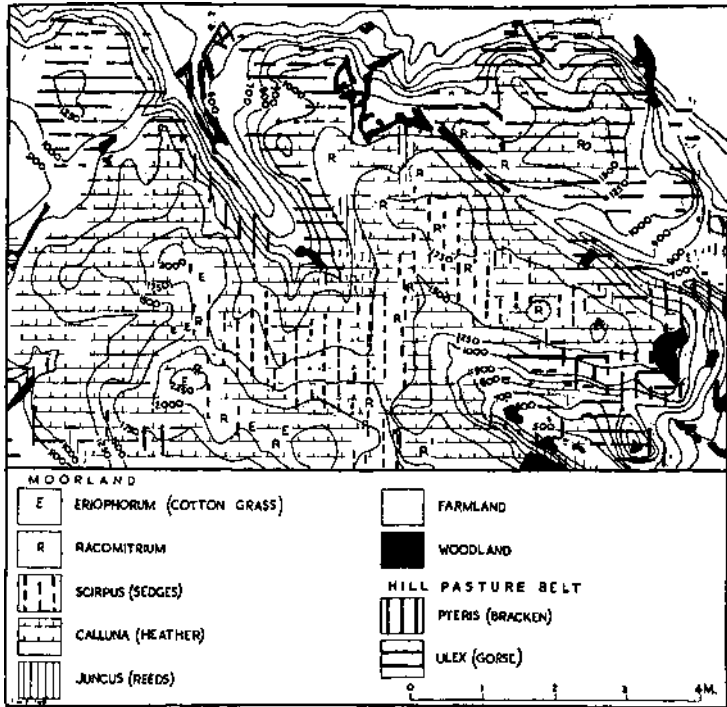


FIG. 50.—VEGETATION OF THE 'DUBLIN MOUNTAINS'

The gorse and bracken is found between the farmland and the upper surface, which has heather moors with sedges, cotton grass and reeds. The limit of cultivation has changed comparatively little since these observations were made over forty years ago.

Redrawn from Pethybridge, G. H., and Praeger, R. L., 'The vegetation of the district lying south of Dublin,' Proc. R. Irish Acad., vol. 25, B6, 1905.

chiefly of oak and birch, sometimes with holly, that clothe many of the steeper slopes in the mountain valleys (see p. 74). The treeless hillsides in many of the valleys are also of interest, particularly in April and May, when they have colourful sheets of bluebell, violet, germander speedwell, lesser celandine and primrose on areas covered later in the season by

bracken. Such vegetation probably represents the lower layers of the former forest community, now dominant. Bracken is not only able to hold its own against gorse, but even to push back its rival, especially on east-facing slopes sheltered from the westerly winds: in some hollows and glens the east-facing slope is covered with bracken and the west-facing with heather. Heather moors are widely developed throughout the Leinster chain, where the drainage is good, and in many places extend continuously from the hill pasture belt to the tops of the mountains; the heather is as much as 2 ft. high at the lower levels, but dwarfed at higher levels. Generally the *Scirpus* or *Eriophorum* (cotton-grass) associations are developed on the higher and more level areas, with some *Rhacomitrium* moss that is intermingled with *Sphagnum* and associated with dwarf *Calluna*, *Scirpus*, *Erica tetralix* and *Juncus squarrosa*. The three associations marked by *Scirpus*, *Eriophorum* and *Rhacomitrium* are almost certainly forming bogs at the present time, but the accelerated cutting of many *Scirpus* and cotton-grass areas will probably result in an extension of the heather moors.

Agricultural life in southeast Ireland is closely influenced by the proximity of the Dublin market. The proportion of dairy cattle in the herds increases from one-quarter in Wexford to one-third in Wicklow; most of the lowland farmers sell the milk to wholesale dealers, who collect it by lorry from platforms outside the gates of the farm or by direct rail services. In Co. Wexford a few co-operative creameries have been established, but direct sale to dealers is more usual. Cattle are reared for the local meat trade or for export through the ports of Dublin, Waterford and Wexford. Some of the salt marshes are used as pastures for cattle, sheep and horses: one part of the marsh between Wicklow and Greystones is traditionally supposed to cure sick horses. The sheep are of the Wicklow mountain breed, a cross between the native strains and the Cheviot breed: in winter they are brought down to the lowlands in very large numbers, and they are reared both for meat, which is sold at local fairs or to dealers, and wool, which is sold co-operatively through the Wicklow Mountain Sheep Breeders' Society. Pigs and poultry are reared on most farms, but are relatively of greater importance on the smaller farms. In recent years some poultry farms have been established, but this is rather the effort of a few enterprising people than any widespread development.

Mixed farming with a pastoral emphasis is the most typical form, and approximately two-thirds of the improved land is in grass. The arable cultivation of the region is generally planned to meet the needs of livestock and the farm household, but Co. Wexford still has more of its land in crops than any other part of Eire, excluding the completely

different country in the west of Donegal; before the post-1932 propaganda drive, *it* had more wheat cultivation than any other Irish county except Cork, with substantial acreages of oats and barley. Sugar beet has been grown here in steadily increasing quantities and Co. Wexford normally supplies about one-tenth of Eire's output. This crop is also grown in considerable quantities on the west side of the mountains, and one of the four Irish sugar factories is at Carlow.

Half the farms of southeast Ireland are of 30-100 acres, and the holding of more than 50 acres is a very significant feature of most lowland landscapes. But some 20% of all the farms are even larger, though less than 5% are of more than 200 acres. There are also numerous small farms of less than 30 acres, which are interspersed among the larger farms in almost every part of the lowland and are dominant in some of the upland valleys, where holdings not unlike those of the west of Ireland may be seen within a few miles of Dublin. The farm size is reflected in the gradation from the thatched and whitewashed two-roomed cottage to the substantial eighteenth- or nineteenth-century house built of local granite and possessing austere but attractive architectural features. The farm buildings as a general rule leave considerable room for improvement, and there are various makeshift arrangements, such as the use of abandoned cottages for storage and barns.

In southeast Ireland there is an average of at least three workers per farm in the lowlands; this is one of the few parts of Ireland having an agricultural labour class of some numerical strength, drawn partly from other regions. Near Dublin the proportion of family workers is as low as 65% of the number of farmers, but *hi* most of Wexford there is approximate parity between the number of farmers and of family workers: the labourers employed per 100 farmers varies from 77% in the Baltinglass rural district (mainly upland) to 138% around Bray.

INDUSTRIES

The few small industries that exist in the region include several enterprises supplying agricultural needs or making articles from agricultural produce, together with a few new concerns located here for no particular geographical reason. The latter group includes a pottery at Arklow, employing 400 people, a razor blade factory at Enniscorthy, a works making insulated wires and cables at New Ross and enterprises at Bray making inks and polishes and also the entire home supply of electric light bulbs for Eire. Arklow also has a small boat-building yard: facing bricks are made from a local clay at Courtown, near Gorey. The industries allied to agriculture are of much greater interest and are generally of older establishment. They include a fertiliser factory at

Wicklow, mills for maize, wheat and oat products in various towns and villages such as New Ross, Wicklow and Rathdrum, bacon factories at Enniscorthy, Wexford and Pilltown, and a tannery at New Ross. Malt is prepared at Wexford, and there are various small breweries in the area. Gorey has a recently established leather factory making boot and shoe uppers and employing over 100 people. Successful small enterprises include hand-weaving mills, which produce tweeds of attractive colour and design, at Avoca in the Vale of Clara, and a woollen mill at New Ross making blankets, tweeds, flannels and rugs. Both these are small concerns employing less than fifty people. Wexford has three iron foundries which provide a large variety of goods including agricultural machinery and employ several hundred people. The largest of the co-operative creameries, at Foulkesmills, Co. Wexford, employs 100 people in butter manufacture. A few rural industries have been successful, in some cases conspicuously so, but as yet there is no widespread rural industrialisation; the towns exist primarily as market centres, but have also attracted a few new concerns such as the pottery at Arklow and retain some older enterprises such as the Wexford iron manufactures, which supply most of the agricultural machinery produced in Eire.

DISTRIBUTION OF POPULATION (FIG. 51)

The population of this area was 182,000 in 1891 and c. 156,000 in 1936 and in 1946, 105 and 90 to the square mile respectively. The most significant changes include a decrease of more than 20% in the rural population from 149,000 to 113,000, and an increase of 25% in the town population from 33,000 to 42,000. The decline in the farming population is much greater than 20% because several rural areas in Co. Wicklow have a considerable residential population consisting mainly of Dublin workers or retired people: the outer suburban area of Dublin includes Bray and Greystones and the localities immediately around them. Outside the residential areas, most of the market towns have remained virtually stationary in population during the past fifty years. But Greystones, eighteen miles from Dublin, began as a tiny fishing hamlet and grew into a residential centre with 500 people in 1891 and nearly 1,600 in 1926, since when its population has remained fairly stable. Bray, five miles nearer Dublin, a market, light industrial, holiday and residential town, increased steadily in population from 7,000 in 1891 to 11,000 in 1946. In all probability, the limit of outer suburban settlement has been reached for the present, though accelerated transport may eventually spread city workers through a still wider area: already individuals come to work in Dublin from places such as Wicklow by daily express bus services.

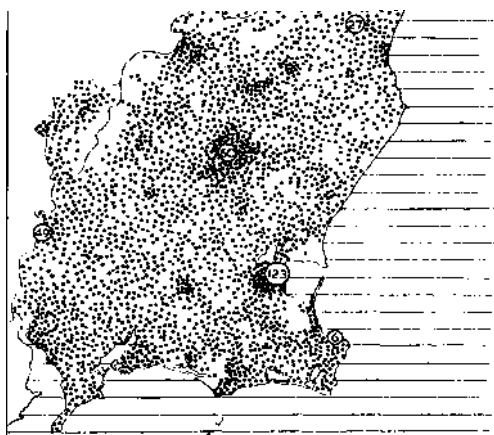
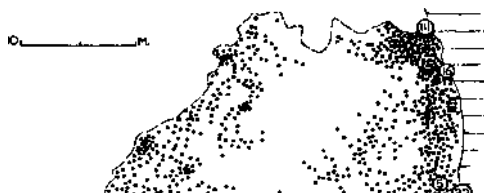


FIG. 51.—DISTRIBUTION OF POPULATION, LEINSTER CHAIN, 1936
One dot to 25 persons.

South of Greystones, the population density is not heavy; it is typical of many areas dominated by medium-sized farms.

Some of the more important small market villages are mentioned in the regional discussion later in the chapter. They include about 15% of the rural population, and are primarily farm settlements with a few shops, banks, inns, churches, and in some cases a mill or small industry. They are of infinite variety in appearance: a few, such as Enniskerry and Blessington, have a dignity acquired from seventeenth- and eighteenth-century building by the squires, but most are far less attractive, and at their worst consist largely of abandoned and decaying cottages. In recent years labourers' cottages, each with a garden of as much as half an acre, have been built close to many of the villages: some of the groups of cottages almost constitute a new village on the standard Irish Census definition of 'clusters of twenty houses or more.' The pattern of rural settlement is remarkably even over most of the region and gaps are either moorlands, peat bogs or sand dunes and shingle ridges along the coast. The general density of population, 80-90 per square mile of improved land, is typical of areas with relatively large farming units. Speaking comparatively, the rural areas of southeast Ireland are more densely peopled than those in Meath and less densely peopled than those west of the Shannon.

SUBREGIONS

The main characteristic of the southeast is the intermingling of upland and lowland, with uplands more prominent in the north and lowlands in the south. As a whole, the Leinster chain and its bordering lowlands is relatively easily divided into smaller units, and many of the subregions are fairly clearly delimited by physical features and possess definite characteristics in their life, so that they may be regarded as small *pays*,

1. THE CENTRAL MOUNTAIN BELT

The central part of the Wicklow mountains, about ten miles wide and twenty-five miles long, consists of rounded granite uplands with summits of 1,500-2,000 ft. in the north and more than 2,000 ft. in the south, finally reaching 3,039 ft. in the schist-capped Lugnaquilla. The junction of the granite with the mica-schist is seen on the east as a line of sharp-featured hills from Knockree to Maulin and Douce, and thence as a hilly ridge intersected by deep gorge-like valleys to Lough Dan and Glenmalur. On the west side the mica-schist line is less clearly defined, though it forms several hills and ridges along the upland edge. The granite upland is mainly bog-covered moorland intersected on the east by valleys that are normally wide and open on the higher ground but narrow and steep-sided where they were occupied by glaciers. On the west side the valleys are usually mature in outline and less sharply glaciated than those of the east. The rivers on the east are downcutting rapidly, and in

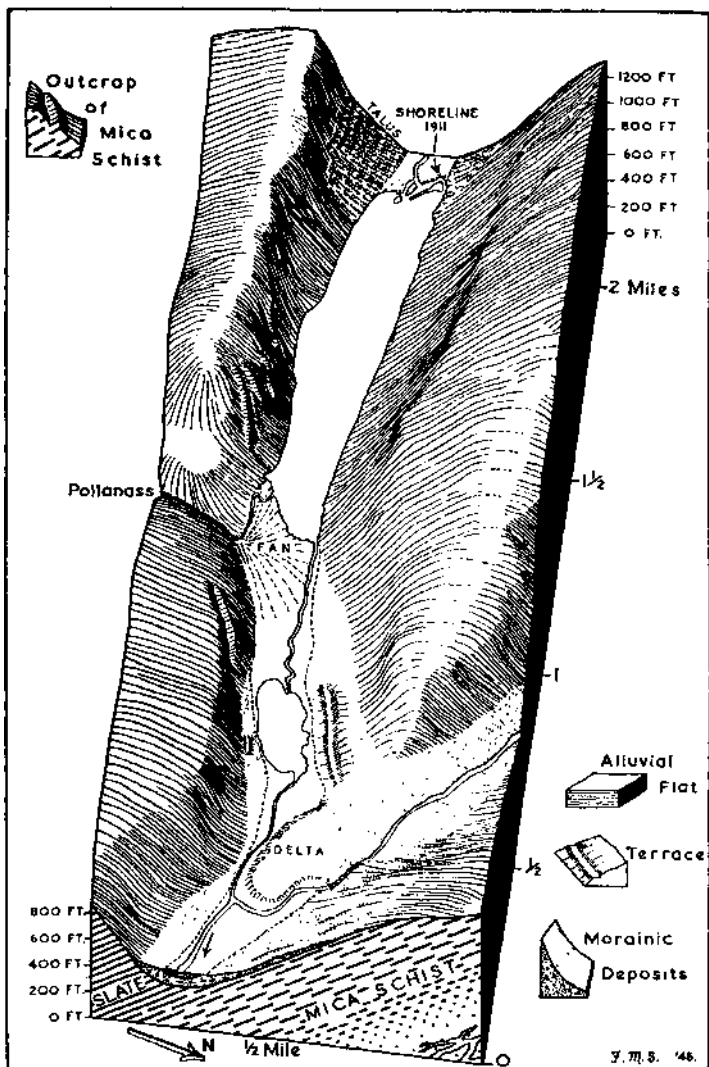


FIG. 52.—THE GLENDALOUGH VALLEY

This non-perspective diagram shows the deeply glaciated Glendalough valley; morainic deposits cover part of the hillsides and the valley floor and the height of a former lake level is shown by the delta and terrace.

Constructed from field observations and from the Ordnance Survey, 6" to 1 mile, sheet 23, Co. Wicklow, Dublin, 1911, by permission of the Minister for Finance of Ireland.

Drawn by F. M. Syngc and published in **Irish Geography,** vol. 1, p. 60.

places dramatically, and have waterfalls or torrent courses where the lower youthful reaches are cutting back into the mature upland surface around and above them: the rivers on the west side flow mainly through lowlands covered with drift and glacialfluvial materials.

Land available for cultivation and settlement is restricted to valley floors and a few of the hillsides; improved land covers less than 10% of the whole area. The valley floors have small floodplains of alluvial material, much of it re-sorted drift, which forms good cattle pastures or arable fields for oats and potatoes. In addition, a few of the moraines provide good and well-drained soils, but the many gaps in the settlement pattern include marshy areas, some with willow scrub, or moraines and outwash deposits of coarse sand and gravel left in forest, some of which is oak-birch woodlands, with holly in places. The hillsides are equally varied in their present land use, for sheep farms on well-drained drift deposits alternate with land never cleared for agriculture and covered in part with some relics of the original woodland, seen most clearly in Glendalough. But the large plantations, of which some cover at least two square miles, are adding a new element in the landscape, and thereby improving or desecrating the scene according to the taste of the observer. The mountain belt is by no means over-developed as a tourist area, though post-war motoring may bring considerable changes: as yet there are few hotels, many poor roads, and Glendalough alone is thronged with visitors, who come to see the Seven Churches, the Round Tower and the awe-inspiring U-shaped valley with its two lakes separated by the delta of a stream flowing from a hanging valley (see Fig. 52).

2. THE BLESSINGTON LAKE-BASIN

The name of this subregion combines recognition of both the glacialfluvial lakes that filled it to a height of 900 ft. at its greatest extent and the modern reservoir constructed with a water level around 615 ft. to augment the water supplies of a rapidly growing Dublin, and to provide electric power (see Fig. 53). The new reservoir was constructed in 1938-1940 and submerged for ever some remarkable morphological features in an area of several square miles, where the Liffey and its tributary, the King's river, were cutting a series of remarkable meanders in the old lake bed and exposing varved deposits; the soils of the basin varied from humified peat to fen-covered clays and well-drained gravels. But without the reservoir Dublin water supplies would have been rationed by 1945, and the associated power station is already a useful supplement to the Shannon and Pigeon House (Dublin) supplies. Again, the new lake, in spite of its morphological sins, has added to the scenic attractions:

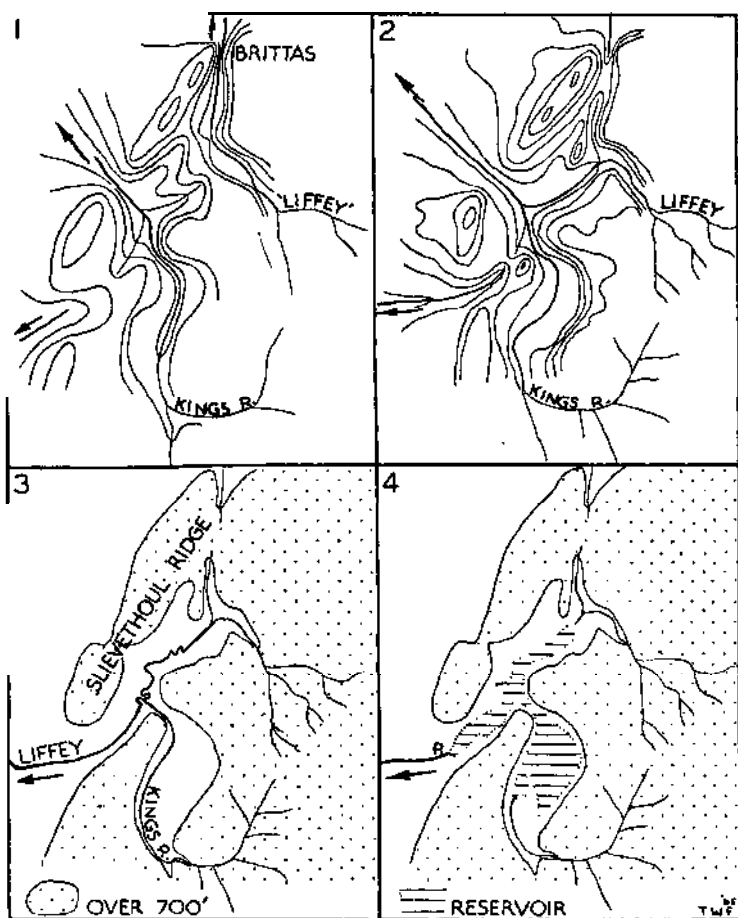


FIG. 53.—THE LIFFEY VALLEY

The four stages are discussed in the text, p. 282.

it reaches up into various valleys in long fingers of water separated by farmed ridges.

The Slievethoul ridge, on the west side of the basin, is made up of Ordovician rocks covered with drifts, which include some remarkable morainic hills of gravels to the west of Blessington. In its present form this ridge is mainly 1,000-1,250 ft. high with a gap at 750 ft. west of Blessington, which probably represents a former channel of the Liffey. The whole lake basin is a subsequent valley worked out before the Ice Age began, and it has been suggested that the original Liffey was a stream flowing through the Brittas col (see Fig. 53), a broad and mature pass now occupied only by a tiny stream. Meanwhile the King's river flowed out to the lowland through the gap to the west of Blessington: one of its tributaries gradually cut back and captured the upper Liffey, which now deserted the Brittas col and found a course through the Slievethoul ridge (stage 2 in Fig. 53). All this happened before the onset of glacial conditions in a period sufficiently long to allow the removal of several hundred feet of strata. The events of the Ice Age left the basin thickly covered with drifts and lacustrine deposits, and the Slievethoul ridge was accentuated as a landscape feature by the addition of a considerable mantle of deposits which closed the Liffey outlet shown in Fig. 53. The river now cut through the Poulaphouca gorge (stage 3 in Fig. 53), and its tributaries began that dissection of the basin which is still proceeding outside the area occupied by the new lake.

The farms around the lake include several of considerable size, some of more than 100 acres, but there are also a number of smaller holdings, especially at the upper levels: in places settlement reaches 1,000 ft. The quarries of Ballynockan have supplied large quantities of granite for buildings in Dublin, but they are now disused, perhaps temporarily. Blessington, a village of late seventeenth-century foundation, with a granite church built in 1683, now has some 300 inhabitants and is a small market centre. The road from Blessington to Dublin had a steam tramway from 1882 to 1932, but almost the only relic of its track is a series of memorials to those killed along the route. An extension of this tramway ran from Blessington to the Poulaphouca gorge from 1890 to 1927.

3. THE VARTRY PENEPLANE

Though possessing a strong resemblance to the Blessington area, the Vartry peneplane has an entirely different surface cover which consists mainly of piedmont moraines from ice tongues that pushed out of the Annamoe river valley and spread almost to the eastern border of the area. These moraines cover the older drift, which may now be seen as a very much weathered deposit; its thin leached soils support only bogs and

heather moors. Most of the fields are on the moraines or on the floodplain of the river Vartry. The whole area, which now appears as a peneplane sloping from 1,000 ft. to 600 ft., would remain mature in outline even if the shallow drift cover were removed. The Vartry river is now cutting vigorously into the surface deposits, probably along much the same line that it followed before the Ice Age; it now escapes to the coastal lowland through the Devil's Glen, a deep gash used by glacialfluvial waters (see Figs. 48 and 49).

The Vartry peneplane is some four miles wide and ten miles long, and is clearly bounded by the quartzite Great Sugar Loaf, 1,654 ft- on the north, by knob-like hills of quartzite reaching 1,000-1,200 ft. on the east, and by the hillfoot of Douce and other mica-schist hills on the west. It is cultivated generally to a height of 700 ft., with local extensions to 1,000 ft. through a well-defined hill-pasture zone dominated by gorse and bracken. Cotton-grass moors are developed with some interesting gradations into heather and bilberry moors as natural drainage improves, but trees are restricted mainly to windbreaks around some of the farms. The agricultural pattern reveals an interesting divergence between the medium-sized farms of 50-70 acres with substantial two-storey houses in the northern and higher parts around Calary and the smaller farms in the south around Roundwood village. The land was gradually acquired by English settlers during the eighteenth and nineteenth centuries and apparently was divided, early in the nineteenth century, between a few English landlords, who settled a number of their countrymen on farms. Their descendants still live in the area and have preserved their allegiance to the Church of Ireland; the Calary division had, in 1936, the one Protestant majority, apart from Greystones, in this part of Ireland. In the Roundwood area the farms are generally smaller, the population Irish in origin and predominantly Roman Catholic. The farming is mixed, with as much as one-quarter of the land given to oats and potatoes, and sheep rearing is predominant, though there is also cattle rearing, some horse breeding, and poultry and pig raising. The cattle and sheep are mainly stores sent to the lowlands and the area produces butter rather than fresh milk. An interesting special development is seed-potato production both for the local trade and for export.

Thinly peopled, with about 30 to the square mile, and about 50 per square mile of improved land, this area is one of emigration: local enquiries show that most of the emigrants before 1914 went first to New York and then moved on to the Middle West and to the state of Ohio. Boom demands for labour arose when the first reservoir was built, almost entirely by hand, in the years 1861-1867: in 1893 the reservoir dried out and rockets were fired into the air in an attempt to produce

rain, which was as unsuccessful as that of the prophets of Baal. The second reservoir was completed in 1925. The isolation of this area has been partially removed by a bus service to Glendalough and by motor lorries, and its one village, Roundwood, is a market centre with two small hotels catering largely for fishermen. In the village there are a few craftsmen, one of whom supplies the whole Vartry area with cartwheels, ladders, gates and other wooden articles.

4. THE BRAY-WICKLOW LOWLAND

This lowland lies between three prominent quartzite hills, the Great Sugar Loaf (1,654 ft.), the Little Sugar Loaf (1,120 ft.) and Bray head

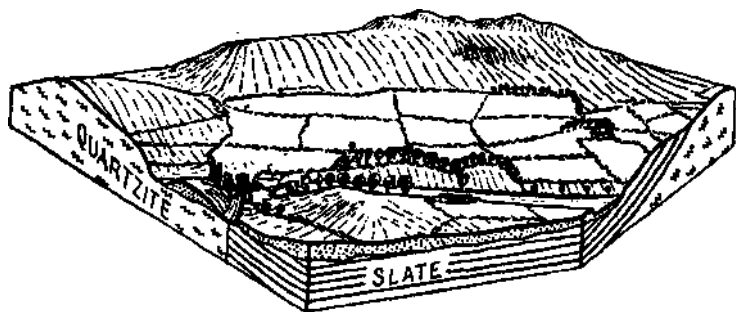


FIG. 54.—THE LITTLE SUGAR LOAF

Quartzite stands out in Bray head, the Little and the Great Sugar Loaf above the surrounding country, here of Cambrian slates: most of the low-lying area is covered with drift.

Drawn by F. M. Synge.

(795 ft-) on the north, and Wicklow head on the south: it extends on the west to the edge of the marked break of slope formed by the edge of the Vartry peneplane (see Fig. 54). It is one to five miles broad and fifteen miles long, and is an important agricultural area just penetrated on the north by a residential development that shows the extreme limit of the Dublin suburban spread. The town of Bray, on the north side of the head, belongs essentially to the Dublin complex and has become its Southend and Blackpool since the railway was built in 1851. Previously there was 'no esplanade ... nothing but the heaped sand, shingle and low sand dunes, along which a rude raised pathway led to the Head, interrupted by numerous hollows and irregularities caused by the digging and carting away of the sand by farmers and others in the neighbourhood.*¹

¹ Joyce, W. St. J., *The Neighbourhood of Dublin*, Dublin, 1912, 1939, p. 83.

Greystones stands on a small rocky promontory made up of Cambrian slates and grits with some quartzite, all under sharp attack in winter storms along the coast. It is a holiday and residential centre of infinite respectability with (in 1936) 981 females among its population of 1,535: 56% of its population was Protestant. This Irish Cranford is in some ways a model suburban development of the pre-1914 era, with tree-lined roads, substantial houses, spacious gardens and a pleasant lack of uniformity. Fig. 51 shows that the density of population in the coastal lowlands decreases sharply to the south of Greystones.

Between Greystones and Bray head, the coast consists of cliffs of drift subject to such heavy marine erosion that the railway has twice been moved back, and the loss of land was estimated at 4 ft. each year between 1905 and 1928: a storm in that year removed a number of houses from the North Beach, Greystones, and the old harbour works are now almost entirely swept away. To the south of Greystones a ridge of shingle and sand forms the coast for more than ten miles and carries the railway to a point one mile from Wicklow town. Wave attack has been arrested by planting marram grass and by laying down enormous concrete blocks, each marked with the date. Immediately behind this ridge there is a belt of salt marshes with lagoons, notably in the Murrough area immediately to the north of Wicklow town, where the Vartry river finally reaches the sea. The coastal marsh belt is everywhere less than a mile wide, and the greater part of the lowland consists of limestone drift of hummocky appearance rising to about 400 ft. at the hillfoot and penetrated here and there by small quartzite hills and isolated bosses. The evidence of glaci-fluvial drainage is seen in a remarkable series of channels, most of which run parallel to the hillfoot, and also in the deep cuts of the upland edge: these include the Glen of the Downs, which is 400 ft. deep, about 450 yards wide, and one and a quarter miles long, and the Devil's Glen. Some of the channels on the lowland are followed by roads, but though their mark on the landscape is indelible, they are almost ignored by the present drainage, which consists of short and inconspicuous streams running from the edge of the Vartry peneplane to the sea.

Agriculturally the lowland is divided into large farms averaging 100 acres but varying in size from 40-300 acres. About one-fifth of each farm is sown to crops, especially oats, potatoes, roots and greens intended for animal feedstuffs, though small quantities of wheat and barley are grown and there is sometimes a surplus of oats sold for milling. The farmers breed store cattle and sheep, and receive young stock from such neighbouring areas as the Vartry peneplane. The milk trade with Dublin is merely one branch of a characteristically mixed farming. The well-wooded appearance of the landscape is due mainly to trees in hedgerows

and windbreaks, though there are also some small new plantations laid down by the Forestry Commission. There are now no native woods in the area, but the oak-hazel-holly woods clothing slopes in the Devil's Glen and the Glen of the Downs are apparently sub-spontaneous. The density of population is less than 100 per square mile, and the area has a number of villages which are partly residential and partly market centres, with labourers' cottages recently added. Wicklow is a market centre with a population of 3,200 in 1946: as a port it is now of negligible significance, though a few small boats bring coal to the chemical works and take away iron oxide, but a century ago, before the railway was built, Wicklow handled the very considerable trade of its flourishing hinterland and shipped the copper and lead then mined at Avoca.

5. THE GLENEALY-SHILLELAGH CORRIDOR

This subregion, eight miles wide and over twenty miles long, consists of a corridor of Caledonian trend limited on the west by the Wicklow mountains and on the east by a line of hills, chiefly made up of igneous intrusions, of which Croghan Kinsella, 1,993 ft is the most significant. The Caledonian line is also emphasised by hills 500-900 ft. high within the corridor itself, but its main feature is a large expanse of land around 400 ft. cut by a number of river valleys. Those in the northern part are the middle reaches of the rivers draining the highest parts of the Wicklow mountains, here flowing in youthful valleys some 200 ft. deep; to the south there is a long wide subsequent valley drained by the Derry river to the Slaney, and by the Derry water to the Aughrim river. It is a possible inference that the line of low passes followed by the road from Aughrim to Rathdrum, and by the road and railway from Rathdrum to Glenealy, represents a continuation of a subsequent drainage line worked out in a former erosion cycle at about 400 ft. above the present sea level. The soils of the area are derived mainly from drifts or from some of the striking moraines deposited by icetongues from the uplands. There are also some alluvial fans at the junctions of the tributary streams, and only in the Derry river and Derry water valleys are there marshes of wide extent.

The lowlands of this area are divided into farms averaging 70-80 acres in size, but employing much less labour than in the Wicklow lowlands, so that the average density of population per square mile is 77, and of the improved area, 95 (1936). The farmed land generally extends to a height of about 700 ft. with some extensions to 1,000 ft. through the transitional hill-pasture belt. Some two-thirds of all the improved land is in pasture and nearly one-fifth in arable cultivation with oats normally predominant, followed by turnips and potatoes. The farmers rear store cattle and sheep

rather than dairy cattle. There are no towns in this area, but the market villages and route centres include Rathdrum with 500 people, and the smaller Aughrim, Tinahely and Shillelagh.

Mining.—Auriferous gravels exist in several valleys between Croghan Kinsella and Shillelagh, including the Gold Mines valley which joins the Vale of Avoca at Woodenbridge. No efforts at exploitation have ever proved a commercial success, though the deposits were worked by the government from 1796 to 1803, and at various times people have found and sold pieces ranging from minute grains to a nugget of 22 ozs. discovered in 1795. The mother lode, however, has never been found, though the association of the mineral with tinstone and wolfram may indicate that it may exist at the margin of the Leinster granite. The Avoca mines lie in an extensive mineral belt stretching along both sides of the Avoca valley. The ore, a complex mixture of sulphides of copper, lead, iron, and zinc with a small content of precious minerals, was worked at the end of the eighteenth century for copper and during the middle part of the nineteenth century for sulphur, but the competition of purer continental pyrites ores made the enterprise uneconomic, and the revival in the 1914-1918 war short-lived. However, the mines were worked both for pyrites and for copper during the 1939-1945 war.

6. THE UPPER SLANEY VALLEY

The Slaney is the only river which cuts through the Leinster chain; from its main source in the North Prison, a corrie on the west side of Lugnaquilla, it descends in a steep torrent course to the Glen of Imaal, a basin cut in granite at 500-700 ft. and surrounded by mica-schist and granite hills rising to more than 2,000 ft. Having left the glen, the river assumes a north-south direction with several sweeping bends across the granite lowlands, and swings east near Tullow. The Slaney gap has the Blackstairs mountains to the south and various isolated hills to the north: in it the river is entrenched some 50-100 ft. below the 200 ft. level; and the latter level is widespread in the gap. Though a connecting link between the lowlands of Carlow and Wexford, this gap has never had a railway and has no towns but merely villages at the river crossings, of which Newtownbarry (population 700 in 1936) is the largest.

Entirely agricultural in its life, this area consists mainly of medium-sized farms averaging 70-80 acres, with a few larger holdings and some small ones, especially near the limit of cultivation, which ranges from 600-1,000 ft. Store cattle and sheep are more important than dairy cattle, and two-thirds of the improved land is in pasture, with the remainder divided almost equally between meadowland and arable crops, especially oats. The density of population is around 70 per square mile, and nearly

80 per square mile of improved land. Most of the settlement is dispersed, though there are a number of small clusters of farms, especially at the higher levels occupied. Nearly one-fifth of the population live in market villages, such as Baltinglass (700) and Rathvilly (300) on the Slaney, and similar centres scattered at intervals of a few miles through the lowlands. The only town is Tullow (1,700) on the Slaney, the terminus of a branch railway line from Sallins and Naas (now disused).

7. THE BLACKSTAIRS MOUNTAINS

This striking range divides the lower part of the Barrow valley from the Slaney lowlands in Co. Wexford and extends for nearly twenty miles in a south-southwest direction. It has a maximum width of six miles, but is generally a ridge only one to three miles wide, though it maintains a summit level of at least 1,500 ft. and reaches 2,610 ft. in Mount Leinster, and 2,409 ft. in Blackstairs mountain. Between these two summits the deep Sculloge gap carries the one route through the range at slightly over 600 ft. The range consists mainly of steep, heather-covered slopes rising continuously from the lowland level off. 400 ft., and some of its valleys show traces of a mountain glaciation, probably to be correlated with the last of the three in the Wicklow mountains, but much less forceful in its action on the landscape. Comparatively little land is farmed, though there is a thin ribbon of settlement through the Sculloge gap, and there are scattered farmsteads in the valleys and on the hillsides to a height of **800-1,000 ft.**

8. THE WICKLOW-WEXFORD LOWLANDS

Wicklow head stands at the northern end of an extensive lowland that is one of the most climatically favoured and fertile parts of Ireland. Developing first as a series of small river basins between low hills of igneous rock around Wicklow, the lowland widens near Arklow and stretches for over twenty miles between the Blackstairs mountains and the sea in Co. Wexford. Everywhere the lowland is saved from monotony by scattered hills of igneous rock, aligned parallel to the Blackstairs mountains. The coast mirrors the Caledonian trend between Wicklow and Wexford, but is varied in features: between Wicklow and Arklow it consists of several bays separated by rocky headlands with one splendid belt of sand dunes, three miles long and backed by marshes, at Brittas bay. South of Arklow there are wide sweeping bays with rocky headlands, some sand dunes and some boulder clay cliffs, of which the finest are those just north of Wexford, where the moraine of the last general glaciation truncates the coast in a jumbled mass of kames and kettleholes.

Between Wexford harbour and Waterford harbour there are signs of east-west Armorican features: Carboniferous beds have been laid down in a belt from Ballyteige bay to Wexford harbour. The south coast of Wexford has an interesting series of bays that are submerged parts of short river valleys and are now almost, or in one case (Lady Island Lake), completely closed by bay bars.

Almost the whole of these lowlands consists of farmlands, and the only gaps in the remarkably even spread of settlement are a few heather-covered hills, rare patches of lowland bog and some sand dune belts along the coast. The soils are varied types of drift, generally reasonably well-drained, and the farms average about 70 acres, with more than three workers per farm. Only 13% of the farms are of less than 15 acres, and only 4% of more than 200 acres. Nearly four-fifths of the rural population depend directly on agriculture and mixed farming is general, with rather more arable cultivation than is usual in Ireland. Even so, less than one-quarter was cropped before the 1939-1945 war, though there was a rise to more than 30% during the war years, mainly through a considerable expansion of the wheat acreage. This lowland has a considerable reputation for cereal cultivation, to which at least two-thirds of the arable acreage is given in most years, with oats and barley rather than wheat as the main crops. Turnips are more widely grown than potatoes or mangels. The chief reliance is on store cattle, some of which are exported through Wicklow or Arklow, though most go through Dublin and Waterford. There are signs that the creamery movement may spread in this area, which is rather too remote from the Dublin market to rely on supplying liquid milk. Pig rearing is more usual than in most parts of eastern Ireland, and there are bacon factories in Wexford, Enniscorthy and Pilltown.

The population density on the improved land varies between 80 and 100 per square mile and the whole of Co. Wexford has a population density of 101 per square mile: there was a decrease of 25% between 1891 and 1946. The market towns are Arklow (population 4,900), Gorey (2,700), Enniscorthy (6,000), New Ross (5,000) and Wexford (12,300). As a group of market towns they are spread at intervals of ten to eighteen miles, and the essential market functions of the countryside are met to a certain extent by the various villages that have failed to grow into towns. The fact that nearly one-third of the population live in towns and villages is itself remarkable: it means that there is more purchasing power in this part of Ireland than in many others, and that commercial life is more thoroughly developed than elsewhere. This lowland may be regarded as a farming area where a mixed economy prevails with both arable crops and stock, and where advances such as the establishment of

more creameries and factories to process agricultural staples are not improbable: in addition most of the towns have some new factories due to the recent industrial drive.

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CHAPTER XIII

DUBLIN AND THE EAST CENTRAL LOWLAND

DUBLIN

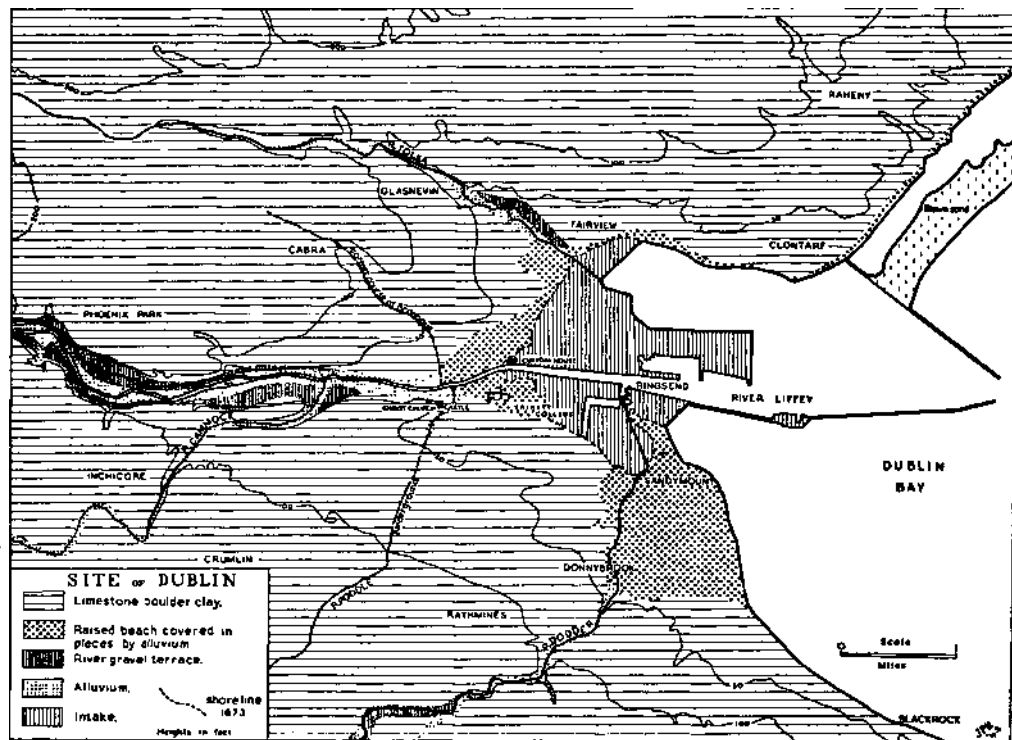
THE CITY of Dublin is the natural approach to the Central Lowland, of which the east section is considered in this chapter. The built-up area of the city and its environs cover some twenty square miles, but every road and rail journey out of the city shows a rapid transition to the essentially agricultural landscape that stretches away to the Shannon and beyond it to the Atlantic coast. Inspection of any road or railway map of Ireland will show the concentration on Dublin of routes from all parts of the country, and throughout its history it has been a bridgehead town looking both landwards and seawards. In this it is comparable to London, but the Romans gave London to England and the Norse people gave Dublin to Ireland. Its name, *Dubh-linn*, 'the black pool,' recalls a Norse harbour, but the postmark and Irish name, *Baile atha cliath*, 'the town at the ford bridged by hurdles' probably refers to an early river crossing near the present centre of the city. The two main factors in the site are expressed in these names, for it was at once bridgehead and port, and remains so to this day. From the beginnings, which probably antedate the Norse arrival, it was one of the few sheltered havens on the east coast of Ireland, and the first evidences of settlement suggest occupation of the spur of dry ground on which the castle was built and the low gravel ridge at Ringsend (see Fig. 55): of these the former was near the main ford and the latter near the wide Dodder estuary.

The Norse people, or 'Ostmen,' as they became, established the first walled city on the south side of the river around Christchurch Cathedral, but houses spread beyond the walls and an early suburb on the north side was known as 'Ostmanstown,' a name* which still survives as Oxmanstown. In 1170 the Ostmen succumbed to Strongbow, and in the thirteenth century the castle was built by the Normans: it remained a centre and symbol of English power until the twentieth century. The thirteenth century saw the addition of St. Patrick's Cathedral outside the walls, only a quarter of a mile from Christchurch: both are Church of Ireland today, but Christchurch is the cathedral of the dioceses of Dublin and Glendalough, while St. Patrick's is a national cathedral. Mediaeval Dublin was a walled city surrounded by the 'Liberties' outside the walls with a northern suburb in Ostmanstown, and the bay was much larger than now. Trinity College, at its foundation in 1591, was given land

FIG. 55.—
THE SITE OF DUBLIN

Most of the dock and industrial land has been reclaimed since the eighteenth century: elsewhere limestone boulder clay occurs except in the valleys. The oldest part of Dublin lies around the Castle and Christ Church, and the city is now centred in streets planned in the eighteenth century, near Trinity College and the Customs House.

Based on the Ordnance Survey, by permission of the Minister for Finance of Ireland. Drawn by J. P. Haughton and reproduced from 'Irish Geography,' vol. I, p. 54.



juxta Dublin* on the site of the demolished monastery of All Hallows, but it is now in the very centre of the city with shopping, commercial and industrial quarters close to its walls. In the college, as in the main part of the city, Georgian architecture figures prominently. This phase of Dublin's history is strongly impressed on the city partly because many new roads, some as much as forty yards broad, were planned by the Wide Streets Commissioners, and numerous celebrated architects of the day were engaged to design homes for the wealthy families associated with the then 'second city of the British Empire.'

Dublin, like other cities, has incorporated various outlying villages in its growth, such as Sandymount, Donnybrook, Rathmines, Crumlin and Inchicore on the south side of the river, or Glasnevin, Clontarf and Raheny on the north side. Its expansion was mainly around the bay and towards the mountains, and there is now a continuous line of settlement from the city to Howth and Dalkey, which guard the entrances to the bay, though Dun Laoghaire is still a separate borough extending from Blackrock to Killiney. There are still considerable areas of open land quite close to the centre of the city, as for example near Sandymount, where houses are now being built, or in Donnybrook, where Trollope's old home, in Seaview terrace, is still surrounded by fields as it was in his years of residence. The spaciousness of many Dublin suburbs impresses visitors; the reasons for this include the survival into the nineteenth century of the Georgian tradition of making wide roads and building long terraces of houses with large gardens in the rear and sometimes also in front, and also of building large houses surrounded by a few acres of grounds within two or three miles of the city centre. Many of these are now surrounded by smaller houses, but a considerable number are still occupied either by families or by various institutions such as monasteries and convents. The most famous of all the open spaces in Dublin is the Phoenix Park, an expanse of almost three square miles to the west of the city which is used by thousands for recreation and has within its bounds the former Viceregal Lodge, now the home of the President of Eire, the Papal Nunciature, the American legation, the Ordnance Survey department, a military barracks and the zoological gardens.

Maritime trade has been the basic feature of Dublin's commercial life for a thousand years, and the reclamation of large areas of land along the estuary began in the eighteenth century, when the river was confined between the two parallel lines of quays which are one of the main features of the city to this day. The reclaimed land has been built up by the dumping of mud and refuse, and this process still continues on both sides of the bay: on this 'intake' land there are docks, industrial premises and warehouses, and the port extends along the quays as far up as the

Customs house, as well as through the dock quarter on the north side. The Guinness brewery, however, is beside the river near the Phcenix Park, and stout-laden barges may be seen on the river to the ships for export. Though a considerable industrial centre, Dublin's factories in the dock area seem quite remote from the city centre, and several other factories are scattered through the suburbs and some neighbouring villages and small towns, such as those along the Liffey valley, including Inchicore with its railway works or Lucan with its woollen mills. Never has the port been more significant than now, as by far the greater part of Eire's overseas trade goes through Dublin.

The growth of Dublin in recent years has been remarkable, and is commonly ascribed to its emergence as the centre of government, commerce and industry in the twenty-six counties. Having 233,000 people in 1841, its population was 394,000 in 1926, 468,000 in 1936 and 507,000 in 1946: with the 45,000 people in Dun Laoghaire, the population is 552,000: including other areas outside both the city of Dublin and the borough of Dun Laoghaire, the Dublin 'conurbation' (see Fig. 57) includes almost one-fifth of the population of Eire. Attention has been drawn elsewhere (see p. 162) to the housing problems of the city and the efforts to solve them by building workers' flats and new cottage housing estates: Dublin still has a strongly residential atmosphere, is far less smoky than most towns of comparable size, and is acquiring an increasing popularity as a holiday centre, though its prosperity depends now as in previous ages on its trade, shipping and industry, together with its metropolitan functions in administration, education and commerce.

THE EAST CENTRAL LOWLAND

The scenery of the Central Lowland is varied: north of Dublin there is the drift-covered limestone country of Meath, the richest pasture land in Ireland, but a westward journey of only twenty miles reaches the first of the many bogs that divide the farmlands into cultivated islands of firm ground, and some fifty miles from Dublin the traveller reaches the Shannon tributaries, which flow through bogs and widen into shallow lakes. The Shannon forms a suitable western limit for this region as it has remained a barrier rather than an artery of communication throughout most of its history; and the fringe of the great drumlin belt is a convenient line of demarcation on the north. On the south the boundary is drawn through the lowlands which encircle the Slieve Bloom, the Castlecomer plateau and the Leinster chain. So defined, the region covers some 4,700 square miles, and is in some ways as amorphous a unit as those parts of the English Lowland through which the kingdom of Mercia expanded and

contracted at different times. In this region the Kingdom of Meath rose and fell; here also was the English Pale, perpetually menaced by the hillmen from the Leinster chain; here, too, were the successive invasions and plantations of which the county names, King's and Queen's, now Offaly and Leix, remained to tell the tale, just as the surviving Meath and Westmeath speak of the ancient kingdoms. Today this region is merely one part of the hinterland of Eire's capital city. In it the landscape contrasts, though considerable, emerge so gradually that a traveller across it may observe with surprise that the fertile farmlands of Co. Dublin grade into bog-strewn country around Kildare: it is in fact a country of transitions, but on its margins the Leinster upland, the Castlecomer plateau and the Slieve Bloom possess a clarity of line that rarely occurs in the lowland itself. Yet there are contrasts of great importance between the continuously farmed lands of Meath and the bog-divided agricultural landscape near the Shannon, though the transition from one type of area to another is gradual. On the whole the lowland is not thickly populated, though it has a number of small towns, several of which have recently acquired some new industry, though their main functions are to provide market facilities for a rural community of relatively high purchasing power.

STRUCTURE AND LANDFORMS

This lowland is floored mainly by varied Carboniferous strata, and has been called a limestone peneplane from the widely developed Carboniferous limestone. Much of the lowland now stands around 200 ft., but it is by no means a single peneplane for younger members of the Carboniferous system stand up as low rolling hills to as much as 400 ft., a feature comparable with that in many other parts of Ireland, notably the Tipperary-Thurles corridor (see pp. 338-340). The general lowland level is broken by small isolated fold ranges of Old Red sandstone, with Silurian and Ordovician beds, all of which form hills rising to 600 ft. or more: one of these folds appears first in the Hill of Allen range and then remains hidden beneath the Carboniferous cover until it is exposed at Portrane, north Co. Dublin, and in Lambay island. Even more significant is the emergence of Silurian and Ordovician strata along a line from Balbriggan to Longford: here shales, slates and sandstones form hilly country rising to 600-900 ft. near Oldcastle and to 912 ft. in Corn Hill, north of Longford.

Long-continued ages of denudation have so moulded the lowland that its innumerable anticlines and synclines are not generally responsible for the existing forms of the pre-glacial floor, except in such areas as the Hill of Allen range, where the anticlinal Armorican folding asserts its line in

upstanding hills rising above bog-covered lowlands. The theory that a 200 ft. peneplane exists, probably in association with others at higher levels, is tempting and useful: at least it emphasises that comparatively little of the lowlands lie near sea level. The most important feature of the present topography is the nature of the glacial and glaciﬂuvial deposits present throughout almost the whole of the lowland: few areas of solid rock are exposed, though a series of reef-knolls, generally drift-free, has been recognised in the Carboniferous limestones near Dublin, and some of the higher parts of the lowland appeared to the surveyors of a century ago to lack any form of drift cover.

In this lowland, the influence of the Quaternary glaciation and glaciﬂuvial action has been felt in three main ways. First, the relief has been altered and generally smoothed out by the filling of valleys and the covering of lowlands with sand, gravel and drift. Thus the pre-glacial Liffey was entrenched to a depth of 100-150 ft. in an old land surface, and the Carboniferous limestone peneplane had a general level of 225-250 ft., rolling up to 350 ft. Today the Liffey is entrenched only in places and the lowland peneplane, though still recognisable, is covered with drift of widely varying depth. In a series of observations recorded in the Liffey basin, the drift cover proved to be as much as 234 ft. deep in the centre of the Curragh, where it exists as rolling ridges of morainic material. The pre-glacial limestone peneplane has an abrupt edge in the neighbourhood of Dublin, but this has been obliterated by the various glacial and glaciﬂuvial deposits. A second vital effect of the Ice Age was the entire reorganisation of the drainage: meltwater channels in the lowland are naturally less striking than those on the ﬂanks of the Leinster chain (see pp. 36-37), but they are immediately obvious to the field worker in such areas as Co. Meath south of the Boyne: one inevitably sees the present drainage as the humbler descendant of a much more powerful meltwater system. Thirdly, the decay of the icesheet provided opportunities for the development of large lakes and fens, many of which have become bogs in the present landscape. These vary in size from a few acres to as much as twenty square miles, but an unobservant traveller could cross the lowland from Dublin to the Shannon and remain almost unaware of their existence, partly because the roads keep whenever possible to the drifts and eskers that form the dry ground (see p. 310 and Fig. 58).

Two main types of river form are seen in the lowland. The middle and lower courses of the Boyne and Liffey and the Barrow below Athy are incised streams cut in drift or, more rarely, solid rock, but the upper courses of the Boyne and Barrow lie in bogs, where the drainage is so badly organised that few clear water-partings exist. One classic case is

the Barrow and middle Liffey watershed which runs through the bog of Tankandsgarden: this bog, resting on 30-40 ft. of drift, and therefore masking the pre-glacial landforms effectively, drains both to the Barrow and to the Liffey: if the Liffey waters rose 15 ft., they would be carried to the Barrow. The greatest of all the Irish rivers, the Shannon, has the least attractive course, for it passes through extensive bogs and widens out into lakes that are generally ascribed to the solution of Carboniferous limestone: what part, if any, was played by meltwaters in their formation remains unknown, but the lakes still remain one of the most significant features not only of the Shannon but also of its tributaries, the Inny and the Brosna.

ESKERS

The remarkable series of eskers in the lowland is comparable with that in Finland or North America. The three main types recognised in Ireland include ridges, isolated mounds or hummocks, and broad flat-topped masses. The most characteristic development is the long ridge, persisting as a natural passage-way for as much as twenty miles across the lowland. Two such ridges are shown in Fig. 58; the most northerly is the Seven Churches esker, so named from the ancient ecclesiastical centre of Clonmacnoise, one of the remoter episcopal centres of the Irish Church. It will be seen that both eskers provide routes across the bogs, though the drift-covered Carboniferous lowland also forms 'dry ground' suitable for road making. Some of the ridges consist of a single embankment 30-100 ft. high, and some of several parallel ridges, which may be connected by transverse ridges and vary in width from a narrow causeway to a ridge hundreds of feet wide. Formed of stratified sand and gravel, boulders, blocks of limestone and strikingly laminated clays and silts, they have been extensively quarried for sand and gravel. Both the ridges and the mounds, hummocks and masses of similar materials show very little weathering, possibly because their sides generally slope at 25° - 30° , which is near the angle of repose for such materials. Some of these forms are perhaps more truly kames with kettleholes, and many have cores or nuclei of bedrock. Especially prominent towards the Shannon, and visible in some cases for many miles, they are locally obvious farther east where a series of small eskers rises above the drift-covered lowland immediately west of Dublin around Celb ridge, Lucan and Tallaght (see Figs. 6-7 and pp. 29, 32).

LAND USE

Little trace of the natural vegetation remains in the east part of the Central Lowland: even the bogs have been grazed for centuries and their margins cleared for fuel. The deeper layers provide the best 'turf,' and

the present active exploitation is bringing their ultimate exhaustion within measurable time, though the supply still seems almost unlimited. The cleared sections generally reveal a clayey soil that will grow potatoes successfully, and has, in fact, been specially recommended for the growth of seed potatoes. Some bogs that have ceased to grow are already colonised by sub-spontaneous pines and birches, and a few bogs are under the care of the Forestry Commission and planted with conifers. Natural fens in the Central Lowland are found only in small areas around the bogs and on the periodically flooded land around the rivers: these * callows' are particularly well developed around the Shannon and the upper Barrow. The major part of the lowland consists of farmland with few patches of woodland, except in demesnes, which are most numerous towards the east coast, especially in Co. Meath. Some of the demesnes possess exceptionally fine woods with magnificent beeches, but several have already been taken over by the Land Commission for resettlement and already experiments in the migration of Irish-speaking people from the west have penetrated such preserves. In all, woods cover less than 1% of the whole area, and the landscape in many parts of the lowland seems almost treeless, though not everywhere, for some roads have lines of trees with occasional small groves and shelter belts around the farms. The Forestry Commission has in all some thirteen square miles, with a similar area on the slopes of the Slieve Bloom: none of it is in Co. Meath. In spite of the region's present paucity of woodland due to its long-continued use for farming, it is not difficult to imagine it as one large forest broken only by bogs and grass-covered eskers some two thousand years ago.

Farmland under crops and pasture covers 95% of Co. Meath and 80-90% in most other districts of the Central Lowland east of the Shannon: only in the heart of the bog country around Edenderry and towards the Shannon is the proportion of improved land substantially less, and even there it generally covers at least two-thirds of any area as much as 50-100 square miles. The trend of the past hundred years has been to add to the improved land by drainage and bog clearing, while little land is removed from agricultural use by afforestation or by building development, except in the immediate vicinity of Dublin. Thus Co. Longford had 75% of its entire area under crops and pasture in 1851, 78% in 1891, and 82% in 1941; Meath had 81% in 1851, 82% in 1891, and 84% in 1941. Lowland areas are reclaimed or not allowed to lapse into a decayed state, but upland areas are more readily withdrawn from agricultural use, either by the desertion of farms or by the sale of land to the Forestry Commission.

The eastern part of this lowland region is climatically the most suitable area in Ireland for arable cultivation, and it is commonly assumed that

such counties as Meath were at one (generally unspecified) time devoted mainly to arable farming. This was not the case, at any rate during the past hundred years, for in 1851 Meath had a mere 31% of its farmlands under crops; at the same date Westmeath had 26%, Offaly 26%, Dublin 33%, and Longford 37%. The arable acreage has declined since 1851, but pastoral farming has always been prominent in this lowland. A passage published in 1837 shows the importance of cattle and their pastures in at least part of Meath: 'Farms are of every size from 2 acres to 3,000: the small holders generally keep their land in tillage, and even many of the largest farms have but little meadow or pasture; yet, there are many large grazing farms, and some of the proprietors consider pasturage to be the most profitable system of agriculture. . . . The quantity of land applied to green crops and artificial grasses is comparatively small in consequence of the vast tracts of natural grasses of the most productive kind; the depth and richness of the soil, and its tendency to moisture without being absolutely wet, causing it to throw up a sward of nourishing verdure unequalled in other parts; hence it is that grazing is so generally followed. . . . The art of fattening cattle is an object of principal attention with most farmers. Early in May the graziers open their pastures for the stock to be fattened; for feeding is their principal object as land bears too high a rent to admit of its being applied to raise stock; the cattle, after being bled, are turned out till they become fit for the butcher, when they are sent to the Dublin market, or sold at neighbouring fairs/¹ E. Wakefield, in 1812, speaks of Meath as 'foremost in Leinster' in the quality of its grazing land, and also comments on the economic advantage of nearness to Dublin and the English market.²

The general organisation of agriculture in this region lends itself to concise summary. Meath is the heart of the cattle fattening country in Ireland, and in some parts of the county as many as two-thirds of all the cattle are more than two years old. The fattening belt extends into Westmeath and southwards through Co. Dublin into Co. Kildare, but in these areas the specialisation on fattening is not so fully developed. The immediate hinterland of Dublin has a dairy farming belt similar to that around most large cities in the British Isles, but it extends only for a short distance beyond the outer suburbs, and merges into the fattening belt, where dairy cattle generally number less than 20% of the herds, and in some cases less than 10%. All these areas, with their obvious specialisation, have under one-tenth of their land under arable crops; the

¹ Lewis, S., *A Topographical Dictionary of Ireland*, vol. 2, pp. 360-361, London, 1837.

² Wakefield, E., *An account of Ireland, statistical and political*, vol. 1, p. 312, London, 1812.

cattle live on pastures and hay, supplemented mainly by imported feed-stuffs in normal times. Outside the fattening and dairying areas the farming assumes the mixed character which is more typical of Irish agricultural conditions; dairy cattle, store cattle, fat cattle, all figure in the economic organisation in varying degree on different farms, and arable crops cover as much as 20% in some districts, especially in Co. Leix, in south Kildare and in Carlow, though pastures cover most of the farmland and hay is an important crop everywhere.

Changes in cropping during the past hundred years include a marked decline in the acreage of wheat, oats and roots, with a temporary rise in cereal cultivation during the 1914-1918 war. It remains to be seen whether the even greater expansion of the cereal acreage in the 1939-1945 war will possess more permanence. In the inter-war years, wheat was grown on less than 1% of the farmed area, and the acreage of oats fell to one-third or even less of its 1851 level. Meadows and pastures have taken the place of arable fields, and the total area farmed has not declined, but tended rather to increase (see p. 298). Sheep rearing is subsidiary in this region, but the well-drained soils of the hilly country in Meath and Westmeath are suitable sheep pastures, and there is a certain amount of fattening on the drier ground for the Dublin and overseas fat sheep markets (see p. 205). Poultry are kept everywhere, but are of most commercial significance on the smaller farms. As yet, the farm specialising exclusively on poultry is rare, even in the immediate neighbourhood of Dublin. Pig production is generally allied to dairy farming, and is more usual outside the cattle fattening belt in the area of mixed farming.

The distribution of farms by average size (see Fig. 34, p. 191) helps to explain some of the remarkable landscape contrasts that exist in the Irish lowland. Around Dublin the holdings average 80-100 acres, and there are a number of large and highly specialised dairy farms intermingled with much smaller concerns, but the Meath-Kildare fattening belt has a mean farm size of over 100 acres, which represents a considerable number of large holdings interspersed among smaller ones. Large holdings specialising in cattle grazing and fattening support a relatively small farm population, and houses appear so rarely in the landscape that people journeying rapidly by road and rail have been known to ask who worked the apparently deserted but productive land. Such areas are essential to the cattle trade in its present development, for in them the cattle received from the extensive hinterland are prepared for slaughter. The fattening belt passes into Westmeath, where the medium-sized farm, with an average of 70-80 acres, is more usual. Towards the Shannon, the farm units become smaller on the whole, with an average of 40-80 acres. There is a gradual transition to the more fragmented agricultural

landscape characteristic of the lands west of the Shannon and the drumlin belt to the north, but to the south the medium-sized farm remains the most important type through the regions discussed in Chapters XII, XIII and XIV.

INDUSTRIES

The agricultural scene dominates this region, but it possesses a large number of market towns, many of which have acquired factories during the recent industrial expansion, though some already had important factories long before 1932. Dublin is the one great commercial city of the Irish lowland and it has many, if not most, of the newly established industries (see pp. 216-229). The country towns, however, possess several attractions for the proprietor of a factory: land is plentiful and cheap, labour generally abundant, especially in days of bicycles and bus services, certain raw materials are available locally, and there are good rail and other transport facilities to and from the port of Dublin. It is therefore not remarkable that the towns of this region should have developed some industries before the minor industrial revolution of the post-1932 era began.

The measure of industrialisation achieved in the towns is varied. Some, like the towns of Co. Longford, still remain almost devoid of factories, while others, such as Clara and Balbriggan, are dominated by a single industry. Several have a number of small industries with one large factory, generally of recent establishment. In Drogheda, the largest town (population 15,700 in 1946), factories line the banks of the Boyne and use the port: they include a large brewery, shoe factories, a chemical manure works, various mills producing foodstuffs and feedstuffs, a cement plant and, most interesting of all, linen mills, one of which dates back to the beginning of the nineteenth century. Balbriggan has woollen mills employing several hundred workers, and may perhaps be regarded as an industrial satellite of Dublin. Co. Meath has a number of small factories employing in all some 2,000 workers. The Navan manufactures include clothing, farm tools, carpets and furniture; boots are made at Kells, and cotton goods at Slane. Obviously one could search in vain for any geographical influence - in such a factory location, especially when carbon papers, typewriter ribbons and similar articles are made in Trim, an ancient market town of 1,400 people. In Co. Westmeath post-1932 factories provide cotton goods at Athlone and concrete tiles and pipes at Mullingar. Older industries include a pot-still distillery at Kilbeggan, a village of some 600 people, where whiskey is made by a process used since 1757, and some seventy people are now employed.

The market towns to the west and southwest of Dublin have a wide

variety of industries, many of which have been conspicuously successful. Here, as in the Nore-Suir-Barrow region (Chapter XIV, especially pp. 319-321), enquiry very soon reveals the enterprise of a few families. Maryborough's large flour mill has branches at Naas, Sallins and several centres along the rivers of the southeast. Again, several hundred people are employed by two firms in Tullamore in a kind of composite industry based on the needs of licensed grocers' shops: the drinks supplied range from whiskey through wines and beer to mineral waters and tea; seed potatoes are sold locally and exported: and finally, each firm controls a chain of grocers' shops. A family at Mountmellick has several shops and a bacon factory. At Edenderry more than one hundred people are employed by a firm dealing in timber, wheat, maize, seeds, wines, dried fruits, rice and whiskey. Such industries have grown to success from the ordinary market-town trade of a fairly prosperous countryside. They are of indigenous and not civil service origin, but they do not complete the present industrial scene for there are several new concerns each employing at least 100 workers. Newbridge has rope and cutlery works; Naas, cotton mills; Kildare, a wallpaper factory; Athy, a tractor and agricultural machinery plant; Carlow, beet sugar, shoe, razor blade and mineral water factories; Birr, footwear; Maryborough, woollen mills; Portarlinton, sports goods, leather and wooden articles of endless variety. The majority of these factories, but by no means all, are post-1932, but in some cases an old industry has been expanded in scope; for example, the new wood-working industry at Portarlinton is based on a century-old sports factory and the furniture industries of Edenderry and Leixlip are based on long-established sawmilling. Given prosperous years, it is conceivable that many such developments will take place, especially if tariffs are to remain.

Two towns, Tullamore (5,900), and Clara (1,600) in Co. Offaly, set in the heart of rural Ireland on branch railway lines, show a remarkable industrial development that calls for special mention. In neither case does the actual population of the town reflect its commercial importance, for labour is drawn from the adjacent rural areas. Tullamore has the chain of food and drink-producing enterprises mentioned above, but in addition there is a Co-operative Society employing nearly 200 people in a sawmill, a bacon factory and the egg and poultry trades: the latest addition is a woollen and worsted yarn factory with some 700 employees. Altogether, Tullamore provides industrial employment for at least 1,500 people, who are drawn from a radius of approximately ten miles. Clara has a jute factory, with as many as 600 workers at times, and the firm responsible for this extraordinary development has recently opened a branch factory in Waterford.

This review of some of the industrial developments in one part of the Central Lowland shows the unexpected and haphazard nature of its economic life. Market towns differ so strangely in their material prosperity that no general ruling is possible for some are decaying and others prosperous, yet most live primarily on their trade with the factories as a supplementary source of employment. The old-established industries are deeply entrenched in the economic life of the country, but the new ones have had chequered fortunes in some cases, especially during the war years, when imported raw materials were scarce, though their sales in the home market are guaranteed so long as tariffs remain. As a result, knives come from Newbridge rather than from Sheffield, cotton textiles from Athlone rather than from Lancashire, and sugar from Irish-grown beet refined at Carlow and not from imports. Industrial decentralisation has been made possible by the use of electric motive power in the factories, and by the conscious planning of the past twenty years: without such planning many of the new industries, if they ever arose at all, would almost certainly have gravitated to Dublin and its immediate hinterland.

POPULATION

Excluding Dublin, the population of this region was 516,000 in 1891, 439,000 in 1936, and 450,000 in 1946: the towns, with c. 91,000 in 1891 and 1936, and 92,000 in 1946, have remained in the aggregate virtually stationary in population, while the rural areas declined by approximately 20% from 1891 to 1936: in actual fact the loss among the farming population was considerably higher, because it is masked by the spread of Dublin into adjacent rural areas, and in addition many of the smaller towns draw many of their workers from the countryside. It may be a safe estimate that the population on the land fell by at least 25%, a figure very similar to that for the whole country, though since 1936, the rural population has increased in parts of Meath, Kildare and Offaly, partly through the addition of workers on the bogs under government schemes around Newbridge, Co. Kildare and Edenderry, Co. Offaly, and also in Meath by land settlement schemes on former demesnes.

The density of population is high, c. 150-250 per square mile, throughout Co. Dublin, and in the extreme northeast of Co. Kildare around Celbridge and Leixlip: such densities are not typical of essentially rural areas in the east of Ireland and indicate the presence of urban workers in some strength. Many of the rural areas not dominated by Dublin show a remarkably low population density: in Co. Meath the average density is 73 per square mile, towns included; in Dunshaughlin rural district it was only 46 per square mile in 1936, but 54 in 1946. In general, the areas still

dominated by large cattle-grazing farms have low densities, but to the west, where the farms are generally smaller and mixed farming prevails, the density increases to 80-120 per square mile of cultivated land. Everywhere, if one excludes the land settlement schemes which are a reversal of old trends, the population is declining, in some cases near the Shannon by as much as 30%. Figs. 56-57 show that settlement is fairly evenly spread over the lowland with some significant gaps which, apart from the Slieve Bloom and a few small uplands, are mainly the uninhabited bogs which extend in a discontinuous series from the neighbourhood of Edenderry to the Shannon. The settlement pattern is noticeably thin outside the towns in Meath and Kildare but much denser in the occupied areas elsewhere, and relatively heavy in Co. Longford,

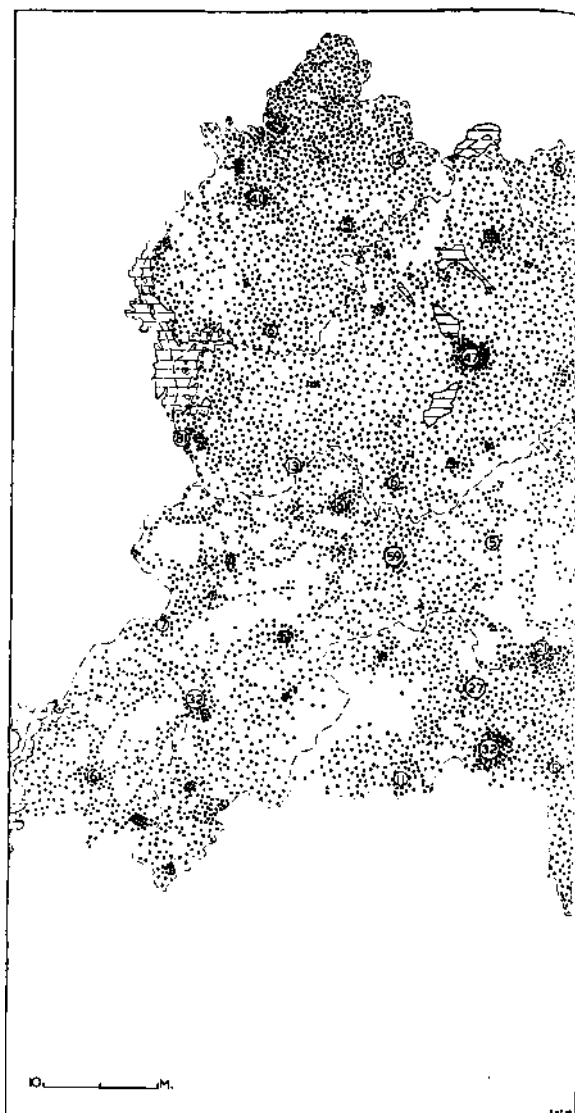


FIG. 56.—POPULATION DISTRIBUTION, EAST CENTRAL LOWLAND, WEST

One dot to 25 persons

where the average size of the farms is less than 40 acres—i.e. one-third to one-quarter that of the Meath-Kildare fattening belt.

The position, however, is not quite as simple as the above paragraph would suggest. While the smaller farms employ more labour per acre, the more prosperous agricultural areas dominated by large farms have in their population many more people not directly engaged on the land. Thus of the employed population (rural areas only) in 1936, 60-70% worked on the land in Co. Meath against 77-81% in Co. Longford. The difference lies in the type of economic organisation, or, more simply, in the amount of money available to engage domestic help or support shops and various paid services. There is a wide gulf fixed between areas of, say, a square mile in Meath divided into four farms, and a square mile in Longford split into twenty holdings. Yet in spite of all the difference in employing power, in Longford the square

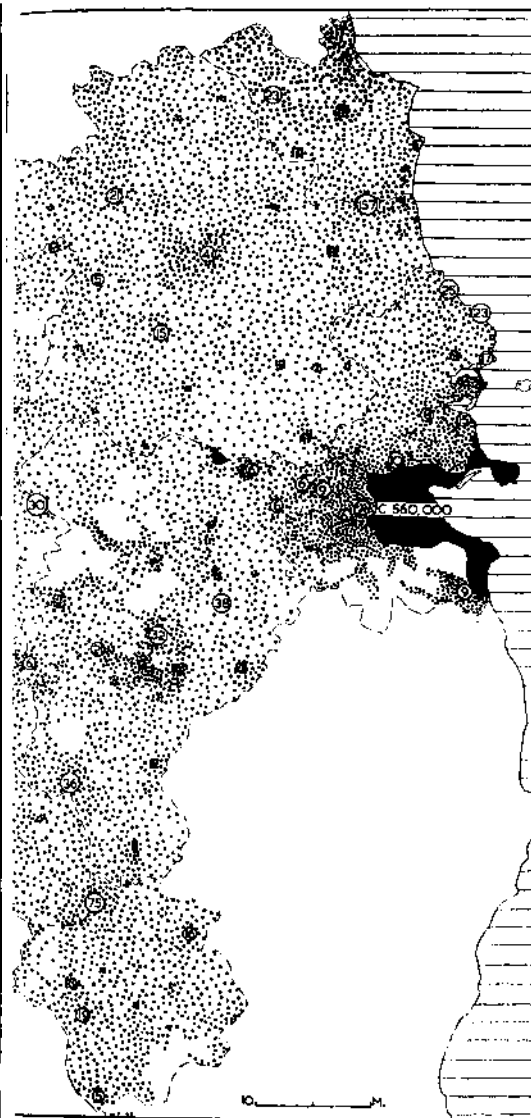


FIG. 57.—POPULATION DISTRIBUTION, EAST CENTRAL LOWLAND, EAST

A great variety of settlement types will be noted. The influence of Dublin extends for some miles around the city, but in Co. Meath the sparsity of occupation is greater than anywhere else in Ireland. Farther west, the interpenetration of bogs with farmland gives an intermittent pattern typical of many parts of the Central Lowland.

mile will have at least twice as many people living inside it, and probably even more.

Over the lowland there are many transitions of human importance. In parts of Meath and Kildare, the ratio of labourers to each 100 farmers is little less than 200, around Dublin it is 300. Near the Shannon there are only 40 labourers to 100 farmers, and in the west of Co. Longford only 31 per 100 farmers. But the number of family workers per 100 farmers is greater near the Shannon than in the east: in the former area it is 80-100% of the farmers, in the latter 65-80%. The position may be summed up in the statement that in the east farm labourers are an indispensable element in the population, numbering, in Meath, at least 40% of all the workers on the land, but towards the Shannon the labourer becomes comparatively rare. The roads traversing the thinly peopled Meath landscape have labourers' cottages, placed singly or in small clusters, but as one moves westward the somewhat humbler type of farmhouse becomes more frequent and the cottages less numerous.

Most of the towns in this region are within six to fifteen miles of another town, and the market villages and periodic rural fairs fill in gaps in the distribution pattern. Apart from Drogheda, with 15,700 people in 1946, only four towns have more than 5,000 people: of these Carlow (7,500) and Athlone (8,400) are major route centres serving large areas and possessing some industries; Tullamore (5,900) has become a successful industrial centre on the basis of its market-town trade and Mullingar (5,400) is an important route and commercial centre less fully industrialised than Tullamore. The remaining small towns call for little comment, apart from their industrialisation (see pp. 301-303); most of them have declined within the past sixty years, but some are floating on a rising, if perhaps uncertain, tide of prosperity.

SUBREGIONS

This region has many contrasts, some essentially local and others covering large areas: the former include the intermingling of small bogs and carefully farmed lowland, the latter the essential differences between the lowlands of Meath and those nearer the Shannon. A division into subregions may be sought in the nature of the present agricultural landscape, which is the result of choice and tradition among the inhabitants: such a soil and such a climate as that of Meath would not preclude and might even favour arable farming, with enclaves of market gardening and fruit growing. Again, the naturally rich pastures are equally suitable for dairy cattle as for fat cattle, and yet the latter reign supreme, except in the immediate vicinity of Dublin. Beyond the Mcath-Kildare grazing belt, mixed farming is more usual, but the store trade is

still dominant over dairying. In so far as there is any evidence of *geographical control,' one may note that large cattle-fattening farms could develop successfully only in an area unbroken by bogs such as Meath, while smaller mixed cattle-breeding farms are more suited to a bog-interrupted landscape such as the lowland near the Shannon. Different as the farming types may be, they depend on one another, for the breeding and feeding areas supply the fattening areas, which in turn rely on the demands of Dublin and the British market.

1. THE MEATH-KILDARE CATTLE-FATTENING BELT

This subregion corresponds fairly closely to the one part of Ireland having an average farm size of more than 100 acres: in the Dunshaughlin rural district, for example, the average farm size in 1936 was 168 acres over as many square miles in the southwest of Co. Meath. It lies just beyond those districts whose population is inflated by the extreme spread of Dublin, but the very presence of the cattle-fattening belt is an indication of the proximity of the city, for the specialisation in milk does not generally extend beyond the limits of Dublin county, though a few farms in Co. Meath have turned from the fattening trade to liquid milk production. Fruit growing is developed around Malahide, Donabate and Rush, primarily to supply jam factories in Dublin; other specialisations depending on the Dublin market include market gardening and poultry farming. But one may search in vain for any market gardening belt similar to those near London or various English provincial cities.

Physically, this area consists of undulating country rising up from c. 200 ft. to 400 ft. with some isolated hills above 500 ft., including the historic Hill of Tara (512 ft. O.D.). The widespread glacial and glaci-fluvial deposits mask an erosion surface at a level around 200 ft. O.D. on folded Carboniferous strata, though Silurian beds form hills rising to 500 ft. south of the Boyne around Naul. There may be a break of slope, even a cliff-line here, but the drift largely but by no means entirely of the limestone-bearing type is thickly plastered over almost all the area, and absent only from a few hills, including some of the reef-knolls recognised around Dublin. While much of the drift forms a natural marl, or lime-impregnated clay, some of it is a stiff, tenacious clay that is easily waterlogged. On the other hand, sandy deposits are also developed, though eskers are less numerous here than in the areas nearer the Shannon. The Curragh, Co. Kildare, is a sandy accumulation of morainic ridges covering the bedrock to a depth of more than 200 ft. in places: it is now the Irish Salisbury plain in a military sense. It is a windswept grassland that rises above the surrounding lowlands, and has a deserved fame for horse-breeding. The Curragh, however, is by no means a typical Irish

landscape, nor is it typical of this subregion which, apart from the Curragh, is now, as in 1837, a 'well-furnished* scene of rich fields outlined by tree-lined hedges and diversified by stately demesnes.

The cattle-fattening belt, as it is somewhat unpoetically named, is a subregion showing opportunities for agricultural development considerably more favourable than those in many parts of Ireland. However, it is often contended that the present cattle farming is by no means the most desirable type, and already some effort has been made to introduce another quite different element into the population through the migration of Irish-speaking people from the congested west on small arable farms. So far, this has been done only to a small extent, but it represents, in theory at least, an intermingling of farmers at each end of the agricultural scale in Ireland—namely, those most fully adapted to the needs of urban and export markets and those nearest to the subsistence economy. The dairying, market gardening and fruit farming ventures near Dublin show the potentialities of the subregion, but as yet they are not considerable, possibly because the Dublin market, on which they depend, is easily saturated. However, the natural wealth of the cattle-farming belt is undoubted, and it possesses the advantage of good transport by roads, canals and railways. It also has a number of market towns, including Drogheda, Navan, Kells and Trim, and may well profit by the growth of the Dublin conurbation, which continues steadily in spite of all the conscious scattering of industry during recent years.

2. THE MIDDLE BARROW LOWLAND

Lying between the Castlecomer plateau and the Leinster chain, this lowland is drained by the middle sections of the Barrow and by the Slaney in sharply incised courses. Drift-covered Carboniferous strata, Ordovician slates, and granites form country around 200-400 ft., varied by hills of upper Carboniferous limestones near Stradbally, and of granites near the Barrow south of Carlow. The presence of 'limestone gravel* was recognised when the *Geological Memoirs* were compiled ninety years ago: this drift cover, which provides a soil containing lime, occurs almost everywhere, but varies greatly in depth from a thin rind to as much as 100 ft. Eskers are few and there are no bogs, except for some small patches on the surprisingly level country to the west of the Blackstairs mountains.

Agriculturally the Barrow lowland lacks the specialisation of the Meath-Kildare cattle belt, and shows variety rather than uniformity. About half the farms are of medium size, but both large farms, especially those of 100-200 acres, and small holdings of less than 30 acres are also represented. Generally one-fifth of the farmland is given to arable crops,

chiefly cereals and roots, and sugar beet growing for the Carlow factory has increased in recent years. Individual farmers may specialise: one large farm near Athy is devoted almost entirely to arable crops, and resembles a patch of the English Fenlands set down in a typically mixed Irish farm landscape. But such farms are rare and the subregion, though not unprosperous, has many local contrasts due to the vagaries of the people who farm it. Cattle are reared both for dairying and stores, but there is neither the fattening emphasis of Kildare nor the creamery dominance of Kilkenny.

The Barrow is a canalised river joined by the Grand Canal at Athy: this route has been followed by barge traffic to Waterford for several generations and is still a useful supplement to road traffic. In this case the canal has outlived some of the railways, as the branch lines from Naas to Tullow and from Bagenalstown to Macmine have been closed. Carlow is the largest of the market towns, which occur at an average distance of ten miles one from another, and the general density of the rural population is around 80 to the square mile, or 100 per square mile of improved land, a figure typical of many mixed farming areas in the south and east of Ireland.

3. THE BOGLANDS EAST OF THE SHANNON

Some 1,000 square miles east of the Shannon consists of carefully farmed drift-covered lowland interpenetrated by extensive bogs. This belt of country, which extends to within twenty miles of Dublin, is drained by the headwaters of the Barrow, the Boyne and two Shannon tributaries, the Brosna and the Clodiagh, though there are many areas of indeterminate drainage. Skirted rather than crossed by main roads and railways, this area is long-settled and of considerable agricultural wealth rather than a desolate wilderness: few parts of it covering even 100 square miles have as much as half the surface in bog.

The greater part of this subregion, which is floored by Carboniferous limestones covered by drift, stands at a height of 200-300 ft. and falls gently towards the Shannon, though in a few places the limestones are overlaid by younger Carboniferous strata and form undulating ridges rising to 400 ft. There are a few igneous intrusions, eroded into isolated bosses such as Croghaun, 769 ft. high, in the middle of vast bogs ten miles west of Edenderry, and also occasional exposures of Old Red sandstone and the underlying Silurians in anticlinal folds, which, however, form only minor hills except near Kildare, where a fold running parallel to the Leinster chain appears in four hills around 700 ft. high. In general the landscape is a drift-covered lowland, crossed by a wonderful series of eskers running in sinuous lines across it. Their formation has been

discussed on p. 32; their human importance lies in their value as routeways, especially in those areas where the boglands are most widely developed. The Shannon crossings at Athlone, Shannonbridge and Banagher are all associated with eskers, and the ancient cathedral centre of Clonmacnoise, with its seven churches, stands on an esker overlooking the extensive bogs around the Shannon. Clonmacnoise, however, though so ancient and reached by a 'pilgrims' road' along the esker, has no bridge across the Shannon, for there is no firm ground on the west bank. Fifteen miles separates the bridge of Athlone from Shannonbridge, and the river flows for another fifteen miles to reach the crossing at Banagher. It is therefore not remarkable that the Shannon should be a county boundary for almost the whole of its course.

The distribution of settlement (see Fig. 56) shows very clearly the alternation of farmlands and boglands. In the extreme east of Co. Offaly, Edenderry has only 56% of its area in crops and pasture; farther west, Birr I rural district has 64%. These figures contrast sharply with the 95% of districts in Co. Mcath, yet farming is the main resource, and as much as one-fifth of the settled area is given to arable cropping in some parts. The cash resources are varied and mixed farming is general: cattle are reared for milk production, stores, and, in some cases, fattening, but very few sheep are kept. The small type of holding becomes increasingly prevalent towards the Shannon, and the average farm size decreases steadily from 100 acres in the east, around Edenderry, to 45 acres near the Shannon. The average employment given per 100 farmers varies from 85 to 100 assisting relatives and 50 to 90 labourers, and the rural density of population is 50-80 per square mile of total area, and 75-100 per square mile of improved farmland.

Historic esker roads in this subregion have been supplemented by a network of main roads which have remarkably straight courses and are built almost entirely on dry ground: of these, the road from Athlone to Tullamore never penetrates the bogs at all in its journey of more than twenty miles, and the road from Athlone to Birr crosses bogs only at a few points. It may amuse the reader to work out imaginary road courses avoiding bogs on Fig. 58: the courses so made will probably correspond fairly closely to those that exist. Canals and railways show less partiality for dry ground than the roads, and the Grand Canal passes through the heart of the bogs. It ascends from Dublin in a series of locks, and divides into two at Robertstown, Co. Kildare, a village surrounded by bogs and inhabited partly by bargees: one section joins the Barrow near Athy and the other passes near Edenderry and through Tullamore to join and cross the Shannon north of Banagher.

Some towns of this subregion, especially Clara and Tullamore, have a

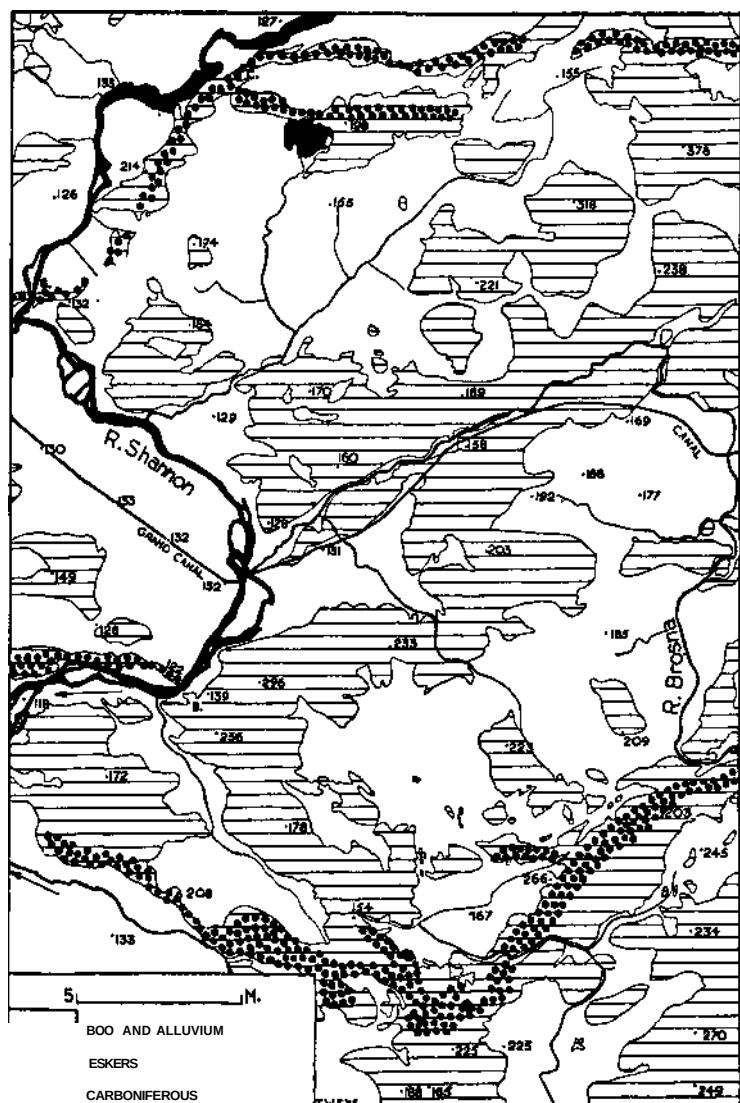


FIG. 58.—ESKERS AND 'DRY GROUND' NEAR THE SHANNON

The bog and alluvium is not improved land but the remainder is settled: eskers wind across the lowland. The mixture of the bog and dry ground is typical of the country near the Shannon. C. (near top) denotes Clonmacnoise; S. Shannonbridge; B. Banagher.

remarkable industrial development that has been discussed on p. 302. Athlone is the largest town on the Shannon above Limerick, and is the meeting place of numerous roads. Edenderry, Portarlinton, Mountmellick, Maryborough and Birr are all small market towns, less industrialised than Clara or Tullamore but indispensable in the general marketing arrangements of the intermittently settled countryside.

4. THE LOWLAND OF WESTMEATH AND LONGFORD

This subregion is the agricultural annexe of the Meath cattle-fattening belt and in some ways similar to it, though its farms are smaller, its pastures more broken up by bogs and its general topography more varied. Much of it consists of an undulating Carboniferous-floored and drift-covered surface around 200-400 ft., but the structure is complicated by numerous folds and the lower Carboniferous limestone rises into hilly country more than 600 ft. high to the west of Mullingar. Other hills 600-900 ft. high are formed of uncrumpled middle and upper Carboniferous beds or are anticlinal ridges of pre-Carboniferous strata, such as the isolated hill at Ardagh, 659 ft. high, and the Slieve na Calliagh near Oldcastle, 904 ft. These hills diversify a landscape that becomes dreary and monotonous in such areas as the flat-floored and bog-covered Inny valley, in which the river falls only 9 ft. in a stretch of twenty-four miles. Towards the Shannon bogs become more frequent, but even so they rarely cover as much as one-quarter of any area of as much as 100 square miles.

The settlement pattern of this subregion is less broken than that of the area to the south and less continuous than that of Co. Meath to the east. The density of population in the rural areas is 40-90 per square mile, and 50-100 if uninhabited areas are excluded. The relatively low densities may be correlated with an emphasis on cattle rearing, both for stores and fattening, though towards the Shannon mixed farming becomes more general, and in the north of Longford dairying becomes steadily more important with the transition to the drumlin-drift country (see pp. 460-462). Everywhere, however, the farming is pastoral in emphasis and only one-tenth of the farm land is given to arable crops at the expense of pastures and meadows. Young cattle move into this subregion from areas west of the Shannon, and nearly half the herds of Westmeath are beasts more than two years old destined for final fattening in Meath. The farms are smaller than those of the more specialised areas in Meath; the average of 80 acres in Westmeath falls to 35 acres in Co. Longford, where most of the farms are of less than 30 acres. The employment given on the land averages 70-95 relatives and 30-80 labourers per 100 farmers. The towns consist of market centres such as Mullingar (5,400 in 1946),

Longford (4,000 in 1946), and Granard (1,200 in 1936): of these only Mullingar shows any tendency to industrialisation. These towns are widely separated one from another, and the trade of the countryside is drawn into various smaller centres that are mere villages. As yet, this subregion shows little traces of that intermingling of agriculture with industry which may be seen in some parts of the Central Lowland east of the Shannon: rather is it an area dominated by cattle farming for the markets and fairs that open the way to Co. Meath and the shipping trade of Dublin.

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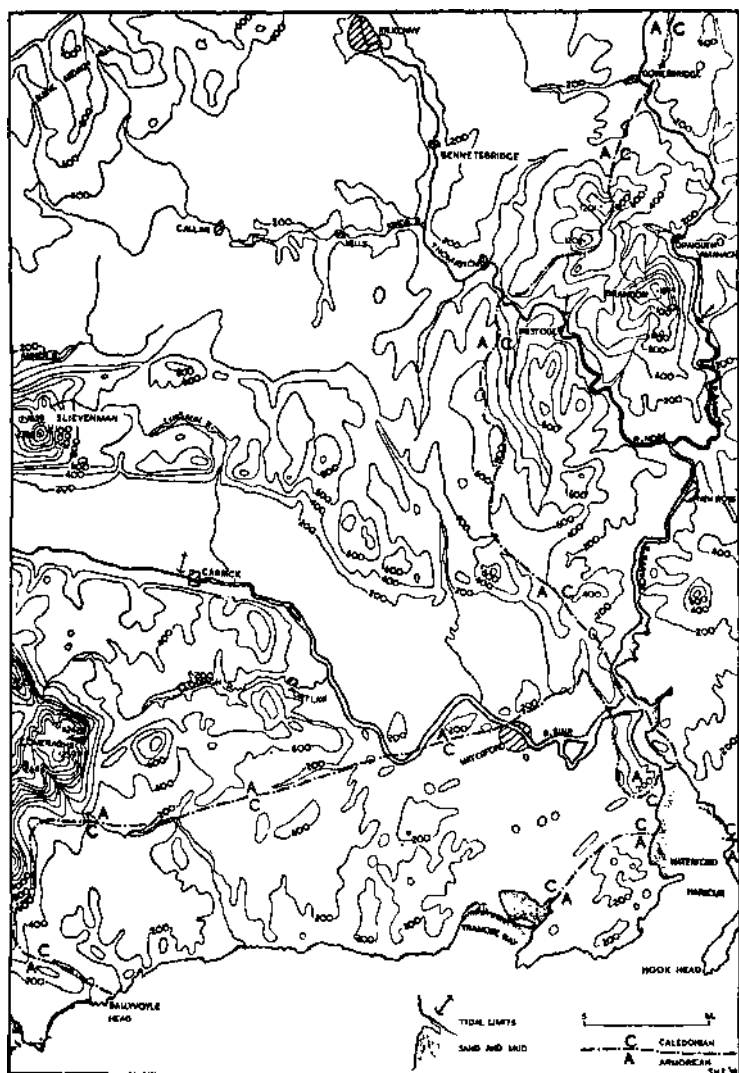
CHAPTER XIV

THE SUIR, NORE AND BARROW BASINS

THESE THREE rivers are known in Ireland as the 'three sisters,' for they eventually join and reach the sea in the long drowned estuary known as Waterford harbour, after flowing between ranges of Caledonian and Armorican structure. This landscape of hills and lowlands belong essentially to the south of Ireland: most of the lowlands are floored by Carboniferous rocks covered with drift that is thin or even non-existent in places, and the soils, generally fertile and well-drained, are industriously farmed, mainly in medium-sized holdings. Both store and dairy cattle are found on most farms and creameries have spread through the region from their original home in Tipperary and Limerick to Waterford and Kilkenny. In the west towards Limerick dairying predominates; in the east towards Wexford arable cropping is more significant, and as a whole the agriculture is prosperous and the rural scene made attractive by the care lavished on the land. The towns, which have not expanded to any substantial degree during the last fifty years, include such historic centres as Waterford, Kilkenny and Clonmel, of which the first-named is a natural regional capital combining the functions of a river port, a sea port, a major market centre and an industrial town.

STRUCTURE AND LANDFORMS

The meeting of Caledonian and Armorican structural elements is one of the main features of this region (see Fig. 59). To the east lies the Leinster chain, aligned from northeast to southwest and making its last appearance in Mount Brandon: to the west, the long east-west parallel ranges and valleys extend for over 100 miles into Kerry and the extreme west of Cork. The Armorican ranges within this region are the Comeraghs with the Monavullaghs (in effect one range), the Knockmealdowns, the Slievenaman and the Galtees, all of which run east-west. Towards the Central Lowland, however, there is a change, for the ranges, though still Armorican in structure, assume a trend from southwest to northeast, probably over a hidden Caledonian floor: this trend appears in the Slieve Ardagh ridge and the Castlecomer plateau, both of which are composed of Carboniferous rocks, and in the long line of hills that **extend** from the Slievefelim, near Limerick, to the Slieve Bloom, and are made up of Devonian and earlier rocks. Where the Old Red sandstones survive there are hills reaching altitudes of between 2,000 and 3,000 ft.,



HG. 59.—CALEDONIAN AND ARMORICAN AREAS IN THE LOWER SUIR, NORE AND BARROW BASINS

The northeast trend of the Leinster chain and the east-west trend of the Slievenaman range meet in this area: Slieve Ardagh is of Armorican structure but Caledonian trend. This map also shows the cliffed coast of south Waterford, the lowlands between the various ranges, and the long estuarine reaches of the three rivers.

or crag-like eminences of lesser height, but hardly less striking form: where the Devonian strata have been removed, the older Silurian and Ordovician strata have been eroded into depressions, many of which are ringed round by hills of Old Red sandstones. Between these hills lie lowlands, generally several miles wide and linked one to another by easy passage-ways, so that the whole landscape has an alternation of uplands and lowlands typical of the southern sector of Ireland.

Although it is in the hills that the Caledonian and Armorican trends may be most easily seen by the informed traveller, the lowlands also show the imprint of each great structural phase. In south Waterford, and also around the lower Barrow and the lower Nore, the lowlands are flooded by Ordovician, Silurian and Devonian strata with varied igneous intrusions, and belong to Caledonian Ireland: elsewhere the lowlands are flooded mainly by Carboniferous rocks and belong to Armorican Ireland. But the most remarkable feature is that the 200 ft. peneplane truncates all these varied rocks, so diverse in hardness and resistance to erosion. Nowhere is this better seen than in south Waterford, where the 200 ft. level extends for several miles as an even-surfaced lowland, and the rivers flow in wide, open and marshy valleys with every appearance of senility until they plunge through gorges on the cliffed coast. Viewed from Waterford harbour, this coast is as remarkable an expression of the 200 ft. level as its analogue in South Wales, for there is a line of cliffs extending for some twenty-five miles from Creedan head to Ballyvoyle head, near Dungarvan, with only one major bay, at Tramore.

It is in this 200 ft. surface that the rivers are incised, in many places with magnificent entrenched meanders and long gorge-like reaches. Above this level there are signs of levelling around 400 ft., especially in the lowlands some distance from the coast, for example around Thurles and Tipperary. Again, there are traces of a surface at about 800 ft. around various uplands. Clearest of all, however, is the 200 ft. surface or Coastal Peneplane (to use A. A. Miller's term), which is so widespread here and in other parts of Ireland.

Glaciation has left its clearest traces within the region in the great corries of the Comeraghs and Monavullaghs, the Galties and the Knockmealdowns, all of which are the product of mountain glaciers that never reached the lowlands. In the southern lowlands the earliest, or Eastern General glaciation, left deposits of limestone gravel, a strongly weathered drift, but the later, or Midland General glaciation, extended only to a line running from the north side of the Galties through Cahir, along the north side of the Slieve Ardagh ridge, then into the Nore valley near Thomastown and the Barrow, south of Borris (see Fig. 5). North of this line, limestone drifts occur generally in the form of

hummocky ground moraine interspersed with bogs where the drainage was interrupted and lakes or fens formed: associated with these features is the presence of a large number of bogs, some very small and others covering several square miles, which have developed on a fen base between the ground moraine. The major feature of the detailed regional geography of such areas is the alternation of these two elements, bogs and ground moraine, as the farmlands are found on the gently rolling country and the bogs occupy the hollows, their brown and purple colouring contrasting pleasantly with the green of the pastures and meadows or the changing colours of the crops through the summer months.

LAND USE

The land use in this region shows at once careful farming and long occupation and the proportion of improved land is remarkably high, in Co. Kilkenny 87%, in Co. Tipperary, 80%. These proportions have remained fairly constant through the past hundred years, and while some uplands areas have been abandoned, a recent land utilisation survey around Graiguenamanagh shows that some land had been reclaimed during the past forty years. Most of the non-agricultural land is in the mountains, notably the Comeraghs, where there are very obvious signs of withdrawal of land from cultivation. A small part of the non-agricultural land is forested, but the area so far developed by the Forestry Commission covers little more than 1% of the region. Woodland is found mainly in demesnes and on some of the steeper hillsides, though there are also some interesting patches of scrub, with oak as a main component, in the gorges of the three main rivers. With the demesnes and hillside woodlands as a basis, the Forestry Commission has established some large plantations, notably on the northern slopes of the Comeraghs, around Clonmel, on the north side of Slievenaman, and on the Old Red sandstones ridges south of Carrick-on-Suir and Portlaw. The slopes of the Galtees, and of Slievenamuck on either side of the Glen of Aherlow, have also been planted, and there are several new plantations on the north side of Mount Brandon. Two demesnes in the Nore valley, near Thomastown and Inistioge, have been afforested, but as yet few plantations are found in the lowlands.

In its agricultural life this region resembles Co. Cork, but has a somewhat higher proportion of small farms: 30% are of less than 30 acres, 18% of more than 100 acres, and many of the medium-sized farms are of 50-100 acres. These figures of average size of farm emphasise the widespread dominance of the medium group, though most of the lowland landscapes include farms of all sizes. In some of the uplands small

farms are most general, but here, too, many contrasts occur, though happily the region for the most part escaped the widespread fragmentation of agricultural land that is characteristic of areas farther west.

Farming is generally mixed and the land use varies considerably from year to year, according to the commercial opportunities of the moment. It has been possible to multiply the wheat acreage during the 1939-1945 war chiefly by ploughing up meadow land, but it still covers less than 10% of the improved land. A development possibly of greater permanence has been the increase in milk production for creameries, which have spread eastwards from Co. Tipperary into Waterford and Kilkenny, though less than one-third of all the cattle are milch cows, and the main cash recourse of most farms is store cattle production: the amount of land in pasture varies from two-thirds in Co. Kilkenny to as much as three-quarters in some parts of Co. Tipperary and Co. Waterford. In fact, it is particularly high in the Suir valley and throughout Waterford, where cattle are reared for the export trade and for the canning industry. The arable cultivation is mainly intended for feedstuffs, and the proportion of land sown to crops is higher in the east of the region than in the west: normally oats, barley, potatoes and turnips are the main crops, with a smaller area under mangels and sugar beet.

Stock rearing and dairy farming are linked with pig and poultry production, and also with sheep rearing. The details of farming economy depend very much on transport facilities: lorries collect milk churns for creameries from farms along the main roads in some districts, but many small farmers or their representatives trail along the roads to the creameries with a donkey cart. A farmer remotely placed from the creamery will make 'country butter' rather than face the journey to the creamery, and a farmer living near a town may find that a milk round is more profitable than sales of a creamery. The spread of the creameries is an indication of the benefits that they have brought to the countryside, for they provide most of the farmers with an assured sale of milk. No recent figures are available, but in 1931 the proportion of farms supplying milk to creameries was 86% in Co. Tipperary, 73% in Co. Kilkenny and 45% in Co. Waterford. The cattle, pigs and poultry are sold at various market centres, which include both towns and villages, largely through the periodic fairs. Some of the cattle are exported as stores and, to a much lesser extent, fat beasts through Waterford, the third port of Eire in this trade, though others are bought for canned meat factories in Waterford. Pigs are also exported or sold to the bacon factories. Eggs and poultry find a local sale or reach Dublin and overseas markets. This region has an agricultural economy in which production, processing and sales are reasonably well organised, and the farmers, with their

typically varied production, are able to alter the relative emphasis on particular staples according to the trend of prices.

The relatively favourable position of farming in this region is reflected in the land valuation, which averages £\$-£,6 per head. No qualitative assessment of the land has been made as yet, and a soil survey would certainly reveal wide local variations, but the drainage is generally good, though with local exceptions, and there are some excellent pastures on the limestones, which are in the main thinly covered with drift. Some of the farmlands on the shales, sandstones and other non-limestone Carboniferous strata weather into acid soils that bear rushy pastures in such areas as the Castlecomer basin, and the locally derived or thinly drift-covered soils of pre-Carboniferous sedimentary and igneous rocks will probably prove to be acid in reaction except where they are covered by limestone drift. Bütif centuries of effort have left their mark on the soils in at least some parts of the region and many local contrasts appear to be due to the availability of manure. It was found that several farms in the Graiguenamanagh basin were divided into two sections—the manured and highly cultivated arable fields near the farmhouse and the more remotely situated permanent pastures. Under such conditions, the soils in one part of the farm have been graded up, while those in another part remain stationary.

Although the decline in the rural population during the past fifty years has been 25%, there is still an average of three workers per farm in Co. Waterford, east of the Comeraghs, and in a block of country around the lower Barrow and the lower No re, above their junction with New Ross. Elsewhere, there is an average of 150-200 labourers and assisting relatives per 100 farmers. The number of assisting relatives is much the same as the number of farmers, though it is lower around such towns as Waterford and Clonmel. The number of labourers varies from 45 per 100 in Castlecomer and 55 per 100 farmers around the Comeraghs south of Clonmel, both relatively poor districts, to 151 per 100 farmers in the country south of Waterford. Labourers' cottages, either singly or in small groups, are a feature of the landscape, especially on the main roads.

INDUSTRIES

Agriculture is the main resource of this region and 55% of all the employed population work on the land. But here, as in Co. Cork, the number of people who depend indirectly on the land is large, for the towns and villages are well provided with shops and furnish various services that give employment and indicate a not inconsiderable purchasing power. The agriculture is itself industrialised to some extent,

as there are about fifty creameries scattered through the region, some of which have branch separating stations. Creameries are found in almost all the towns, in most of the villages and also on the roadsides away from any definite centre of population. Few creameries employ as many as twenty persons, but some have opened shops or sawmills: one such, employing sixty people in the farmed country between the Comeraghs and the Knockmealdowns, is in effect a rural department store and supplies groceries, dairy, footwear, feedstuffs, machinery, hardware, coal and sells eggs and milk-fed chickens to England, as well as in the Irish market.

Milling is based on small concerns serving a limited area, often by grinding the wheat and oats provided by farmers and bought back by them for use on the farms. It has been considerably extended in recent years and various brands of porridge oats, wheat flour and feedstuffs, including maize meal, are produced. The larger mills are those in Waterford, Carrick-on-Suir and Cahir, but there are also mills that have existed for more than a century at the villages of Kilmacthomas, Co. Waterford, and Bennetsbridge, Co. Kilkenny. Many mills, some now abandoned, are situated on the three major rivers, such as those at Thomastown on the Nore and Graigenamanagh on the Barrow. Bacon factories exist at Kilkenny, Waterford, Roscrea and Callan. At Waterford, a firm that was established in 1820 now employs 500 people in what is said to be one of the largest bacon factories in Europe. The factory at Roscrea, which was established in 1908, can absorb a thousand pigs each week and is co-operatively owned. Canned meat and a variety of cognate goods are produced in Roscrea and Waterford in factories established during the last twenty years, and other industries of directly agricultural origin include wool preparation and fellmongery at Clonmel, a condensed milk factory at Tipperary, a small tannery at Carrick-on-Suir and a large new tannery at Portlaw. Waterford also has a margarine factory run by a firm that owns several creameries. Thurles, a town of few industries, now has one of the four sugar beet factories in Eire.

Clothing industries have achieved some success in this region, and there are woollen mills in Kilkenny, Cahir and at Ardfinnan, a village in the centre of the Suir lowland, where a mill established in 1870 has so extended its trade that it now employs 200 people drawn from the neighbouring rural areas. Kilkenny, Clonmel and Waterford have factories producing boots and shoes.

The industrial enterprise in this region has spread beyond the processing of the output of the rural areas, and there are several manufacturing concerns located here for no particular geographical reason. Waterford has, in addition to its Hour mills, tinned meat and bacon factories, iron

foundries, a works making sacks and bags, printing works, a brewery, and a nursery providing seeds, bulbs and trees. Clonmel has a large number of small industries, including a cider works and firms making motor car bodies, perambulators, mineral waters and footwear. Linoleum is made in Tipperary, and safety glass at Templemore. Kilkenny has a large brewery and furniture works as well as its clothing and footwear industries. This dispersion of industry through a large number of towns is by no means new, though there are several factories that date back only to the post-1932 period. It is largely a question of individual enterprise, often of particular families: for example, a group of farmers established the canned meat industry in Waterford, a family established a chain of mills in various towns, and a shop supplying bread extended its trade until it became a factory with a fleet of vans carrying bread over a wide area. Some towns have been left behind in the struggle, while others have prospered, and it would be idle to pretend that geographical 'causes' alone account for the present industrial distribution.

POPULATION (FIG. 60)

In this region the total population was 315,000, 125 per square mile, in 1891, 254,000 in 1936, 100 to the square mile, and 249,000 in 1946. The town population has remained about 70,000, with another 25,000-30,000 in very small towns and market villages. It is probably a fair estimate that the rural population declined by 60,000 in fifty years, and the rural density of population was reduced by approximately 25% from 97 to 71 per square mile. This decrease is spread fairly uniformly through the region. The rate of decline and the present distribution of population is very similar to that in the neighbouring regions of Wicklow and Wexford to the east, and the Cork uplands and lowlands to the west, all of which are dominated by medium-sized farms.

The dot map of population distribution shows a generally even pattern if the various mountain masses such as the Galtees, the Knockmealdowns, the Comeraghs, and Slieve namán are excluded. The only lowland gaps of consequence are found in the scattered bogs towards the north of the region. In a few places, notably east of Thurles, it is possible to distinguish ribbons of settlement that stretch along roads in some bogland areas, either because the road follows a patch of better-drained ground moraine or because small clearings have been made. Another feature illustrated by the dot map is the considerable number of villages that supplement the market towns in the general economic life of the region. While more than 60% of the population is living outside all towns and villages, small clusters of population are more frequent here than in many parts of rural Ireland. Many of them consist of little more

than a number of farmhouses lined on either side of the road with churches and a few shops, but the larger ones, even if their population is only a few hundreds, are in effect market towns. Thus in Co. Kilkenny, the county town, with 10,300 people, is the only large market centre, and the local trade is focused on such * towns' as Callan, with 1,500

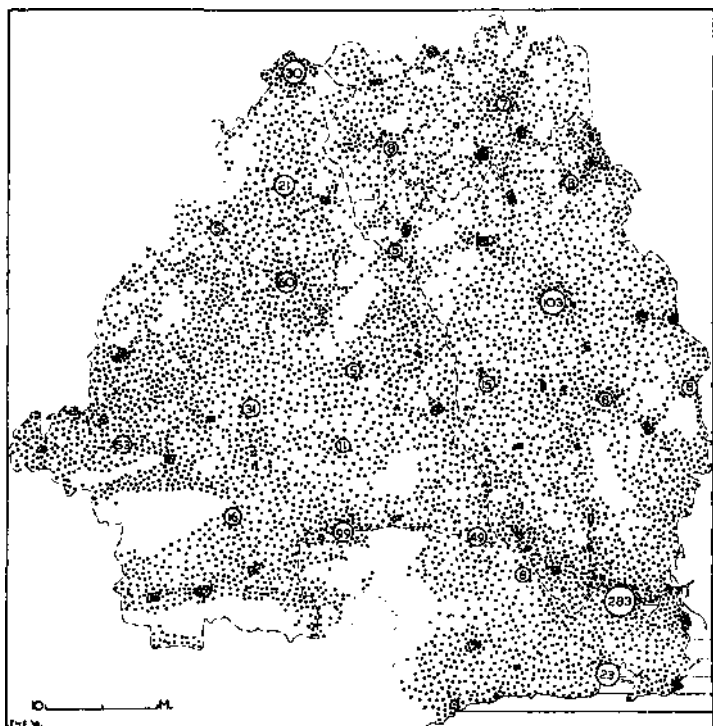


FIG. 60.—POPULATION DISTRIBUTION, SUIR-NORE-BARROW REGION

One dot to 25 persons.

The settlement pattern is remarkably even: in the south the main gaps are such uplands as the Comeraghs, Slievenaman, the Knockmealdowns and Galtees, but to the north lowland bogs interpenetrate with farmlands.

people, or Thomastown and Graigucnamanagh, each with some 800 inhabitants.

The towns fall roughly into four groups (see Fig. 61). Waterford is the main port, market and industrial centre of the whole region, and in effect a regional capital: its population was 26,200 in 1891, and 28,300 in

1946. Next follow two of the larger inland towns in Ireland, Kilkenny and Clonmel (9,900 in 1946), both practically stationary since 1891, though industrialised to some extent and serving large areas as market towns. A third group of towns is represented by Tipperary, Carrick-on-Suir and Thurles, with populations in 1946 of 5,300, 4,900 and 6,000

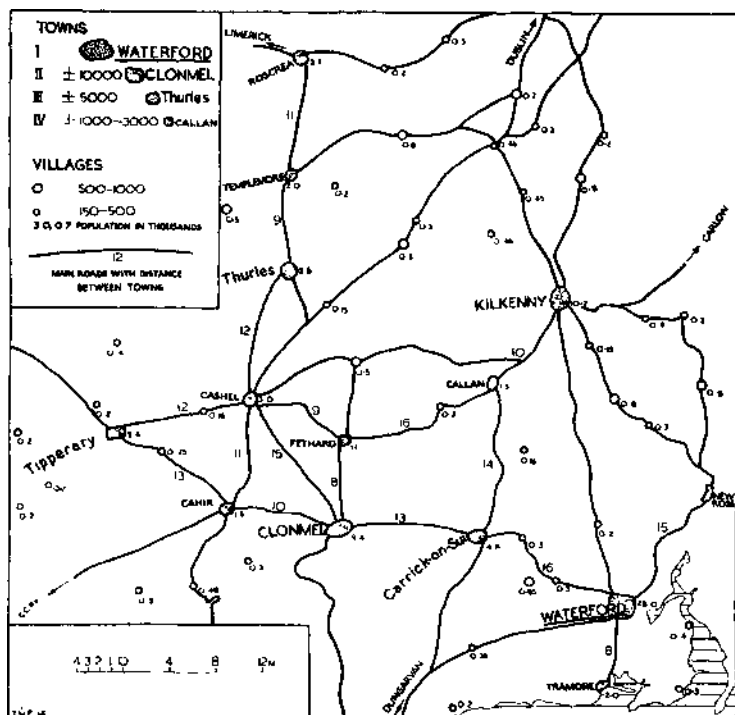


FIG. 61.—TOWNS AND VILLAGES IN THE SUIR-NORE-BARROW REGION

The populations are those for 1936: 1946 returns are used in Fig. 64 for towns. The towns are 8-16 miles apart, but over much of the region, for example to the north of Kilkenny, no centre above the status of a village exists, though, as explained in the text, these villages are towns in function.

respectively, which are typical of many moderate-sized Irish market centres that exist primarily on the trade of the countryside and generally lack any considerable industry. Thurles alone of these three towns has grown within the past fifty years, or more accurately the last twenty, partly through the establishment of a sugar beet factory. The fourth urban group consists of the small Irish towns that are very closely allied

to the rural areas and seem in many cases to be little more than overgrown villages; Roscrea, 3,000, and Cashel, 3,100, are the largest of these, but the group also includes Templemore, 2,100; Cahir, 1,600; Callan, 1,500, and Fethard 1,100 (in 1936, but other figures for 1946). Industry has passed most of these towns by, but Cahir is a milling centre and Roscrea has food processing factories. Some of them acquire a certain amount of trade through their location on main trunk roads; thus Roscrea is on the main Limerick-Dublin trunk road, Cashel and Cahir on the Cork-Dublin road, but Callan and Fethard are more secluded.

SUBREGIONS

Some parts of this region could be subdivided into a very large number of small units, while other parts are more or less homogeneous over considerable areas. On the one hand, the complex arrangement of hills and valleys in the Comeraghs, the Slievecanman ridge and the country on both sides of the Nore between Thomastown and New Ross gives a landscape of contrasts in which almost every bend of the road reveals something different. On the other hand, the long traverses across the lowlands that extend from Bagenalstown to Clonmel or from Clonmel to Tipperary and Roscrea are monotonous in comparison, and the chief scenic variety in them is provided by the surrounding hills. If the whole region were submerged to a height of 500 ft. above sea level, the lowlands would appear as a sea surrounding a number of hilly islands, which would fall into three main groups: first, the Knockmealdowns, Comeraghs, Slievecanman and Mount Brandon; second, the Galtees, Slieve Ardagli and Castlecomer plateau; and third, the Silvermines and neighbouring hills including the Devil's Bit and the Slieve Bloom. The lowlands are richer in geographical interest than in scenic attraction, for they show a puzzling interplay of surfaces around 200 ft. and 400 ft., a river system of complex history, a low stream density, and, in the south, an absence of the bogs for which so many Irish lowlands are justly famed. Almost continuously farmed and in the main fertile and prosperous, these lowlands have many signs of long settlement in ancient castles, churches and abbeys. The soil is the chief resource, and the agricultural life shows both variety and resilience to changing economic circumstances; the facilities for processing the farmers' staples are a particularly useful feature of the industrial life.

Eleven subregions are distinguished here. Four of the regions are wholly lowlands, but none are wholly uplands, for all the mountain groups are penetrated by significant lowlands and valleys. The first three regions (A1-A3) belong to Caledonian Ireland, the remaining eight (B4-B11) to Armorican Ireland.

Ai. THE WATERFORD LOWLANDS

The lowlands around the city of Waterford show a remarkable development of the 200 ft. surface, with hills rising to 400 ft., truncating various Ordovician rocks with igneous intrusions. This level is particularly clearly seen along the coast, where the cliffs are broken only by Tramore bay, which is cut in Ordovician strata, and almost crossed by a line of sand dunes: the town of Tramore stands on the hillside, rising to the 200 ft. level. The Suir valley is outlined by slopes rising, with varying steepness, to the coastal peneplane, and the river has a magnificent series of meanders with small floodplains. Agriculture is the main resource of the subregion, which is divided into medium-sized and large farms, many of which profit from the proximity of Waterford with its canning and bacon factories, store cattle exports, and local meat trade: in addition a number of farms supply milk to creameries. There is a dual emphasis on store cattle and dairying, though fat cattle normally account for about one-fifth of the exports. There is very little rough pasture, though marshes have developed in some stream valleys on the 200 ft. surface, and there are a few small bogs. The rural population has declined by approximately one-quarter during the past fifty years.

Waterford city developed around the creek provided by the St. John's river, and is the first crossing place of the river from the sea: it possesses a mile of quays on the south side of the river, and can be entered by vessels drawing 20 ft. of water. Most of the shipping is coasting steamers, whose main export cargo is cattle, though for a time the passenger ships from Fishguard came to Waterford instead of Rosslare. The suburb on the north bank, Ferrybank, has the main Rosslare-Cork railway on a narrow strip of river-bank, backed immediately by a steeply sloping rise, but Waterford city rises more gently from its quays to reach the 200 ft. level. The St. John's river, which traverses the alluvial flat on which part of Waterford is built, flows through a marshy valley, now followed by a railway line to Tramore, which may be an abandoned course of the north-south consequent drainage. The industrial enterprises of Waterford (sec pp. 320-321) include flour mills, bacon factories, a tinned meat factory, iron foundries, printing, a works making sacks and bags; near the town is a nursery specialising in bulbs, trees and shrubs. The population of Waterford has remained fairly stable for many years, and in 1946 was 28,300: Tramore, with 2,300 people (1946), is a market town and holiday resort whose fortunes are closely tied to those of Waterford.

A2. THE LOWER NORE AND LOWER BARROW BASINS

The Nore and the Barrow unite two miles above New Ross and flow southwards as the Barrow to the point where they are joined by the Suir,

six miles east of Waterford. They cut across the local limits of Caledonian Ireland in valleys with incised meanders that are generally at least 100 ft. below the surrounding 200 ft. surface. Only in a few places, such as the area north of New Ross where the two rivers join, is the floodplain of considerable extent: here the fear of floods is constant, due to the neglect of various embankments. The fenlands developed here are almost unique in the south of Ireland, but elsewhere in the valleys there are narrow patches of marshy pastures, willow and alder groves and even reed swamps.

Mount Brandon provides a scenic focus in this region, which has level or gently undulating topographical lines around 200-400 ft., and also 800 ft. The 200 ft. level is as obvious in the neighbourhood of New Ross as it is around Waterford, and the town of New Ross climbs from the river by steep streets and staircase-like alleyways. To the west of New Ross, however, the 200 ft. surface swells up into low rolling hills about 400 ft. high, and to the north of the Barrow the main road from New Ross to Graiguenamanagh rises steeply to 400 ft., only to descend again on to a very clearly defined patch of 200 ft. surface between the Barrow gorge and Mount Brandon, which rises from it without any higher break of slope. The 800 ft. ridges, on the other hand, are very clearly defined in the country west of Brandon, and possess a north-south line that is accentuated by the deep valleys between them (see Fig. 62).

The variety of aspect in this subregion is considerable, and two-thirds of the land is farmed: the remaining third is rough pasture of four main types—first, the heather-covered Mount Brandon; second, the gorse and heather-covered upper parts of the 800 ft. ridges, partly decayed pastures; third, a few flat and ill-drained parts of the valleys in the ridge country; and fourth, the intractable flooded areas around the Nore and the Barrow. The limit of cultivation is 600-800 ft., and the farming is mixed, with 15-20% of the land under arable crops, and the remainder in meadow and pasture. There are a large number of very small farms at the higher levels, but as a whole the medium-sized and large farms are dominant, with an average of two helpers per farmer. Creameries are now well established in this area, and the market centres are New Ross (see p. 289) and Thomastown, a small place with 800 inhabitants, but typical of many Irish country towns grouped around a mill and a river. Inisfidge is a village of 300 people around an ancient abbey at the first crossing place of the Nore above its confluence with the Barrow: the large demesne has fallen into decay and is now taken over by the Forestry Commission,

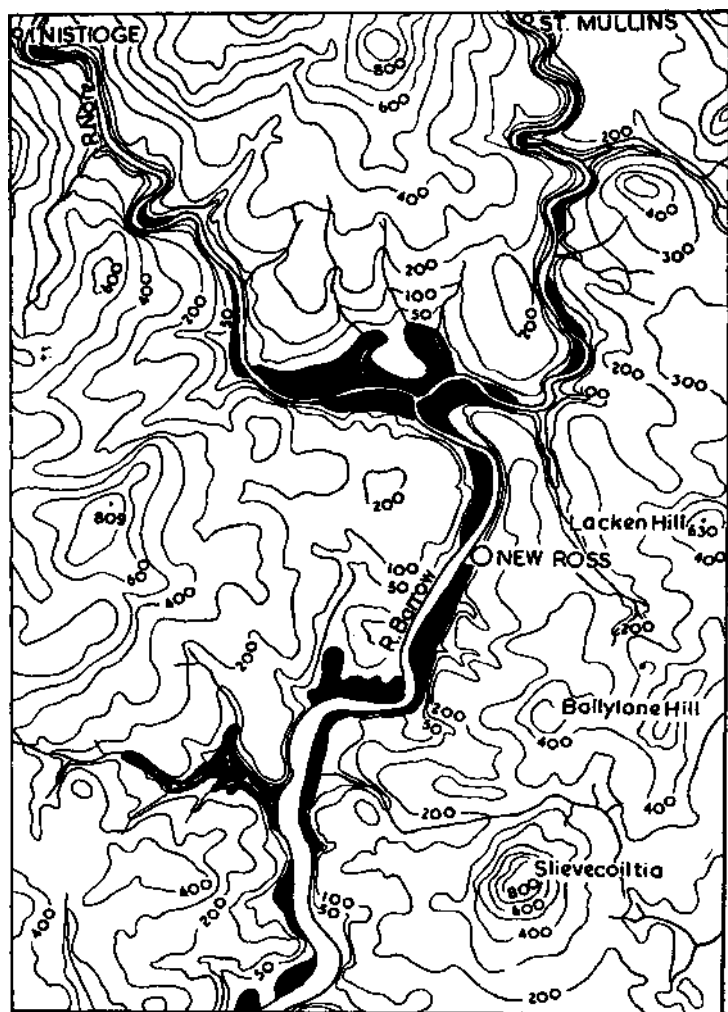


FIG. 62.—THE LOWER NORE AND THE BARROW

There are extensive floodplains around the confluence of the Nore and the Barrow, and also beside the Barrow to the south of New Ross. Above the confluence area the floodplains, though smaller, are developed at various points: the river has some gorge-like reaches and incised meanders. The 200 ft. peneplane is widely developed, and a second surface around 400 ft. may exist: the 800 ft. level is also clearly seen in this area.

Map drawn by W. B. Nevill.

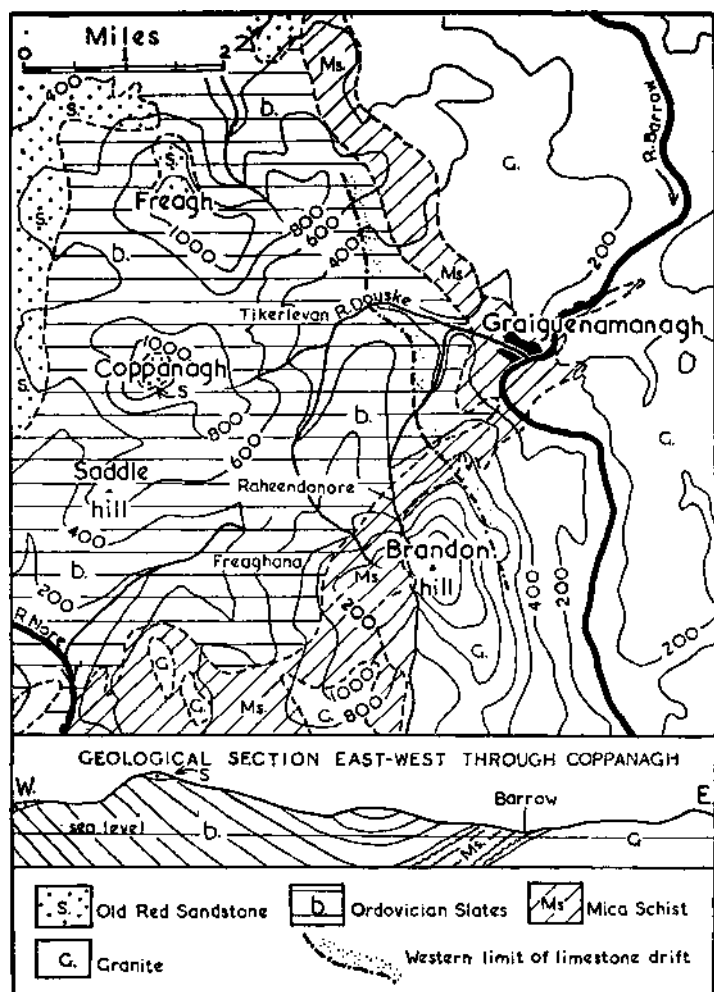


FIG. 63.—THE GRAIGUENAMANAGH BASIN

The Leinster granites and Ordovician slates are separated by a band of mica-schists: over the slates lie caps of Old Red sandstone. The 200 ft. peneplane is extensively developed here and the Barrow is incised, with some striking entrenched meanders. The limestone drift, mapped by A. Farrington and J. P. Haughton in 1945, was previously supposed to have ceased some miles farther north.

Drawn by J. P. Haughton and reproduced from 'Irish Geography,' vol. 1, p. 63.

A3. THE GRAIGUENAMANAGH BASIN

This small subregion of some fifteen square miles (Fig. 63) is worthy of special consideration as an exceptionally clearly defined basin, which is very carefully cultivated and possesses a market town in Graiguenamanagh, placed where the Barrow gorge opens out slightly as several streams join the main river after flowing through trenched valleys divided from one another by long sloping interfluves. Mount Brandon defines this subregion on the south, and two flat-topped hills, Freagh and Coppanagh, both 1,200 ft. on the west and north: these hills are capped with Old Red sandstone and probably mark the beginning of Armorican structures in this part of Ireland. But the basin is by no means isolated, as apart from the river crossing at Graiguenamanagh into Co. Carlow, there are passes between the various hills and the 200 ft. peneplane is continued northwards on the west side of the Barrow gorge. The limestone drift of the second general glaciation penetrated the lower part of the Graiguenamanagh basin, but otherwise the soils are chiefly of local origin and derived from the granites, mica-schists, red sandstones and Ordovician slates of which the area is composed.

Well-drained fields occur on the long sloping interfluves of the basin, and have pastures, meadows, and arable crops, including wheat, barley, oats, potatoes and roots. The most remarkable feature is the aggressive attitude of the farmers towards the encroachment of rough pastures: a survey made in 1945 shows that many fields had been wrested from gorse and bracken, since the 6-inch to one mile map was published in 1903, and that very few fields had degenerated to rough pasture during the same forty years. Individual stories of the clearing of particular fields showed how hard the struggle for reclamation may be and the enemies, gorse and bracken, are perpetually on the watch, for they line the hedgerows waiting to advance into the fields. In this area the general limit of cultivation lies around 800 ft., though it is lower on the steep slopes of Mount Brandon and higher on the gentle slopes of Coppanagh and Freagh, with some fields reaching 1,100 ft. The farming is characteristically mixed, with sheep, store and dairy cattle as the main livestock. There is a separating station at Graiguenamanagh, and churns of milk are brought in by the farmers or collected by lorry from platforms beside the farm gates. But at some of the remoter farms butter is made and sent to Cork to become 'factory butter' (see Fig. 64).

Graiguenamanagh is an ancient 'town' that now lives mainly by retail trade and monthly fairs for the neighbourhood: its narrow street is lined with extremely well-stocked shops. Houses and gardens have submerged the old abbey, whose cloisters and outbuildings are hidden away in gardens, though part of the old abbey church has been used by the

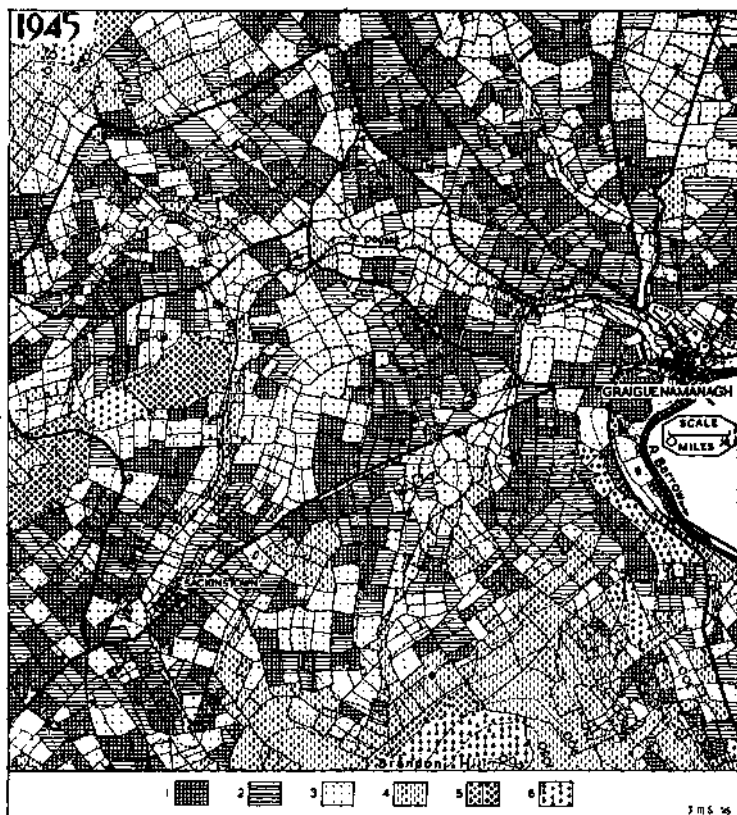


FIG. 64.—LAND USE IN THE GRAIGUENAMANAGH BASIN

1, Arable land; 2, Meadow; 3, Permanent pasture; 4, Rough pasture; 5, Coniferous and deciduous woods; 6, New plantations. Contours at intervals of 150 ft.

The basin is cultivated to a level varying from 450 ft. to 850 ft.: the forests on Mount Brandon reach 1,200 ft.

Drawn by F. M. Synge and originally published in 'Irish Geography,' vol. 1, p. 65.

Catholics since 1813. The town has a woollen mill and a saw mill, and is the home of the bargemen travelling along the Barrow, which is canalised from St. Mullins upstream. The barges come from Waterford through New Ross to St. Mullins on the tidal river, and then by the river and the stretches of canal with locks that circumvent the rapids. There are quays on either side of the river at Graiguenamanagh, and barges lie up here on one stage of their journey to or from Athy and Dublin. The town has a fairgreen and various pound-like enclosures, but on a fair day the livestock overflow from these and line the streets, as at most Irish fairs. In general appearance Graiguenamanagh is extremely congested, but investigations in 1945 showed that there has been a significant change since the 25" map was published in 1902, for many cottages had been abandoned and in some cases, but unfortunately not all, disappeared (Fig. 25). The housing need has been met by new cottages built in the past forty years on the outskirts of the town which, with their white plastered walls, contrast sharply with the more sombre colour of the older houses. Characteristically enough, the newest buildings in the town provide for education in various forms, and consist of a cinema and schools, giving primary and technical education but not secondary education in the normal sense of the term.

B4. THE COMERAGHS AND THE KNOCKMEALDOWNS

The long line of hills that includes the Knockmealdowns and the Comeraghs forms a rampart on the south side of the Suir valley for more than thirty miles between Mitchelstown and Carrick. Seven of the peaks in the Knockmealdowns are of more than 2,000 ft., one of them 2,609 ft., and the range has an abrupt slope to the valley of the Tar, a stream tributary to the Suir: a famous tourist road from Cahir to Lismore climbs the slopes through a series of hairpin bends and achieves its summit of 1,114 ft- at a point called the Gap. The 800 ft. or South Ireland peneplane, so clearly seen between the main Knockmealdown range and the Blackwater valley (see pp. 344, 345), does not appear on the north side of the range, though it is seen between the Knockmealdowns and the Comeraghs in interfluves 600-800 ft. high between various river valleys. The Comeraghs and Monavullaghs are really a single mountain range extending from Clonmel to the lowlands around Dungarvar*, and now appearing as a north-south line, though belonging structurally to the east-west folds of southern Ireland. Like the Knockmealdowns, they have several peaks above 2,000 ft., and reach 2,597 ft. at one point, but they are much more sharply glaciated, and their stream-cut valleys, which must have been impressive before the mountain glaciation, are hollowed out into splendid cirques, most of which enclose small lakes overhung by craggy

precipices. Coomshingaun, one of the finest corries in the British Isles, is walled in on every side except the east by almost perpendicular cliffs that rise at one point to 1,288 ft. above the surface of the lake, which is dammed by a block moraine. A few of the other corries are almost equally impressive, and the range shows a clearness of glacial sculpture that is rivalled in few parts of Ireland except perhaps in the Dingle peninsula, in the Reeks of Kerry, and in some of the Leinster chain valleys. East of the Comeraghs there are hills 500-1,200 ft. high, formed of Old Red sandstone around a lowland, or in appearance an upland basin 200-500 ft., floored by an inlier of Silurian strata. Here the anticline has been denuded by the removal of the Devonian beds and the softer Silurians have been worn down into a basin consisting of comparatively fertile land drained by the Cladiagh river to Portlaw.

In this subregion the landscape is completely dominated by the Knockmealdowns and the Comeraghs, both of which are mainly covered with a heathery vegetation. The lower hills of Devonian strata beside the Suir valley have some old woodlands, and are now being intensively forested. The basin formed of Silurian beds is farmed and settlement penetrates the Comeraghs in various remote valleys on the western side to as much as 1,000 ft. in places, but on the steep eastern side cultivation generally ceases at the hillfoot. There is also continuous agricultural settlement in the threshold between the Comeraghs and the Knockmeal-downs, but in this range cultivation ceases at the hillfoot almost everywhere. The farming is mixed with sheep, dairy and store cattle, and normally about three-quarters of the land is in pasture, with the remainder divided fairly evenly between meadow and arable crops.

B5. THE SUIR LOWLAND

This lowland lies between the Comeraghs on the south and the Slieve-naman range on the north, and is mainly between 100 ft. and 200 ft. high. It is formed of the lower Carboniferous limestone covered, generally

1. (top) Original north-south consequent drainage on Cretaceous or early Tertiary cover. Some present windgaps in the Knockmealdowns and Comeraghs are shown, with a possible course of an early Suir.

2. The Suir has now cut a course in the lower Carboniferous limestones: it receives in time the drainage from the Tar and from an original consequent. At one stage the Suir may have flowed through the gap to the south of Mountneil hill ('M*' on map), where the present summit level is 225 ft. There is a magnificent elbow of capture and the Suir is an entrenched stream in Carboniferous limestone.

3. The present drainage. Note, with reference to 2, the adjustment to structure in the Old Red sandstone hills, the low stream density in the Carboniferous lowland, and the interplay of consequent and subsequent elements in the drainage pattern.

*Derived from data in Miller, A.A., 'River development in southern Ireland,' * Proc. R. Irish Acad.,* vol. 45, 1939, pp. 321-354.*

thinly, by limestone drift of the earlier glaciation, and is a continuously farmed area laid out in medium-sized or large farming units, with mixed farming, including dairying, as the usual type. As a whole, it is fairly typical of the Carboniferous limestone lowlands that lie between Armorican ridges in the south of Ireland. North of Clonmel, the Upper (Carboniferous) limestones and shales have not been removed, and there is a rise of level to 300 ft. and even 400 ft. in places. The Suir, which flows in a well-defined valley at the southern fringe of this lowland, possesses a floodplain which is narrow at Clonmel, but widens out towards Carrick and becomes a marshy flat more than a mile wide at Portlaw: all the main north-south roads descend into Clonmel or Carrick, the two market towns situated at the principal crossing-places of the river. Both these towns are market centres for considerable areas, including those around the Comeraghs; but Clonmel is the larger, more prosperous and more industrialised, and has various mills and small factories on the Suir island or in the main part of the town on the north bank of the river. The modern town has not entirely submerged the ancient walls, and one of the mediaeval gateways still survives, but the old quays have been turned into an attractive promenade facing the northern flanks of the Comeraghs.

B6. THE SLIEVENAMAN RIDGE

This east-west ridge extends for some twenty miles on the north side of the Suir lowland and is structurally comparable with the Comeraghs and their environs described as region B4. Old Red sandstone forms Slievenaman, a peak 2,368 ft. high, at the western end of the ridge, and two lines of craggy hills 700-1,000 ft. high on the north and south of an upland basin, 400-600 ft. high, worked out in Silurian slates. The slates in this basin, which is drained by the Lingaun river, were formerly quarried for roofing materials, but only the scars of quarrying and a vestigial industry remain today. East of the Lingaun basin the Old Red sandstone forms a series of north-south ridges, all around 800-1,000 ft. These ridges are continued to the north between Thomastown and New Ross, but the Old Red sandstone fades out along a line running due south from Thomastown, which must be regarded as the present eastward limit of Armorican structures (see Fig. 59).

Slievenaman does not possess the striking evidences of mountain glaciation that mark the Comeraghs, but it shows evidence of an icecap at one stage and awaits detailed investigation. The Lingaun basin has drift deposits described in the venerable *Geological Survey Memoirs* as 'limestone gravel' and probably to be ascribed to the first general ice-sheet. This basin is farmed over its whole extent, and cultivation also extends on to the north-south ridges to the east, interspersed with rough

pasture lands. But Slievenaman is a definite gap in the settlement pattern, though it is farmed on its gentler eastern slopes to 1,250 ft. in places and has a few farms on its steeper western slopes. The farming of the area is mixed, and there are several co-operative creameries in this subregion and immediately outside it. The Forestry Commission has planted large areas on the slopes of Slievenaman, and there are also woodlands on the hills surrounding the basin.

B7. THE SUTR-NORE LOWLAND

This lowland extends for more than fifty miles in a northeasterly direction from the foot of the Knockmealdown mountains to the Barrow valley at Bagenalstown. It is defined, not too clearly, by discontinuous lines of hills on either side, and is in fact a great natural route leading from the Upper Barrow to the Mitchelstown gap and the upper Blackwater, with easy connections to all the lowlands in the south of Ireland along the valleys of the Suir, Nore and Barrow. But it has not become a major artery of trade and commerce, for roads and railways cross it rather than follow its central axis. It would appear to offer the easiest route from Dublin to Cork, but both the road and railway traverse the parallel lowland on the northwestern side of the Slieve Ardagh ridge. The two chief towns associated with this lowland, Clonmel and Kilkenny, are on its margins, and as a whole it preserves an almost exclusively agricultural character with a quality of remoteness that is, in all the circumstances, surprising.

Carboniferous strata underlie this lowland, and the striking mountains that rise abruptly from it in the south, Slievenaman, the Comeraghs, Knockmealdowns and Galtee's, are formed of Old Red sandstone and the underlying Silurian strata. To the north the Slieve Ardagh ridge develops much less conspicuously in a series of low hills, some little more than 400 ft. high, around Cashel and Fethard. These hills are formed of the younger members of the Carboniferous system, while the older members, such as the lower limestones and the lower limestone shales, form the prevailing level around 200 ft., rising in places to 300 ft. and falling, especially where the (lower limestone) shales are developed, to 150 ft. or less. At a few points in the lowland there are small eminences due to the preservation of younger strata, but generally the surface is undulating rather than flat. Drift deposits, usually ascribed to the older of the two general glaciations, cover most of the surface, but many of the soils are extremely thin, and probably derived directly from the underlying limestones; in some cases, notably to the south of Kilkenny, rock outcrops are not infrequent, and the stream density is remarkably low over the whole of the lowland.

This lowland is continuously farmed but relatively thinly populated: it now has 60-75 persons to the square mile, and the population has declined by at least 25% during the past fifty years. Very little land is unimproved or has reverted to rough pasture, though there are marshy pastures around the stream courses on the 200 ft. surface where the rivers are not incised. The landscape is dominated by medium-sized farms and the average farm size varies from 55 acres in the upper Suir lowland to 80-90 farther east. On the average about one-sixth of all the farms are of more than 100 acres, and family workers employed are almost equal to the number of farmers. Farming employs three-quarters of all the occupied population almost everywhere; thus Clogheen rural district in the upper Suir basin has 73% in farming, and Callan rural district, 76%. The farming is mixed and permanent pastures cover two-thirds of the farmland in the east, and as much as three-quarters in south Tipperary, with the remainder divided between meadows and arable crops. Co-operative creameries have now been established throughout this area and wooden platforms for milk churns are seen at most farm gates: while the immediate market for milk provided by the creamery is of particular importance, store cattle raising is also general. As already noted, the main towns serving this subregion lie outside it in such centres as Clonmel, Cahir, Cashel and Kilkenny. Two very small towns, Fethard and Callan, with 1,100 and 1,500 people respectively, are typical of the Irish towns that, though long established, have not risen in status beyond minor market centres. Fethard still preserves its ancient walls, and was given a charter by Edward III, and Callan is almost equally venerable. But although Fethard, at least, has a stately eighteenth-century main street, both towns now lie off the major trunk routes and are commercially subsidiary to Clonmel and Kilkenny respectively.

Kilkenny.—The historic city of Kilkenny stands on either side of the Nore, but, unlike Clonmel, it turns its back on the river. Kilkenny, the see of the Ossory dioceses, has two cathedrals, one of them dating from the thirteenth century, a castle that is said to be on the site where the Kings of Ossory lived and has been a significant centre for more than a thousand years. It is placed on the Nore between the Slieve Ardagh ridge and the Castlecomer basin. Today the city has a dominant commercial position over an area covering the whole of Co. Kilkenny, and there is no town of even 5,000 inhabitants within a radius of twenty miles. Its importance was recognised by the railway builders in the nineteenth century, and it was linked to Dublin through Kildare by 1852. The lines to Waterford and Maryborough were built during the next thirty years. However, in spite of Kilkenny's continued prosperity as a market centre and its maintenance of a number of industries through all crises, the town

has not grown during the past hundred years: its population was 19,100 in 1841, 11,000 in 1891, 10,200 in 1936, and 10,300 in 1946. Its main industries are brewing, furniture, clothing and footwear. The fame of Kilkenny marble is considerable: it is a greyish crystalline limestone which becomes deep blue and black on polishing. Much of it was taken from a quarry near the town to which everyone had access, and the stone has been used for building, and even for paving the streets.

B8. THE SLIEVE ARDAGH

This ridge appears as a number of hills around Cashel and Fethard, and extends in a northeasterly direction for more than thirty miles to the Nore valley. In trend, as in the strike of its rocks, it is Caledonian, but in structure it is Armorican, for it consists entirely of Carboniferous strata forming a syncline, more accurately a synclinorium. The ridge rises to 1,100 ft., is pierced by numerous gaps, including that followed by the railway from Thurlis to Clonmel, and is not a barrier to agricultural settlement, as most of the hills are farmed to their summits, and the density of population varies from 50 to 80 per square mile, with farming similar to that of the lowlands to the south.

The varied rocks of Carboniferous age which form this ridge include the Upper limestones and the shales, flagstones and Coal Measures that are of successively younger date. There is a definite scarp on the north-west, but a gentler fusion of upland and lowland in the southeast. The Slieve Ardagh coalfield, which employed less than fifty men in 1936, yields an anthracite coal that was mined more energetically during the 1939-1945 war. There are eight or nine known seams in synclinal basins, but the upper and more accessible ones have been exhausted, though a number of former workings have left their scars on the landscape. However, under the stress of scarcity, a thin seam 12"-20" thick has been worked recently, though the supplies are merely a supplement to those of the Castlecomer field.

B9. THE CASTLECOMER BASIN

The Castlecomer plateau, or basin, which covers an area of more **than** 200 square miles between the Nore and Barrow valleys, is one of the most clearly marked *pays* in Ireland. It is surrounded but not crossed by important trunk routes, followed by roads and railways, and it is seen from almost any of the surrounding areas as a plateau ringed round by an even ridge-like skyline about 900-1,100 ft. high, with well-marked scarps. A synclinal basin, with sandstones (flagstones) and shales on its margins and Coal Measures in the centre, it is drained by one main river, the Dinin, which joins the Nore a few miles above Kilkenny. This **valley**

gives easy access to the basin and was followed by the railway line built during the 1914-1918 war from Kilkenny to Castlecomer, but elsewhere roads climb the scarps with steep gradients from the surrounding lowlands. The Castlecomer basin, with the Slieve Ardagh area discussed above, forms what is rather grandiloquently called the Leinster coalfield. It is the most significant coalfield in Eire, and at times employs as many as 500 miners. The coal has been mined for two or three hundred years, at first along the outcrops of the synclinally disposed seams, later by driving in adits from the edges of the basin, and more recently by working inclined adits inside the basin, which have reached the water level so that pumping is necessary. There are many evidences of the three phases of mining in the basin. During the war of 1939-1945, the peacetime output, which rarely reached 100,000 tons per annum, was considerably increased, but this is only a small contribution to the needs of Eire, and in addition the anthracitic nature of the coal limits its usefulness.

Agriculture employs many more people than mining in this plateau-basin, and in Castlecomer rural district, the miners number less than one-fifth that of the workers on the land. There are mining settlements, notably Castlecomer itself, with 800 people in 1936, and some 20% or the population lives in villages, a somewhat unusual feature that is obviously related to the mining, which is in many cases combined with the tilling of an acre or two of land. There are few gaps in the farming settlement, and 93% of the Castlecomer area is improved land, in spite of the altitude of as much as 1,100 ft. and the fact that the sandstones and shales weather into acid soils supporting rushy pastures. Mixed farming with a decided emphasis on cattle production for stores and dairying is general. The basin has two main creameries, one of which (at Muckalee) has three branches and marks the present northward limit of the creamery belt in this part of Ireland. Some two-thirds of the improved land is in pasture, one-tenth under crops and the rest in meadow, and about half the farms are medium-sized, with an average of 60 acres. Most of the remainder are small, and the moderate fertility of the land is reflected in the fact that there are only 45 labourers (but 118 family workers) per 100 farmers. The density of population per square mile was 127 in 1891, and 90 in 1946, a decrease of 30%, and the basin is essentially an agricultural area with a development of coal mining that has left its inevitable imprint on the landscape, but is likely to provide employment for at least some time to come.

Bio. THE TIPPERARY-THURLES LOWLAND

This lowland lies between the Slieve Ardagh on the southeast and the hills of Devonian and Silurian strata that extend from the Roscrea gap

to Tipperary town on the northwest. The lowland is generally about fifteen miles wide and merges at its southern end into the Golden Vein, the famous Munster dairying belt stretching from Clonmel to Limerick: through the lowland runs the main Dublin-Cork railway line like a central artery, with branches to Roscrea, Clonmel and Cashel. Featureless as this lowland may appear, it has complex morphological problems. It is entirely floored by Carboniferous strata, covered almost everywhere by drift, and crossed by morainic belts that mark stages in the recession of the ice from its greatest forward spread in the second general (Midland) glaciation. Bogs are increasingly prevalent away from the outer morainic margins: around Cahir and Tipperary there are no bogs, between Cashel and Thurles they appear as a minor element in the landscape, but east of Templemore they cover many square miles of land drained by the upper Suir and the upper Nore. A 'level' of 400 ft. is widespread in this lowland, but there is an extremely gentle slope southwards towards the 200 ft. level recognisable in the Suir lowland around Cahir and Clonmel: in addition various hills, which may be monadnocks, rise to 600 ft. or even in one case 775 ft. at Killough hill, between Cashel and Thurles. These hills are not numerous, but in an undulating and in places almost flat landscape they are conspicuous: some appear to be due to differential erosion in locally more resistant strata, as in the case of a line of hills almost 600 ft. high formed of crystalline-dolomite to the south of Rathdowney.

Agriculture is the main resource of this lowland and the medium-sized farm is the most characteristic unit, with an average farm size of 60 acres. There are more small farms than large farms, and on the average each hundred farmers has the help of 75-100 labourers and 100 family workers: the net result is a mean of slightly under three workers per farm, a feature typical of a farm economy dominated by units of moderate size. Permanent pastures cover at least two-thirds of the land and most of the remainder is meadow, though the arable acreage 'has been increasing sharply of late. Fodder crops, such as potatoes, mangels and oats, are grown, with some wheat and barley, but the building of a large sugar beet factory in Thurles has stimulated the growing of this testing crop. In 1933, a low-water mark of arable farming in Ireland, as little as 5% was under crops around Tipperary. Cattle production is still the main resource, and the areas around Tipperary and Thurles are usually called 'dairy farming' belts. Even so, three-fifths to three-quarters of the cattle are stores and the farm economy remains mixed rather than specialised. Pig and poultry production is widespread in association with milk, and there are numerous creameries.

Outside the towns, three-quarters of the population are directly

engaged in agriculture: the towns are market centres with small industries processing the agricultural output. Thus, Tipperary has a condensed milk factory, and Roscrea bacon and meat factories. Thurles has revived since the sugar beet factory was built and its population, 6,000 in 1946, shows an advance over any Census date since 1851. Thurles is the centre of the Roman Catholic archdiocese of Cashel, and there is a large ecclesiastical and monastic population around the impressive Romanesque cathedral. Cashel, the older centre, has seen no such growth: it has just over 3,000 people today, and has been virtually stationary for the past fifty years, and Tipperary is in much the same position. But all these, with Templemore, Cahir and a number of small centres that can only be called villages, are the indispensable markets of the lowland, and account for 30% of its population. They are very obviously agricultural centres, and at the humbler levels little more than groups of farms along a road. The density of rural population in this lowland is 60-80 per square mile, and about 80-100 with the towns: the rural population has declined by one-fifth to one-quarter during the past fifty years.

Bn. THE GLEN OF AHERLOW

The Glen of Aherlow, an offshoot of the Suir lowland, lies between the Galtees and Ballyhoura hills on the south and the Slievenamuck ridge on the north. The Galtees, a typical Armorican range made up of Old Red sandstone anticline, rise sharply from the surrounding lowlands to several points above 2,500 ft., culminating in Galtymore, 3,018 ft. high. These mountains have nourished one or possibly two mountain glaciations and have numerous corries, some of which have lakes and block moraines. They persist for some fifteen miles as a range, and then break down into an upland basin worked out in Silurian slates and surrounded by Old Red sandstone ridges—a structural feature similar to that in the Comeraghs and the Slievenaman range.

The Slievenamuck ridge is also formed of Old Red sandstone and rises to 1,216 ft.: its northern edge, which forms a very clear limit to the lowlands around Tipperary, is a fault scarp. The Glen of Aherlow, which is 200-300 ft. high and floored by Carboniferous limestone, is one to two miles wide and over ten miles long, and owes its length to the fact that a fault let down the rocks on the north side of the Galtees so that the easily eroded Carboniferous limestones were brought down to the lowland level. The Glen stands out on the population map as an area of continuous agricultural settlement. There is mixed farming, with the emphasis on dairying: the co-operative creamery at Bansha at the eastern end of the valley and several other creameries within easy reach take milk supplies from the farmers, though butter is also made at home.

Farming is almost entirely restricted to the valley and both the Galtees and the Slievenamuck ridge are heavily wooded, partly with old woodlands and partly with new plantations laid out by the Forestry Commission.

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CHAPTER XV

THE VALLEYS AND UPLANDS OF CORK

THE VALLEYS and uplands of Cork are the heart of the old Munster province, and have a southern softness of climate and verdancy of growth that adds to the attraction of the scenery, which is generally pleasant if rarely striking. The countryside is mainly well farmed, and the holdings are larger than those of Kerry: the great success of the creameries during the past sixty years has meant that dairying still predominates with the result that the city of Cork is, now as for centuries past, the centre of the butter trade. Over forty years ago, Mackinder made a not entirely apt comparison of twentieth-century Ireland with mediaeval England, and said that if Dublin was its London, Cork was its Bristol. Admittedly, Cork is a cathedral city, with industries and wharves beside a tidal river, but perhaps it would be wiser not to push the comparison further. In at least one respect, Cork has some fame in Eire as the home of a people of singular enterprise, always ready to seek fresh worlds to conquer in Dublin or even more distant places invigorated, it seems, by climates more bracing than that experienced near the gently flowing waters of the river Lee. Cork, the natural heart of this region and the one major city of the southwest, is less cosmopolitan than Dublin and therefore more truly Irish in life and outlook.

Mountains and lowland bogs cover one-quarter of this region, and the remainder is dominated by medium-sized farms averaging 75-85 acres around Cork and Mallow, but only 40-50 acres farther west. Pastoral farming for dairying is most prominent, but most farmers also rear store cattle, though sheep farming has declined. As a result of the farmers' main reliance on a return from cattle in some form, the actual land use is pasture first, meadow next and arable crops last and least. Even the arable crops are intended chiefly as cattle feedstuffs or as foodstuffs for home use. Industry, more deeply rooted in this region than in many other parts of Ireland, is based mainly on the processing of agricultural raw materials for the satisfaction of the immediate needs of the rural community: Cork city, however, has recently acquired some heavy industry, but the economic pattern is in general agricultural, and the towns are primarily market centres with a stationary or diminishing population.

STRUCTURE AND LANDFORMS

Nowhere else in the British Isles is the east-west trend of Armorican structural elements as well developed as in this region, which consists of a series of anticlinal ridges, of varying altitude but including some peaks over 2,000 ft., and synclinal valleys drained by streams flowing east, some of which have a right-angled bend before they reach the sea. Anticlinal ridges are by no means an inevitable structural development, and Cole has pointed out that if the Carboniferous strata had been mainly quartzose conglomerates, and the Devonian strata limestones, the superior resistance of the former would have given up-standing ridges with valleys flooded by Devonian strata. This speculation may seem pointless perhaps, except to show that the coincidence of the anticlines with the ridges and the synclines with the valleys depends on the tenacity of the Old Red sandstones which, in this region, are not removed to reveal the more easily weathered Silurian and Ordovician beds.

The country south of a line from Killarney to Dungarvan has the east-west Devonian ridges very perfectly developed: north of this line, the Armorican ranges rise out of a lowland composed mainly of Carboniferous limestone. This limestone disappears near Carrigaline, and is replaced by Carboniferous slates and Coomhola grits: this change is of great topographical significance, as in south Cork both the Old Red sandstones and the Carboniferous strata, especially the grits, form hilly

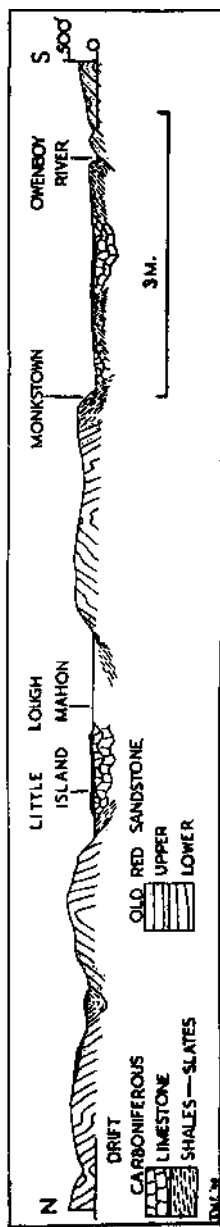


FIG. 66.—SECTION DRAWN APPROXIMATELY NORTH—SOUTH THROUGH LOUGH MAHON

The anticlines and synclines have a sharp development, and the dips are at high angles. The vertical scale is three times the horizontal, but the even nature of the upper surfaces appears clearly.

Copied from the Geological Survey, 1" to 1 mile. Cork District, drift series, Southampton, 1905.

country, though the hills are rarely as much as 600 ft. high and are cut by an intricate system of valleys (see Fig. 66). Farther north the correspondence of river valleys with synclines and ridges with anticlines is much clearer; these are:

1. *The Cloyne Syncline*, which extends from Bally cotton bay to Cork harbour, where the Carboniferous limestones appear in two well-known islands, Spike and Haulbowline.

2. *The Knockadoon-Great Island Anticline*, a ridge with summits of 200-400 ft. in the east, and 600-800 ft. in the west.

3. *The Cork Syncline*, a lowland stretching from Youghal bay to lough Mahon, through Cork city and west into the valleys of the Lee and the (Cork) Bride.¹

4. *The Boggeragh-Nagles Anticline*, in its full extent reaching from the borders of Kerry to the Drum hills, south of Dungarvan. The general level of the sharply dissected ridge is 600-800 ft., but the Nagles rise to 1,400 ft. and the Boggraghs to 2,100 ft. In addition there are small synclinal depressions in this area, notably those around Riverstown, Blarney, and Dripsey, north of Cork: in the east, the river Bride flows through a synclinal valley to join the Blackwater.

The Blackwater is the greatest of all the Cork rivers, and its long west-east course from near Millstreet to the right-angled bend at Cappoquin is one of the most remarkable features in the physical geography of Ireland. The obvious route to the sea is through Dungarvan, instead of through the gorge-like course to Youghal. This strange phenomenon inspired J. B. Jukes to put forward revolutionary theories of river evolution as long ago as 1862; more recently, A. A. Miller has suggested that the original drainage was from north to south, and that the west-east lines have become prominent through an involved series of river-captures in which, nevertheless, certain relics of the original north-south drainage have survived (see Fig. 67). Through this process of evolution, certain levels have achieved prominence; these are:

1. *The South Ireland Peneplane*, around 600-800 ft., which is widely developed in various anticlinal ridges, especially the long ridge lying to the south of the Blackwater valley from the estuary to the Boggeragh mountains, which has swelling crests around 600-800 ft. It is also seen in the Drum hills and on the south side of the Knockmealdowns, which appear to rise above it like a hilly island in a sea. Various ridges and hills south of the river Lee are also around the 600 ft. level.

2. *The Coastal (or Lowland) Peneplane*, which appears to be widely

¹ To differentiate the two rivers named after St. Bridget, that flowing into Cork city has been called the Cork Bride: the other river is tributary to the Blackwater.

represented in many parts of Ireland, around 200-400 *ft.* It is seen with wonderful clarity on the coast here, as everywhere from Waterford harbour to the extreme southwest of Co. Cork.

Miller suggests that the various surfaces represent marine abrasion, and readers are referred to his paper for a full treatment of the subject. At least, their existence is remarkably clear and, as shown on pp. 316 and 325, they are continued into Waterford and across the channel into south Wales. On them, streams flow in senile courses, but plunge down through gorges to reach the major rivers or the sea. Again, the drowning of the estuaries shows that the streams were at one time working to a base level considerably lower than that of the present: in the Lee valley, the rockbed below the alluvium is 40 *ft.* below C.D. at Carrigohane, and 90 *ft.* below O.D. at Cork; this phase is held by Miller to antedate the Ice Age, though there may well have been phases of very low sea level during the glacial period. Leaving aside the complicated history of changes in sea level, one thing is clear: the region has drowned valleys, in which quantities of alluvial material have accumulated, with the result that near the coasts some reclamation has been possible, notably in Cork city, where several islands and marshes have been joined together to form the site of the main part of the town.

The direct influence of the Quaternary glaciation on this part of Ireland was comparatively slight. There were probably two glaciations, but the drift cover is generally thin or even non-existent in some places, such as the areas around the Boggeraghs, Nagles and Knockmealdowns. In the main the drifts are sandy or gravelly, and thick only in a few river valleys, though some of the river gravels and alluvial fans such as those in the Lee valley and near Midleton give particularly fertile soils. In places where the drift is very thin or lacking there are sinkholes and caves, as around Midleton and Mitchelstown, and on most of the limestone lowlands the stream density is low, so that the main rivers must be fed from subterranean sources.

LAND USE

The climatic circumstances of winter mildness, heavy rainfalls and infrequent frosts favour the growth of the various exotics that are also associated with Kerry. The richness of gardens, the density of woodlands, and the abundant wild flowers or garden escapes on waste ground are notable features. Peat bogs are developed only to a slight extent on the lowlands, though they normally cover the higher parts of the uplands. It seems fairly clear that blanket bog does not accumulate on lowlands as easily as in Kerry, Mayo or Donegal, probably because this region has a lower rainfall and better natural drainage. The valleys west of Mallow

show a transition to the Kerry landscape as the pastures become more and more sedge-filled, and patches of bog appear in a steadily increasing degree. Here the proportion of non-improved land is nearly half the total, as against less than one-fifth in east Cork.

Woodland in this region is restricted almost entirely to demesnes, notably in the Blackwater valley, or to slopes too steep for cultivation, especially in the gorges cut in the South Ireland peneplane and a few patches elsewhere. The Forestry Commission's work has not so far meant any revolutionary change in the landscape, for only thirteen properties have been acquired, and in all they cover less than thirty square miles. The largest forests will be located on the Ballyhoura hills, at Kilworth to the north of Fermoy, at Tallow in the Bride valley, at Cappoquin, and near Dungarvan. This region is not destined to be one of the major forest reserves of the country, probably because it is closely farmed over almost the whole area where trees could be grown.

Agricultural transitions and contrasts are numerous, and this region has a complex mingling of small, medium-sized and large farms, with the middle group most significant everywhere. The rich heart of the region is the country to the north of Cork city, an area well served by the excellent market facilities of its regional capital. The valuation of land averages *£*76 per head in the east, and half that amount in the west: typically enough more people are supported on the poorer land which, equally typically, is laid out in smaller farms. This point has been demonstrated by investigation of a sample group of farms on the north Cork-Limerick border, where the amount of labour units per 100 acres (family and hired) was 10-16 on farms of less than 20 acres against 2-17 on farms of more than 250 acres, with a steady progression between these two extremes. In the aggregate, the amount of employment given on farms is relatively considerable, for east Cork has an average of more than 3 workers per farm, and the remainder 2-5-3 workers per farm. In the sample given above, it was found that the amount of family labour used on all the farms, except the smallest, was approximately equal, but that the amount of hired labour employed increases steadily on farms above 60 acres, below which level few labourers were engaged.

Creamery developments in the past sixty years have done much to integrate the economic life of this region. In the sample noted above, over 90% of the total output was either milk or the natural associates of dairying, calves, pigs and poultry. In north Cork, until recently, only about one-tenth of the improved land was sown to crops, and all the remainder was hay and pasture, though in south Cork and the west of Waterford, where cattle production for stores and meat is more significant, the proportion of arable land was as high as 20-25%, even before

the tillage drives. The use of the crops in the north Cork sample was varied, but probably fairly typical of most farms in the region. Oats, the principal crop, was used mainly for livestock, though any surplus was sold. Wheat was milled locally and used at home in most cases, though some farmers sold their whole crop, while others kept back any poor quality crops for the livestock. Barley and sugar beet were cash crops, turnips and mangels were grown for the dairy-herd, carrots, parsnips and green crops for home use, and potatoes both for the family and for the stock. Although the land was used primarily for hay and pasture, essentially the cheapest feed for the livestock, on many of the smaller farms hay was bought and additional pasture acquired through the renting of 'conacre' (see p. 156). The farmers and their households consumed about 13% of their produce at home on almost every type of farm. In some form mixed farming is characteristic everywhere, with stock production as the main aim: towards the south dry cattle for the store trade and, less frequently, local meat markets are more important than farther north, where the creameries have brought even the small farms within the commercial network of the dairy industry, which also includes the butter factories of Cork city and the cheese manufacture of Mitchelstown.

More than seven-tenths of this region is improved land and the limit of cultivation is relatively high: the gaps in the rural settlement pattern are mainly in the higher upland areas. Although a certain number of farms have been withdrawn from cultivation, this region does not show the wholesale advance of rough pasture that may be seen in some Irish uplands. The proportion of the improved land in corn crops fell from 19% in 1851 to 9% before the war of 1939-1945, but doubled during the war years to 18%: wheat is grown on more land than ever before, but the increases in oats, barley and root crops are less striking, and in all 25% of the improved land is in crops against 15% before 1939. As in most of Ireland, the area of hay has increased steadily since 1851, and now covers 17% of the improved land: the most striking development in Co. Cork has been the doubling of the numbers of cattle (c. 524,000 in 1945), pigs (nearly 250,000 in 1940, but 65,000 in 1945), and the steady increase in the number of poultry from c. 600,000 in 1851 to c. 2,800,000 before the 1939-1945 war (c. 2,364,000 in 1945). On the other hand, the number of sheep (c. 176,000) is considerably lower now than during the latter half of the nineteenth century; it is perhaps reasonable to correlate the diminished sheep population with the expansion of dairying, and the associated store cattle trade. The wartime decline in the number of pigs and poultry was due to feeding difficulties, which are perhaps temporary; on the other hand, the stresses of the war years have demonstrated that

the farmers are able to increase arable cultivation when necessary. The main hopes for future agricultural prosperity lie in the extension of creamery production, perhaps with more homegrown feedstuffs, and the grading up of pastures that are inherently rich over the greater part of the region.

INDUSTRIES

Co. Cork and Co. Waterford have a balance of agricultural and industrial life that is reflected in the high proportion of people in towns, and in the considerable numbers employed in commerce and distribution. Only 42% of the employed population in Co. Cork and 39% in Co. Waterford is directly engaged in agriculture, as even in the rural areas many people provide goods and services or work in various small industries. The industrial life is closely interwoven with the agricultural economy. Cork city, still the third town of Ireland in size, gathers up the trade of the countryside, exports its products, and provides it with goods and services, but its industrial life is mainly an extension of that in the rural areas it serves, with the recent addition of a few large-scale heavy industries placed there by government planning. As an industrial centre it is overshadowed by Dublin, which, with its better facilities for trading, has attracted a very large share of the new industries. Cork, therefore, while assured of its place in the industrial life of the country, seems unlikely to grow into a large manufacturing city, and its population will probably remain around 80,000, or 100,000 with various satellite towns and outer suburbs. The provision for a possible population of 250,000 in the Town Planning Report seems at once unreal if in some ways far-sighted.

The creameries of Co. Cork carry industrialisation into the remotest countrysides: most of them are small concerns employing less than a dozen persons, but a few have already become large enterprises employing as many as 100 workers. One of these, at Mitchelstown, produces various light cheeses, but while a number of creameries produce cheeses this side of dairying remains of minor significance. Some of the creameries also deal in eggs, pork and such feedstuffs as maize meal. Bacon production is controlled by large factories in Cork, and there is also a small factory in Cappoquin. Cork also produces factory butter, tinned butter and margarine, and has various concerns controlling the distribution and export of the creamery butter. Milling is a widespread industry in Co. Cork, with a few large concerns in Cork city and many small ones in the various market towns and villages. These mills provide feedstuffs, especially maize meal, and grind wheat grown locally or imported.

Hosiery manufacture is a long-standing development in this region,

with large factories at Cork, including one that employs nearly 1,000 workers, and smaller ones at Bandon and Kanturk, which is one of the comparatively few small towns in Eire more or less dominated by its industry. The trade in woollens and tweeds is also very firmly established: there are several factories in Cork city, and others in Blarney (over 700 workers), Midleton, Fermoy and Dripsey, the last-named a village with a mill employing 100 workers and producing excellent tweeds and woollens, especially blankets. In Cork itself ready-made clothing and weathcrproofs are made to supply the large wholesale and retail trade. Boots and shoes are also made in Cork and there is a large tannery, established in 1936, at Dungarvan. Almost all these industries, it will be noted, are of agricultural origin, even though they depend to a considerable extent on imported raw materials. Two other special trades are distilling, by a firm in Cork with a branch in Midleton, and brewing in Cork city. Stout and porter are produced, and consumed in various tied houses—this is the one part of Ireland in which the 'tied house' system predominates.

The industries lacking any perceptible agricultural basis are located almost entirely in the city of Cork. They cover a wide range of articles and depend mainly on imported raw materials. Engineering trades include ironwork, electrical equipment and allied heavy steel and motor manufactures. The building trade is supplied by lime and timber merchants, retail concerns by several firms making confectionery and soft drinks, and there are also stationery and printing works. The prosperity of Cork depends very largely on its import as well as its export trade, and some recently established firms may help to restore prosperity to the city and its satellite towns. Cobh (Queenstown) lost a great deal of trade through the withdrawal of the British Naval dockyard, but the first heavy steel mill in Eire, established on Haulbowline island in Cork harbour, should fit into the network of the engineering and building concerns already there. Ford cars have been made in Cork for over twenty years, and Dunlop tyres and rubber articles are also produced in the city. These non-agricultural industries have spread outside the Cork focus only to a very limited extent, though mention should be made of an ironwork and general engineering factory at Macroom and a pottery at Carrigaline that produces earthenware of unusually attractive design and colour.

POPULATION

This region had a population of 409,000 in 1891, 340,000 in 1936, and 330,000 in 1946, with a density per square mile of 152, 125 and 123 respectively. The decline of 19% in the total population covers a loss of 30% in the rural areas and a slight increase in the towns as a group,

though in actual fact only Cork has gained to any significant extent, and most of the smaller towns are stationary or declining in population. All the towns together now include over two-fifths of the inhabitants against one-third in 1891. As there are some industrial developments in rural areas, there is a socially healthy balance between agricultural occupations and those connected with industry and commerce.

The relatively even pattern of settlement is largely an indication of the size of farms, and outside the closely settled area around Cork harbour, where farmlands and outer suburban developments interpenetrate, the density per square mile is generally 50-100 per square mile in the east, about 100 per square mile in the centre, and rather more in the west, especially the northwest. In the actual mapping (*cf* Fig. 68) it was found that farms are generally built on roads, and some of the areas apparently unoccupied are in fact covered with fields. Apart from a few hill masses, such as the Nagles, Boggeraghs, Ballyhouras and the Knockmealdowns, gaps in the agricultural occupation are infrequent. Only in the extreme west on the border with the Kerry-West Cork region (see Chapter XVI) is there any marked population divide, and even there the farmlands of the upper Blackwater valley are linked with those to the east of Killarney (*cf* Figs. 68, 72). Ribbons of agricultural settlement penetrate the various uplands, generally along hillside roads, and there is no uniform limit of occupation; the frontier of agricultural settlement lies between 600 ft. and 1,000 ft., and the extent of withdrawal from the maximum occupation depends largely on personal factors.

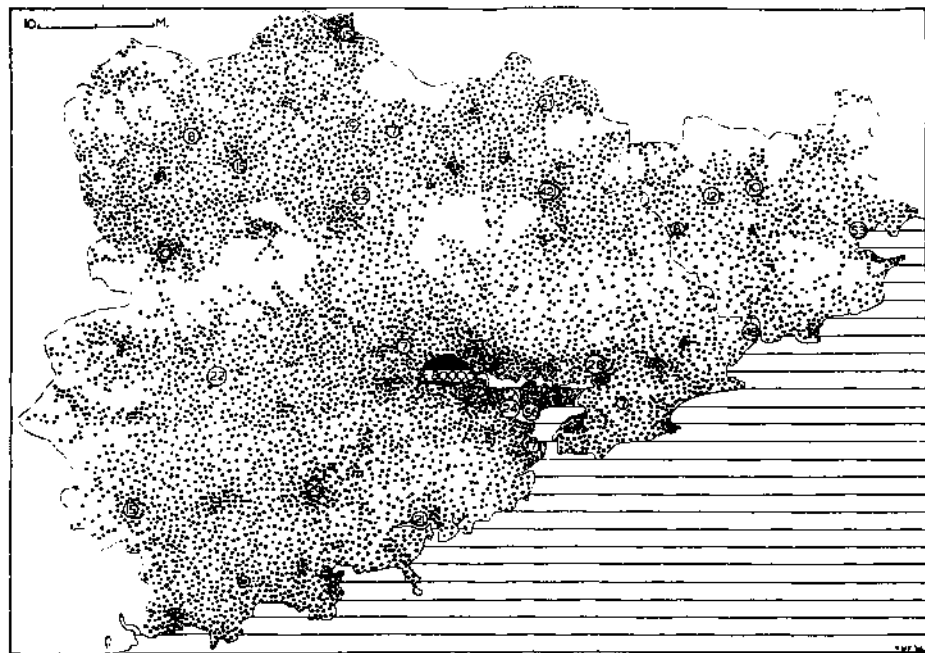
Population decline in the various rural districts between 1891 and 1946 ranges from 24% in Kanturk to 50% in Youghal. The Cork rural district shows an increase of 5% in the same period, but actually it declined in strength from 1901 to 1926, and has been gaining since then, due entirely to the outward spread of Cork to such neighbouring districts as Ballincollig, Bishopstown and St. Mary's: the essentially rural areas have declined. The Cork conurbation as a whole has not increased markedly during the past sixty years, though it has been spread out by the movement out of the city into suburbs, and as a population unit it has certainly failed to absorb its natural increase, so that it is an area of net emigration rather than of immigration. And the superior industrial and commercial pull of Dublin will probably remain in any predictable future.

Rural areas along the seaboard show particularly heavy declines of population, which may be ascribed partly to the decay of fishing, a feature common to the whole of south and southwest Ireland (see also p. 379 *ff.*) The main loss, however, is due to an emigration movement from the farms which, though considerable, would have been even more marked but for the successful developments of the creameries. While none of the

HG. 68.—POPULATION DISTRIBUTION, CORK UPLANDS AND VALLEYS

One dot to 25 persons.

Cork and its satellite area appears very clearly: elsewhere the gaps are mainly uplands and the settlement is slightly more intensive in the west than in the east. The coasts were formerly very densely populated, but it is not so now.



areas possessing creameries have decreases as slight as those in North Kerry and Limerick, the decreases in Kanturk, Millstreet, Mallow and Mitchelstown (24-30%) are considerably less than those of areas farther south in the region, and there are at least some signs that the drain of population from these areas is lessened, if not perhaps arrested, by these creamery developments. All the small market towns of this region declined between 1891 and 1946, with the exception of Mallow and Dungarvan, both of which have some small industries. The decline is partly a direct reflection of the loss of population in the rural areas with which the smaller towns are so closely associated: in addition, the whole modern tendency is towards the centralisation of industry, commerce and marketing, and trade is drawn towards such a centre as Cork to the detriment of smaller towns, most of which have very few of the new Eire industries (but see pp. 349-350). The departure of the British Army and Navy has affected some towns adversely: thus Cobh declined from 8,200 in 1911 to 6,200 in 1936 and 5,600 in 1946; Fermoy from 6,900 in 1911 to 4,100 in 1936, but 4,200 in 1946. Fishing centres had comparable decreases: Kinsale had 4,000 people in 1911, 2,400 in 1936, and 2,100 in 1946. The social changes involved in some of these towns are considerable, and in many of them the Protestant communities have now merely a fraction of their former strength: Fermoy lost 93% of its Protestant population between 1911 and 1926, and even in Cork city the loss was nearly 50% during the same period. On the other hand, there are long-established Protestant communities, consisting mainly of Irish farming families, in West Cork, who remain in strength to this day (see also pp. 170, 177).

SUBREGIONS

The structural unity of this region as a whole is one of its most striking features; as a population unit it has few blank patches between its settled lowlands, and there are few lowland bogs to separate one area of fertile soils from another. But it possesses an abundance of extremely small regional entities, such as valleys cut in Carboniferous limestone between the well-defined peneplaned ridges of Old Red sandstone, or again, hidden estuaries with towns and villages around harbours whose significance belongs to the past rather than to the present. Only an infinitely detailed scheme of division could do justice to so varied a landscape, but the subregions used here are at least a convenient descriptive framework and will be found to possess a certain individuality.

1. THE CORK NUCLEUS (Fig. 69)

This includes the city of Cork and the area dominated by it around Cork harbour, and the lower parts of the Bride and Lee valleys. Its

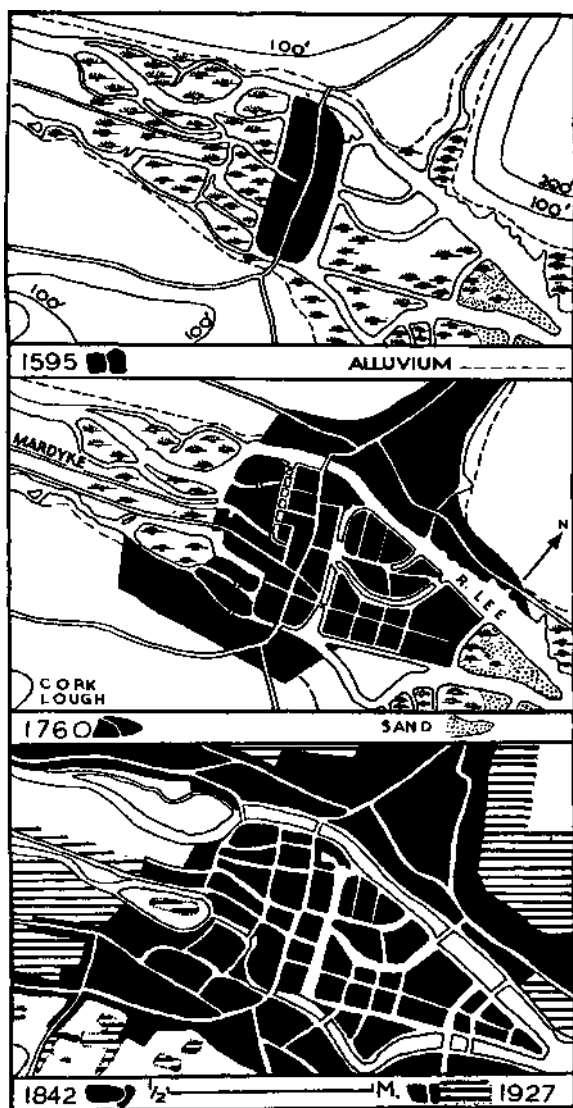


FIG. 69.—THE CITY OF CORK

The marshes in the Lee valley were gradually united, and the channels between them were covered in to form the main streets of the city.

Based on maps in the Geological Memoir 'The country around Cork and Cork harbour' Dublin, 1905, and the 6" to the mile maps, by permission of the Minister for Finance of Ireland.

structure is simple and striking: the entrance to Cork harbour is a mile-wide gap through a ridge of Old Red sandstone and the harbour, with its extensive anchorage and deep channel for shipping, is the submerged part of a synclinal valley of Carboniferous strata. Great Island, part of an Old Red sandstone anticline, is defined by two drowned valleys, of which the western carries a shipping channel to lough Mahon, a wide sheet of water in the synclinal trough which runs from Cork to Midleton and Youghal. Cork city is placed at the head of navigation on the Lee, and its quays and wharves, which have water up to 30 ft. deep, receive most of the shipping, though transatlantic liners use Cobh as an outpost. The city and its dependent towns have a population of over 100,000, of whom 75,000 are in Cork, which shows, in its area of four square miles, the congestion of most Irish cities and towns. It is now spreading out along the various main roads, as it has done throughout its history; the modern suburbs lie on the Old Red sandstone hills to the north and the lower Carboniferous limestone country to the south.

Few cities have a more attractive site, for there is great charm in its long winding sea channels with a river divided into two arms around the very centre of the city, and wooded suburbs on higher ground to the north and south. The first origins are associated with the arrival of St. Finbar about A.D. 600. The exact site of the first monastery is not known, but it may have been that of St. Finbar's cathedral (Church of Ireland) on the south side of the river. Norse raids in the ninth century were apparently directed against the monasteries, but the Danes probably began the settlement on the marshes in the Lee, where the walled town which grew up later became an Anglo-Norman stronghold. It has been suggested that Cork grew around two centres, one on the marshes, and the other on the higher ground to the south of the river. The former is still part of the city centre, but the walls, partly destroyed by cannon in 1690, when the city was still faithful to James II, gradually decayed and were never rebuilt. The process of reclamation had begun long before this date, and the channel which ran through the city from east to west had been covered in by the beginning of the seventeenth century. There was already some settlement on the firmer ground to the north and south, but its exact limits are uncertain. By the middle of the eighteenth century reclamation of the marshes had brought the centre of the city to a state at which it bore some resemblance to Venice or Amsterdam of the present day. The old main street through the original walled city survived, as indeed it does still, but buildings covered most of the marshes, and a large number of bridges crossed the channels between them. The Mardyke, a promenade that runs through the west of the city, was laid out in 1720. Island Cork was complete in form by the end of the eighteenth century;

its channels were covered and spacious streets, notably Grand Parade, Patrick Street and South Mall, were already laid out. The final developments included the construction of numerous quays, altogether four miles long, of which some are used for shipping and others merely as promenades. The suburban development continued, but the extent of building between 1842 and 1927 was surprisingly small. The city's population, 81,000 in 1841 and 75,000 in 1946, has changed very little during the past century, and most of the new houses lie beyond the city boundaries. Cork does not possess the impressive Georgian architecture of Dublin, Waterford and other Irish towns, as most of its eighteenth-century houses are of red brick imported as ballast on ships that maintained the then profitable export trade with the Netherlands. Some of the later buildings have a pleasing mixture of red sandstone and white limestone, but the latter finally prevailed, and Welsh slates gradually became universal. One of the city's major problems is the large number of very small houses that has fallen into decay, but its main streets and quays are dignified and attractive, and the Mardyke on the west runs beside a large public park. (See also pp. 349-350).

The chief geographical interest of Cork lies in its position as a regional capital serving a primarily rural community. Port, industrial centre, Cathedral and University town, it is a minor metropolis, but there are elements of uncertainty in its future. Heavy engineering industries have replaced those associated with the British naval dockyard before 1921; but while the long-established woollen and agricultural industries appear to possess assured prospects, Cork will have to face the increasing industrial power of Dublin, with its superior port facilities, its greater natural nodality and its proximity to the British export market. The future of Cork depends upon the maintenance of its maritime trade with Britain and America, and on the prosperity of the agricultural hinterland that it serves. If air traffic supersedes shipping, Limerick's location on the Atlantic air routes may affect Cork adversely by drawing away trade.

2. SOUTH CORK

South Cork is dominated by ridges formed of Old Red sandstone and various Carboniferous slates and grits: the clearest morphological features are the South Ireland peneplane, here at 600-750 ft., and the 200-400 ft. surface, which is best seen in the many cliffed headlands along the coast. The river system is extremely complicated, but there is an interplay of west-east and north-south stretches seen, for example, in the Bandon Valley; the only Carboniferous limestone valley is that drained by the Owenboy river to Cork harbour through Carrigalinc (see Fig. 70). The

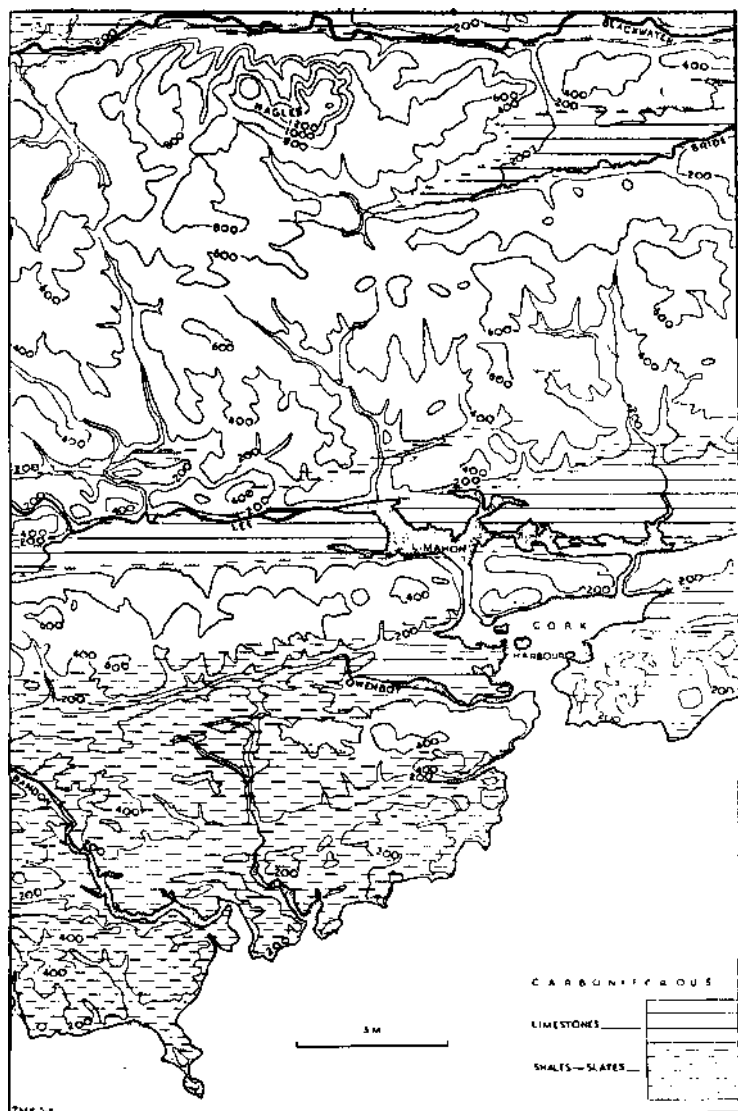


FIG. 70.—COUNTRY FROM CORK HARBOUR TO THE BLACKWATER VALLEY

Anticlinal ridges and synclinal valleys appear very clearly: Old Red sandstones form the greater part of the area north of the Lee, though Carboniferous beds occur in the synclinal valleys, such as the Blackwater, the Bride and the minor depressions around Blarney and Biverstown. In the extreme south Carboniferous limestones merge into slates and shales, some of which show a marked resistance to erosion.

rivers, incised into the surfaces, reach the sea through the long winding estuaries that interrupt the cliffed coast, but few ships now reach the little ports, as fishing has declined almost to extinction. South Cork now lives mainly by farming the valleys and uplands, and medium-sized farms are the most usual type. The farming is mixed, with as much as one-fifth of the land in crops, especially oats and potatoes, over most of the area, and cattle are reared for dairying as well as for the store trade. Creameries are less numerous here than farther north, but the Cork butter market is easily accessible. Sheep are reared, but they are generally of subsidiary importance to cattle, pigs and poultry.

The rural density of population in this area is now 60-100 per square mile, but in 1891 it was 100-150 per square mile. The small market towns, such as Kinsale, Clonakilty, Bandon and Dunmanway, have lost population in harmony with the rural areas for various reasons which include the decline in fishing: there are less than a hundred fishermen along this coast today, but fifty years ago there were several hundreds and the harbours were regularly visited by fishing smacks. Kinsale, which had 4,600 people in 1891 and 2,100 in 1946, has been described by Lennox Robinson in a book that recalls the social atmosphere of the pre-1914 years, when the Protestant community of south Cork was much stronger and the British garrison still of considerable social significance. In addition, fishing smacks came from far and near to the little harbours along the coast.¹ Kinsale itself, with its narrow winding streets, had gentlemen's houses side by side with shops or small houses, and a street which seemed almost a slum would suddenly display a large house, and behind that house would stretch a very large garden crammed with fruit trees.' Now, however, 'the Kinsale people are fewer and the ancient town is so depopulated, so stagnant as to be almost dead. The mackerel and herring in their queer inconstant way suddenly deserted the Kinsale waters. No Manxmen and Cornishmen, no men from Scotland come any more, and in place of the four or five hundred fishing smacks which once used to moor on a Saturday night round the harbour, so close together that you could walk the whole way stepping from deck to deck, there is not now a single craft bigger than a drier to be seen. The battalion of infantry was withdrawn after the Anglo-Irish treaty, and in a spasm of upside-down national enthusiasm the empty barracks was burned down, and its empty skeleton broods gloomily over the town. The coastguards went too, and the coastguard station was burned like the barracks... the social life sickened and the fine old parish church of St. Multose emptied.

¹ Robinson, L., *Three Homes*, Dublin, 1938, pp. 65 and 134-135.

3. THE LEE AND BRIDE VALLEYS

The Lee and Bride basins are dominated by the South Ireland peneplane and bounded by a girdle of hills that includes the Boggeraghs on the north and the Derrynasaggart and Shehy mountains on the west. On the south, however, there is no clear limit to this subregion. The Bride flows through a deep valley in the Old Red sandstone ridge from its source to a point seven miles west of Cork, where it joins the Lee, which has traversed a wide open synclinal valley floored with Carboniferous limestone. This syncline maintains its identity through lough Mahon eastwards to Midleton, Castlemartyr and Youghal harbour.

East of Macroom there is almost continuous farmland, but farther west the proportion of rough pasture steadily increases and gaps in the settlement pattern become more frequent even on the lowlands, for bogs develop more readily as the rainfall increases steadily to the west. In effect, this is an indication of transition from the fertile and verdant lands of Cork to the saturated lands of the west. The farms over the whole of the subregion average 50 acres, and the density of population per square mile is now slightly under 100, as against 160 in 1891. These figures are for the Macroom rural district which, though not exactly conterminous with the subregion, represents its main features fairly accurately. There are twelve family helpers and six labourers to each ten farmers: the dependence on family rather than hired labour is also typical of an area not too richly endowed in agricultural resources. The agricultural production is mixed farming, with dairying as an important element as most of the farmers supply milk to the creameries. The loss of rural population has been 46% since 1891 in the rural areas: Macroom, which had 2,200 people in 1946 compared with 3,500 in 1891, is the largest market centre, and over 80% of the population lives in dispersed habitations.

4. THE BOGGERAGHS, NAGLES AND MALLOW GAP

The Old Red sandstone ridge between the Blackwater valley and the Cork syncline is mainly 600-800 ft. high, but mountain ranges rise above this level to 1,400 ft. in the Nagles and to 2,100 ft. in the Boggeraghs. These ranges are sufficiently extensive to make gaps in the settlement pattern of Co. Cork, but the gaps are insignificant in comparison with those made by the mountains of Co. Kerry farther west. There is continuous agricultural settlement between the two ranges, in a lowland some eight miles wide, and the limit of cultivation varies from 600 to 1,000 ft. The farming is mixed, with specialised milk production for creameries and for the Cork market. The main railway line from Dublin to Cork

crosses the Blackwater at Mallow by a long viaduct, climbs 300 ft. in seven miles, and then runs to Cork along a track hardly less steep.

5. THE NORTH CORK LOWLANDS

These lowlands are defined by the edge of the Old Red sandstone ridge on the south, by the Carboniferous uplands that extend into north Kerry and Limerick on the nordrwest, and by the Ballyhouras and Kilworth mountains on the east. Covering an area of approximately 800 square miles, the lowlands are typical of many hill-girdled areas that lie between the lower Shannon, the Barrow and the Blackwater. Wide gaps continue the settled agricultural lowlands into Co. Limerick through Charleville, into the middle Suir valley through Mitchelstown and into the lower part of the Blackwater valley through Fermoy. At Mallow, the natural centre of this basin, the main Dublin-Cork railway line crosses the east-west line from Waterford to Killarney.

Four-fifths of this lowland is in farms, which are spread fairly evenly across the peneplane surfaces of which it is formed. In the east, around Mallow, Mitchelstown and Charleville, the 200-400 ft. surface" (or surfaces) is developed and to the west, around Millstreet and Kanturk, the 600-800 ft. surface appears. The area is drained by various tributaries of the Blackwater, but the stream density is conspicuously low over much of the Carboniferous limestone area, and the drift cover is generally thin or even absent. Around Mitchelstown there are a number of underground caves. In the inter-war period the proportion of arable land was in some years as little as 10%, with as much as 70% of the improved land in pasture and the remainder in meadow. The reliance on dairy cattle is most marked in the west around Millstreet and Kanturk, but it is also considerable around Mitchelstown, Charleville and Mallow. Everywhere the creameries are a dominant influence; at Mitchelstown the creamery is in effect a large factory specialising in butter and cheese, with an egg-collecting station and a pig farm: in all some 200 people are employed. The establishment of one of Eire's four sugar beet factories at Mallow has stimulated beet growing, but many farmers, here as elsewhere, regard it as a crop demanding far too much attention to be really profitable. The farms are generally medium-sized, of 30-100 acres, with a number of holdings between 15 and 30 acres and some large farms. The population has declined by one-quarter since 1891, and is now 70-100 per square mile of improved land. Mallow (5,200), the largest of the market towns, has gained in population since 1891: the others, Millstreet, Kanturk, Charleville and Mitchelstown, are smaller, with populations of 1,000-2,000. Kanturk (1,500 in 1946) has a successful hosiery industry, but most of the towns and villages, which together include about one-fifth of the

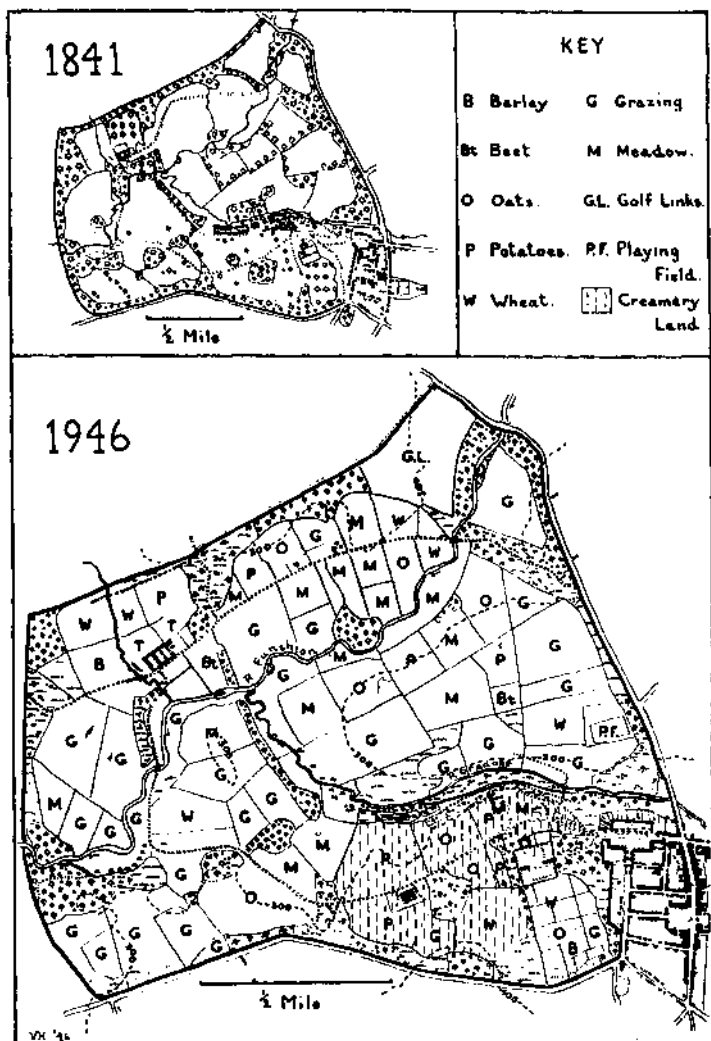


FIG. 71.—MITCHELSTOWN, CO. CORK; THE DEMESNE AND TOWN, 1841 AND 1946

The town has changed very little during the century but the castle was burnt in 1922, and the demesne now includes fourteen farms, a modern piggery owned by the Creamery, which employs 200 people, mainly in cheese manufacture.

The upper map is taken from the 1841 Survey: the lower is based on the map issued in 1937, by permission of the Minister for Finance of Ireland. Drawn by D. Vida Henning, and first published in 'Irish Geography,' vol. I, p. 98.*

population, are merely agricultural centres with a few shops, banks and market facilities, though the creameries have already carried a small measure of industrialisation into this dominantly agricultural area (see Fig. 71).

6. THE MIDDLE BLACKWATER AND BRIDE VALLEYS

The North Cork lowland gradually narrows into the Blackwater valley around Fermoy, and the river flows for nearly ten miles between the Knockmealdowns and the ridge that separates it from the Bride valley. The Knockmealdowns here consist mainly of the South Ireland peneplane surface, c. 600-800 ft., deeply incised by valleys now grading their courses to the Blackwater and crowned by lines of hills, nearly 1,200 ft. high south of the Araglin valley and over 2,000 ft. high to the north, where the highest summit is 2,609 ft. The ridge between the Blackwater valley and the Bride has several hills 500-600 ft. high and is broken by a gap south of Fermoy, now a marshy hollow drained by the Shanowennadrimina stream, but probably a relic of the consequent drainage pattern. The Bride valley is a clearly defined synclinal trough with patches of the South Ireland peneplane on either side.

More than two-thirds of this area is improved land: farmlands spread with little interruption from the valleys to the peneplaned surfaces above them, and reach an altitude of as much as 1,000 ft. There are, however, extensive woodlands on the steeper slopes of the Knockmealdowns, on the ridge between the Blackwater and the Bride, and in numerous demesnes along the Blackwater valley. The farms average 65-80 acres, and while medium-sized farms are the predominant type, there is an appreciable number of large farms. Thus in Fermoy rural district nearly 30% and in Lismore rural district approximately 20% of the farms are of more than 100 acres. As the amount of employment given on farms is comparatively slight (the average is two family or hired workers around Fermoy and rather less around Lismore), the density of population per square mile of improved land is relatively low and generally averages 60-70. Close inspection of Fig. 68 will reveal the thinness of the population distribution. There has been a decline of more than 30% in the last fifty years and Fermoy has lost heavily through a variety of causes (see p. 353). However, the area is one of considerable agricultural significance, with pasture covering seven-tenths of all the farmlands, and the remainder divided almost equally between crops and meadows. The store cattle trade is generally more important than dairying and creameries are less numerous than farther west.

7. THE DUNGARVAN LOWLAND

The lowland between Cappoquin and Dungarvan is as clearly defined a part of the synclinal Carboniferous limestone trough as the Blackwater valley; on the south, the Drum hills carry the Old Red sandstone ridge to its sharply cliffed termination in Helvick head, and on the north there is a sharp break of slope at the edge of the 600-800 ft. peneplane. This erosion surface forms a saddle cut by several rivers, crossed by various roads and partly occupied by farms between the Knockmealdowns and the Monavullagh mountains. The main morphological interest lies in the continuation of the tectonic line that extends from Dingle bay to its extremity in Helvick head, and in the failure of the Blackwater to continue its subsequent course across this lowland, which is drained by sluggish streams incapable of effecting river capture. Otherwise it is merely an agricultural area of mixed farming generally similar to that described above with one main market and small industrial centre in Dungarvan (population 5,300 in 1946) placed beside a sand-encumbered estuary that is the drowned end of the lowland.

8. THE DRUM HILLS—ARDMORE AREA

To the east of the lower Blackwater an intricate landscape of heathery ridges and cultivated lowlands is developed on Old Red sandstones and varied Carboniferous strata. The northernmost ridge runs almost unbroken from Helvick head to the Blackwater and includes a number of summits from 500 ft. to nearly 900 ft.; this and the other ridges, one of which has a summit of 991 ft., probably belong to the South Ireland peneplane. But the 200-400 ft. level of the Coastal (Lowland) peneplane is also well represented in various ridges above the depression worked out in the less resistant Carboniferous beds. The coast from Helvick head to Ardmore bay is a cliffed ledge similar to that farther east in Co. Waterford (see pp. 316, 325), on which the streams flow in wide open valleys before descending in gorges to the sea. The southern coast between Ardmore and Youghal has two clearly defined ridges of Old Red sandstone just over 200 ft. high, and separated by Whiting bay, cut in Carboniferous limestone.

The density of population is 50-60 per square mile of improved land, and the decline in numbers has been more than 40% during the past sixty years, due in part to the lessened employment in fishing. Ardmore and Ring are primarily fishing villages, with some tourist developments, and there are about 200 fishermen in the area: one of the tourist attractions is the presence of an Irish-speaking community cut off from the main Gaeltacht (see pp. 179, 181). Mixed farming is dominant, with both stock rearing and dairying, though the only creamery serving the area is

at Dungarvan. Three-quarters of the farmland is in pasture, some 15% is cropped and the remainder is meadow. The medium-sized farms are the most frequent, though nearly one-third of all the farms are of less than 30 acres; for each 100 farmers there is an equal number of family helpers and some 65-70 hired labourers.

9. SOUTHEAST CORK

Three peneplaned ridges of Old Red sandstone and two low-lying troughs filled with Carboniferous limestone form the southeast of Co. Cork. From south to north these are the cliffed coastal ridge at 200-300 ft., the Cloyne depression, the Knockadoon ridge over 300 ft. high, the Midleton depression and finally a wide ridge that rises to 800 ft. The east-west line offolding is very clearly seen in this area, particularly along the coast where the Old Red sandstones stand out as headlands and in cliffs above the sandy bays of the Carboniferous lowlands. One feature of special interest is the existence of several reef-knolls in the Midleton synclinal trough: these rise as small hills to more than 100 ft. and may be more numerous than the present records suggest.

This area has a rural density of population of 55 to the square mile of improved land, and farms cover seven-tenths of the total area. The farms are mostly medium-sized, with an average of 84 acres in the Midleton area and of 65 acres around Youghal. The store cattle trade is more important than dairying and nearly one-quarter of the land is normally given to crops, chiefly to oats and barley with potatoes and feedstuffs. The rural areas have declined in population by one-third in the past fifty years and the towns, which include nearly half the population, have also declined, but less heavily. These include Youghal (4,800 in 1946) and Midleton (2,800), both of which are market centres; in addition Youghal is a seaside resort and has some sea and river salmon fishing. Altogether there are some 250 fishermen in this area, of whom nearly half live in Youghal and the remainder in Ballycotton and various villages around Cork harbour. Cloyne, a village of less than 700 people, has a cathedral dating back to the eleventh century.

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CHAPTER XVI

KERRY AND WEST CORK

THIS REGION, the extreme southwest of Ireland, is deeply penetrated by the sea in a series of rias with numerous islands: it is at once maritime, peninsular and mountainous. Maritime in its climate of mild moist days with a small annual range of temperature, it has a prodigality of vegetative growth reminiscent of Cornwall or Brittany; peninsular in its penetration of the Atlantic, Kerry is the most westerly part of Europe; mountainous everywhere, it has some of the finest ranges in Ireland through the combined effects of long-continued denudation and glacial sharpening. Some places in southwest Ireland have scenery of international fame, such as the lakes of Killarney, a complicated series of waters in a wide wooded valley surrounded by mountains, or the harbour of Glengariff, set with many small islands in an amphitheatre of heathery hills having subtropical vegetation on their lower slopes. The charm of the scenery lies largely in the many local contrasts that this region provides by the intermingling of sea and land, hills and valleys, woodland and moorland, farmland and bogs.

Climatically the resemblances between southwest Ireland, Cornwall and Brittany are striking, but there are also similarities with other parts of the western fringe of Ireland. These are partly climatic, partly vegetational but not structural, for the southwest belongs to Armorican Europe, and Donegal and West Connacht to Caledonian Europe. There is an overriding human unity along the western seaboard, most clearly revealed when the investigations of the Congested Districts Board showed that the poverty of Donegal and West Connacht was matched by that of Kerry and the west of Cork, even though the fragmentation of the land into tiny farms was less marked. Southwest Ireland remains to this day an area partly dependent on remittances from emigrant relatives and it is still unable to absorb its increase of population within the region. Some developments that seemed likely fifty years ago seem highly improbable today, for fishing has declined, specialist vegetable growing has never developed and the tourist industry is restricted to certain areas and provides employment only for a select few. There has, however, been a considerable rise in the standard of living, partly through agricultural improvements, and the housing is very obviously better than at any previous period.

STRUCTURE AND LANDFORMS

The main structural lines are clearly seen in the long anticlinal Armorican ranges, primarily composed of Old Red sandstones, separated by

synclinal valleys filled with Carboniferous strata. Marine submergence has etched out six separate peninsulas with drowned valleys or rias between them; these are, from north to south:

1. *The Kerry Head Peninsula*, which has rugged hills rising to 700 ft.; it is merely a miniature of the Dingle peninsula some ten miles farther south.

2. *The Dingle Peninsula*, which rises sharply from the lowlands around Tralee and runs for nearly forty miles westward to the Blasket islands, which have precipitous cliffs over 900 ft. high. The greater part of the peninsula consists of mountains deeply seared by valleys, and the major lowlands are in the extreme west.

3. *The Iveragh Peninsula*, the greatest of them all, thirty miles long and fifteen miles wide, which has a long line of mountains in the south with twenty summits of more than 2,000 ft., and the Reeks in the north, a sharply glaciated range culminating in Carrauntoohill, 3,414 ft. In the west of the peninsula there are a number of isolated hills overlooking wide and generally bog-covered lowlands: hills dominate the landscape to the Very shores of the Atlantic and perish only in magnificent cliffs several hundred feet high and as challenging as the Blasket islands at the western end of the Dingle peninsula.

4. *The Caha Peninsula*, between the Kenmare 'river' and Bantry bay, is of similar length to the Dingle and Iveragh peninsulas, but little more than ten miles broad at its base. It is sharply indented by the sea towards the west, where there are a number of natural harbours and islands such as Bear island, which shelters the magnificent anchorage of Berehaven. The peninsula has a striking mountain range with many summits over 2,000 ft., and the tourist road from Kenmare to Glengarriff crosses the range by climbing with difficulty to over 1,000 ft. through a series of tunnels. Only in the extreme west is there easy passage from north to south, and even there the lowlands are very restricted: the greater part of the coast is sharply cliffed.

5 and 6. To the south of Bantry bay there are two peninsulas which terminate in *Sheep's head* and *Mizen head* respectively. These peninsulas have hills lower than those farther north, with summits mainly around 1,000 ft., but the Armorican line is clearly seen. Lowlands are very restricted in the Sheep's head peninsula, which is ridge-like in form, but the Mizen head peninsula consists of hills and valleys intermingled one with another.

Peninsular Kerry and West Cork is drained by short and immature rivers with waterfalls, rapids and lakes. The topographical detail is due largely to the glaciation, the full history of which has not been worked out,

though in the last stage there was an icesheet lying to the west of Kenmare, from which ice moved northwards through the Iveragh peninsula to Dingle bay, and southwards across the Caha peninsula to the area around Skibbereen. The lower hills to the south of Bantry bay were completely covered by ice, but the greater mountains of the Caha and the Iveragh peninsula had unglaciated summits rising as nunataks above the valley and piedmont glaciers. The Dingle peninsula had its own valley glaciers, perhaps at the same stage, and it seems fairly clear that around Dingle bay there are certain areas that were never ice-covered at all (see p. 28 and Fig. 5). In short, no two valleys are alike, though almost all in the mountains show the very clear imprint of glaciation. Corrie basins occur singly or in a series; hillsides and valley heads have been made precipitous by glacial erosion and have moraine-dammed lakes; and moraines spread themselves in a bewildering series both in the valleys and on the surrounding lowlands. The form of the actual mountains depends largely on their former proximity to the snow-line: Mount Brandon in the Dingle peninsula and the Reeks have striking aretes, but the lower hills of the Dingle, Iveragh and Caha peninsulas have smooth upland surfaces that contrast sharply with their strongly glaciated valleys. Peninsular Kerry and West Cork are a museum of glacial forms worthy of very close study.

The land forms of north and central Kerry are more subdued. They include the only continuous lowland of southwest Ireland: this is developed on both lower and upper Carboniferous limestones and extends from a point east of Killarney to the inner shores of Dingle bay, around the Dingle peninsula to Tralee and northwards to the Shannon through Listowel. It is covered almost everywhere by glacial drift and has extensive areas of reedy pastures. Sharply delimited by the Old Red sandstone hills of the Dingle peninsula and the striking hillfoot, also of Old Red sandstones, from Killarney to Glenbeigh, it is also defined by the hills of Upper Carboniferous Coal Measures and flagstones that cover a large part of east Kerry and extend into Cork and Limerick. These uplands have flat rounded outlines with wide valleys, and are deeply covered by peat resting on drift.

LAND USE

Kerry and West Cork have the oceanic type of west maritime climate developed in its fullest form, and while the climate and weather is in some ways similar to that of the west of Connacht and of Donegal, its closest parallels are to be found in southwest Wales, the extreme southwest of Cornwall and the Atlantic coast of Brittany. The winter mean temperatures of 44°F. are similar to those of Falmouth and Penzance and also to those of Biarritz and Marseilles. No visitor to Kerry in winter could fail

to observe the spring-like atmosphere and the continuing growth of vegetation. The temperatures in west Connacht are similar, but Kerry owes its richer vegetation largely to the natural shelter provided in various hill-girdled valleys. There is a small diurnal range of temperature, averaging only 7°-8° in winter, and severe frosts are remarkably rare. At Cahersiveen (Valencia observatory), 7⁰ of frost were recorded on only six occasions in thirty years: the lowest temperature was 20°F. in the winter of 1893-1894. This fact does much to explain the subtropical luxuriance of vegetation, the survival of many evergreen forms and the rich development of ferns and mosses. Winter is the season of heavy rainfall: Cahersiveen has three-fifths of its mean annual rainfall of 56" between October and March, with rain on three days out of four, but an annual average of only five days with snow.

The southwest coasts of Ireland are subject to high winds and exposure affects the vegetation almost to the point of domination. Sheltered valleys have woods of oak, birch, ash, hazel, holly and even arbutus, with many introduced trees in great luxuriance (see pp. 72-73), but the rich woodlands of Killarney and Glengariff are exceptional and blanket bog covers most of the hills and valleys of the peninsulas, with clearings on better-drained soils or even in the heart of the bog-lands. Some of the bogs have been so thoroughly cut that the sub-Boreal forest is revealed *in situ*. Few trees are to be seen in exposed places, for any small woodlands are windcut; windbreaks are established only with difficulty. At once capable of great luxuriance and sombre desolation in its vegetation, Kerry has some treasured remnants of the natural forest cover (see pp. 71-72): the Forestry Commission has taken over only two small areas covering three square miles for development, at Killarney and Kenmare.

Kerry and West Cork belong in many ways to the maritime west of Ireland in their agricultural life, and in 1891 almost the whole of the peninsular areas were congested, together with the poorest parts of the uplands and lowlands in north Kerry. But the very small farms typical of Donegal, Mayo and Galway are much less prominent in Kerry and West Cork, and medium-sized farms of 30-100 acres are the main group, with a small but important percentage of large farms. Since 1891 there has been an interesting adjustment of population to farming resources. The areas ranked as the poorest in 1891 have lost most heavily in population, while the more favoured parts of the north Kerry lowlands have lost less sharply or even shown a slight increase in numbers. In north Kerry there has been a limited but useful development of co-operative creameries; marketing facilities for dairy products have greatly improved during the past fifty years. The southwest of Ireland does not now present the severe problems of agricultural adjustment still present in Donegal, Mayo and Galway,

largely because it never experienced the universal division of cultivable land into very small farms.

The proportion of land given to crops and pasture in Kerry and West Cork has declined fairly steadily since 1871, when it was 70% of the whole areas as compared with 50% now: the essential fact is that one-fifth of the total area has been allowed to revert to rough pasture in less than eighty years. Similarly, 10% of the entire area was sown to crops in 1851 but only half as much by the end of the century, and arable cropping remained at this low ebb except in the wars of 1914-1918 and 1939-1945: in both these wars the farmers increased the land tilled by eating into their meadows and pastures rather than by reclaiming new land. The bogs of Kerry are an important source of pasture, fuel and bedding for animals; in addition, Kerry ranks third as a turf (peat) producing county, and in 1945 the farmers drew 442,000 tons from the bogs, partly for home consumption and partly for sale. Farmlands are overwhelmingly devoted to pasture and meadow throughout this region, but the proportion of improved pasture has declined markedly: in Co. Kerry from 638,000 acres in 1871 to 347,000 acres in 1945 (from c. 1,000 to c. 540 square miles). On the other hand the acreage of meadow has increased from 63,000 acres to 114,000 acres (from c. 100 to c. 180 square miles): the trends in West Cork have been similar. Clearly a large part of the pastures once improved has been allowed to revert to rough grazing, even during wars, partly through the abandonment of many farms, though some of the pastures have been transformed into meadows. In 1945, approximately 21% of all the improved land in Kerry was meadow, and 17% arable, which is almost twice as much as in the inter-war period; the remainder is pasture.

Livestock are the mainstay of farming throughout this region, and the number of cattle (in Kerry) increased from 159,000 in 1851 to 268,000 in 1911, since when there have been no significant changes. In West Cork there were 89,000 cattle in 1933. Throughout the whole area two-fifths of the cattle were milch cows and creameries are numerous in north Kerry with a few in the peninsulas: this region lies on the fringe of the great Munster dairying belt and Kerry ranks fourth among the Irish butter-producing counties, but beyond the range of the creameries farmers' butter is made. Pig production has developed with dairy farming: though depressed by the lack of feedstuffs in the 1939-1945 war, it seems likely to reach the pre-war levels within a few years. Most of the pigs are sold at fairs for the bacon factories in Tralee, Limerick and Cork. Poultry rearing has expanded steadily since the middle of the nineteenth century, and the number kept has increased steadily from 211,000 in 1851 to well over 1,000,000 in the inter-war period, among which turkeys account for one-seventh and are a significant export before Christmas. Store cattle

are raised widely in the region, but most are sold before they are two years old to dealers at the fairs. Sheep farming is found primarily on the uplands of the peninsulas, and least in the north of Kerry and around Skibbereen. The number of sheep has more than doubled since 1851, and there are now 160,000 in Kerry and about 25,000 in West Cork. It will be seen that more stock are kept in spite of the decline in the acreage of crops and improved pasture. Finally, some interest lies in the draft animals: there are now only 9,000 donkeys in Kerry but nearly 27,000 horses. The steady decline in the number of donkeys and the rise in the number of horses may be an indication of increasing prosperity among the farmers.

Nearly nine-tenths of all the 'producers and repairers' in the population of Kerry and West Cork are agriculturists in some form or another and there can be no doubt that their lot has been greatly improved during the past hundred years. The retrogression of so much pasture land to a wild condition may seem regrettable to some, but the productivity of the area as a whole is greater than before. Possible improvements include the extension of fodder crop production, the grading-up of pastures, the establishment of more creameries or branch separating stations and the provision of better transport facilities. There are still some very poor communities in the peninsulas of Kerry and West Cork, but no visitor could fail to observe the signs of quite recent improvement, above all in housing.

INDUSTRIES

Domestic industries were never strongly developed in Kerry and West Cork, though there was cottage weaving of flannel in the Dingle peninsula and of tweed around Kenmare some fifty years ago and there is still some home spinning and weaving. The only factory developments along the same lines are small enterprises producing homespun and socks at Kenmare, tweeds, blankets and rugs at Beaufort and Killarney, and woollens and tweeds at Bantry.

The agricultural industries fall into three main classes—creameries, milling and bacon curing. The twenty creameries of the region are situated mainly in rural areas of north Kerry. Milling is also scattered through the countryside in a number of small concerns, some of which are in towns such as Dingle, Tralee, Bantry and Skibbereen. Locally grown oats and imported maize are prepared for feedstuffs and in some mills flour is ground from wheat. The only large mills are in Tralee, which also has two important bacon factories.

Tralee, the most important town in Kerry, serves a wide area as a market centre and minor regional capital, and has a number of old-established industries and some new ones established since 1930. Those connected

directly with agriculture are the most typical, but there is also a boot factory, an enamelware factory supplying the whole of Eire and employing more than 200 people, and various small concerns supplying toys, furniture and other articles. Killarney has one large and old-established boot factory, but relies for its prosperity mainly on the tourist trade and the general market facilities for the neighbourhood. Tralee alone of the towns in this region has been able to attract new industries: the other towns remain small market centres sharply conscious of the competition of larger rivals such as Tralee and the relatively distant but economically powerful centres of Cork and Limerick.

POPULATION (FIG. 72)

Co. Kerry had 134,000 inhabitants in 1946, 74 to the square mile, and 294,000, 162 to the square mile in 1841. The decrease of 55% in a century is not phenomenally high by Irish standards, yet the loss by emigration has been at least 300,000 in the past hundred years and the outward movement is still considerable: even between 1936 and 1946 the population of the Dingle rural district declined by 14% and that of the Kenmare rural district by 11%. Many of the western districts show particularly heavy declines, and there is a closer correlation between heavy declines and poverty in Kerry than in other parts of western Ireland. In the whole of Kerry the declines since 1891 have been 25%, but in West Cork the decline has been 41%, from 64,000 in 1891 to 38,000 in 1946.

The settlement pattern shows a fairly even distribution of population in most of the lowlands, with some ribbons of habitation and cultivation on hillsides or in valleys, and scattered groups of houses in the middle of the bog-lands. In some cases, the houses and farms lie almost exclusively along the roads through the bogs, a curious form of settlement found not only in Kerry but also in Donegal and Sligo (see pp. 453, 480, and Figs. 83, 90). The actual density per square mile of improved land varies between 100 and 200, but is even higher in some districts, though it nowhere reaches the extremely high levels of northwest Donegal or West Connacht, for the farms in the southwest are larger and emigration has been a substantial relief to population pressure.

Town and village populations number approximately one-quarter of the whole and remain fairly stationary in Kerry; but in West Cork the decline in the town populations have been comparable with those in the rural populations, and the towns still have approximately one-fifth of the entire population as they have had for the past sixty years. The significant facts are that even now three-quarters of the population are living in dispersed habitations, that the town population is not increasing but tending to fall, especially in the case of the smaller centres, though a few in north



FIG. 72.—DISTRIBUTION OF POPULATION, KERRY AND WEST CORK

One dot to 25 persons.

In the six peninsulas settlement is mainly along the coasts though there are also farmed areas in various valleys. North Kerry shows an alternation of bogs and agricultural land and here also the desolate Carboniferous plateaus are unoccupied. The extreme southwest was very densely peopled when fishing was properous but has seen marked population declines during the past sixty years.

Kerry have been revived by such recent agricultural developments as the founding of creameries.

SUBREGIONS

Kerry and West Cork may be divided into four parts, each of which consists of a number of smaller and in many cases distinctive entities (see Folder Ha). The major divisions are: (A) the lowlands, and (B) the uplands of north and central Kerry; (C) the six peninsulas, and (D) the lowlands forming the extreme southwest of Cork. Though the whole area is part of Armorican Ireland, there is a sharp distinction between the hilly peninsulas of Old Red sandstone and the Carboniferous plateaus of north and central Kerry. The former landscape is merely the western and seaward extension of the long mountain ranges of Cork and Waterford, and the latter is continuous with similar landscapes of like geological formation in Limerick and Clare (see pp. 387-389).

A. THE LOWLAND OF NORTH AND CENTRAL KERRY

These lowlands, formed mainly of Carboniferous limestones with patches of Yoredale shales and flagstones, are surrounded by uplands formed mainly of Coal Measures (subregion B). The lowland is somewhat varied in form: much of the lower ground is floored by limestones, but the Yoredale shales and flagstones occur mainly in the higher parts, chiefly near the Shannon, and also outcrop on the lower slopes of the hills. Peat bogs have developed on the widespread alluvial river plains and also on the many other areas of poor natural drainage: comparison of Fig. 72 with a topographical map will show that settlement is sparse or nonexistent along many river valleys, though there are also considerable patches of well-drained land continuously occupied and threads of settlement through the bogs.

Half the farms in this lowland are of 30-100 acres, one-tenth of more than 100 acres, and the rest of under 30 acres. Although some of the farms are able to absorb a certain amount of labour from the west, there is an average of only 60-80 labourers per 100 farmers, with 110-120 relatives to each 100 farmers, making an average of three workers per farm. The main economic staples are store and dairy cattle, pigs and poultry, and the crops are grown mainly for fodder. Grassland, in pasture and meadow, predominates: at the worst it is little different from the natural rush-filled alluvial flats, but at the best it is a rich, well-drained pasture and meadow. Most of the farmers plant some of their fields with crops intermittently, and a rotation recorded near Killarney consisted of oats on lea ground, followed in the second year by potatoes and roots, then by oats with which grass seed is planted, and in the fourth year hay, after which the field reverts once more to pasture for several years.

The density of the rural population averages 100-200 per square mile of improved land, and about 100 per square mile of the entire area. Since 1891 there has been a decrease of as much as 30% in some areas, but in others the very slight declines, or even the small increases, have been ascribed to the success of some of the creameries. At its lowest level, farming in this lowland was so poor in 1891 that some districts came within the scope of the Congested Districts Board, whose inspectors reported that there were very few extra sources of income available, though there was a little fishing in the Shannon and Cashen estuaries. In 1936 there were 138 fishermen in the rural districts of Listowel and Tralee, many of whom were unemployed for a large part of the year.

Three towns serve the lowland as market centres—Listowel (3,300 in 1946), Tralee (10,000), and the marginally placed Killarney (6,000). Listowel is a typical small market town with a few small industries such as saw mills and the making of agricultural implements; Tralee, the county town, is the most prosperous and industrialised place for many miles, and Killarney, less industrialised, has a number of tourist hotels but is basically a market-town at the meeting place of uplands and lowlands. As a whole, the town and village population is a mere 25% of the whole: there are several small market centres such as Castleisland (population 1,300 in 1936), and also a number of agricultural villages containing a few hundred inhabitants.

B. THE UPLANDS OF NORTH AND CENTRAL KERRY

These uplands are made up of Coal Measures with some flagstones and shales. The Coal Measures consist of shales, sandstones and grits so highly folded, crumpled, faulted and fractured that the coal seams, if existing at all, are economically useless. Intricate as their underlying structure may be, the uplands present long featureless lines to the observer at Tralee or Killarney: they rise fairly sharply from the surrounding lowland to 600 ft., and possess considerable relatively level surfaces around 600-800 ft., 1,000 ft., and 1,200 ft. Their highest crest is Knocknedaune, 1,441 ft., on the Kerry border, where the Blackwater has its source. A large number of river valleys, drained to the Laune, the Maine and the Feale, carry tongues of lowland into the very heart of the plateau. Some of these valleys are wide and open and have farmlands up to a height of 600 ft., or even in some places up to 1,000 ft., but continuous areas of settlement are found only in the more open valleys, such as the middle Feale, and elsewhere settlement is restricted to clearings on hillsides with a few farms scattered among the bogs that are so widespread over all the more level areas and continuous on the higher surface.

The poorer parts of the uplands, mainly in the east, were included in the

congested districts in 1891. Most of the farmers in them had little more than 3 acres of arable land divided between potatoes and oats, with a patch of greens, and rotation took the simple form of two years' potatoes, one year's oats and a return to grassland. Mountain grazing was allocated to the farmers. At a slightly higher farming standard the rotation was lea oats, potatoes, oats and grass. The main cash staples were bacon, butter and eggs at the poorer levels of farming, and more intensive store and dairy farming on the better farms. Since 1891 the changes have not been revolutionary, though some creameries have been established in the uplands as well as on its margins, and the population has declined by one-quarter, so that the once-congested area would hardly exist on a reassessment; on the other hand, many fields and farms have reverted to rough pasture. The density of population is now around 80 to the square mile, but generally at least double this in the areas actually settled, and 200 per square mile in the middle Feale valley. There are railways to Killarney and Listowel, but the upland communities depend primarily on road transport facilities and many farms are several miles away from the villages that together include less than 10% of the whole population.

C. THE PENINSULAS OF KERRY AND WEST CORK

These peninsulas have certain features in common: all are anticlinal ridges of Devonian strata (though the Dingle peninsula's form is perhaps doubtful) and are separated by synclinal troughs containing Carboniferous beds, mainly limestones in the north and slates in the south. Glaciation has left a strong imprint almost everywhere and the mild moist climate has favoured bog development, so that settlement is restricted mainly to areas possessing some degree of natural drainage, inadequate as it may be. Almost entirely congested in 1891, the peninsulas have lost so heavily in population that few areas would remain congested on a reassessment, yet there are still some very poor communities, especially in the remote fastnesses of the uplands. Permanent emigration has seemed, and still seems, the best possible resource in the eyes of many of its inhabitants.

Ci THE KERRY HEAD PENINSULA

Covering only some forty square miles, this peninsula consists of a ridge of Old Red sandstone stretching from Kerry Head to the Cashen estuary. At its western end, in the part that is truly peninsular, it has hills over 700 ft. high, but elsewhere it is mainly 200-300 ft. high, with many stretches of cliffs along the coast. Bogs cover some of the more level land, but most of the peninsula is occupied by farms placed along the roads, and the population density reaches 200 per square mile of cultivated land. Having lost one-fifth of its population since 1891, this area now has a

general density of population of about 120 to the square mile. Relatively closely settled still, it was almost entirely congested in 1891 and part of it would be congested on a current reassessment. The small farms in 1891 had an acre each of potatoes, oats and meadows, a patch of greens, some pasture, and access to rough grazing. Ploughs were used and seaweed was collected for manuring cropland and as a top dressing for grassland: the only form of rotation was to plant potatoes and oats in successive years on land subsequently left as pasture for several years. Some men worked seasonally as fishermen but they, like the labourers, normally had a small holding and kept a few pigs and some poultry. Since then the changes have not been great, though there are now creameries in the area, which is economically allied to the north Kerry lowland.

C2. THE DINGLE PENINSULA

Forty miles long and from three to ten miles wide, this peninsula rises from the Kerry lowlands into the Slieve Mish mountains, which have a central line of peaks culminating in Baurtregaum, 2,796 ft. high. The Dingle railway cuts through the peninsula to the west of the Slieve Mish range, crossing it at a height of 691 ft., and the ridge is continued westward in rolling moorlands around 2,000 ft. high with no point below 1,000 ft. In the east the uplands are formed of Old Red sandstone, but to the west the 'Dingle beds' appear: these consist of grits, sandstones and shales so completely folded and faulted that their age (perhaps lower Devonian) and relationship to other strata are highly controversial. The upland surface is remarkably smooth except where it is scarred by a corrie glaciation that has become a valley glaciation in a few places, of which the best evidence is the magnificent series of cliffed hollows on the north side. At Dingle, the mountains swing northwards into the Brandon range, which culminates in Brandon mountain, 3,214 ft., and consists of a craggy ridge maintaining an altitude of 2,500 ft. to within a mile of the sea, finally terminating in cliffs at Brandon Head, 1,200 ft. above the water. The cliffs are not sheer, for landslips have dislodged huge crags of rocks and the cliffs resemble a heap of ruins.

Lowlands stretch along each flank of the peninsula from the neighbourhood of Tralee, reaching Brandon bay on the north and the Inch sand dunes on the south: between Inch and Dingle, hills of 800-1,000 ft. reach the sea and the lowlands are restricted to a few small river valleys along the coast with various inland basins traversed by the Dingle railway and the main road. In the west, however, there are extensive lowlands, notably around three natural harbours, Dingle, Ventry and Smerwick: these lowlands are separated from one another by hills around 1,000 ft. high. The last expression of this hilly topography is the Blasket islands, the most

westerly part of Europe, a group of six small, shelterless islands with many outlying rocks. The largest island, the Great Blasket, a knife-edge four miles long and half a mile wide, rises at two points to nearly 1,000 ft.

The density of population over the whole area averages 70 per square mile, and on the cultivated land 100 to over 200 per square mile. The area under crops and pasture covers one-third of the peninsula. The loss of population since 1891 has been over 30%, and as a result few parts of the peninsula would be congested on a reassessment. Almost all the peninsula was congested in 1891, and the areas not then congested had a rateable valuation per head only just above the statistical limit. The arable areas on the small farms varied from 3J to 4[^] acres in equal proportions of oats, potatoes and meadow with a small patch of greens. The only rotation was to sow potatoes for one or two years, oats for a year and then grass-land. Farmyard manure, sand and seaweed were used as fertilisers. One-fifth of the farmers were recorded as very poor in the eastern part of the peninsula in 1891, while few were so regarded in the west. Small farms were not then dominant in the Dingle peninsula: today only one-fifth are of less than 15 acres, and one-half are less than 30 acres. Most of the remainder are medium-sized and the farm of about 30 acres is the most characteristic unit, especially in such areas as the central part of the peninsula, both in the long valley carrying the road through Anascaui and 011 the gently sloping hillsides around Dingle and farther west. However, extensive areas have been allowed to revert to rough pasture, especially on the boglands and towards the upper limits of cultivation, which varies according to the type of soil and drainage, but reaches 700 ft. in places. Many small farms have been amalgamated and the general standard of housing has risen: two-storey slated houses have replaced thatched cottages now serving as out-buildings. Yet poor thatched cottages surrounded by a few fields of indifferent quality are still a picturesque, if depressing, feature of the landscape. There is one sociological detail of particular interest: Dingle rural district has more relatives working on farms (132 per 100 farmers in 1936) than any other part of Ireland. The dependence on family labour was noted in 1891 as a feature of the district, and labourers are comparatively few (26 per 100 farmers) for an area of reasonably prosperous farming. Some men and women went as farm labourers and servants to the Kerry lowlands (see p. 374) in 1891, but only from the eastern parts of the peninsula. Eighty-eight per cent of all the 'producers' were on the land in 1936. The produce of the west part of the peninsula is sold in Dingle, a fishing and market centre which has monthly fairs for cattle, sheep and pigs attended by buyers from Tralee, Limerick and Cork. Dingle (1,700 in 1946), the most westerly town in Europe, now has a co-operative creamery and is linked to Tralee, over

twenty miles away, by bus services for passengers and a goods service on the light railway.

Fishing for herring, mackerel and lobsters is widespread around the coasts of the peninsula, which is one of the few districts in Ireland with a landless fisherman class, though most of the fishermen outside Dingle town have small holdings as a secondary source of income. But the fishing has steadily declined: in 1891 there were at least 600 fishermen, in 1926 over 400, but in 1936 only 250, most of whom were almost destitute. Numbers give only part of the story, as many people fish for home consumption and intermittent sale. The inhabitants of the Great Blasket island sell lobsters to French trawlers from time to time, and they are experienced navigators of dangerous waters in their currachs. Except in times of special demand, the fisheries are not commercially successful and a fisherman's life in Dingle is hazardous economically as well as physically.

C3. THE IVERAGH PENINSULA

This peninsula has great topographical diversity, due largely to glaciation and to post-glacial adjustments of drainage. Structurally the peninsula is a huge anticlinal curve of Old Red sandstone, complicated by many minor undulations in the strata, and the strike generally coincides with the direction of the longest mountain ranges and the main longitudinal valleys. In the east evidences of ice-moulding include such deep U-shaped valleys as the Laune, the Gap of Dunloe, the Caragh and the Behy, the last with five wonderful lake-filled corries: there are corries in the mountains, glacially roughened surfaces on the mountain-sides, and a profusion of moraines. The whole district, lowland and upland alike, owes its great beauty of crag and lake to ice action, but there are also important remnants of the pre-glacial surface, which was apparently a hill country having the Reeks as a steeply peaked range and Mangerton, Stoompa and the Paps as the crests of a more gently moulded upland. Today the Reeks have been sharpened by corrie development, but the mountains farther east still preserve their gentle, maturely moulded curves above abysmal corries and glacial valleys similar to those of the Dingle peninsula. Five main ice-tongues coalesced at one stage to make a piedmont glacier on the lowland, and a series of crescentic moraines was laid down: at a later stage lakes were held up and terraces formed, some of which, between Headfort and Kenmare, and equally to the east of Killarney, provide singularly fertile soils. Three lakes on the lowland, Caragh, Leane and Guitane, are held up by moraines, and most of the corrie lakes scattered through the mountains are also dammed by moraines of late glacial origin (Fig. 73).

Farther west the evidence of ice sculpture in the mountains is equally

clear, especially in the long range of mountains, with twenty peaks over 2,000 ft., that extends from the country between Killarney and Kenmare to its final termination in the high cliffs near Waterville; hidden away in this range are many remote and rarely visited corrie basins. To the south of this range lies a lesser line of hills, 1,000-1,400, separated one from another by short transverse valleys drained to the Kenmare river*: to the

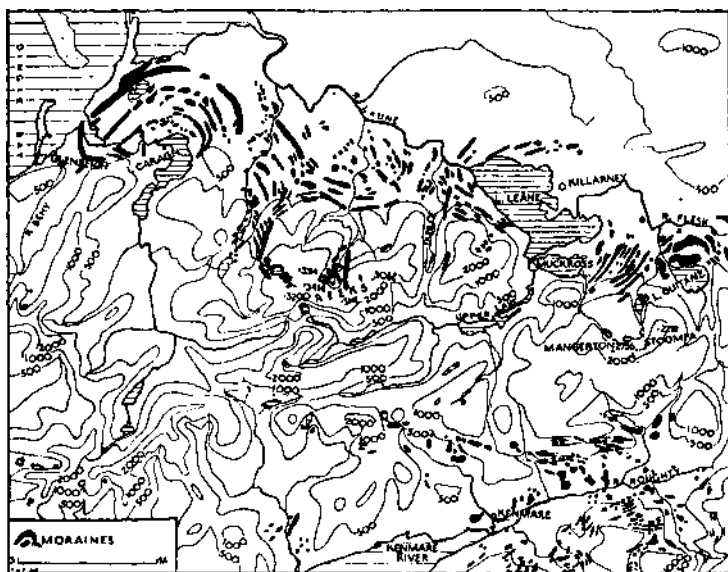


FIG. 73.—RELIEF AND MORAINES, CENTRAL KERRY

The areas shown on this map includes some of the most strikingly glaciated valleys in Kerry; and the various moraines associated with the local icesheet include an interesting crescentic series to the north of lough Caragh.

*Compiled from data on the 1" to 1 mile Geological map Killarney and Kenmare district drift edition 1922, and on a map by W. B. Wright in 'Memoirs of the Geological Survey of Ireland,' * The Geology of Killarney and Kenmare,' 1927, p. 63.*

north there are isolated hills 800-2,000 ft. high surrounding lowlands drained partly by the rivers Cumrneragh, Inny and Ferta, all of which flow parallel to the strike. In the west of the peninsula there is an intermingling of hills and lowlands not unlike that in the west of the Dingle peninsula, and the coastline consists of high cliffs where the hills reach the sea, alternating with featureless lowlands or drowned valleys such as the Ferta, on which Cahersiveen is placed. Valencia island, normally approached by

ferry across the sound, consists of hills and lowlands similar to those of the mainland.

Little more than one-quarter of all the land in the peninsula is farmed and the density of population is now under 40 to the square mile but was nearly 60 in 1891: the decline has been as much as 60% in some parts of the peninsula. Almost the whole peninsula was congested in 1891, but hardly any of it would be today, though in spite of the heavy decline the density per square mile of improved land is mainly around 150-200. The actual settlement, influenced more by drainage than by altitude, is mainly on the lowlands and on the lower slopes of the hills, with several farms at 400-700 ft.: inspection of Fig. 72 will reveal that there are some very remotely placed communities in this area.

About one-fifth of all the farms in the peninsula are of less than 15 acres, one-quarter each of 15-30 and of 30-50 acres respectively. The average farming unit is about 30 acres, and, although the proportion of very small farms is much less than in West Connacht or in Donegal, the rudimentary type of farming reported in 1891 still survives on many farms. In 1891 the smallest farms generally had about 3 acres of arable land, of which half was sown to potatoes and the remainder to oats and green crops, and any form of rotation was limited to the growth of potatoes for two or three years followed by oats or green crops. There were also fields in meadow and pasture and the cattle and sheep were pastured on rough 'mountain and moor' grazing lands, held mainly in common or by several farmers jointly (in severalty). In some cases the amount of common land allocated to each farmer was in direct proportion to the valuation of his farm. Only spades were used on the smallest farms and seaweed with sand were the usual manures: to this day the farmer collects seaweed and sand, accompanied by ass and cart; even the ass with panniers is a very usual feature on the beaches. The farm's cash sales included butter, eggs, poultry, pigs, calves, sheep and wool: in general the products of mixed farming with an emphasis on dairying. The larger farms have similar staples but more arable land and may even employ a certain number of paid workers, though the proportion of labourers in the Cahersiveen rural district is only 136 per 1,000 farmers, as compared with 1,031 relatives.

In spite of all the changes of the past fifty years many parts of the peninsula still have some very poor farming communities. Around Caragh and Glenbeigh, only a few miles from the relatively rich Killarney lowlands, there are very closely settled areas on the moraines of the piedmont glacier or on the bogland itself; most of the farmhouses are thatched cottages and the area would still be congested on a 1936 reassessment. There is in this peninsula a dependence on agriculture that is extreme, for

nine-tenths of all the 'producers' work on the land. Only one-eighth of the population live in towns and villages: Cahersiveen, the only town (1,800 in 1946), serves the extreme west of the area. Killorglin (800 in 1936) and Kenmare (900 in 1936) are the largest of a few market villages. Seasonal migration has never been strongly established in this area, though some men and women go as farm servants for part of the year to the lowland of north Kerry, and to comparable areas in Cork and Limerick. Fishing has always been the main supplementary economic resource, but in 1936 there were only 97 fishermen in the Cahersiveen rural district, against 213 in 1926 and more than 700 in 1891. The markets for herrings in Russia and Germany and for mackerel in America have been lost and the Irish market is easily satisfied, but very many farmers along the coasts have boats and catch fish for home consumption and occasional sale. One interesting example of former enterprise is seen in Valencia island, where Old Red sandstone slates were quarried in long cave-like galleries for water-tanks, billiard tables and thick roof slates, of which the last named may still be seen in the district, but the quarries closed in 1884 as they were unable to meet the competition of Welsh roofing slates.

The Iveragh peninsula is separated from the Caha peninsula by the ria known as the Kenmare 'River,' and by a narrow lowland around Kenmare formed of Carboniferous limestone. This is completely bare in some places, but mainly covered with a thin drift cover: the soils are rich dark loams producing large crops of swedes, mangels and potatoes. Kenmare is served by a branch railway line from Headford junction which passes through the Roughty and Flesk valleys, already mentioned as areas of good soils on lacustrine deposits. Three enterprises in Kenmare itself are worthy of mention. There is a co-operative creamery making butter and cheese, a small warehouse for homespuns, the last relic of a home knitting industry once widespread in the neighbourhood, and a quarry producing lime for building and general purposes and carrying on a large trade in a country of soils markedly deficient in lime.

C4. THE CAHA PENINSULA

This peninsula is an anticline of Old Red sandstone flanked by Carboniferous slates on the coasts of the Kenmare river and Bantry bay. A long ridge, followed by the Kerry-Cork county boundary for nearly thirty miles, has no pass below 1,000 ft. along its whole length. Various lateral spurs and deep valleys, some of them with precipitous sides, run north and south from the main ridge. Low passes occur only in the extreme west, north of Castletown, and the mountainous ridge persists as a recognisable feature into Dursey island, which is separated from the mainland by a submerged pass in Dursey sound. The Carboniferous slates and grits

to the north and south of the peninsula form hills rising to 600 ft., in Bear island to 800 ft. The coasts have several harbours and sounds, with islands. The peninsula was covered by ice coming from the Kenmare river area, though some of the higher summits, such as Hungry Hill, 2,251 ft., may have been ice-free. There are a few accumulations of drift on the southern side of the peninsula, but there are many striated rock surfaces with little or no soil, plentifully strewn with erratics and possessing *roches moutonnees*. Only about one-third of the total areas is improved land.

The whole of the peninsula was congested in 1891 and part of it would be congested on a 1936 reassessment. The decline in population has averaged 30-40% and the density is now less than 80 per square mile. But the settled areas are relatively closely occupied, with at least 150 and frequently over 200 per square mile. Nearly one-fifth of the population are in villages, such as Castletown (700 in 1936), the most significant of several small market centres. There are more small farms in this area than in the peninsulas farther north: in Castletown rural district, over 70% of all the farms are of less than 15 acres. Few agricultural labourers are employed, but the number of relatives engaged on farms is slightly in excess of the number of farmers. The agricultural practice on the smallest farms is similar to that in the peninsulas farther north: spade cultivation is general; seaweed, sand and farmyard manure are used; the main crops are oats and potatoes, and the only rotation is to plant oats for one year, potatoes for two years, oats for a further year, and then grass. The main economic reliance is on dairy produce, with store cattle and sheep. Many small farmers depend largely on pigs and poultry. The decline in fishing has removed the main source of additional income in the Caha peninsula and helps to explain the heavy decline in population. In 1891 there were over a thousand fishermen employed *in* catching mackerel, which was sold fresh in spring and summer and cured in the autumn: but all this is a memory in these days, for in 1936 there were only 36 fishermen in Castletown rural district.

C4(a). THE AREA AROUND BANTRY BAY

At the head of Bantry bay, Carboniferous slates and grits form a synclinal trough and are eroded into hills and valleys of Armorican trend: the simple correlation between hills of Old Red sandstones and valleys of Carboniferous limestones is lost here, for some members of the Carboniferous system, such as the Coomhola grits, stand up as hills, which reach 1,797 ft. in the Shehy mountains and over 2,000 ft. to the north of Glengariff, though most of the hills are merely 600-800 ft. high. Boulder clay is widespread but not universal in the valleys, and there are also numerous drumlins, some of which lie as separate hills with bare rock

exposed on either side while others rise from a general boulder clay spread, notably around Bantry: in most cases the drumlin base is about half a mile long.¹ The coastal lowlands and the lower hillslopes are settled up to 700-900 ft. in places and there are 100-150 people per square mile of improved land and about 70 per square mile of the whole area. Bantry, a small market town (2,400 in 1946), served by a branch railway line, is a port for coastal traffic in the Bay: a steamer runs to Whiddy island and other centres. Bantry has, however, lost its former significance as a fishing port and has only one small factory, in which woollens and tweeds are made.

C5. THE SHEEPSHEAD PENINSULA

This finger-like peninsula is an anticlinal ridge of Old Red sandstone flanked by Carboniferous slates and Coomhola grits. The main ridge, of sandstones, rises to 1,136 ft. in Seefin but is mainly below 1,000 ft. and is cut by several passes: it terminates in Sheep's Head, a hilly promontory with sharp cliffs. The Carboniferous slates and the Coomhola grits form the coastal lowlands, but they too have cliffed shorelines with few inlets. The hills are sharply glaciated by ice that came from Bantry bay, and there are many bare rock surfaces with some spreads of boulder clay in the small south-facing valleys of the peninsula.

On the north side of the peninsula, settlement and cultivation is restricted to a narrow and discontinuous coastal fringe, but the south-facing valleys are occupied to a height of 400 ft. The whole area was congested in 1891, when the population density was 100 per square mile: it is now around 50 to the square mile, though in many places there are as many as 200 persons per square mile of improved land. More than half the land is mountain and moor grazing, most of it held in severalty, and the smaller farms had in 1891 only an acre each of oats, potatoes and meadow, with a plot of green vegetables. The only known rotation was to sow potatoes for two years and then oats for a year before putting the land back to grass; ploughs were used only on the larger farms, and farm-yard manure, seaweed and sand were used as fertilisers. The income was and still is acquired mainly from the sale of cattle, sheep and dairy produce, but the fishing has virtually ceased; in 1891 there were 220 fishermen in the peninsula, but in 1936 approximately 20.

C6. THE SKULL PENINSULA

Lying between Dunmanus bay and Roaring Water bay, this peninsula consists of a number of isolated hills separated by lowlands; around

¹ These drumlins were noted in the *Geological Survey Memoir* (1864) as hills with green cultivated slopes quite distinct from the rocky hills (presumably *roches moutonnies*) covered with heather and gorse.

Dunmanus bay, Carboniferous slates and grits form hills and valleys similar to those at the head of Bantry bay, but the remainder of the peninsula is of Old Red sandstone and its highest point is Mount Gabriel, 1,339 ft. high, to the north of Skull harbour. The coasts, sharply cliffed in Mizen Head, are penetrated by several inlets, both on the north and the south. The drift covering is thin over much of this area, but some good cultivable soils are developed on the sandstones.

More than half the area is in crops and pasture, and farmlands cover most of the lowlands with patches of the hillsides up to about 600 ft.: the average farm size is now about 30 acres, and only 15% of the farms are of less than 15 acres. The whole area was congested in 1891, but none of it would be congested now as the population has declined by nearly 50% since 1891, from 125 to 65 per square mile: the density per square mile of improved land is 100-200. The heavy decline is partly due to the virtual elimination of fishing as a resource in the district: in 1891 there were more than 500 men engaged in mackerel fishing, in 1936 there were 38. The farming on the smallest holdings in 1891 was similar to that of areas farther north, with the liberal application of sand and seaweed in addition to farmyard manure; and part of the resource of each farm was the mountain grazing, most of it held in severalty. At present the farmers normally have an assisting relative, but there is only one labourer to every five farmers. There are no towns in this peninsula and its marketing needs are met by three small villages, with one-eighth of the total population, or by Bantry and Skibbereen. The main staples are store cattle, sheep and dairy products.

D. THE SKIBBEREEN LOWLANDS

In this area the Hen river cuts transversely across the general Armorican trend of the country for eight miles and gathers the waters of many longitudinal tributaries before turning sharply west at Skibbereen. Both Old Red sandstones and Carboniferous slates or grits form hills rising to 400-600 ft. near the south coast and to nearly 1,000 ft. a few miles farther inland. The relation of these hills to the erosion surfaces distinguished farther east is worthy of investigation (*cf.* pp. 344-346): this area also shows the interplay of consequent north-south and subsequent east-west lines characteristic of areas to the east in Co. Cork (see p. 344). There is a fine coast of submergence, with several islands and some striking cliffs.

The Skibbereen rural district corresponds almost exactly with this subregion. Its loss of 45% (1891-1946) in population is due to the widespread emigration from the countryside and to the marked decline of fishing along the coast. There were well over 1,000 fishermen in 1891, but only 115 in 1936. In some coastal districts the decrease of population has

been well over 50% during the past fifty years, and the old congested area around Baltimore has ceased to exist as such. The farming on the smallest holdings resembles that on similar areas in the southwest, but only 14% of all the farms are of less than 15 acres and the average holding is around 35 acres. Pastoral farming for dairy and store cattle predominates, but one-sixth of the land is given to crops. This area, which lies on the fringe of the Cork creamery district, has an average of one labourer to every three farmers, but the number of assisting relatives is almost equal to the number of farmers. The density of population is 80 per square mile, but 100-150 per square mile of improved land and even more on some of the very closely settled areas near the coast and on the islands. One-fifth of the whole population lives in towns and villages, of which Skibbereen (2,400 in 1946) is the most important: these centres have, like the rural areas, declined in population with the decay of fishing and the heavy emigration from the neighbourhood.

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CHAPTER XVII

LIMERICK AND CLARE

THE OUTLOOK of this region is to the west, and Limerick, its regional capital, is the largest town on the Atlantic seaboard of Ireland. America is not far distant in the imagination of its inhabitants, and the recent establishment of Foynes as a seaplane base and Rineanna as a land-plane base has brought the New World much nearer in travelling time. Even more significant is the possibility that one or more airports on the Shannon estuary will become the gateway to the European continent, but the developments are unpredictable, for already the Foynes base, used for transatlantic services during the 1939-1945 war, is said to be out of date, though it was regarded as the future Croydon of the Atlantic. The effects upon the region are hard to assess, though Limerick's commercial prospects seem more favourable than those of Cork. It is perhaps salutary to recall that in the twenties, ocean liners were expected to make Galway and Cork into strong commercial cities, closely linked with the maritime trade of the whole world. However numerous the aeroplanes, however great the financial return given by travellers, the life of this region can be affected only to a limited extent and farming will remain its chief resource. The link with America that is most vital is the record of emigration extending over a century and more: to quote an old Clare woman on her family: 'Some are in America, but two are away over in England.' Life in Clare and Limerick centres around the farmsteads that cover its lowlands, interrupted only by a few ranges of hills and by the wonderful bare limestone plateaus around Galway bay.

STRUCTURE AND LANDFORMS

The three main structural elements in this region are a number of Armorican ranges in the east, a Carboniferous limestone lowland in the centre, and Carboniferous plateaus in the west. The Armorican ranges are anticlinal ridges comparable with those in the south of Ireland from Kerry to Kilkenny and, like them, having Old Red sandstones overlying Silurian slates and grits. Where the Devonian sandstones survive, as in Keeper Hill (2,278 ft.) south of Nenagh, there are sharp hills, but most of the summits are lower, generally from 1,000 to 1,700 ft. in the Arra mountains, the Slieve Bernagh, the Slieve Aughty and the Cratloe hills. The Silurian strata have weathered into lower ground and these hills, though prominent, are hardly a barrier to communication: the Shannon is in effect a natural frontier, especially in lough Derg, which spreads to a width of ten miles

between central Clare and the Nenagh district. Spenser spoke of the 'spacious Shcnan spreading like a sea': but the river is bridged at Killaloe and O'Briensbridge as well as at Limerick.

In the west of Limerick and the west of Clare, upper Carboniferous strata form plateaus of limestones, sandstones and shales, of which the limestones have weathered into a karstic landscape with scarp slopes and dry valleys. Some of the limestone pavements have vertical joints that have been widened into a series of cracks varying in width from a few inches to several feet, all of them filled with soil and richly overgrown with shade-loving plants. The hills that rise above this stony desert consist partly of bare limestones and partly of slopes covered with heath plants and hazel scrub, according to the local conditions of exposure. In places there are mighty scarp edges: thus the amphitheatre around Ballyvaghan on Galway bay is bounded on three sides by very steep, terraced rock faces above a flat, grassy valley, and there are equally impressive scarps guarding a waterless lowland around Kinvara, Co. Galway. In this karstic area most of the drainage is underground and a cave in Slieve Elva, occupied by a stream, has been traversed for two miles and is thought to extend for several miles more. The rapid runoff recorded in some places suggests a well-organised subterranean drainage: near Ballyvaghan, the fields were reported dry two hours after the rain had ceased for the first time in forty-eight hours. On the other hand, the writer observed cascades of water pouring down the west slopes of Slieve Elva after a day's rain in June, 1937, and was told that here, at least, the phenomenon was frequent.

On either side of the Shannon estuary, sandstones and shales with useless Coal Measures overlie the upper Carboniferous limestones, and form featureless uplands rising in places above 1,000 ft. This dreary and monotonous landscape is continued south wards in Kerry and Cork: everywhere it has long undulating ridges with wide open valleys and few features of scenic interest. Its edge is a very definite escarpment on the west side of the Limerick lowland to Foynes on the estuary, but in Clare the scarp is less marked, though it is recognisable on the west side of the Fergus estuary. The Clare section of the 'Carboniferous plateau' consists primarily of lowland, but also has some flat-topped hills with terraced sides, one of which, Slieve Callan, rises to 1,282 ft. Sandstones, especially the local flagstones, stand out in ridges and form some of the remarkable cliffs that extend along the coastline at intervals from Loop Head to the cliffs of Moher, which rise to more than 600 ft. sheer from the sea with some outlying stacks showing very sharp marine attack. This western area is partly covered by drift, largely of local materials, but also contains some limestone, though its soils are markedly acid and support a calcifuge vegetation. Throughout western Clare and Limerick, rushy grass-heaths occupy much

of the lower ground, interspersed with some bogs, while the hills are peat-covered moors similar to those of north Kerry and the adjacent areas of Cork.

The limestones¹ that extend through central Clare from Galway bay to the Fergus estuary form a number of ridges and low craggy hills, 150-300 ft. high, some of which are covered by drift and are good farmlands. The general grain of the country is northeast to southwest, and the drainage reaches the surface in a number of rivers, which appear for a few miles and then disappear, or in some cases emerge only for a few yards in a collapsed cave. 'Turloughs,' the most extraordinary feature of all, are limestone hollows in which water lies for periods depending on the amount of inflow and outflow. They vary considerably in size but may be as much as a mile across and 30 ft. deep: after long dry periods they become grassy depressions with small residual lakes. Not all the lakes are of this type, for some have an impervious floor and persist throughout the year without such striking changes in extent. In all, the lake country extends through thirty miles from central Clare to Co. Galway, preserving throughout its southwest-northeast trend.

The 'lower' Carboniferous limestones come to the surface on the east side of the Fergus estuary and also underlie a large part of the Limerick lowland (see Fig. 74). This lowland has a rockfloor that is of very varied composition, and a recent worker has claimed that it includes a complete Carboniferous sequence from Lower Limestone shales to Millstone Grit flags, though the higher strata, consisting of shales and Millstone grits, are preserved only in the hill-girdled basin lying to the southeast of Limerick around lough Gur. The lowland also possesses what Geikie has called 'the most compact and, for its size, one of the most varied and complete of all the Carboniferous volcanic districts of Britain'² and a further topographical element is a number of anticlinal ridges in which Old Red sandstones appear. In the main, the Limerick lowland is some 150 ft. above O.D., rising to around 350 ft. with a few minor hills, and the general appearance is a rolling hummocky landscape smoothed by glaciation; the ridges of Devonian beds, with igneous intrusions, rising to 948 ft. near Ballingarry, offer no vital barrier to communications. The two volcanic phases of the Carboniferous period have left behind a wide variety of igneous rocks, including basalts, trachytes and beds of ash, either as dykes or interbedded with the Carboniferous strata. In places the igneous intrusions stand up as hills, particularly in the loosely defined 'basin' to

¹ These limestones are normally regarded as belonging to the upper Carboniferous beds.

² This remark was quoted by Ashby, D. F., in *Proc. Geol. Ass. Lond.* vol. 50, 1939, p. 324.

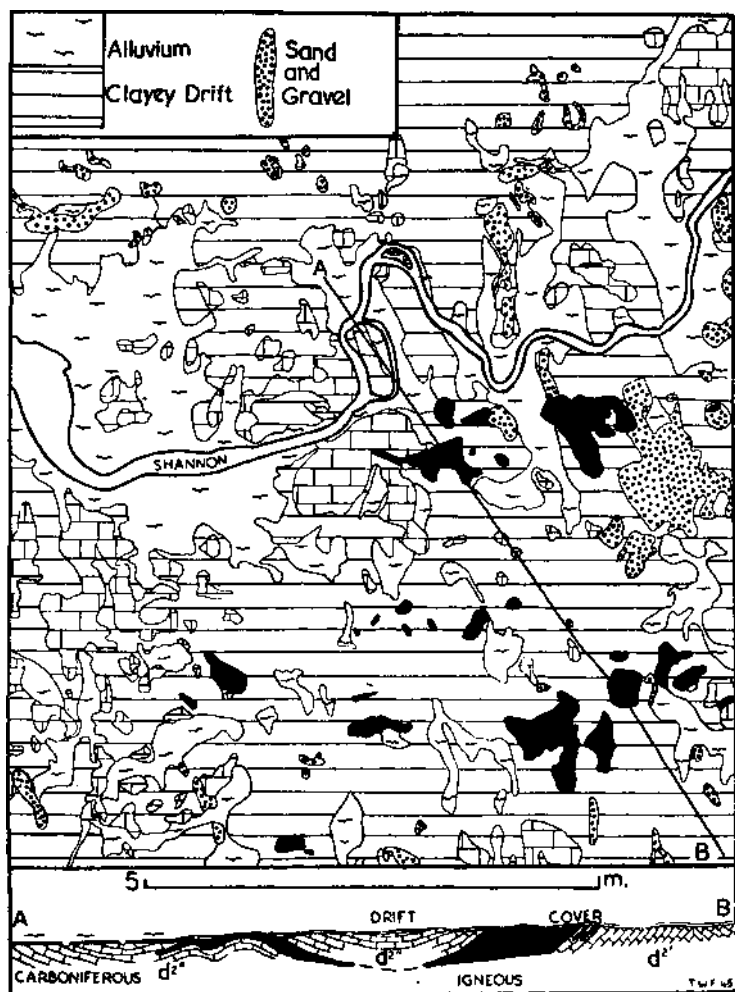


FIG. 74.—GEOLOGY OF THE LIMERICK DISTRICT

Most of the area is covered with drift, chiefly of a clayey nature, and there are wide spreads of alluvium near the Shannon, but Carboniferous limestone and igneous rocks appear at the surface in a few places.

Based on the 1" to 1 mile Geological map Limerick district, drift edition 1906, by permission of the Minister for Finance of Ireland,

the southeast of Limerick, where a basalt forms Knockseefin, 749 ft., and trachyte vent-plugs form Deuk hill and Kilteely hill, at 782 ft. and 680 ft. respectively. Not always, however, is past vulcanicity so clearly reflected in the landscape, though among several low hills due to intrusions is Carrigogunnel which, crowned by a mediaeval castle, rises above the sloblands around the Shannon and has a cliff face of stratified ash overlying columnar basalt: a crag 100 ft. high, it has a long tail of boulder clay to the south and provides one of the few examples of crag-and-tail formation so far recorded in Ireland.

The imprint of glacial action is more marked in the Limerick lowland than in Clare, but drifts are not present everywhere and some of the limestones and volcanic rocks appear as drift-free islands with soils of local origin. The limestone soils tend to be unretentive of water and shallow, and some of the volcanic soils are well drained but not more than 2 ft. deep. The soils derived from the drift and from glacifluvial meltwater deposits are varied and range from sands or gravels on eskers and esker-like mounds to thick clays likely to become waterlogged at any time. Intermediate types between these extremes include limestone boulder clays and red sandy soils, of which the latter are extensively developed north of the Shannon at the foot of the Cratloe hills. Bogs are relatively few, though some have developed on freshwater shell marls, which are the sites of small lakes impounded by drift deposits. A few lakes still survive, but most have long since perished by infilling; in addition, the peat they once contained has been removed by a population not too plentifully supplied with fuel.

THE SHANNON FROM LOUGH DERG TO THE SEA (FIG. 75)

The river Shannon falls into two sections that are divided at Killaloe, the bridgetown at the southern end of lough Derg. Above Killaloe, the river falls only 55 ft. in more than 100 miles, but below Killaloe, it falls by 100 ft. in a journey of twenty miles to the tidal reach at Limerick. This extraordinary feature has never been adequately explained, though one theory bearing upon it suggests that the river has missed a pre-glacial course and cut through the Old Red sandstones around Killaloe and then through the hummocky drift-strewn country around Limerick; the pre-glacial course, however, has never been found and the explanation may lie in another theory that the Shannon thalweg was worked out in relation to a sea level some 200 ft. below that of the present day, so that the immaturity of the lower reaches is due to grading to the recently established sea level. It is also possible that the development of large lakes by solution of the Carboniferous limestone may have so weakened the general erosive

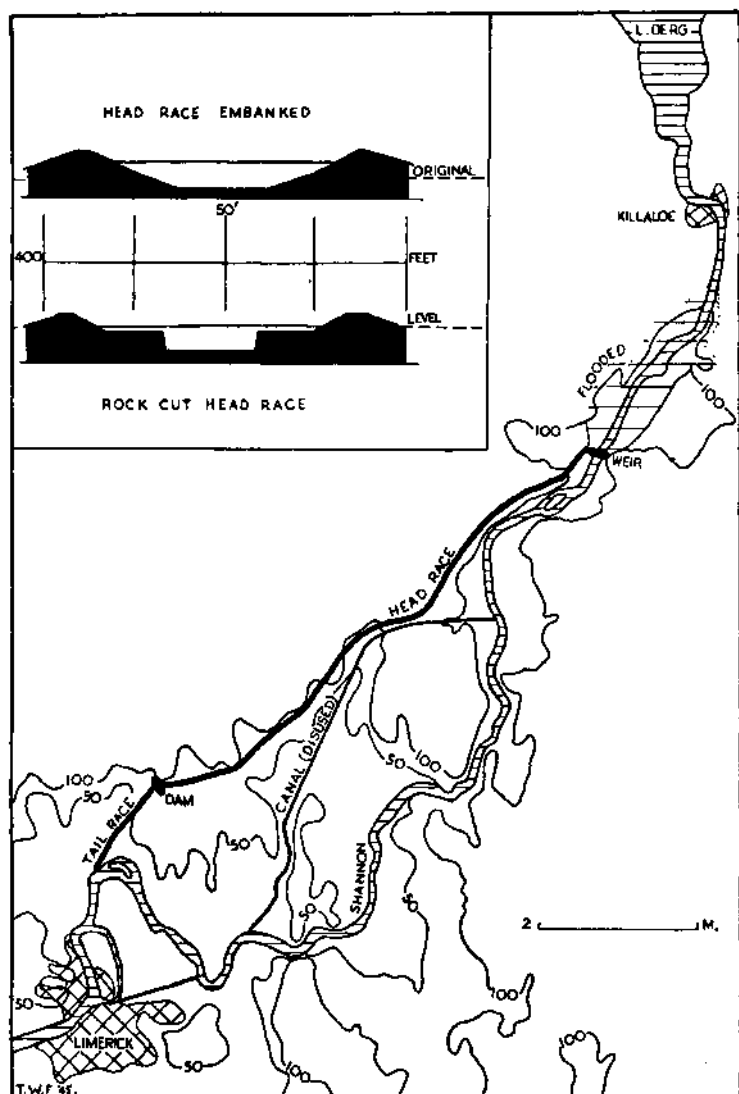


FIG. 75.—THE SHANNON FROM LOUGH DERG TO LIMERICK

The changes consequent upon the construction of the Ardnacrusha power station are discussed in the text.

Based on the 6" to 1 mile maps of the area by permission of the Minister for Finance of Ireland and on 'Engineering' vol 131, 1931, pp. 250-251.

power of the river that it is reduced to impotence from lough Derg upstream.

Lough Derg, twenty-two miles long and two to ten miles broad, interposes an effective barrier between the lowland on either side. In the gap between the Slieve Bernagh and the Arra mountains, the lough is 20 fathoms deep, probably due to ice scouring, and at Killaloe it narrows into a river which is dammed up to a height of c. 109 ft. above O.D. at Partreen weir (Fig. 75), as part of the Shannon hydroelectric scheme. Embankments have been built to protect the surrounding countryside, and the water at Partreen is 32 ft. deep: around the weir there is a fish ladder, 600 ft. long, built to preserve the Shannon fisheries. At Partreen the Ardnacrusha canal begins, and the lower Shannon is now a shadow of its former self for it merely receives the water not needed for the canal, which is nearly nine miles long. The headrace above the power station is seven and a half miles long, 37 ft. deep and nearly 300 ft. wide, and the dykes are made of earth covered with a 2 ft. layer of clay and faced with layers of stone and concrete. In a few places the headrace flows through rock cuttings, and the tailrace is almost entirely rock-cut. The general effect resembles a major ship canal and the old Shannon navigation canal is now completely superseded; two modern locks carry barges past the Ardnacrusha power station, where the whole drop of 100 ft. is concentrated.

The Shannon hydroelectric scheme was carried out between 1925 and 1929 and was hailed as a bold experiment in the electrification of an essentially agricultural country. It was believed that the Shannon could be made into a single storage basin by raising the weir at Partreen, by adding weirs on lough Ree and lough Allen and by building embankments on either side of the river for several miles. Provision was made to generate approximately double the amount of power, but the Shannon has proved to be a river particularly susceptible to low water levels in drought periods, probably due to the depletion of underground supplies. Further, the use of electricity has expanded beyond all expectations, and so the supplies drawn from native water have been supplemented by those from imported coal in the power stations at Dublin and Cork: the supplementary hydroelectric schemes include the Liffey, already completed, and the Erne, now under construction, with others in prospect.

Two miles above Limerick, which is more than fifty miles from the open sea, the Shannon becomes tidal. The estuary is a drowned river valley, fringed on either side by sand and mud banks, and by many square miles of alluvial flats composed of silt, loam and clay. These flats, which are mainly 'intake' or land reclaimed by embankments and protected by levees, require artificial drainage if they are to become good

pastures. They penetrate along the various tributaries of the Shannon, such as the Maigue, which is tidal for seven miles to Adare, and the Fergus, which is tidal to Ennis. All the small rivers flowing into the Shannon are aggrading their courses and depositing large quantities of alluvium in times of flood. The Fergus estuary has a number of islands formed of Carboniferous limestone covered with boulder clay, several of which are inhabited. In this estuary a considerable amount of *Spartina townsendii* has been planted, and reclamation is proceeding actively. The Shannon west of the Fergus narrows to less than one mile between the upper Carboniferous shales and sandstone country on either side, but it widens and deepens towards the open sea between Loop Head on the north and Kerry Head on the south.

VEGETATION AND LAND USE

This region has a mild, humid climate comparable with that in other parts of the Atlantic seaboard, and its natural vegetation is highly varied and of unusual interest, especially in the limestone Burren area of Clare, which is a botanical museum including specimens of the alpine, the Mediterranean (Lusitanian) and the American floras. The *Dryas* and gentian (*Gentiana verna*), both alpinists, grow on the limestone pavements, but the intervening cracks are thickly occupied by the maidenhair fern (*Adiantum*) of Mediterranean origin: probably these varied species, once having arrived, were able to settle and maintain themselves, as the area is naturally treeless and has never been cleared for agriculture except in small patches. It is generally believed that the drift cover has been entirely removed, though a few relics may still remain, and its former presence may be partly responsible for the mixture of calcicole and calcifuge species: there are, however, notable absentees from the flora, such as gorse, which is so widespread on the acid soils of Ireland (see Fig. 13, p. 63).

The vegetation cover of the Burren is not continuous, and while some visitors comment on the singular extent of the bare limestone surface, others are impressed by the luxuriance of the vegetation: possibly the desolate wilderness of a first view blossoms as the rose on closer inspection. Certainly the vegetation cover is thicker than that of the limestone pavements in the Pennines of England, but the Burren lies near sea level and has a winter with few frosts. Tree development is impeded by strong winds, but the vegetation is able to rise above the purely xerophytic level which would be encountered in a dry climate. The ecological sequence, according to Tansley, may follow one of two lines of serai development. Pioneer mosses and lichens form a thin layer of black humus with such calcicole grasses as sheep's fescue (*Festuca ovina*) intermingled with *Dryas*, wild thyme [*Thymus serpyllifolius*], and other plants. This vegetation is

calicole in emphasis and provides excellent pasture where grasses are dominant. But in some places the serai development takes a different turn, and a limestone heath may develop in which heather (*Calluna vulgaris*) and crowberry (*Empetrum nigrum*) are intermingled with bracken and tufts of *Molinia*, which is more typical of a bog-land flora.

No woodlands occur on the more exposed coastal sections of the Burren, but scrub appears in some sheltered hollows. This is foreshadowed near the coast in the occasional presence of hazels and hawthorns, or the Scotch rose (*Rosa spinosissima*) in the fissures of the limestone pavements, which are more characteristically the habitat of the maidenhair fern and a variety of woodland field-layer plants. Hazel-dominated scrub is seen where there is adequate shelter, though the trees are rarely more than 10 ft. high: intermingled with the hazel, there may be hawthorns, blackthorns, ivy, the Scotch rose, the spindle tree, birches, ash, holly and elm with a woodland ground flora. In some places, however, notably in one section recorded by Tansley, the hazel bushes were suffering from the effects of wind and the upper shoots were drying and withering: not far away, in an even more exposed site, the hazels were killed to the base so that a heath was formed. Only in the interior of Clare, in the district between Ennis and Corrofin, is ash wood seen; in one wood investigated, the ash was dominant, with birch and hawthorn abundant, and wych elm, hazel and even beeches, self-sown from a neighbouring plantation, also present. Much of the scrubby woodland in sheltered places away from the sea consists of hazel thickets rather than ashwoods.

The Burren vegetation in its present form shows very clearly that microclimatological factors are a crucial influence in its distribution. The limestone pavement has one climate, the intervening damp, black-soiled creeks another: a moderate degree of shelter enables scrub to develop, but only a yard away no tree can survive. The valleys around Ballyvaghan have rich grasslands, for they are aligned north-south and protected from the prevailing and sometimes overpowering westerly winds. Again, the distribution of individual species is highly varied: here *Dryas* spreads over many square yards, almost alone; there gentians are supreme, though usually in grasslands. On some almost soilless areas a few planed junipers or dwarfed yews occur; otherwise the limestones are bare until one reaches the next tiny depression with a little shelter. The Burren vegetation is of interest at any time of the year, but attains its full glory around the third or fourth week in May, when both the gentians and the *Dryas* are in full bloom.

The Burren flora is continued to some extent on the limestone country of central Clare, but nowhere else, except on the Aran islands (see p. 443, is its development at all comparable with that in northwest Clare.

Many reasons might be advanced in explanation, including the closer human occupation of central Clare, with long-continued and intensive grazing: in addition, woodland probably formed the main vegetation cover away from the Atlantic coast and the ground flora was never able to develop so completely: central and eastern Clare have patches of oak- or ash-dominated woodlands that appear to be survivals of the natural forest cover (see below). The Burren flora also ceases abruptly around Lisdoonvarna, where shales of Coal Measure age produce a heavy, wet soil, frequently black in colour, and the vegetation is rushy or heathery with peat on the hills and on some of the ill-drained lowlands.

A recent survey of part of the limestone lowland near the Slieve Bernagh showed vegetation types ranging from sphagnum bogs to oak woods. Bogs occur in patches covering as much as one square mile, and their depth ranges from a few inches to more than 20 ft.: the damp bogs are dominated by sphagnum, sedges, rushes and cotton-grass, but heather moor covers the drier bogs and on some of them shrubs such as gorse, broom and hazel are now established. Isolated patches of rhododendrons are a curious feature of some dry bogs; they were probably planted as fox coverts. Limestone outcrops, some of which have a thin drift cover, show a vegetation which varies from rough fescue grass with low-growing hawthorns and blackthorns to dense hazel thickets associated with ash trees and well-developed hawthorns. The humbler form is a *garigue*, the greater a *maquis*. Given favourable conditions the dense thickets may spread out rapidly; on limestones practically bare of drift, at the foot of the Slieve Bernagh, a hazel thicket of maquis type has now submerged Enagh castle, its grounds and the attached graveyard. The maquis-like woods of Clare and Limerick generally include such trees and shrubs as the holly, blackthorn, hawthorn, wild cherry, crab apple, spindle tree and guelder rose in addition to oak, ash and hazel. But the planted demesne woodlands are a much richer type: some consist of magnificent beeches and, more rarely, limes, with conifers on the poorer soils.

The Forestry Commission has not, as yet, planted a large area of woodland, in this region. The largest property acquired covers slightly more than three square miles near Kilfinana in the Ballyhoura hills, and there are also small plantations on the east side of the Slieve Bernagh, facing lough Derg, at Mountshannon and Tuamgreeny. In addition, small woods have been replanted at Kilrush and Cratloe, and land has been acquired for forests at Tulla, Co. Clare, and Adare, Co. Limerick. While any extension of woodland on the Atlantic fringe of Clare is probably impossible, and almost all of Co. Limerick is improved farmland or grazed rough **pastures**, the survival of some patches of natural woodland at least suggests that a considerable expansion of the forest acreage might be feasible in

east Clare. As a whole, the Slieve Bernagh and the Arra mountains are remarkably bare of woodland, but the interests of the farmers, whose holdings penetrate to an altitude of 900 ft. with grazing rights even higher, may prevent any considerable planting.

The proportion of the land given to crops and pasture is 89% in Limerick, 67% in Clare, and 82% in the Nenagh district. Clare shows a steady increase in the amount of rough pasture, for in 1891, 78% was improved, but the proportion has not been materially altered in Limerick for a century. In effect, Clare shows the same tendency to abandon land that is marked in such western counties as Kerry, Galway, Mayo, Leitrim and Donegal, but Limerick's experience is similar to that in most of the Central Lowland. Most of the rough pasture is used by the farmers, and is either attached to particular holdings or (more rarely) held in severalty. The rough pasture consists of the uplands within the region, the Burren almost in its entirety (though not the grass-covered valleys leading to Galway bay), and some areas of peat-covered or wooded lowland in northeast Clare and elsewhere. The status of the reclaimed land along the Shannon and its tributaries is varied, though much of it forms valuable pastures for at least part of the year. As a whole, the land not under crops and pastures corresponds fairly closely with the blank areas in Fig. 76, p. 401.

Farming is the main occupation of the region, and employs 77% of the working population in the rural areas of Clare and 64% in Limerick. Its dominance is more complete in Clare than in Limerick, where the greater prevalence of non-agricultural employment is due largely to higher purchasing power of a population who provide more trade for shops and employ more domestic labour in their homes. In west Clare at the humbler end of the agricultural scale, farming approximates to the subsistence level characteristic of the western seaboard of Ireland, but in east and central Limerick, the farming is comparable in standard with that of the Munster dairying belt. The rateable valuation of the land ranges from around £2 per head in the sandstone and shale belt of west Clare to more than £6 per head in east Limerick. Some of the poorest parts of the area, which is comparable to that in North Kerry, are very little removed from the level of congested districts: in the year 1909, part of Co. Clare (all except the rural districts of Ennis, Corrofin and Meelick) was brought within the area administered by the Congested Districts Board.

The average size of the farms varies from 40 acres in west and northeast Clare to 50-80 acres in Co. Limerick and around Nenagh. In other words, small farms are frequent in the west, and medium-sized farms become increasingly prevalent towards the east: in no part of the region are large farms of more than 100 acres prominent, as even in the east the number

only one-fifth of the total number of holdings. The farms are worked by their holders, who have generally one family helper, and the number of paid workers ranges from 22-50% of the farmers in the west to 85-120% in the east.

Throughout the region the proportion of land cropped is low, and in some districts all the improved land except for some 5% is given to hay and pasture. Oats and potatoes are the only crops of any significance, though wheat production was encouraged during the two wars and almost completely abandoned between them; again, turnips and mangels, grown on a few thousand acres as feedstuffs, are of quite secondary importance compared with oats and potatoes. During the war of 1939-1945 the proportion of the land cropped was raised to 12-13%, almost equally distributed between oats and potatoes. Even in 1851 less than one-quarter of the land was arable, and the past century has seen a steady decline. A writer of 1837 speaks of the small amount of tillage in Co. Limerick and adds that there were clauses in some leases to prevent the cropping of more than 1 acre in 20 or even, in extreme cases, 1 acre in 50. Many of the farmers had herds of as many as 400-600 cattle and a farmer bringing more land under the plough was regarded as a man of declining fortunes. These comments of pre-famine days show that then, as now, wealth lies in the herds rather than in crops.

Cattle rearing has become the mainstay of farming throughout the region, except in the Burren and the adjacent limestone areas around Corrofln, where sheep rearing is much more important. Ballyvaghan rural district, for example, has 37 sheep and 19 cattle per 100 acres of crops and pasture, and Corrofin 38 sheep and 25 cattle, but all the remaining rural districts of Clare have 35-40 cattle per 100 acres, and in Limerick there are 40-50 cattle per 100 acres. Excluding the lowland sheep districts of north Clare, sheep farming is mainly restricted to the uplands and has declined steadily during the past century, so that now there are hardly a quarter of the sheep supported in the seventies, when this form of farming reached its zenith. On the other hand, the number of cattle has doubled under the stimulus of the milk-demanding creameries and the export trade in stores. Almost every farm in Limerick supplies milk to the creameries that have spread through the county since 1890, but Clare still has few creameries: as many as half the cattle of the herds are dairy cows in some parts of Limerick, and Clare has a higher proportion of milch cows than the creamery development so far achieved would warrant, for much of the milk is made into butter for local sale or factory processing in Cork, or fed to pigs and calves. The store cattle trade is also important and there are good fattening pastures near the city of Limerick. Surplus members of the herds find their way to the port of Limerick or are sold

through the fairs to farmers and dealers from areas farther east, so **that they** eventually move towards Co. Meath and the Dublin market. Pig production fluctuates markedly from year to year, but the bacon factories of Limerick absorb the local supply. Finally, poultry rearing has increased enormously during the past hundred years and egg production, with the occasional sale of table birds, has proved a useful adjunct to an economy based largely on stock raising.

INDUSTRIES

Four types of industry may be seen in this region. First, the creameries provide a direct outlet for milk from the farms and are in effect small processing concerns. Second, Limerick city has a range of industries (see p. 404) comparable with that of other Irish regional capitals such as Cork and Waterford. Third, the few market towns of the region have some very small factories of social interest, but, apart from Ennis, they have not been among those towns revived by recent industrialisation. Fourth, quarrying is generally of some importance, though more often depressed than prosperous.

Nowhere is the creamery more important than in Co. Limerick, but so far in Clare the only creameries are those at Scarriff in the east, and at Ennistymon. Many of the creameries have a network of branch separating stations, and the functions of some include the production of cream and cheese as well as butter: some are also depots for eggs and poultry, and a few have a mill for maize meal and flour. Co. Limerick is associated with the first beginnings of the creamery movement in Ireland (see p. 202) and they are now firmly planted in the export trade. Generally they are small and employ hardly more than a dozen people, but they are a form of co-operative industry in the closest possible touch with the countryside. A more advanced form of factory development, on a creamery basis, is seen at Knocklong, Co. Limerick, where a condensed milk factory employs fifty people.

The small towns of Limerick are almost devoid of industries, except for a few sawmills and small factories making mineral waters, always a localised trade in Ireland. In Co. Clare, milling is established in Ennis and also in Kilrush, where one flour mill, dating back to 1811, employs 100 workers. Ennis has one of the larger post-1932 factories, with over 200 employees making boot laces, elastic, tapes and sash cords. Two rural centres have clothing industries similar to those scattered over Ireland: knitwear is made at Milltown Malbay, with sixty workers, and the manufacture of tweeds, blankets and yarns at Sixmilebridge gives employment to more than **100** people. Nenagh has the one aluminium works in Eire, the product of the post-1932 era, a small forge and a blanket works.

Quarrying is an activity of the past rather than the present in many parts of Ireland, but the flagstones around the cliffs of Moher, so frequently seen as roofing materials in the neighbourhood, are still quarried. Silurian slates for roofing are quarried in the Arra mountains and some 300 men are employed. But for the most part extractive industries are abandoned, though lime is quarried in several places and a cement factory at Mungret, near Limerick, uses some local supplies. During the war of 1939-1945, rock phosphates which occur in lens-shaped deposits at the junction of the Carboniferous limestones and shales in Clare were exploited and used in the manufacture of fertilisers. At the maximum, 250 men were employed in the neighbourhood of Lisdoonvarna, but this development was essentially an emergency measure, as the supplies of phosphates imported from North Africa are easier to handle in the factory and, in the end, less expensive than those of Clare, which are difficult both to mine and to transport.

POPULATION (FIG. 76)

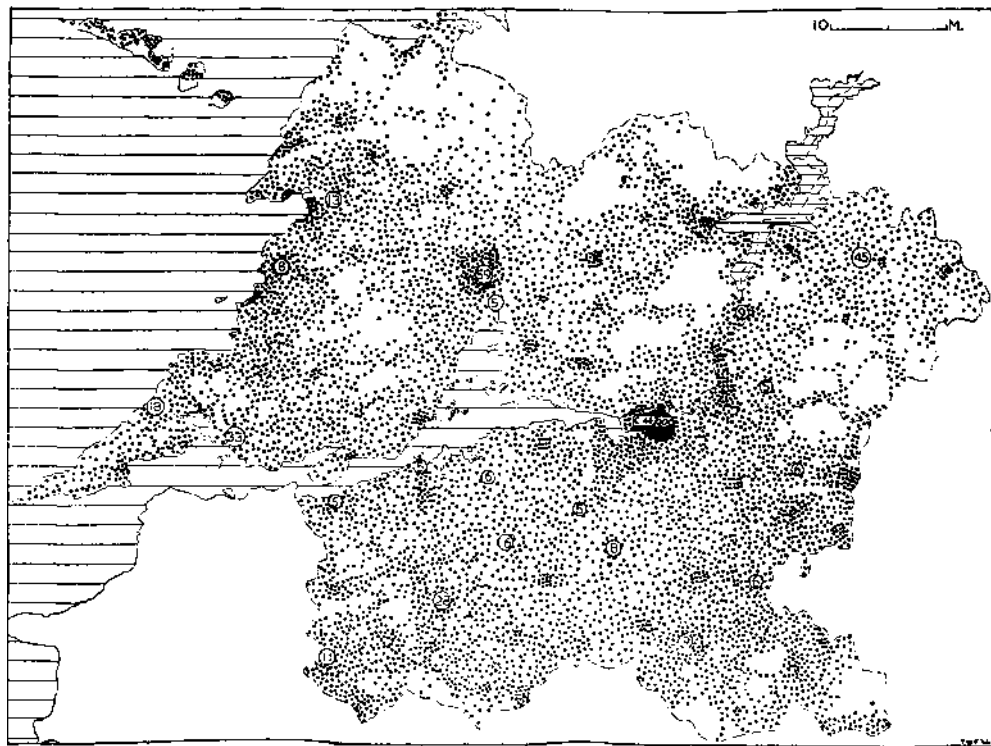
This region covers 2,500 square miles and had a population in 1946 of 247,000, of whom rather more than a quarter live in towns. Limerick had 43,000 people in 1946, but its suburbs have spread slightly beyond the city boundaries so that its effective population is around 47,000. The other towns are small: in 1946 Ennis had 5,900, Nenagh, 4,500, Kilrush, 3,300, Newcastle West, 2,800, and Kilkee, 1,800; only Limerick and Ennis have shown an increase since 1891, when the town population was 58,000. In 1891, however, the total population was 311,000 and the decline since then is due to the loss of more than 25% among the rural population. Some parts of Clare show particularly heavy decreases and Tulla rural district, with a loss of 46% since 1891 (to 1946), almost achieves an Irish record; but the declines in Limerick, at least, since 1911, have been much lighter and the success of the creameries has been suggested as an explanation. The rural areas of Limerick have a population density of 80-120 per square mile, and slightly more per square mile of improved land. In Clare, with its greater proportion of uninhabited country, the density per square mile of improved land is 75-110, except in the remarkably thinly settled country around the Burren, where it is less than 50 to the square mile. As a whole, therefore, Limerick is more densely peopled than Clare both in terms of total numbers and in relation to the improved land: further, its slighter loss of population since 1891 means that a richer county has lost less heavily than a poorer one. Though this may seem natural enough and to be expected, it is not the universal experience in Ireland.

The rural population is spread fairly evenly through the region, and most of the gaps in the population map (Fig. 76) are mountainous

HG. 76.—DISTRIBUTION
OF POPULATION,
LIMERICK AND CLARE
One dot to 25, persons.

Most of the unpopulated areas are uplands, though there are some bare limestone karsts near Galway bay. Towards the west, both in Clare and Limerick, there is a substantial proportion of small farms, and the density of population is rather higher than in the Limerick lowland.

The Aran islands are included on this map, but discussed on pp. 443-446.



country, lowland peat bogs and headis, or the limestone pavements of the Burren. There are also some less obvious features worthy of comment: these include the relatively heavy settlement of areas in the west of Clare and the west of Limerick, both of which have a large number of very small farms. Market towns are few in number; the Limerick lowland has a considerable number of market villages, possessing many of the functions of towns, but not towns in size or appearance: there are also a few such places in Clare. In all, one-tenth of the population lives in these market villages, which are primarily agricultural in their life; the smallest of them are little more than a cluster of farms with a few shops, churches, inns and schools. In 1936, the region as a whole had 61% of its population outside any form of clustered settlement.

Industrial life, apart from Limerick, is hardly more than the processing of a few agricultural staples with a few successful efforts to meet a local demand for clothing which has been the basis for an expansion into the wider markets beyond the neighbourhood. Of the whole employed population, 5% work on the farms, 14% in manufacture and trades, and the remainder provide services intended largely for the farming community. Fishing now employs only 200 men in the Shannon estuary and along the coast of Clare, but as recently as 1926 more than twice this number was recorded. The tourist trade has not achieved the development that the natural beauties of Clare would warrant, though there are several hotels at small centres along the west coast, especially Kilkee. Lisdoonvarna, placed just south of the Burren country, is a spa with sulphur and iron springs and consists mainly of hotels that receive large numbers of visitors in the summer months. There are some interesting limestone ravines contrasting with the black-soiled country of Carboniferous shales, but the attractions for visitors extend far beyond the waters or the scenery, and the 'season' is strongly social in character. So great are the crowds that the church cannot contain the congregations, and altars are erected in the churchyard at which Masses are said by the numerous priests included among the visitors.

LIMERICK (FIG. 77)

This city is the one large distributing centre for the whole region and has more than half its entire town and village population. It is perhaps reasonable to correlate the lack of strong market towns with the long-established supremacy of Limerick as a regional capital, for it is at once a port, an industrial town, a Cathedral see with two bishops, the meeting place of many roads and railways, and an active commercial town and distributing centre. The town has spread along the east side of the Shannon, with suburbs on the west. The old harbour lies between the two Shannon

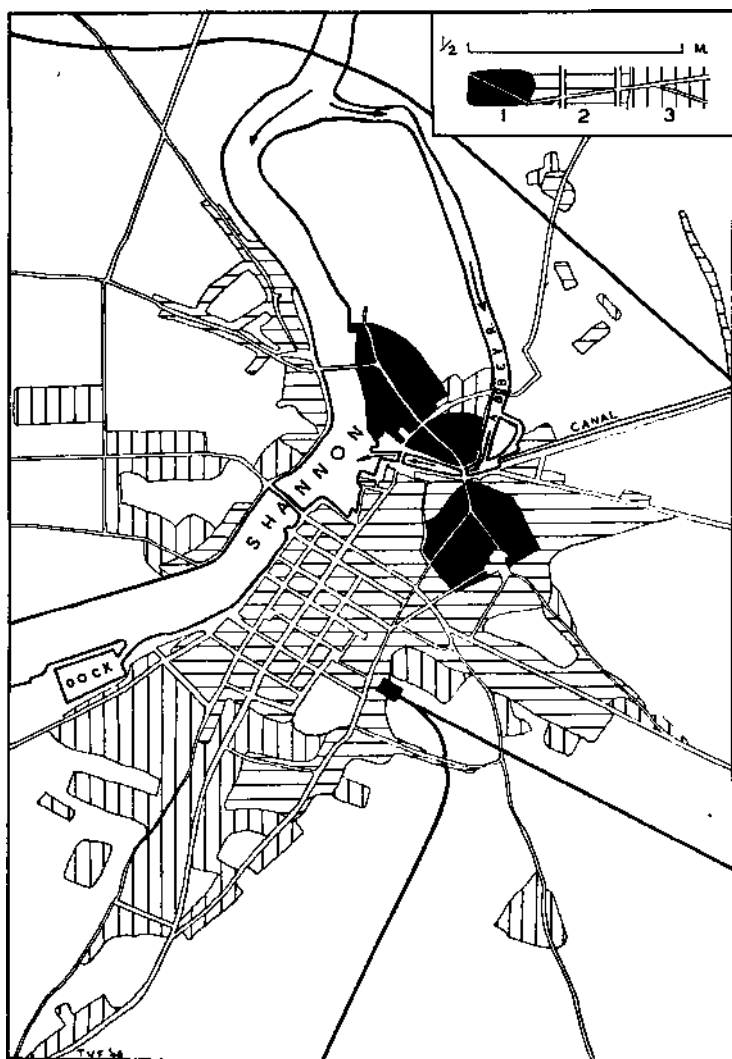


FIG. 77.—THE CITY OF LIMERICK

1. Mediaeval walled town; 2, Expansion to 1841; 3, to 1925.

The main features of the town, discussed on pp. 402-405, include the hour-glass shape of the early walled town, the Georgian planning in a rectangular pattern, and the late nineteenth and early twentieth century spread on both sides of the river.

The outline of the mediaeval town is from Leask, H.G., "The Ancient Walls of Limerick," North Munster Antiquarian Journal, Limerick, vol. 2, 1941, pp. 95-108.

bridges, with quays on the main river and in the Abbey creek, but the main part of the town today is below the bridges along quays that extend for nearly a mile and lead to a floating dock with water 24 ft. deep. The port is entered by coasters or tankers with cargoes of grain, coal, oil, petrol and a few other commodities. Few store cattle are exported through the port as the sea journey to Britain is too long, and it is therefore preferable to send them to Dublin by special train: consequently, the exports are limited to dairy produce, with small supplementary cargoes of slates, timber and hides.

Like Dublin, Waterford and Cork, Limerick is a Norse foundation at the lowest ford of a river. The town first grew up on what is now known as King John's Island, a drift-covered Carboniferous limestone ridge 40 ft. high surrounded by the Shannon and the Abbey river. Part of this island is reclaimed land still subject to floods, but it is a defensible and often defended site with a ford leading to firm ground on the west bank of the river. Its name commemorates, as few things do, except Magna Carta, King John, who came in 1210, after which a bridge was built across the Shannon. The town on the island was High Town, or the English settlement, and in time this was supplemented by 'Irish town' on the opposite bank, with the result that Limerick was like an hour-glass in shape: all of it was walled in the fifteenth century and a bridge was added to connect the two parts. In the eighteenth century the walls were allowed to decay and the town spread southwards along the firm ground east of the river into the Newton Pery district, and also on the west side. From this period of expansion, Limerick has inherited the wide streets and dignified architecture characteristic of late Georgian planning, but the town as a whole is very congested, as most of its inhabitants live within an area of less than one square mile. The general tendency of the present is for the town to spread outwards, but at the 1936 Census one district in central Limerick had 90 persons to the acre, a density almost equal to that of the most congested parts of Dublin. Such conditions occur in several old Irish towns which, like Limerick, are of early mediaeval foundation, later became walled, and finally expanded in the latter part of the eighteenth century and the early nineteenth, since when they have remained fairly static in population. The population of Limerick has fluctuated around 40,000 since 1861, but has a more hopeful future if an airport on the Shannon becomes one of the entrances to Europe from the New World.

The industries of Limerick are varied, and the town's factories are concerned mainly with the processing of the agricultural output drawn from the immediate neighbourhood, with the milling of imported grain, and with the satisfaction of the home demand for clothing, agricultural implements and building materials. Three large bacon factories, all of which have

been established for more than a century, have sold Limerick bacon and ham widely in home and export markets: subsidiary lines include lard and sausages, and, in the case of one firm, vegetable canning. Three hundred people are employed in a factory making milk products, tinned cream and butter. Milling is in the hands of one large combine, though a few small concerns have managed to survive: home and imported grains are used to make flour and the feedstuffs so widely sold in the dairying and cattle-rearing countryside. One tannery, with branches at Tralee and Cork, has 200 workers, but the footwear industry is almost undeveloped here. Ready-made clothing and waterproofs are made by a firm which claims to have an export sale. Building trades are intensively developed, and several large firms either provide materials ranging from timber (chiefly imported) to lime, or else work as contractors in the town and surrounding areas. A machinery works supplies gates and railings for the builders, and also makes some farm implements. All the varied enterprises so far discussed belong to the pre-1932 phase, though some have been expanded since that date: almost the only recent addition is a nail-making works. Outside the town, at Mungret, there is a large cement factory.

It will be seen that in the main Limerick is an industrial centre for the processing of agricultural staples and the supply of clothes and building materials in the neighbourhood: in all this, the industrial activity shows a definite geographical influence. It is also clear that several useful industries have been successful in Limerick, but unfortunately lace making, which employed several hundred workers during the nineteenth century, has almost died out, though its fame remains. Finally, the proximity of the Shannon waterpower scheme has not attracted new industries, nor is there any reason why it should, for the nation-wide transmission of electricity has made possible the decentralisation of industry rather than its concentration in any one place.

SU13REGIONS

Limerick itself might perhaps be regarded as a subregion, if one accepts Unsteady's view that a city may itself be a regional unit.¹ Leaving aside this methodological question, it is possible to distinguish five subregions on a morphological basis, and it will presently appear that each has some distinct agricultural qualities. This must remain a crucial factor in the consideration of such an area, for fishing, the tourist trade, quarrying and (except for Limerick) industry are all of quite minor importance. The welfare of the people rests largely in developments such as those of the creameries, which bring direct profit to the farmers, for agriculture is the region's main resource.

¹ This is suggested for London in Unstead, J. F., 'A System of Regional Geography,' *Geography*, London, vol. 18, 1933. pp- 175-187.

i. THE LIMESTONE COUNTRY OF NORTH CLARE

In the Burren, very restricted areas are available for settlement, but the valleys opening to Galway bay and a few small coastal lowlands have farms given to sheep rearing, with some store cattle raising. To the east lies the turlough area, with its fluctuating lakes and drift-covered limestones separating bare limestone areas: here, too, sheep rearing is more important than cattle production. The subregion as a whole is thinly settled, and the farms are mainly medium-sized or large: the decline in population since 1891 has been over 25%. Ennis is the only town, and the only villages are Corrofin and Ballyvaghan.

2. THE SANDSTONE AND SHALE COUNTRY OF WEST CLARE

In the upper Carboniferous plateau area, sandstones, especially flags, stand out prominently, but most of the area is lowland, drift-covered, and having some acid and ill-drained soils with bogs. But apart from the higher parts of the ridges, a few coastal heathlands in the Loop Head peninsula, and the bog-lands, there is close settlement with many small farms, though the average farm size is 40 acres. The only creamery is at Ennistymon, and the main emphasis of the farming is on the rearing of young cattle and on butter production, with some pigs and poultry. The two largest centres are Kilkee and Kilrush: Ennistymon (1,300 in 1936) and Milltown Malbay (800 in 1936) are the only other centres with more than 500 inhabitants. The loss of population since 1891 has been one-third.

3. WEST LIMERICK

Structurally similar to the west of Clare, and separated from it only by the Shannon estuary, this subregion has a well-marked scarp edge that divides it clearly from the Limerick lowland. Its valleys are closely settled and medium-sized farms predominate. Much of the land is poor, with rushy pastures, but the creameries so dominate the economic life that half the cattle are milch cows, and sheep are almost entirely absent. The surplus young cattle find their way to richer pastures through fairs at such centres as Abbeyfeale (1,100 in 1936) and Glin (500): the nearest town is Newcastle West. The railway from Limerick to Tralee passes through the area. In population it has lost 20% since 1891, but still has more than 100 people per square mile of improved land.

4. THE LIMERICK LOWLAND

This region lies at the western end of the * Golden Vein/ and is linked with a somewhat similar area in Tipperary: to the north lies the Shannon and the Silvermines mountains, to the south the Galtees and Ballyhouras. As a lowland, it is relieved from monotony by low volcanic hills and

Armorican ridges. Milk production for creameries is more important than anywhere else, though there is cattle fattening near Limerick. The population per square mile of cultivated land is 80-130, and the population decline since 1891 has been little more than 10% over much of this lowland, which, with its numerous small market centres, is industrialised only to a slight extent through the work of the creameries, but yet shows signs of population stability rare in rural Ireland.

5. THE UPLANDS AND LOWLANDS OF THE LOWER SHANNON

Sharp landscape contrasts exist here, as the Armorican mountain ranges are surrounded by lowlands and trenched by corridor valleys. The uplands have some sheep farming, but stock raising is more important everywhere for the creameries have not the power they possess in region 4. Nenagh is a market town with small industries, and there are several market villages, of which the largest is Killaloe, the see of a diocese covering a large part of Clare. As a whole, the loss of population has been very heavy, in places over 40% since 1891, and it seems unlikely that it will add to its present population density of 50-60 per square mile of total area or 70-100 per square mile of improved land.

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The 'Shannon scheme' is described in *Engineering*, London, vol. 127, 1929, p. 141; vol. 129, 1930, pp. 731, 743, and 771; vol. 131, 1931, pp. 250, 340, 526, and in the annual reports of the Electricity Supply Board, Dublin, which includes a review of the river levels through each year: some of this data has been used in Chapter III (Climate and Weather).

The author is indebted to a former student, Mr. R. C. Le Clerc, B.A., for the use of his unpublished thesis on an area near the Slieve Bernagh.

CHAPTER XVm

EAST CONNACHT

A DIFFERENCE OF farming pattern, together with poorer soils, more heathlands and bogs, and a much damper climate, marks Connacht off from Leinster, and in spite of all the improvements made during the past fifty years the Shannon still separates the 'peasantry' of the west from the farmers of 50-100 acres in the east. Through Connacht, from the Shannon to the Atlantic coast, the number of people living on each square mile of improved farmland steadily increases, the towns, with a few conspicuous exceptions, become mere villages and industrial enterprises almost disappear. The land, in some places at least, cannot support the people living on it, so that migratory labour still persists in the more closely settled districts, though it is far less prevalent now than in 1891, when the Congested Districts Board began its work. Permanent migration has been widespread and the loss of population has been heavy. In theory, therefore, the population are living on their small farms; in practice they depend partly on financial resources poured into the region from their relatives who work abroad, either for part of the year or permanently.

There has been a steady amelioration of conditions during the past fifty years and in consequence the area that would rank as 'congested' has been reduced almost to extinction in East Connacht. Very heavy population decreases are primarily responsible for this change, but in spite of an average decline of 30% since 1891, the density per square mile is still high. Nor is the tide of emigration stopped, for almost every rural district showed a substantial decline of population between 1936 and 1946. On the other hand the towns have grown slightly during the past fifty years and now have a small share of the new factory developments, though they include little more than one-fifth of the total population and exist mainly as market centres for an agricultural community of comparatively humble economic status. Some 70% of the region is improved agricultural land, and the remainder consists either of bogs or of bare limestone lowlands. The drift cover is extremely thin or even non-existent around Galway bay and on the long low ridge dividing the Shannon from its tributary, the Suck, but considerably thicker in much of the region and piled into drumlins towards the north. A series of eskers and gravel mounds crosses the region from east to west and carry many historic roads across bogs and marshes.

The hillfoot west of lough Mask and lough Corrib is a structural and

human divide between the peninsular upland of west Galway and the lowlands of east Galway, south Mayo and south Roscommon. On the south, the lowlands merge into the turlough area of central Clare, which lies between the Burren hills and the desolate Slieve Aughty upland. The Shannon bogs and 'callows' are a distinct barrier on the east and a striking change of landscape is seen along the margins of the drumlin belt, which maintains its identity across the whole of Ireland. As a whole, this east Connacht region consists of the areas drained, partly by streams with underground courses, to the Shannon, Suck and Clare rivers; and the wide spreading interfluves, 200-400 ft. high near the Shannon, fall gently towards Galway bay, where they reach the coast in peninsulas and islands with sandbanks and reefs offshore.

STRUCTURE AND LANDFORMS

The greater part of this lowland is composed of Carboniferous limestones, which probably belong to several phases of deposition; in addition, Carboniferous sandstones appear at the surface in a few places without exerting any marked effect on the landforms. The whole of this lowland belongs to the Armorican structural province of Ireland, and its western boundary is the line of junction with the Caledonian west. Old Red sandstones and earlier rocks break through the general Carboniferous surface in places: several of the inliers fail to break the lowland level but two appear as hills in Slieve Aughty, an upland reaching 1,200 ft., and in Slievebawn, a ridge that extends for twelve miles with a north-northeast trend in east Roscommon and a maximum elevation of 864 ft. There is a gradual rise from sea level in Galway bay to 400 ft. between the wide river valleys, with a few hills of 500 ft.

The term the 'land of bare limestones' is perhaps an over-emphatic description of even the least drift-covered section of this lowland, but the covering is deep only on the margins of the drumlin belt. The drumlins, which are varied in form and may be as much as 70 ft. high and half a mile long, occur to the east of lough Mask and around lough Kilglass, immediately west of the Slievebawn. As a rule the southern limit of the belt of drumlins is a fairly clear line, but it has never been precisely mapped. The thinness and even the absence of the drift cover over much of the region is a puzzling feature which has been ascribed to the paucity of waste near the centre of an icesheet located either in Sligo and Leitrim or in Galway and Mayo. The drift cover outside the drumlin belt is rarely more than a few feet thick, whereas it is more than 100 ft. thick in many districts east of the Shannon. Its virtual absence around Galway bay and on the long interfluvium running through the heart of Roscommon between the Shannon and the Suck may be due partly to post-glacial denudation. Some

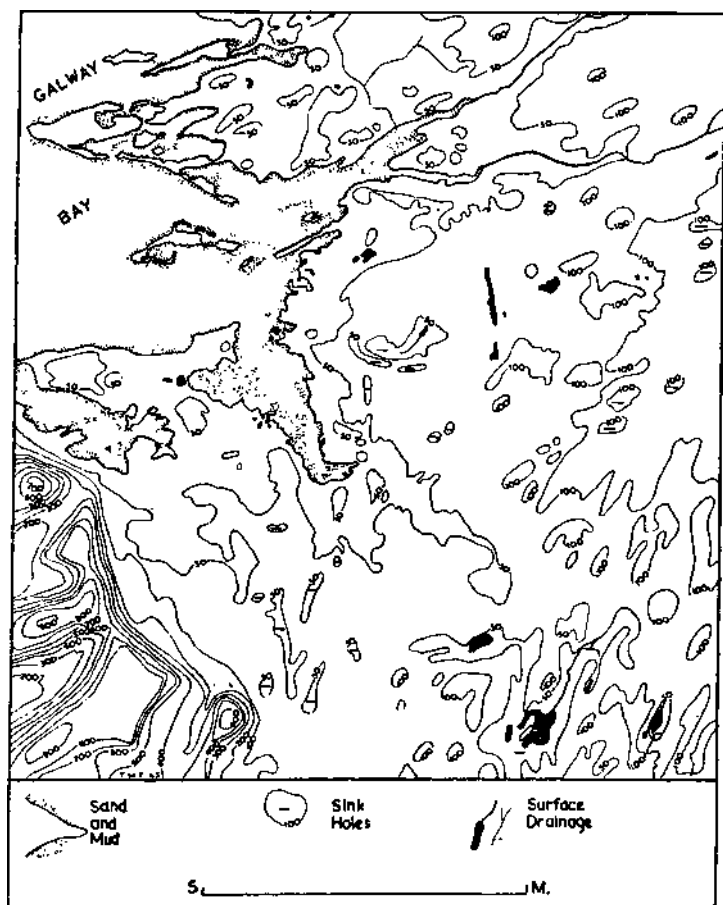


FIG. 78.—THE KARST AREA, GALWAY BAY

Very little surface drainage exists in this area: note especially the escarpment forming the edge of the Burren area in Co. Clare.

Based on the 1" to 1 mile maps, sheets 105, 106, 114, 115, by permission of the Minister for Finance of Ireland.

areas are karstic and have exposures of bare limestones: in such districts cultivation and settlement is mainly restricted to patches of drift. This is especially true in the waterless country that extends from central Clare (see p. 389) to Galway bay and northwards to Tuam.

Turloughs are hollows filled with lakes at times and completely dry at others: the periodic filling shows the fluctuations of the underground drainage system in a climate with abundant but often curiously distributed rainfall from season to season. In this belt, with its intermittent drift cover, very few rivers manage to maintain a permanent course (see Fig. 78) and the surface has a large number of sinkholes, some of which expose the underground drainage. It is reasonable to regard the turlough as the more splendid relation of the sinkhole, as both are due to the subsidence of limestone strata. Such large permanent lakes as lough Corrib and lough Mask are almost certainly expressions of the same vulnerability of limestone to what is essentially chemical weathering or solution, though their great depth, which reaches 191 ft. in lough Mask and 152 ft. in lough Corrib, suggests that glacial scouring has played some part in their evolution.

A sinkhole (or swallow hole) may be nothing more than a tiny depression too small to appear on almost any map. The local name is 'sluggy' and there are well-told stories of gardens sagging down in the night as a new 'sluggy' formed. The sinkholes marked in Fig. 78 represent only a fraction of the total number, as even a much larger scale and closer contour interval could not show them all. The normal form is a bowl-shaped hollow, varying in diameter from a few feet to many yards and having, in most cases, a dry base filled with stones and loose clay. Sinkholes occur through the whole of East Connacht, notably around Castlerea, Co. Roscommon and Williamstown, Co. Galway, and there are individual turloughs in the same areas; but the turlough and sinkhole country is most continuously developed in the part of the lowland stretching from central Clare into central Galway.

The drifts are varied and consist mainly of local materials, though there are numerous erratics of granites and schists derived from the Caledonian area. The bogs are most widespread in the east, particularly around the Shannon and the Suck, where they cover several square miles in some places. The drier limestone areas are bog-free, but bogs occur in numerous depressions and on drift-covered level areas even in the east. The so-called 'eskers' provide a further element of variety in a landscape that to the superficial observer is merely monotonous: they show a variety of form shared by those to the east of the Shannon (see p. 32). Many of them have no clearcut direction and are in fact mounds of sand and gravel spread out in a very complicated pattern, yet there appears to be a north-south series

joining an east-west series and some maintain their identity for many miles; notable examples are the Athlone esker to the south of lough Ree, and the Clonmacnoise esker, which is continued across the Shannon and the Suck (see Fig. 58, p. 311). It is not impossible that some 'eskers' are kame-like marginal accumulations comparable with the great Salpausselka ridges of Finland, or again that others are successive deltas laid down during the withdrawal of an icesheet and therefore possessing an alignment at right angles to the marginal series. If this be so, the analogy with Finnish conditions is close: at present it is only possible to state that there is general evidence of a withdrawal of the icesheet towards the north and west.

LAND USE

The natural vegetation of the region ranges from heather-dominated moorland on the poorest and most stony soils to patches of natural or sub-spontaneous woodland on the limestones and on the drifts so liberally represented. Many of the Mediterranean and Alpine species found together in the Burren extend over the less-famed limestones of this area (see pp. 62-64 and Fig. 13); but while many parts of the limestones have never borne trees, there are some patches of scrub and even of woodland. The scrub is largely composed of hazel, intermingled with hawthorn, and the most characteristic woodland is dominated by ash, though oak is also very prevalent and in some places more frequent than ash. It is possible that the steady leaching out of the limestone content in the soil has favoured an oak rather than an ash type of woodland in places. The flora of lough Mask and lough Corrib is calcicole on the bare limestones and calcifuge on clayey drift. Some of the islands in lough Mask are covered with ash, oak, birch, holly and alder on drift-covered Carboniferous limestones; the woods are wind-planed and the tallest trees at the eastern ends of the islands are only 30 ft. high. Similar areas in lough Carra are wooded, with birch, buckthorn, ash, willow, juniper and various other trees in smaller numbers. Pines, though not native, are spreading sub-spontaneously through all these woodlands.

Apart from scattered patches of scrub and a few untouched natural woodlands in such remote places as islands in the lakes, trees are mainly found in the numerous demesnes which break the dreary monotony of an open limestone country with grey-walled fields. A few demesnes have been taken over by the Forestry Commission, which now has twenty-seven square miles of country, or 1% of the region, under its care. Some of the demesne woodlands are very small, but the largest of them, at Cong, covers five square miles. East Connacht shares a general lack of forests, and even in some parts of individual trees, with many other parts of

Ireland, but the acquisition of land is not easy, for many of the limestone crags or turf bogs are used either for rough grazing or, in the case of bogs, for home supplies of fuel.

The proportion of this region given to crops and pasture varies from 60% around Galway bay to more than 80% in the Roscommon rural district. The land used only for rough grazing includes Slieve Aughty, some parts of the peat bogs and a few of the stoniest tracts of the limestones around Galway bay and in Roscommon. But some of the limestones have great agricultural value and form excellent sheep pastures; parts of the Shannon peat bogs are more truly marshy 'callows,' suitable for cattle feeding and perhaps best regarded as water meadows. Over most of the lowland the area of improved land has been considerably extended during the past hundred years, largely by the reclamation of bog-lands after they have been cleared for fuel.

Agriculture is by far the most important source of employment in this region, for 80% of the entire 'employed' population and 90% of the 'producers and repairers' work on the land. These figures indicate an economy in which industry hardly enters, commerce is rudimentary and farming is mainly at a humble level. The number of labourers employed varies from 7 to 35% of the number of farmers, most of whom have the assistance of a relative on their holding. The cash resources are low and the holdings are small, though a definite specialisation has been evolved in the rearing of sheep and young cattle, many of which are destined to be sent eastwards across the Shannon, some through the famous fairs of Ballinasole. This is almost the only lowland part of Eire in which sheep outnumber cattle and are the main cash staple of many farmers. Their association with dry limestone pastures is natural enough, and it is perhaps not surprising to find approximately 1,000 sheep per 1,000 acres of crops and pastures in the almost driftless belt that extends from north Clare through Galway into south Mayo around Ballinrobe.

Farms of less than 30 acres predominate in northeast Galway and in the adjacent parts of Roscommon and Mayo, all of which included considerable areas regarded as congested districts in 1891. In spite of the very heavy declines of population since then, small farms are still supreme in the landscape and the density of population is 120-150 per square mile of improved land. Such a density here means that each farming family has to live on a farm of little more than 20 acres and, as some large farms and demesnes cover part of the area, very much less in many cases. Many of the holders migrate to Great Britain as seasonal labourers year by year, or earn money as labourers on the larger farms, or on roadwork, or turf-cutting, or even in the towns. The reports of the Congested Districts Board showed that most of the small farms were little removed from the subsistence level:

as a rule 3-4 acres were divided equally between oats and potatoes, with a small patch of meadow, and the remainder of the farm was pasture. The inducement to migrate was very strongly felt by those in a position to leave; in some districts 'all the young people migrate to America before they are twenty-five/ Except that Great Britain is now the outlet for emigrants, the position remains much the same and the area still shows distinct signs of population pressure in spite of long-continued emigration.

In south Galway the small farms are less numerous than farther north and the pressure on the land is less acute. Very few areas came within the statistical limits laid down for a congested district in 1891, though there are still islands of poverty in what is hardly a land of plenty. However, medium-sized farms, especially those of 30-50 acres, are the most usual type, and the number of farms of more than 100 acres is everywhere significantly small. The density of the rural population is now 60-100 per square mile of improved land, and the rate of decline during the past fifty years has been 20-30%; both figures are lower than those for areas farther north in the region.

At least two-thirds of the improved land is in pasture, and most of the remainder is in meadow, though some 10-15% of the farmland is arable in some areas. Most of the cropped land is in oats and potatoes, intended for use as foodstuffs and feedstuffs. During the war of 1939-1945 wheat was grown in some of the drier areas, but its maximum extent was 27,000 acres in Co. Galway in 1945: normally it covers little more than a quarter of this acreage and is equally insignificant in Roscommon and Mayo. In spite of the establishment of a sugar beet factory in Tuam the crop has never been grown extensively, though in 1945 it covered 12,000 acres in Co; Galway, one-twelfth of the arable acreage for the county. The main areas of sugar beet production in Ireland are in the drier east of the country and in the richer lowlands of Tipperary and Cork.

Farming is strongly pastoral in its main emphasis; wheat and sugar beet cultivation are merely sidelines in the agricultural economy. As yet, creameries have scarcely penetrated this region and the cows are kept mainly for butter production, though a good deal of milk is fed to calves, which are kept for a year or more and then sent forward to Westmeath and Meath for fattening. In addition, many farms in the area act as intermediate feeding grounds between the poor pastures of the west and the rich pastures of the east. Cattle are most numerous in central Roscommon and sheep in Galway on the driftless limestones, though there are local variations of wide range. Although specialisation on sheep and cattle has raised the farmers above the subsistence level, many problems remain. Large numbers of the farms are too small to be economic, and even if the creameries penetrate into the area, many of the farmers will find it difficult

to supply milk daily as they have only three or four cows: creameries are generally more successful in areas dominated by medium-sized farms. As yet, pig keeping is unimportant, but poultry provide a useful source of income on almost every farm. The sale of eggs and table birds has expanded steadily for a hundred years and the profits during 1945 were estimated at £38 per householder: even this modest amount may be a substantial part of the total income on a small farm.

INDUSTRIES

Galway, a regional capital serving a large part of Connacht, is the only important industrial centre in this region; it is one of the few provincial towns that have grown steadily in population since 1921, and had over 20,000 people in 1946. The best-known of the new industries is a hat factory, but most of the enterprises centre around contracting and the supply of materials used by farmers. Among these are sawmills employing several hundred men and a foundry making a variety of iron goods, including many of the local types of spades used by the farmers. Fertilisers and feeding stuffs are prepared by a firm employing 300 people, and there are several small flour and maize mills: another essentially rural industry is harness making. Furniture factories cater for the demand of the neighbourhood. There are also many other small concerns such as printing works that are typical of the larger Irish market towns, but there is little sign of any processing factories for agricultural staples in Galway: rather must it be regarded as a market town supplying goods to the rural areas, attracting their trade, especially at fairs, and owing its strong position partly to remoteness, as no town of even 10,000 people lies within a radius of forty miles.

The remaining towns of the region have very few industries and are little more than rural market centres. Tuam has one of the four new sugar beet factories in a building of strikingly modern design, and also has milling and contracting firms. Ballinasloe, a town on the Suck famed for its cattle fairs, has a footwear factory and Athenry has a sack and bag works with sawmills. Mount Bellew, a market village of less than 300 people, has a rural co-operative society, whose activities include the milling of oats, maize and wheat and also the manufacture of gates, carts, barrows and handles. In south Mayo the most notable single development is a bacon factory at Claremorris employing over 100 people, but otherwise industries are almost non-existent, though a firm at Hollymount makes egg, fish and poultry cases and even railway sleepers. The industrial position of Castlebar, Westport and Ballina is discussed on pp. 433-434. The status of industry in Co. Roscommon is equally humble, as there are merely a few sawmills, with bacon factories and creameries at Ballaghaderreen. A

creamery at Kilmore, near Drumsna, also has bacon curing as a sideline. The lowlands of East Conn ache as a whole are agricultural areas of primary production only, for the region is almost devoid of any processing factories. There are no indigenous industries and the local purchasing power is so low that few factories relying on local demand have developed except in the town of Galway.

POPULATION (FIG. 79-)

Essentially rural in character, this region of 2,700 square miles has nearly 80% of its population living outside all towns and villages. The dot map (Fig. 79) reveals the many gaps in the settlement pattern, most of which are uninhabited peat bogs: the largest single break is the Slieve Aughty upland, south of Loughrea. Fig. 79 also demonstrates that there are many places where a ribbon pattern of settlement reflects the road system, especially around Ballinrobe and in die area between the town of Roscommon and Castlereia. Some of the roads follow tongues of cultivable land on eskers and moraines through bog-covered lowlands. Comparison of Figs. 6 and 79 will show that the general northwest-southeast line of the bogs is not without its influence on the distribution of settlement. In addition, some of the driftless country is practically devoid of habitations, especially around Galway bay and, to a lesser extent, in some parts of Co. Roscommon.

The population of this region was 303,000 in 1891, 233,000 in 1936 and 222,000 in 1946, and has declined by 26% since 1891, but the towns increased from 43,000 to over 50,000 during the same period, largely through the recent growth of Galway. The decrease in the rural population therefore is nearly 30% since 1891: the density per square mile outside the towns is now 64 compared with 96 fifty years ago. There were 130 people per square mile of improved land in 1891, and 90 in 1946, but this general figure hides the fact that the number of people living on the land is still comparatively high, especially in such pockets of close settlement as the south of Mayo and the adjoining areas in Galway and Roscommon. The reports of the Congested Districts Board drew attention to these pockets of over-close settlement and said that in them 'the land is incapable of maintaining its population . . . the majority of the able-bodied men are compelled to spend from one-third to one-half of their lives as migratory labourers, absent from their homes, and unable to attend to the cultivation of their land/'¹ At the poorest levels this picture is substantially true today, but the congestion has been alleviated in various ways, some of which were

¹ Base Line Reports of the Congested Districts Board, 1891: this quotation is from a 'General Report referring to the inland districts of Mayo, Galway, Roscommon and Sligo.'

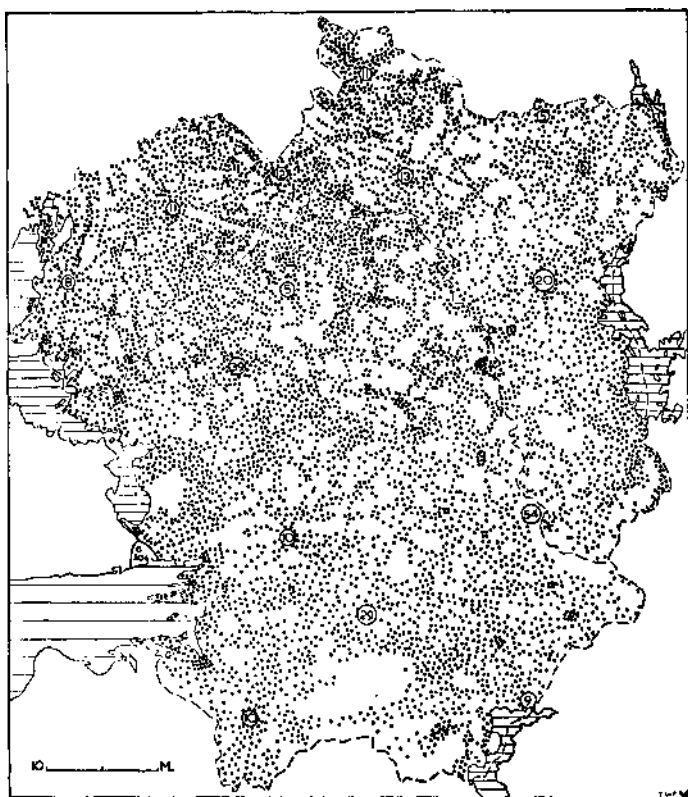


FIG. 79.—POPULATION DISTRIBUTION, EAST CONNACHT

One dot to 25 persons.

This map shows, perhaps more perfectly than any other in this book, the interruption of farmlands and settlement by bogs and, on the Shannon-Suck, interfluvium, or around Galway bay, limestone karsts. Towns are widely spaced and, generally, small; the largest are Galway, in some senses the regional capital of Connacht, and Ballinasloe.

foreseen and even set in motion by the Congested Districts Board, though seasonal migration still remains and the region is therefore supporting fewer people than it appears to maintain.

Too many people lived in this region in 1891 under the then existing form of agricultural organisation, and emigration has been part of an essential adjustment that has meant a general rise in the standard of living. The same desirable results might perhaps have been achieved through rural industrialisation combined with co-operation, but these have not been a feature of the area. The improvements suggested fifty years ago included the promotion of better systems of agriculture with superior breeds of livestock and poultry, the provision of artificial manures, and the construction of accommodation roads to remove the isolation from which some farmers suffered acutely. All these have been achieved to some extent and, coupled with diem, housing schemes have done much to improve the standard of life. But perhaps die most important development of all has been die acquisition of new lands for setdement and the reorganisation of many holdings formerly dissipated into a large number of strips. Most of die demesne lands have been taken over for new tenants and the enlargement of the holdings has gone on to the present day. In both 1926 and 1936, there were about 36,000 farmers in this region, but while 67% of them had less than 30 acres each in 1926, only 60% of them had such small farms in 1936. The number of farms covering 30-50 acres increased from 21 to 26% of the whole in the same decade and those of 50-100 acres from 8 to 10%. Large farms of more than 100 acres now cover less than 4% of the total area. While therefore the standard of farming remains relatively modest to this day, one may discern a steady union of the smaller holdings, or at least their enlargement. Especially notable, perhaps, is the reduction of the number of farmers holding less than 15 acres from 9,544 in 1926 to 6,899 in 1936, a decrease shared by every part of the region. Even so, these holders cannot support themselves from such farms and must either find work locally or migrate seasonally. As die supply of land in demesnes available for settlement is limited, any further enlargement of the holdings will probably result in emigration. Still less can the area absorb its natural increase of population unless a quite unforeseen industrial development takes place in the near future.

There is little fishing in the region, except from the town of Galway, where the number engaged has steadily declined; there were only 78 fishermen recorded in 1936 against 142 in 1926. The fishermen live in the Claddagh, which was originally a self-governing Irish setdement of thatched cottages quite distinct from the English town. The Claddagh has been considerably altered by a rehousing scheme.

The comparative stability of the town population since 1891 is a fairly

usual characteristic of rural Ireland. This region, which has a low buying power among its rural community, had 15% of its population in towns in 1891 and 22% in 1946. The position of Galway as a regional capital has already been noted: in addition to its industries and wide trading contacts, it has a University college and is the centre of a diocese. Galway increased in population from 13,800 in 1891 to 18,300 in 1936 and to 20,400 in 1946; its suburb, Salthill, has gradually become a seaside resort with a large number of hotels. In 1946 only four other towns had more than 1,500 people: Ballinasloe (5,400), Tuam (3,800), Loughrea (2,900), and Roscommon (2,000). Clearly these five towns do not provide a complete marketing framework for so large a region, but there are also a number of smaller places, hardly towns in the normal sense of the term, which act as trading centres for the countryside; the largest of them has 1,000-1,500 people and the smallest only 200, but in all they contain approximately 16,000 people. They have been counted with the towns as a group, though in many instances they are little more than clusters of farms with a few shops.

SUBREGIONS

East Connacht is almost entirely a lowland and its demarcation into subregions depends largely on the nature of the local soils and drainage which influence the farming pattern and the distribution of population. The presence or absence of drift and the extent of the bog-lands in each part of the region are factors of primary significance, but the division of the land into small farms of modest economic status has been almost equally important in the shaping of the landscape as it appears today. Even more, the agricultural landscape of tomorrow will probably differ only in detail from that of the present, though the farms are expanding rather than contracting, housing is improving, and the standard of living is at least not declining. Five subregions are delimited here; reference to Folder I will show their essential geomorphological basis.

1. THE LIMESTONE COUNTRY OF CENTRAL GALWAY

The belt of country that extends from the neighbourhood of Gort to Galway bay and thence northwards to Tuam and Ballinrobe consists of Carboniferous limestones which are either driftless or else have merely a thin covering. Few rivers manage to maintain a course on the surface except for the Robe, the Clare and two small streams flowing to Galway bay, but there are numerous sinkholes and some larger fissures, including collapsed caverns (see Fig. 78). The extensive but intermittent 'turlough' lakes that characterise Central Clare are found only around Gort within this region, though there are many small depressions of comparable formation.

Bogs occur only around lough Corrib, but the cultivated area is limited to 60% of the whole as there are stretches of bare limestones that are covered with a vegetation reminiscent of *maquis* or *garigue*. This subregion therefore has some features in common with the adjacent Burren district of northwest Clare (see pp. 394-396), and is also comparable to Central Clare (see pp. 389, 396) and Roscommon (see pp. 422, 423). It rises gently from a fragmented coast with many peninsulas and islands (Fig. 78) to a ridge 200-500 ft. high. This ridge forms a low water-parting between the Clare and the Suck drainage basins to the east of Athenry, and is clearly limited on the south by the Burren hills and Slieve Aughty. On the north there is no clear boundary, but rather a gradual transition into drift-country with drumlins around lough Mask.

One of the strangest memorials of human folly in Ireland is a waterless canal course between lough Corrib and lough Mask made in the middle of the nineteenth century. After £30,000 had been spent the work was abandoned, as the rock was found to be so porous that it would be impossible to make the canal watertight. Apparently the engineers failed to observe that lough Mask had no visible outlet, but poured through subterranean crevices and channels into lough Corrib, two miles away; had they cut the canal in the Silurian and igneous rocks a few miles farther west it might have survived to this day, though even if it did exist, the traffic would probably be light.

Agriculturally this region is distinguished by its lowland sheep farming, which is more fully developed here than anywhere else in Ireland. In both Tuam and Gort rural districts there are four times as many sheep as cattle, and in all the flocks number 300,000, or more than one-quarter of the total for the entire province of Connacht. The farms are mainly in the 30-50 acre group, with a substantial number of smaller farms and a few larger ones; only in a few places is there an economic decline to the level of a congested district. The density of population is now 60-80 per square mile and around 100 per square mile of improved land. Galway is the major market centre and Tuam, a Cathedral city with a Roman Catholic archbishop and a Church of Ireland bishop, provides the northerly part of this subregion with trading contacts, but otherwise the only 'towns' are such places as Ballinrobe (population 1,400 in 1936), Gort and Athenry, each of which has less than 1,000 people, and a few villages such as Kinvarra on Galway bay.

2. THE SLIEVE AUGHTY UPLAND

These uplands, which extend over some 250 square miles, are of Armorican structure and expose Old Red sandstones at the surface with occasional inliers of Silurian strata. They consist of long monotonous ridges

rising to 1,000-1,200 ft., and are covered by bogs. The Slieve Aughty are by-passed by almost all travellers and offer little scenic attraction; their isolation is accentuated by lough Derg, a water barrier of considerable significance, on the east. Settlement is restricted to the valleys and some lower hill slopes: the farmed lands are generally surrounded by rough pastures to an even greater extent than Fig. 79 would suggest. A substantial part of this upland area was congested in 1891 and, in spite of a loss of population of 40%, part of it has hardly risen above the congested level since. The farms generally have about 3 acres under oats and potatoes, 3 acres of meadow and a share in the mountain grazing, which is either individually owned or grazed in common by two or more holders. Home-made butter, eggs, pigs, calves and sheep are the main sources of income, and as neither migratory labour nor local employment has ever been common in the district the emigration rate has been particularly heavy. The main problem of the farmer in such an area as this is access to markets: many farms are as much as fifteen miles distant from Loughrea or Gort and therefore depend on the intermittent fairs and on the inconsiderable commercial facilities of Woodford, a village of less than 200 people. Up to 1914 eggs sold in Woodford were taken to Portumna, then by steamer along the Shannon to Banagher and by rail to Dublin, but the Shannon traffic never revived after the 1914-1918 war and the produce is now collected by dealers. A co-operative creamery, or at least a separating station, would provide a greater return than the sale of farmers' butter, but the sparsity of the population and the distances involved in daily journeys to a creamery make such a development unlikely, though the more enthusiastic advocates of the creameries hope to bring such areas within their orbit in time.

3. THE PORTUMNA-BALLINASLOE LOWLAND

This subregion is in many ways a typical piece of the Irish Central Lowland, as it consists of drift-covered rolling country, floored by Carboniferous shales and limestones. Mainly 200-400 ft. high, it has patches of bogland, especially on the divide between the Clare and Suck rivers and near the rivers, but it is most remarkable for its 'eskers,' which extend across it in sinuous lines that are almost invariably followed by roads. These dry ridges are of particular importance where they cross bogs, especially those developed around the Shannon and the Suck. An esker carries the road from Loughrea to the important Shannon crossing at Banagher; from Banagher it is eight miles upstream to Shannonbridge and thirteen miles downstream to Portumna. Similarly, Ballinasloe lies on an esker at one of the few places in the Suck valley where there is firm ground on each side. The isolating influence of the Shannon is due not only to its

infrequent bridges and its wide bogs but also to the wide extent of its flooding in most seasons.

In no sense, however, is this lowland a congested district; although the farms are generally smaller than those in Tipperary and Offaly, the counties on the opposite side of the Shannon, they generally average 50-60 acres. They are usually worked by the holder with 'assisting relatives/ but labourers are few and average only 25-35 per 100 farmers. Rough pasture, chiefly bogs, accounts for one-quarter of the total land. The main emphasis is on sheep and cattle rearing; while sheep are generally two or three times as numerous as cattle, the area lacks the very definite specialisation on sheep which has developed around Galway bay. The rural density per square mile is now around 50-60, following a decrease of approximately 25% in the past fifty years, and the area has two market towns, Loughrea and Ballinasloe. But these towns are eighteen miles distant from one another and the area depends for its marketing partly on various smaller centres such as Portumna (900 in 1936) at the head of lough Derg. In all, it has approximately one-quarter of its population in towns and villages, all of which are practically without industry. The balance achieved between town and country here is intermediate between that of the poorer areas with less than 20% and in some cases less than 10% of their population in towns and villages and those richer areas where the towns are larger, have more trade and have even attracted various industries.

4. THE SHANNON-SUCK INTERFLUVE, ROSCOMMON

The interfluvial between the Shannon and the Suck consists of an almost drifless expanse of Carboniferous limestones at an altitude of 200-400 ft., diough to the north of lough Ree, Slieve bawn, a ridge composed of Devonian and Silurian strata, rises to 864 ft. A few Armorican ridges of similar rocks appear in this interfluvial area, but fail to break its generally smooth rolling line (see Folder I). Extensive bogs are developed around the Suck and the Shannon and also in various depressions near the town of Roscommon, but the area is most notable for its limestone pastures, which vary from karstic fields of little or no agricultural value to rich grasslands that support large numbers of cattle and sheep.

Sheep are in a distinct majority here, especially towards the south, where they are three times as numerous as cattle (in the Athlone II rural district), but farther north there is some of the best cattle-fattening country west of the Shannon, between Strokestown and Boyle. In general terms, this Roscommon subregion has a farming pattern that includes both sheep and cattle production, with the latter prevailing towards the north. Pastures and meadows cover nearly nine-tenths of the improved agricultural land and cropping supplies only a limited quantity of foodstuffs and

feeds tuffs. In some ways Roscommon, like Longford, is an ante-chamber of the Meath-Westmeath cattle fattening and grazing area, as its economic organisation rests upon the satisfaction of demands from areas farther east. One family of farmers possess a number of holdings scattered through Roscommon, Westmeath and Meath, and move their cattle from one farm to the next without taking them through the various fairs; but this example of family co-operation is probably unique.

The farming pattern here is fairly typical of those areas west of the Shannon that are not congested but yet are dominated by holdings of small extent. The majority of the farmers have less than 30 acres, but medium-sized holdings are also very numerous and there are a few large farms: the average is about 40 acres. The employing power in such an agricultural organisation is comparatively slight and averages 80-90 relatives and 15 labourers per 100 farmers. As there is no industry in the area and the community depends entirely on the land, the town and village population is only 10% of the whole. Emigration has been heavy and during the past fifty years the population has declined almost by one-third, so that the density is now 60-80 per square mile.

5. THE CLAREMORRIS-CASTLEREA AREA

Southeast Mayo, west Roscommon and northeast Galway are included in this subregion, which consists of densely settled bog-strewn country very little above the status of a congested district in 1891, and still dominated by small farms with an average size of 25-30 acres. Here the Carboniferous rockfloor is almost entirely drift-covered, with a series of eskers running north-south at right angles to the east-west series; the land slopes gently from an altitude of 200-400 ft. towards the Suck valley in the east and the Clare valley in the west. Patches of bog are frequent but rarely extensive and some three-quarters of the total area is improved farmland. The population is almost entirely dependent on agriculture; its towns are merely small market centres, though Ballyhaunis now has a bacon factory and there is an agricultural co-operative society in Mount Bellew (see p. 415). In 1891 the density of population was 150-200 per square mile, but this has been reduced to 80-110 per square mile as a result of particularly heavy emigration. In some parts the loss has been as much as 40% within fifty years, and seasonal migration still persists. The town population is little more than 10% of the whole and the market centres are all small, with populations of less than 1,500; thus in 1936 Castlereagh had 1,300, Ballaghaderreen, 1,100, Ballyhaunis, 1,200 and Claremorris, 1,100. Each of these gathers up the trade of as much as 100 square miles and as a group they provide interesting examples of Irish market centres

which, though towns in function, are little more than villages in size owing to the restricted purchasing power of the areas they serve.

The dominance of the small farming unit, averaging 25-30 acres, is the salient feature of the economic life of this area: the number of labourers is approximately 10% of the number of farmers, though the proportion of assisting relatives is 80-90%. On the farms as much as 15% of the land is given to crops, chiefly to the fodder staples, oats and potatoes, but cattle are more important and more numerous than sheep; the sale of young cattle is linked with the home butter production and with pig and poultry raising. The bacon factory is almost the only sign of any attempt to raise the area above the status of primary agricultural production and may provide at least some economic stimulus which in turn may check the emigration that was still continuing actively between 1936 and 1946. However, in spite of the alleviation of population pressure during the past fifty years, this subregion still has more people than it can comfortably support under the present economic organisation. The solution of its problems may lie partly in the local establishment of agricultural processing and possibly other industries, in the development of co-operative buying and selling, and in the enlargement of the holdings. All have begun already on a very small scale, but, some would say, on so small a scale that their effect is as yet imperceptible.

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CHAPTER XIX

WEST CONNACHT

WEST CONNACHT is a hard environment of mountains and bog-covered lowlands, peninsulas and islands, with few areas of fertile soil. One may walk for as much as twenty miles across lowland country having no sign of settlement; but houses cluster thickly in the restricted areas occupied by small farms. The Congested Districts Board became responsible for the welfare of the vast majority of the inhabitants in 1891, and their investigations covered both the densely settled seaboard and the thinly occupied interior, which has severe problems of isolation through lack of transport. The reports showed that the evil genius of poverty was rampant and that there was very little land available for resettlement in the region or in such immediately adjacent areas as East Connacht, which still has its own problems of excessively small farming units. 'It was,' says Micks, 'the deplorable conditions of the people in Connemara, Achill and Erris that produced the general feeling of sympathy that made the Congested Districts Board popular.'¹ The small farms still remain, though improved in many cases by rearrangement into groups of small fields instead of scattered plots of infinitesimal size, and also by fencing the arable land with high walls to keep out animals. Most of all, the housing has been revolutionised and many of the hovel-like cottages are now relegated to the status of farm buildings, while the families live in new, if less picturesque, homes.

In spite of all the changes, this region still remains relatively humble in its economic position. Most of the market centres on the west coast are little more than villages, though there are some prosperous towns, such as Ballina in the Moy valley or Westport in the Clew bay lowland. Galway, the regional capital of a large part of Connacht, lies on the eastern fringe of this region. The dominance of agriculture is greater here than in any other part of Ireland for there is very little indigenous home industry, and although fishing is a supplementary resource of many people living on or near the coast, all efforts to make it commercially successful have failed. The scenic attractions of West Connacht are considerable, but here, as elsewhere, the employment given by the tourist industry is small. It is difficult to imagine any development that can provide a substantial measure of employment in the region, and a greater resource than any of the above has been seasonal migration, year by year, and emigration of a more permanent

¹ Micks, W. L., *An Account of the Constitution, Administration and Dissolution of the Congested Districts Board*, 1925, p. 138.

character: the seasonal migrants' savings still balance family budgets as they have done for more than a century, and the postal orders of the sons and daughters in dispersion are almost as useful.

West Connacht is an environment of great beauty, with towering mountains rising above wide valleys and lowlands, fine rivers and lakes, sea cliffs several hundred feet high, peninsulas guarding long inlets that are almost fiordic in character, and numerous islands both near the coast and some distance from it in Atlantic waters. Surrounded by the sea on three sides, this region may be defined on the southeast by lough Corrib and lough Mask, and in the northeast by a line drawn through the lowlands near Castlebar to the Moy estuary near Ballina. The Aran islands are also included *in* this chapter, as their main link to the world is through Galway. These islands are composed of bare limestones partly covered with 'made land*' and have an Irish-speaking population possessing many traditional customs and crafts: the type of life has an individuality rarely seen in the British Isles and still undestroyed by its appearance on the cinema screens of the world in the nineteen-thirties.

STRUCTURE AND LANDFORMS

Mountains cover only a small part of West Connacht but form a back-cloth in every lowland landscape. The three main structural elements are first, a highly metamorphosed rockfloor of pre-Cambrian date which forms lowlands and, where quartzites occur, conical hills; second, Ordovician and Silurian sedimentary rocks of highly varied types, best seen in the mountains around Killary harbour; and third, Carboniferous strata, mainly limestones and sandstones, preserved around Clew bay and in north Mayo. If a rise of 250 ft. in sea level took place, the present valleys and cols would be filled up and there would be a number of hilly islands: the valley sides are steep and in places precipitous, especially around Killary harbour, where Silurian strata stand out *in* a series of bluffs above the lonely shores of the 10-fathom deep fiord.

The pre-Cambrian floor is formed of gneisses, schists, Galway granites and, around Recess, the serpentines known as Connemara marble: its form is complicated and probably more than one phase of pre-Cambrian metamorphism was involved. The Galway granites, of pre-Cambrian date, form gently rolling country rising to a maximum altitude of 1,198 ft. between Galway and Recess. Far more impressive are the conical hills of pre-Cambrian quartzites, most of them over 2,000 ft. high in the Maumturk mountains, the Twelve Bens, Achill island, the Nephin Beg **range** and the isolated peak of Nephin itself. In all there are more than thirty quartzite peaks over 2,000 ft., which stand above the lowlands as

sentinels of which it has been said, 'Waste thou wast, waste thou art, waste thou shalt remain/

Ordovician and Silurian rocks outcrop from the shores of lough Mask to the Atlantic and form the mountainous country on either side of Killary harbour. A wide variety of strata is represented, for the rocks range from extremely coarse conglomerates to the finest sands; and metamorphism has produced slates and mica-schists, some of which are highly resistant to erosion. Mweelrea, 2,688 ft., is the highest point in West Connacht, and there are several other peaks more than 2,000 ft. in an upland which still has a few Carboniferous outliers on the tops of hills near Killary harbour. Cole and Hallissy suggest that this is a Devonian peneplane, cut by fault movements into a series of blocks separated by deep and generally wide valleys which became avenues for icetongues in the Quaternary period.

In all probability, Carboniferous strata at one time covered the greater part of the region, but long-continued denudation has revealed underlying structural features such as the long, broken ridge, Caledonian in origin, which extends from a point near Westport past Castlebar into the Ox mountains. Carboniferous strata now appear at the surface in three areas, in addition to the relics on the mountains: first, the Balhna lowland of north Mayo; second, around Castlebar; and third, as the coastal belt of Clew bay, around Westport. The Carboniferous sandstone country west of Ballina is a dreary bog-covered lowland mainly 200-400 ft. high, but wide hills 600-800 ft. high near Killala bay. The limestones in the Ballina lowland are covered by drumlins, moraines and eskers which provide soils of varying fertility. Around Castlebar and Westport, where the Carboniferous beds are separated by the Caledonian ridge from those in the neighbourhood of Castlebar, hundreds of drumlins cover the lowland and also form an archipelago in Clew bay, where the islands are already cliffed on the west side by wave attack: inland, the gaps between the drumlins are filled by peat bogs, marshes and lakes, with a few driftless areas showing a karstic quality.

The whole of West Connacht was heavily glaciated in at least two major phases, in one of which an icesheet was centred over the Twelve Bens and the Maumturk mountains: ice moved north and northwest towards Clew bay, and south towards Galway bay, and the drumlins, where developed, run parallel to the striae. In addition there were local glaciations, which have their most striking memorial in the many corries and cliffed valleys of the mountains. As a whole, the glaciation has left its mark in U-shaped valleys, morainic deposits, erratics and in the varied deposits that cover the lowlands. There are few areas of bare rock to be seen today, though it is thought that much of the blanket bog lies on a driftless surface, and there are granites around Pontoon, lough Conn, which have a

mammilated surface reminiscent of Labrador or Finland. Cultivation is easiest on stretches of well-drained drift, such as the drumlin country, or on sand and clayey mounds, together with patches of alluvium, but only a small proportion of the farms are on such relatively favourable areas, for many fields are 'made land' acquired by reclaiming the bog by manuring the sand, lime and seaweed: over most of the region, bog is the natural vegetation under the conditions of climate and drainage.

Coasts.—The coasts of West Connacht, as varied as the land behind them, are merely the present margins of a land recently subjected to marine submergence. There are drowned valleys with long muddy estuaries or long winding channels, peat bogs partly covered by the sea, drumlin islands now subject to vigorous wave attack, and truncated hills with cliffs several hundred feet high. The sand dunes developed along some parts of the low-lying coasts are prone to move inland under the stimulus of heavy and constant westerly winds, though many have been stabilised by planting marram grass. As a whole the waterways are unattractive to navigation as there are numerous submerged rock belts and sandbanks, few good natural harbours and many inlets with banks of sand and mud. The Atlantic swell is heavy for most of the year and storms are violent: in addition inlets such as Killary harbour have severe local winds dangerous to shipping. All these factors help to explain why West Connacht possesses, apart from Galway, only two ports, both of little significance, Westport and Ballina, and also why fishing on a commercial scale has never been successful. But the island people sail Atlantic waters in their currachs, made of laths covered with tarred canvas, which are said to be better suited to the rough seas than wooden boats as their very lightness gives them a cork-like buoyancy: many families, however, have lost at least one son in these tempestuous waters.

LAND USE

Two-thirds of West Connacht has never been cultivated and preserves a vegetation little altered from its natural state, especially in those areas where peat bogs are accumulating. Turf cutting has reduced some of the bogs in extent and even reached the underlying rock floor, for example at Carraroe, where the ice-polished and striated granite is now exposed, or on the island of Inishbofm, where there is an equally barren waste on Silurian slates. In contrast to the bogs, the stony mountains of quartzites and gneisses have large areas of soilless rock or scree with very little vegetation on their steep slopes. A few native woodlands survive on hillsides: near Lough Conn there are large areas of oak and oak-birch woods with rowans, holly, ash, hazel and a rich ground vegetation. But most of the region has no woodland above the status of scrub, which is

found in sheltered places as far west as the islands lying off the coast: thus, the east side of Clare island has scrub 4-8 ft. high with hazel, birch, holly, rowan, oak, willow and a ground flora that includes bog-myrtle and honeysuckle. Again, some of the islands in the innumerable lakes of Connemara have a windshorn vegetation in which yew is sometimes dominant, together with rowan, holly, juniper, and gorse, while the ground flora has bog-myrtle, heaths and heathers (*Erica* spp., *Calluna* spp.) and the bearberry (*Arctostaphylos uva-ursi*). In all probability woodland is the climax vegetation over only a very small part of this area, owing to the restricted development of suitable soils and the prevalence of high winds with heavy rainfall. The classic failure of an attempt to afforest Connemara is discussed on p. 77: it is not remarkable that the Forestry Commission has so far taken over only one small demesne at Ross, between Galway and Oughterard, for planting, though the lough Conn woods may be included later.

Blanket bog, the climax vegetation over the greater part of the area, is interrupted over many square miles of lowland only by a multitude of lakes with brown peaty water which is strongly acid (*pH* 4-5). In Iar Connacht, some 300 square miles of bogs is enclosed by roads that run from Galway through Oughterard to Maam Cross, then south to Cashla bay and east to Galway again: this bog is apparently on a driftless granite rising in broad undulations from sea level to 1,000 ft. The detailed plant distribution, however, shows interesting local transitions from *Sphagnum* and other plants favouring a saturated habitat to *Calluna* in better-drained areas, though *Molinia* is conspicuous everywhere, and cotton-grass moors extensively developed. Similar bogs occur over almost all the more level parts of Connemara to the Atlantic coast, in the valleys stretching to Killary harbour and Clew bay, and in north Mayo, where more than 400 square miles is uninterrupted bog, treeless, trackless and extremely isolated. The continuity of the bog landscape is unique even by Irish standards, for the bogs in Donegal or Kerry or in the Central Lowland, though of considerable area in the aggregate, are broken into a number of patches.

The West Connacht bogs have a flora which includes some species of special interest. Among these are three Mediterranean heaths and the *Saxifraga spathularis*, none of which is found in Britain. This saxifrage is hardy and is found clinging to bare rocks at all altitudes, though it may be near its northern limit in Mayo as it is much less luxuriantly developed in Donegal. The three heaths are *Erica mediterranean* *E. mackii* and *Dabeocia cantabrica* (St. Dabeoc's heath): the first, or Mediterranean heath, is the most widespread and covers large areas south of Clew bay and a wide belt of country in north Mayo, including Achill and the Mullet. Though it

can survive in damp places, it flourishes best on well-drained peat or dry ground and reaches a height of 6 ft. at Mallaranny though it is usually little more than 2 ft. high. In 1860 Dr. David Moore wrote, 'to find a district of at least a quarter of a million acres in extent covered with this lovely heath, in full bloom, during the second week in April, forms one of the most remarkable botanical features the British Isles can afford.'¹ The flowering may begin in January, but in some years the plant suffers heavily from strong seawinds; Praeger records that in 1931 there were few blooms around Mallaranny on the coast. The two other heaths, *Erica mackii* and *Dabeocia* have a more restricted range: the former is found only in two places near Roundstone, but the latter extends through west Galway and also occurs in patches through Mayo from Cong to Achill. A native of southwest France, Spain and the Azores, *Dabeocia*, like *Saxifraga spathularis*, is not a tender plant for it climbs to 1,900 ft. on the Twelve Bens and survives on exposed heaths to the edge of the Atlantic.

On and near the coasts the most striking effect of climatic exposure is the virtual elimination of tree growth or its restriction to sadly planed scrub. Equally significant features are the bog developments and the survival of some unusual immigrant species which found a climatically favourable environment that was also treeless. *Plantago* sward is perhaps the most complete expression of a climate dominated by seawinds; it is found on the west of Inishturk, the west of Clare island, on Achill up to 300-400 ft., and on the now-evacuated island of Inishkeena, where the waves have thrown huge fragments of rock to a height of more than 100 ft. as a storm beach. *Plantago* probably occurs elsewhere in West Connacht but remains unrecorded: comparable developments are seen in Kerry, Clare and Donegal (p. 52).

In the Clew bay lowland and the Moy valley some three-fifths of the total area is farmland, but elsewhere hardly one-fifth has been reclaimed and cultivated: even so, farming is the essential means of sustenance for almost all the population, whatever their supplementary resources may be. At least half the unoccupied area is lowland peat bog rather than mountain country, and the present limits of settlement are the frontiers that human enterprise has reached in its struggle against intractable soils. The peat bogs, which are used for pasture, bedding materials for animals, and fuel for the home or for sale, are by no means negative areas in the farm economy. However, one feature of great interest in the land use of this region is the extent to which the natural vegetation remains little altered from its primeval state of bogs harbouring rare plants, or scrubs of bushes rising to the stature of trees only in a few favoured localities.

Agriculturally, West Connacht is comparable with West Donegal; it

¹ Quoted in Praeger, A. L., *The Botanist in Ireland*, 1934, para. 413.

has the same preponderance of small farms, similar high densities of population on cultivated land, and a general routine of subsistence farming. The holdings average 10-30 acres; they are smallest along the coast where the population per square mile of improved land is most dense. Thus, in Belmullet rural district, the northwest corner of Co. Mayo, the farms average 11 acres and there are 350 persons per square mile of improved land; Westport rural district, with a mean farm size of 18 acres, has 200 (1936) per square mile of improved land, and Oughterard, a mean farm size of 15 acres, 250 (1936) to the square mile of improved land. These figures show exactly what congestion means, and in spite of some heavy losses of population during the past century close settlement to the point of congestion remains to this day. The farming practised now is substantially the same as that described by the Congested Districts Board inspectors; small fields on the holdings are given to oats and potatoes, with a patch of green crops and a tiny meadow. Few farmers are without grazing rights on 'mountain and moor'; in most cases the rough pasture is held in common, but in some instances a charge is made for each animal.

Farmers in West Connacht aim at providing food for their families and for as many stock as possible; they use every possible resource in rough pasture and manure their farms with seaweed, sand and farmyard dung, with some chemicals in places. Through the combined use of homegrown feedstuffs, farm pastures and rough grazing, the number of stock kept is remarkably high. In Belmullet rural district there were (in 1933) 66 cattle, 52 sheep and 440 poultry per 100 acres of improved land; in Westport rural district, 47 cattle, 80 sheep and 264 poultry per 100 acres of improved land. The emphasis on cattle, sheep and poultry varies from place to place, but the general position is that a farmer of 10 acres has about 5-7 cows, 4-15 sheep, 15-45 poultry, and, as a general rule, very few pigs. The cattle are mainly milch cows or young beasts intended for sale to dealers from the east and sold at fairs in the towns and villages. As yet, this region is entirely beyond the range of the creameries and therefore 'farmers' butter' is made for home use, local sale and factory processing (in Cork). The most interesting development of the past fifty years has been the steady rise in poultry keeping both for eggs and table birds. This feature is typical of many of the poorer parts of Ireland and perhaps especially of the areas that send their menfolk out as seasonal migrants for parts of the year, for the care of poultry is a woman's job, and the profits are hers also; as the women carry the burden of the whole farm for several months of the year, the concentration on this line is not unnatural.

In theory at least nine-tenths of the population of this region are directly supported by agriculture. There are few labourers, but the number of 'assisting relatives' is approximately equal to that of the farmers. Only a

small proportion of the farmers depend solely on their land; most of them spend a large part of their working time elsewhere. The Congested Districts Board reports include such statements as (several hundred) 'labourers leave this district annually for Great Britain: the time of departure varies according to the size of the holdings and the poverty of the families, some starting in March and others in May and June . . . they save on an average £8 each in ordinary years and return home in October or November.'¹ The profits are now much greater and the men of Mayo scatter through the more prosperous farming districts of Great Britain year by year. The division between a farm labourer and an actual farmer is often difficult to draw in such regions as this, for the labourer in most cases possesses a certain amount of land and merely hires out his services locally to the few holders of large farms. In addition both those who are returned as 'labourers' in the Census classification and many of the humbler farmers work on the roads for parts of the year, especially the winter months. Other resources of the men on the land include turf-cutting and fishing, the former for sale in the towns and on some of the islands, and the latter for home consumption or intermittent sale. Over 400 men were reported to be fishermen in 1936, against 500 in 1926, but there are few landless fishermen outside Galway and Clifden.

The variety of the resources explains to some extent why the population declines of the past sixty years have not been greater and why, therefore, this community possesses a stability comparable with that noted along the western seaboard of Donegal (see pp. 479-480). It has frequently been urged that the small farms of this area could be made more productive if the people would 'till the land in a husband-like manner, keep it free from weeds, give it adequate manuring, sow good seeds... grow root crops for the cattle in winter, drain and reclaim land, breed animals that are sound and adapted to the holdings, pay special attention to poultry and eggs.'² Some of this has been done since these words were written in 1891, but the seasonal migration involves the drastic reduction of manpower during the crucial season of the agricultural year and it is difficult to see how the labour force could be drawn back to so hard an environment. The extent of land tilled on each farm depends partly on the amount of manure available: during the war of 1939-1945 the Eire government had to decide whether it could keep up the supply of chemical fertilisers in the congested districts at the expense of richer lands farther east. On the whole, the community is better off now: R. L. Praeger, looking back over forty

¹ *Congested Districts Board, Base Line Report*, Rath Hill district, Co. Mayo (east of Blacksod bay: similar remarks are made for other districts).

² *Congested Districts Board, Base Line Reports*, general report on Ballaghaderreen and other districts.

years in 1937, wrote of Achill, '... in 1898 ... the population, far larger than the meagre agriculture and spasmodic fishing could support, was maintained by American money sent home by absent sons and daughters. Housing conditions were still very bad: Dooagh was a huddled cluster of poor thatched cabins... but now things are changed for with government aid all the old hovels are gone and a quite extensive village has arisen of houses not, as in so many places in Ireland, of design quite alien to the people and the environment. There is a little more tillage, due to continued peat-cutting and drainage.'¹

INDUSTRIES

Home industries are a traditional feature of life in Co. Galway and to a lesser degree in Co. Mayo. Wool from the sheep shearing is spun and knitted into socks or woven into flannel or rough tweeds, in some places for home use but in others also for sale. In 1891 some families derived as much profit from the women's home industries in winter as they acquired from the men's summer migrations. These industries have not died out, as in Kerry, nor have they provided the foundation of factory enterprise, as in Donegal, but 'bawneen' tweeds and 'Connemara' socks still find their way into the town shops. The flannels and tweeds are generally worn undyed and possess an off-white colour favoured by women and certain men, but some of the fabrics are dyed in colours of varying brightness, some of which are made from lichens or other local materials. The seasonal migrants, however, generally favour navy blue suits, and their sisters are equally standardised.

Efforts by the Congested Districts Board to develop indigenous industries were only partly successful in West Connacht because, it has been said, the women of Mayo and Galway, unlike the women of Donegal, never acquired the habit of walking several miles to a distributing centre, carrying a load of wool home and then returning to receive a pittance for the garments they had knitted. The most successful individual enterprise is that at Foxford (p. 223), where rugs and blankets are made, but there are knitting industries on Achill island and at Belmullet, which also has a toy factory.

The three market towns on the fringes of West Connacht live mainly by trading with the surrounding rural areas but also have a number of industries. Ballina (6,100 in 1946), a small port, has mills for maize and wheat, with sawmills made prosperous by government rehousing schemes. The industries of Westport (3,200) include the making of hosiery, knitwear, boots and sewing cottons—the two last each employ more than 100 workers and are of recent establishment. Castlebar (4,900) has a

¹ Praeger, R. L., *The Way that I went*, Dublin, 1937, pp. 192-193.

bacon-curing factory and a works making felt hoods for hats (in alliance with Galway), established in 1939. This list of industries reveals two features common to many parts of Ireland: firstly, a number of enterprises serving the countryside by turning its pigs into bacon or milling foodstuffs, or again by providing building materials, and secondly, a few works showing no geographical influence at all, but placed there to give employment in towns threatened with slow decay. The social value of such a location is considerable, but it would not have been possible without the transmission of electric power into such remote areas. In other words, the Shannon scheme has made possible at least some small part of what the Congested Districts Board tried in vain to accomplish here.

POPULATION (FIG. 80)

This region covers 2,160 square miles and in 1946 had a population of 122,000, 56 to the square mile, as compared with 169,000, 78 to the square mile in 1891, a decline of 28%. The town and village population, which increased from 19,000 to c. 21,000 since 1891, chiefly through the expansion of Ballina and Castlebar, represents only 15% of the whole. In the extreme west the rural districts of Belmullet, Clifden and Oughterard have little more than one-twentieth of their population in villages. Dispersed settlement, therefore, dominates the region except in the Aran islands (see pp. 444-446). Fig. 80 shows that the coastal fringes of Galway bay and of the Atlantic shores are very closely occupied, but only for a depth of one mile or so from the shore. There is a similar type of settlement along the western shores of lough Corrib and lough Mask, but few farms occur in the interior valleys. Finally, the lowlands extending from Clew bay to the Moy estuary show a continuity of occupation that is typical of the Irish Central Lowland, though there are numerous gaps where peat bogs or isolated hills occur.

The pattern of rural settlement is so closely woven that the term dispersed* cannot be applied to it without some qualification. Here, as in western Donegal, the farmhouses are so near one to another that many roads resemble a village street lined by houses. Another feature shown by Fig. 80 is that, except in the Clew bay-Moy lowlands, almost all the population lives near the sea. The ribbon of small-farm settlements west of Galway, the closely farmed coastlands of Connemara, the lines of houses and fields on either side of Clew bay illustrate this point; the shores are uninhabited only in Killary harbour and in places where the coast is formed of cliffs, as in north Mayo or Achill, or of sand dunes, as on the west of the Mullet. Inland, the limit of settlement is rarely altitudinal; more generally it is a line of demarcation set by the farmers themselves between their fields and their rough pastures, which generally consist of

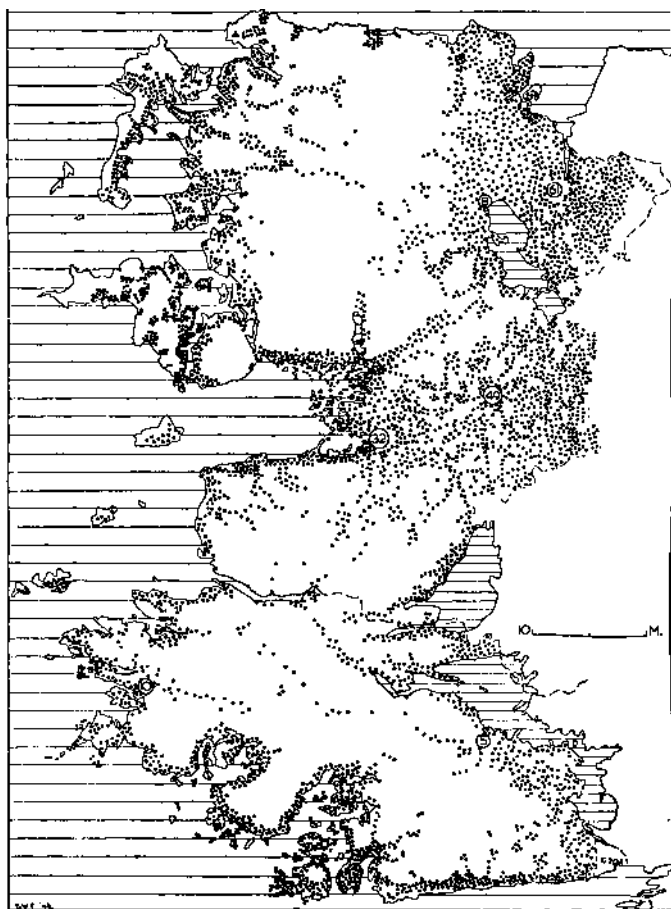


FIG. 80.—POPULATION DISTRIBUTION, WEST CONNACHT

One dot to 25 persons.

Except in the Clew bay lowland, the Ballina lowland and around lough Corrib and lough Mask, most of the population live near the coast.

bog-covered lowlands rather than hills. In all the circumstances, it is surprising that as much as 29% of this region has been made into improved land for farming.

Population density in the rural areas is high and averages 172 (1946) per square mile of improved land as compared with 242 in 1891: the decline of 30% since 1891 is slightly greater than that for rural Ireland as a whole but not remarkably high in view of the fact that in 1891 West Connacht had some of the poorest communities in Ireland. The western fringe of Mayo, from Belmullet to Achill, has a particularly slight decline, but the coastlands of Clew bay and Connemara show heavy decreases and the mountain valleys have also lost very substantially (Fig. 81). The uneven rate of decrease from one area to another remains a puzzling feature of the region and one of the many possible explanations is the choice of the potential emigrants themselves. The importance of fishing, labouring, turf-cutting, seasonal migration and home industries in the life of the agricultural community has been discussed on pp. 431-433; nominally at least 82-87% of all the 'gainfully employed' population outside the towns are on the land, for few people are engaged in professions, commerce, distribution or various forms of personal service in such a community. The town population is small and in the extreme west there is no market centre above the status of Clifden (1,000 in 1936) or Belmullet (700). The larger towns, Ballina, Westport and Castlebar, all lie on the fringe of the congested districts and Ballina, at least, has some claim to be the regional capital of north Mayo. Galway, discussed in Chapter XVIII, pp. 415, 419, is the regional capital for most of West Connacht south of Clew bay, and also for a large part of East Connacht.

SUBREGIONS

The landscape contrasts that exist in West Connacht are considerable: quartzite peaks rise above dreary bog-lands, smoo-di-topped mountains hide steep-sided trough-like valleys, drumlins interpenetrate wide marshes and bogs, and the coastal waters are studded by islands and peninsulas. In such an environment there are many microcosms, each with its own individuality and problems: every island, every peninsula, every remote group of farmsteads is a small human region in some way distinct from its neighbours. A broader sweep also reveals contrast. Connemara has a mass

The upper map shows the increases or decreases in each district electoral division; the lower, the areas congested in 1891. The rates of decline are remarkably varied from one district to another, but on a 1936 reassessment the congested area would still be large.

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of tiny lakes and rocky heaths which is matched only in the Outer Hebrides within the British Isles, but the Moy lowland is an actively farmed and closely settled country with numerous drumlins, in some ways similar to the whole drumlin belt that stretches across Ireland to the vicinity of Dundalk. There are therefore both small and great contrasts within the region: less mountainous than Donegal or Kerry, West Connacht shares with them a variety of scene. It may be divided into six subregions, which will now be considered.

i. THE LOWLANDS OF SOUTHWEST GALWAY

TWO regional names occur in this subregion, *lar Connacht* in the east and *Connemara* in the west. Neither has any precise definition, but *lar Connacht* is the country beside Galway bay which has a straight east-west coast with no islands: the name *Connemara* is applied to the district west of Cashla bay, which consists of many peninsulas and islands, most of them inhabited. These lowlands are bog-covered expanses of the pre-Cambrian floor, and away from the coast there is an almost deserted area, rarely penetrated by travellers and almost devoid of any sign of human occupation. Almost the entire population lives either near lough Corrib on the limestone country or in a coastal belt about one mile wide from Galway westwards. The islands are as densely settled as the mainland, but the interior, though low-lying, is desolate and uninhabited, except for a few farms along the road between Oughterard and Clifden. The poverty of the farmers in this area fifty to sixty years ago staggered most observers, and not least the inspectors of the Congested Districts Board, who reported that in some places half or even three-quarters of the population were desperately poor. Their estimate of poverty was necessarily relative and subjective, but its prevalence was undoubted. One inspector analysed the amount of work involved in manuring an acre of land: some stable manure mixed with heather, sedges and weeds was used, and in addition seaweed was brought from the shore, where it had previously been collected and dried. For 1 acre, 36 horse or donkey loads, or 200 'women's basket loads' were needed; the donkey, with its baskets, would make the journey six times a day and six days of good weather, rarely consecutive, would be needed. Under such conditions it is not remarkable that the arable acreage on a farm rarely exceeds 2-3 acres divided between oats and potatoes: equally significant is the concentration on the seaboard. Cattle and sheep are kept on the farm pastures and on the heathlands. Fishing and turf-cutting still provide, as they did fifty years ago, extra sources of income, and emigrants' money still comes into the area. Seasonal migration is not strongly established in this district, but home industries are widespread. The decline in population has been more than 20% in *lar Connacht* and over 30% in *Connemara*,

but nearly half this area would still be congested on a reassessment. Clifden is the main market centre in the west and Galway in the east, but much of the area's commerce is transacted at roadside shops or monthly fairs.

2. THB MAYO-GALWAY UPLANDS

These uplands, covering more than 400 square miles, have summits 2,000-2,500 ft. high: the sharp quartzite peaks of the Twelve Bens and the Maumturk mountains contrast with the smooth summits of the Ordovician and Silurian strata that form the Partry mountains, Mwcclrea and the other hills north of Killary harbour. The combined effects of faulting, river action and glaciation have produced a network of deep valleys, one of which, submerged, forms Killary harbour. Only along the coast is there continuous settlement: the lowlands elsewhere are almost unoccupied.

The farming is similar to that of the coastlands in the southwest of Galway, with 2-3 acres on each holding tilled for oats and potatoes. Cattle and sheep are pastured both on the farms and on the surrounding mountain grazings. Clare island, Inishkea, Inishbofin and Inishark, all over four miles from the mainland, are together inhabited by 1,000 people, who live by farming and fishing. Men go away each year as seasonal migrants both from the islands and the mainland; home weaving and knitting are found mainly in the east among the communities of Joyce's country and the Partry mountains. Though the population has declined almost everywhere by 20-40% during the past fifty years, one division, Owenadorraun, at the northern entrance to Killary harbour, almost doubled in population between 1891 and 1936, when it had 161 inhabitants; under a settlement scheme land was reclaimed, fences built and new houses erected. There are many other areas where this could be done, but at considerable expense and only for tenants willing to accept a humble manner of life; as a rule, emigration offers an easier remedy for economy stringency to the inhabitants. This subregion has some of the most isolated communities in Ireland and possesses an air of remoteness rarely equalled elsewhere.

3. THE CLEW BAY LOWLAND

This lowland may be regarded as a single subregion though it includes three distinct geomorphological units. The first is made up of Carboniferous limestones and sandstones, covered with a swarm of drumlins, which form the country around Westport and Newport with the numerous islands at the head of Clew bay. Secondly, a low drumlin-covered ridge, 200-400 ft. high, made up of Silurian and metamorphic rocks, crosses the lowland from Westport to Castlebar; it belongs to the Caledonian structural line that is continued through Pontoon (lough Conn) to the Ox mountains.

Third, Carboniferous limestones, also drumlin-covered, are developed between Castlebar and lough Mask. Although these three separate morphological units may be distinguished, this subregion is primarily a drumlin belt with a mixture of good well-drained soils on the slopes and desolate bog-lands, marshes or lakes in the hollows. The surface drainage is so immature that there are a large number of lakes in the hollows, one of which, Castlebar lough, is three miles long. Some of the land between the drumlins is entirely driftless and streams such as the Aille sink into the ground to reappear some miles away.

Agriculturally, this lowland is one of small farms averaging 20-25 acres most of which are worked by the holders and some family helpers: there are very few labourers. The farming is mixed, with cattle, sheep, pigs and poultry as the main sources of income: little more than one-tenth of the improved land is cropped and approximately one-third of the area is rough grazing, either in the form of peat bogs or bare limestones. The towns of Westport and Castlebar are market centres in origin, but also possess a few small industries: their trading activities extend over wide areas in the hilly country to the north and south. The density of population is still over 150 per square mile of improved land, in spite of a decline in numbers of approximately 30% during the past fifty years. Though more richly endowed than the congested districts and having some fertile soils, the Clew bay lowland is a closely settled, small-farm landscape typical of the greater part of Connacht.

4. THE COASTS AND PENINSULAS OF WEST MAYO

Mayo's western fringe is a complex series of peninsulas and islands, with closely settled coastal lowlands everywhere. In Achill and Corraun Achill, quartzite peaks rise to 2,200 ft., but elsewhere lowland prevails on the rockfloor of metamorphosed sediments. Settlement and agriculture are almost completely restricted to a maritime belt: only a tiny fraction of the whole population lives more than two miles from the shore. The continuity of this fringe of coastal occupation is remarkable: the only blank areas are sand dunes, as on the west side of the Mullet, or hills such as those of Achill. Inland there are boggy heaths of vast extent, some of them with Mediterranean species (see pp. 429-430). The farms here are almost the smallest in Ireland and have about 4 acres of arable land divided between potatoes and oats, pastures of similar extent and access to rough grazing, generally held in common. The chief produce sold consists of young cattle, sheep, pigs and eggs.

Fishing is hampered by the lack of any sales, but turf-cutting is remunerative in some places. Domestic industries are deeply rooted in this area, but the industrial developments that have arisen from it are slight though

the Achill knitting factory has been very successful. Migratory labour is strongly developed in parts of the region, especially in Achill: the men are absent for at least three months and generally much longer. The density of population per square mile of improved land is 350 in Belmullet rural district, where the decline during the past fifty years has been surprisingly slight. Standards of living have improved since 1891, but isolation still remains acute. Belmullet, forty miles away from Ballina, is, however, connected with it by buses, lorries and occasionally by steamers. Achill had a railway connection with Westport from 1895 to 1940, but it is now replaced by a bus service.

5. INTERIOR MAYO

Almost uninhabited, this subregion lies between the coastlands of west Mayo and the Ballina lowland. A few farms are scattered in cleared patches among the bog-lands, and small communities live in valleys along the north coast, but otherwise an area of nearly 400 square miles is unoccupied. Most of this area is a lowland which is thickly covered with blanket bog interspersed with numerous lakes. It is crossed only by roads from Castlebar and Ballina to Belmullet. The bogs rest on Carboniferous sandstones in the northeast and on the pre-Cambrian floor to the west. The Nephin Beg range consists of ice-sharpened peaks of quartzite, 1,250-2,400 ft. high and reaching 2,646 ft. in the isolated Nephin, two miles west of lough Conn. The lower and more rounded hills developed on the pre-Cambrian rocks reach the north coast in a series of cliffs, some of which are several hundred feet high.

6. THE BALLINA LOWLAND

This subregion lies between the Ox mountains and the desolate lowlands discussed above: it is connected to the lowlands around Castlebar and Swineford by the Foxford gap. It is floored by Carboniferous limestones that are covered by glacial deposits, mainly moraines north of Ballina and drumlins to the south. Good pastures and arable fields exist on the various glacial deposits, but the amount of bog on level ground increases towards the south, and in some places the fertile meadows surrounding the Moy appear as a ribbon of green surrounded by the purple-brown bogs. The farms are generally small with an average size of 25-30 acres, but several demesnes have been parcelled out and added to the farmed area, partly in an effort to resettle some of the poorest farmers (see p. 188). Few farmers employ labourers, but almost all have family helpers. The density of population is around 90 per square mile and 100-120 per square mile of improved land; the decline since 1891 has been over 25%. The

poorest parts of the area on the flank of the Ox mountains were congested in 1891 and are still at a humble economic level.

Ballina, at the first crossing of the Moy, is a small port used mainly by tramp steamers, which bring in most of the coal, timber and grain for north Mayo and part of Co. Sligo. The exports include cattle, horses, sheep, pigs, eggs, butter and bacon. The town also has a railway terminus, but its bus connections now bring more people into the town; there are daily buses to Dublin, Sligo, Belmullet, Killala and various other centres. Railway lorries also deliver goods through the countryside and the isolation of some communities has been lessened by these services. Ballina, with its wide hinterland, is a relatively prosperous town and increased in population from 4,800 in 1891 to 6,100 in 1946. Milling grain and sawing timber are the main industries. The Moy salmon fisheries are well known, but until recently the fish were never consumed locally but stored in ice for shipment to London, Manchester and Liverpool, though in response to local pressure, salmon are now sold in the town. Eel fishing still survives on the Moy; the fish are trapped at weirs, kept alive in large floating tanks in the river, and then shipped to London and Liverpool during the winter months. The commercial side of fishing is better developed here than in many parts of Ireland; in addition, Ballina is visited by many anglers for its salmon and trout fishing. The town is generally said to be more prosperous than many of its kind, yet it lives by trade rather than industry and has no new large-scale enterprise brought by the recent government programme. Its commercial strength lies largely in its widespread contacts and it has no rival of any consequence in an area covering at least 300 square miles, with a population of more than 50,000. A small regional capital in function, it has two weekly newspapers, five banks, hospitals, a Roman Catholic cathedral and several hotels, but its prosperity contrasts strongly with the poverty of most of its hinterland, excluding the Moy valley. Almost half the population of Ballina have been rehoused by building schemes, mostly inaugurated since 1932, with the result that the poorest cottages have been abandoned and, in some cases, pulled down.

Killala, beside the entrance to the Moy, an older town than Ballina, has given its name to a diocese, but is now a decayed village clustered around a famous round tower and a Church of Ireland cathedral. The harbour has silted up and now is used only by fishing boats, but there are many warehouses built to store goods in transit. The village now has empty houses, deserted shops and stores, and its population is 450 as compared with 600 in 1891. The last vestiges of its commercial prosperity are weekly markets and three fairs per year, but most of its trade has been drawn to Ballina.

THE ARAN ISLANDS (FIG. 82)

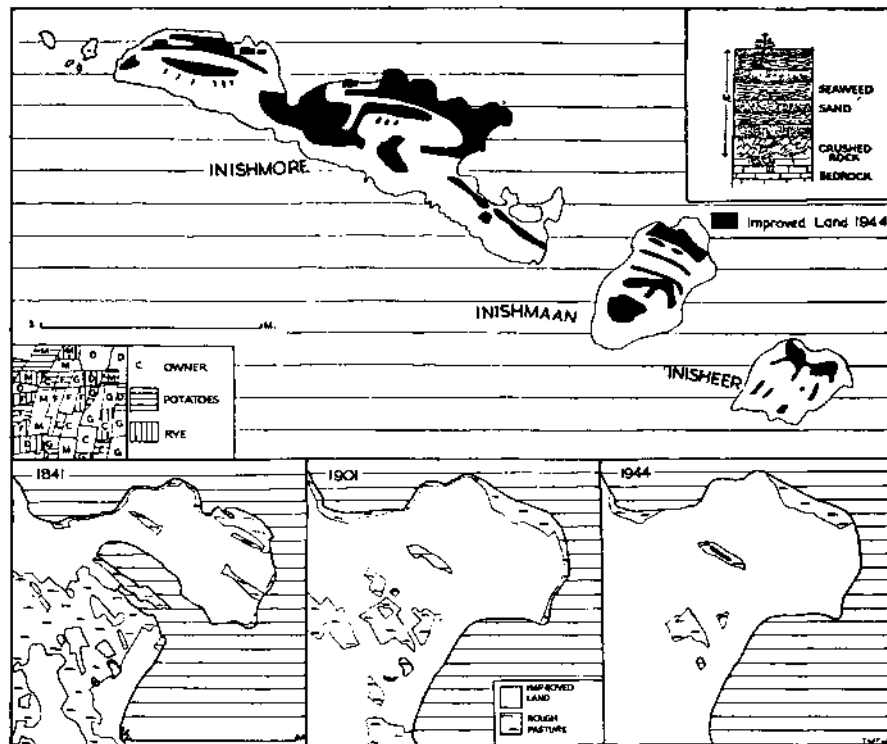
The Aran islands stretch across Galway bay, forming a barrier running roughly northwest-southeast; there are three main islands—Inishmore, the largest, Inishmaan and Inisheer. All three are closely settled in relation to their resources, for they consist of bare Carboniferous (probably upper Carboniferous) limestones, laid down in nearly horizontal beds and appearing at the surface as a series of grey terraces having limestone pavements comparable with those of the Burren in Co. Clare (p. 388); and only in a few places is there a covering of sand on the limestones. The stony appearance is accentuated by a number of erratics, largely of granites, brought by an icesheet from Connemara, by the numerous archaeological remains of prehistoric and early Christian times, such as large forts, and finally by the stone walls, 5-6 ft. high, built around the tiny fields. Stone is abundant everywhere, even in the memorials built by a people at once pious and filially minded to departed members of their families. The cliffs on the southwest side reach 200 ft., but the land slopes gently towards the inhabited northeast, and the human outlook is towards Galway and Connemara rather than to the desolate Burren coast of Clare.

Plant life in the Aran islands is very similar to that of the Burren, Co. Clare (see pp. 394-396). A large part of the flora is confined to the joints in the limestone pavement, which have been widened by solution and have a thin vegetable soil at the bottom. The maiden hair fern (*Adiantum sp.*) with leaves as much as 2 ft. long is frequent in the cracks, and gentians (*Gentiana verna*) are also common: Aran, like the Burren, shows an intermingling of northern and southern types. There are no trees on the islands, but shrubs are found in rock crevices among the low-growing herbs, where they manage to resist the onslaughts of high winds and grazing animals. The shrubs include the spindle tree, blackdiorn, guelder rose, hawthorn, oak and hazel.

Unpromising as this environment may appear, it supports an Irish-speaking community of over 2,000 people in an area of eighteen square miles, of which only one-third is cultivated. In all the circumstances it is remarkable that any land is cultivated at all, but the islanders have made their * gardens' (fields) by piling layers of sand and seaweed on the top of crushed rock (see Fig. 82): the fields are laid out in lazy beds and in some parts of the islands the cultivated area has been steadily extended. Fig. 82 shows that one townland near Kiltonan is now almost covered with arable fields, not necessarily sown each year. The farmers' chief crop is potatoes intended for foodstuffs, which grow well in the limey soil of these islands, but only in exceptionally wet years is any surplus available for stock or for sale in Galway. Rye, the only other considerable crop, is used for thatching straw. The only form of rotation is an alternation of rye and potatoes,

FIG. 82.—THE ARAN ISLANDS

The area of rough pasture in 1841 and 1901 for part of Inishmore (northeast of Kilronan) are taken from the 6" to one mile maps; the 1944 observations were made by Joan M. Ward, B.A. The insets show (J) the soil profile in a *made garden,* and (b) the ownership of a number of small fields by five men.



though land is left as pasture for several years after it has been used for crops. Everywhere the holdings are small and dissipated into a number of separate fields. Fig. 82 shows a patch of land covering approximately 70 acres which is divided into nearly forty fields owned by five separate farmers, none of whom live on their land. Cattle and sheep are pastured on the farms and on any waste patches that will support them: pigs are now kept in small numbers, though they were plentiful, owing to high prices, in the 1914-1918 war. The cattle are taken to Galway for sale and beef is hardly ever consumed, though mutton and pork appear on the table at intervals.

The cash resources of the islanders are slender and fluctuating. They are almost self-sufficient in their economic life, as they grow or catch their own food, make their own clothes and thatch their own houses. The food consists mainly of potatoes, with eggs, bread, butter, tea and fish caught by lines suspended over the cliffs or by hand lines or small nets from the curraghs. These boats are made locally of a lath framework, either of driftwood or bought timber, covered with tarred canvas, which is usually old flour sacks. Curraghs are used not only for fishing, but also for transport to the mainland or to take people, cattle and surplus potatoes to the steamer. The boats spend four years on the open sea and four more in coastal waters, and are generally seaworthy: when not in use, they are carried on to the shores and rested upside down on flat stones. The men of Aran fish the waters around their islands, but their cash profits are now negligible, as the export trade to Britain and the United States, which flourished during the 1914-1918 war, was lost in 1920 and the few landless fishermen left on the islands are now poverty-stricken.

Clothing is made of wool spun from sheep fleeces which is then knitted or woven into garments of distinctive design. The men wear 'bawneen' trousers, sombrely dyed, a knitted sweater and a waistcoat, sometimes sleeveless, also of 'bawneen' tweed. This tweed has recently acquired some popularity in Dublin and is sold by the islanders to tourists. The traditional type of shoe is a 'pampootie,' a kind of moccasin made from cowhide and bound together with strips of the same material. Another local craft is basket making from willows or coiled straw rope. Even furniture is made on the islands: in some of the poorer cottages only furniture made from driftwood is seen. Unlike some rural communities, the people of Aran are house-proud and will use financial windfalls for improving their houses or building new ones: many were built after the 1914-1918 war and a number of two-storey slated dwellings have been erected with government subsidies since then.

Kelp burning was an important source of revenue among many communities of western Ireland fifty years ago, but Aran is one of the few

places where it still survives. Seaweed is collected from the shore or cut from the rocks at low tide and carried beyond high water mark, where it is laid out to dry. Fifty years ago the seaweed was transported in baskets (creels), but carts drawn by horses or donkeys are now used. After drying, the seaweed is laid out in stacks 6 ft. high, 6 ft. wide and 8 ft. long. Each stack weighs about 4 tons and yields about 1 ton of kelp through burning, which takes place during a specified period in July. The price paid for kelp varies according to the amount of iodine content, and recently has been around $\text{£}5\text{--}7$ a ton. The labour involved in the kelp industry is considerable and consequently it has been favoured mainly at times when fishing was not profitable. In recent years the scarcity of imported iodine has led to a revival that may be short-lived.

An aura of romance is frequently cast over the life of the Aran islands and not without reason, for its people still possess a degree of self-sufficiency that is rare in the modern world. As a result, 'much of the intelligence and charm of these people is due to the absence of any division of labour, and to the correspondingly wide development of each individual, whose varied knowledge and skill necessitates a considerable activity of mind. Each man can speak two languages. He is a skilled fisherman, and can manage a curragh with extraordinary nerve and dexterity. He can farm simply, burn kelp, cut out pampooties, mend nets, build and thatch a house, and make a cradle or a coffin.'¹ Above all, the Aran people have at least preserved the spiritual aspect of life in spite of all the infiltrations from the outer world: Sir John Russell has recently called attention to the dangers that beset any peasant community that loses its essential religious basis, but it has not happened here. But there are dangers ahead. The one certain resource of the islanders, who need at least some money to buy fuel from the mainland as they have none on the island except cowdung, is cattle, which are shipped by steamer to Galway. Fishing has failed, kelp burning may fail, the selling of homespuns may suffer through changing fashion and the tourist industry is precarious and in any case not invariably helpful. Much has already been done to improve conditions, notably in housing and by providing water troughs diat conserve water for dry periods, but there has been considerable emigration in the past and will be more in the future.

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¹ Synge, J. M., *The Aran Islands*, 1910, pp. 156-157.

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CHAPTER XX

THE DRUMLIN-DRIFT BELT

THIS CLOSELY settled belt of country, a hundred miles long and forty wide, extends from Dundalk bay to Sligo bay: primarily lowland, it has few level areas as the drumlins mask an uneven rockfloor composed of Ordovician, Silurian and Carboniferous beds in the east and lower Carboniferous limestones farther west. In Sligo and Leitrim, middle and upper Carboniferous strata survive in residual hills reaching 2,000 ft., which form the only striking gaps in the settlement pattern. On the south the drumlin-drift belt is defined by a line drawn from the Clew bay lowland through Mayo into north Roscommon and thence into Leitrim, Cavan and Louth. On the north, however, it is much more difficult to discern a regional boundary on a morphological basis, for the drumlins of the Erne valley are continued into south Donegal and those of Monaghan and north Louth belong to the great drumlin swarm that extends through the heart of Ulster to Strangford lough and the suburbs of Belfast. But if there is no clear morphological boundary, the Border between Eire and Northern Ireland now provides an effective human and economic divide that must be taken into account in a general regional study.

In this chapter, the drumlin-drift belt is divided into two sections: (a) the *western*, which includes the Carboniferous plateaus of Leitrim and Cavan, with the lowlands around the Ox mountains; and (b) the *eastern*, which consists of the hilly country of Ordovician and Silurian rocks in Cavan and Monaghan, and the low-lying Carboniferous-floored areas between them. For convenience, the term 'drumlin-drift belt' will be taken to refer to the whole, 'region' to each of the two major parts, and 'subregion' to the lesser divisions of which it is made.

A. THE WESTERN HILLS AND LOWLANDS

The western part of the drumlin-drift belt covers nearly 1,900 square miles, seven-tenths of which is cultivated land. Much poorer than the eastern part, this region includes some areas under the care of the Congested Districts Board in 1891 and now has a population of 145,000: its agricultural lands are closely settled and dominated by small farms. The non-cultivated land consists partly of uplands, varied in structure but rising generally to c. 2,000 ft., and also of the peat bogs which lie between the drift-covered ridges and drumlins. The region extends from Sligo bay to the upper Erne valley.

STRUCTURE AND LANDFORMS

The uplands of this region include the Ox mountains, a Caledonian fold with pre-Cambrian metamorphic rocks intruded by granite, the Curlews, an Armorican fold with Old Red sandstones and Silurians, and most impressive of all, a number of plateaus formed of the middle and upper strata of Carboniferous age. Lowlands stretch around these various hills and penetrate them as constricted and frequently steep-walled valleys: the uneven rock-floor has been plastered by a variety of drifts with the result that level surfaces are few and the lowland usually possesses an undulating, even a hummocky character. A number of lakes diversify the scene still further, especially in the upper Shannon valley and that of its tributary, the Boyle; in addition, there are many peat bogs which are, however, generally of small extent.

The Ox mountains have rounded summits from 600 to almost 1,800 ft. high west of the Collooney gap, and maintain their identity as a number of isolated hills on the shores of lough Gill to Manorhamilton at the foot of Benbo, 1,367 ft. high. The maximum width of the Ox mountains is seven miles, but they form a clear population divide between the closely settled lowland on either side: the only important break is the Collooney gap, which carries the road and railway to Sligo. The mountains are a desolate expanse of spongy bog, which has a depth of 2 ft. on the numerous massive erratics that occur on the high ground.

The Curlew mountains are an Armorican range reaching 867 ft. near Boyle and continued to the east and west in low hills 500-700 ft. high. Comparable with many of the low Armorican ranges that penetrate the Carboniferous limestones in Central Ireland, they are overshadowed by the Carboniferous plateaus 1,000-2,000 ft. high. These plateaus, formed of Yoredale sandstones, shales and limestones, Millstone grit sandstones and shales, with Coal Measures uppermost, extend from the vicinity of the Curlew hills to the Erne valley: almost everywhere, they have flat summits and steep, sometimes cliffed, valley sides with floors used for farming or occupied by lakes. Some of the hillsides have two or more escarpments, made by outcrops of Millstone grit or limestone, and a few valleys, notably Glencar (near Sligo), show the effects of many landslips and also have long sheets of talus beneath the crags. This area, which is in some ways comparable with the Peak District of Derbyshire, is thought to have been near the centre of an icesheet at one phase and its deep wide valleys have almost certainly been moulded by ice. Drift is widespread and drumlins are frequent on the lowlands: the disorganisation of drainage imposed by drumlin formation is especially marked in the country from the upper Erne to the Shannon, where lakes are numerous, or again in the lowlands of

Mayo farther west, where peat bogs form a sea of waste between islands of cultivated land.

LAND USE

Relics of the natural vegetation include extensive bogs and patches of natural woodland. Bog covers most of the Carboniferous plateaus and is especially well developed on the Ox mountains. On the top of Carrowkeel, a hill overlooking lough Arrow, it occurs in hollows within a limestone pavement. The ground flora of the bogs varies considerably: heathery moors are frequent on the hills and indicate good natural drainage, as for example on Carrowkeel, where rainfall percolates rapidly into an underground drainage system. The accumulation of bogs is due partly to the high rainfalls, which are probably at least 60" per annum in almost all the uplands. In the lowlands the curious arrangements of the drifts has meant that many hollows have become natural sites for bogs and lakes: in south Leitrim, says Praeger, 'the narrow, alternating parallel tracts of farmland and of bog or lake give the country a quite peculiar aspect.'¹

Patches of natural woodland survive around lough Gill and include among their constituents the arbutus which, though undoubtedly native, is separated by 160 miles from its next station in Co. Kerry. The arbutus occurs here on sites similar to those around Killarney, such as rocks and rough ground close to lough Gill, and on islands in the eastern-half of the lake; it is frequently associated with the yew. The arbutus survives on limestones, sandstones and metamorphic rocks alike, and cannot, therefore, be classed as either calcicole or calcifuge. Two types of oak forest, which have respectively calcicole and calcifuge affinities, have been recognised around Sligo: in the calcicole type, oak occurs with ash and hazel and a rich ground flora that includes anemones, primroses and bluebells; in the calcifuge type, oak occurs with birch, holly and hawthorn and the ground flora is much poorer with bilberry (*Vaccinium myrtillus*), sometimes bluebell, and wood sorrel. There are many grades between the two extremes of rich and sparse oak forest, and the Finnish technique of classifying woodlands by their undergrowth might perhaps be usefully employed in this area. Many of the sheltered glades have a remarkably rich growth of ferns and mosses, and garden plants such as *Monthretia* are naturalised in some places. The luxuriance of growth recalls that of Kerry under generally similar, but slightly warmer conditions: peat bogs grow rapidly on glacial erratics, walls have an abundance of plant life and even the thatched roofs of neglected or abandoned cottages are quickly overgrown.

Rough pasture covers approximately one-third of this region, and

¹ Praeger, R. L., *The Botanist in Ireland*, 1934, para. 426.

consists mainly of bogs; more than half is attached to farms and forms a useful supplement to the enclosed fields. The extent of rough pasture has varied considerably during the past century, especially in Co. Leitrim, where it was 28% of the area in 1851, only 22% in 1891, but 28% in 1945. Statistical assessment of pasture is liable to fluctuate, but obviously some areas were improved and then allowed to degenerate as the pressure of population became less acute. This loss of ground to rough pasture is a feature common to all the uplands areas of Ireland.

As yet, very little land has been acquired for afforestation, and most of the plantations cover old woodlands, including some treasured relics of the native vegetation or areas immediately beside them. In Collooney, near the gap carrying the road to Sligo, some 3,000 acres have been bought for forests, but more than one-third of this area is bare rock or heathland that will not support trees. Some of the woods around Lough Gill have been incorporated in a forestry estate of 1,200 acres and a wood near Foxford has also been acquired. The uplands as a whole remain sparsely wooded though a few demesnes in the valleys have been planted. The entire area of new plantations covers less than ten square miles, and while many of the old demesne trees, planted as much as two centuries ago, are of great size, the general aspect of the landscape is open, with farmlands and bogs stretching to the hills limiting the lowlands on every side.

Agricultural land classed as improved* covers seven-tenths of the region and forms the main resource of the inhabitants. Everywhere the small farm is dominant, the farming pastoral in emphasis and the labour force small, but there is little employment available in non-agricultural occupations, except in the few towns. At the lowest financial levels the rural communities are small holders residing in congested areas, but at the highest levels they are farmers of 40-50 acres with a reasonably prosperous existence, though medium-sized and large farms such as those of the Central Lowland are comparatively rare. Nearly two-thirds of the whole farmed area is divided into holdings somewhere between 15 and 50 acres.

Economically the farmers depend mainly on cattle, with poultry as an important sideline. The small cropped area, which rarely covers more than one-tenth of the improved land, is divided between oats and potatoes grown in carefully manured fields or parts of fields. Spade cultivation, which is fairly general here, restricts the arable land to a few acres and means that the cattle depend chiefly on the pastures rather than on any feedstuffs grown on the farm. The acreage of meadow has, however, gradually increased and now covers as much as one-fifth of some holdings. The cattle farming has two main objectives: milk production and the sale of young beasts at fairs. The dairy farming of this region is less industrialised than that of the Munster creamery belt, although one-quarter to

one-half of the cattle are milch cows on most farms and approximately half the farmers of Sligo and Leitrim take supplies to creameries or separating stations. In fact, many of the farms are too remotely placed for milk to be taken to a creamery profitably and some of the herds are too small to make a daily supply of milk possible.

Outside the creamery network the farmers depend mainly on home butter-making and the sale of young beasts at fairs. Dairying is, therefore, little more than a foundation for the store cattle trade and many of the young beasts are sent to the 'plains of Boyle,' limestone grasslands with nourishing pastures to the east of Boyle; from this area they proceed through the Central Lowland to their ultimate destination. The number of cattle kept varies from 24 to 27 per 100 acres of crops and pasture, but few of these are more than 2 years old. Sheep are much less numerous than cattle except on the Ox mountains and on some of the upland limestone pastures, but poultry number 180-400 per 100 acres of improved land: very few pigs are kept.

A farmer of 30 acres might possess 10 cattle, of which 4 would be milch cows and the rest young beasts for sale, 30 hens and, in some places, a few sheep and pigs. Cash returns are small, but few farmers at this level depend solely on their holdings, for they either migrate seasonally, or vicariously through the sons, or receive periodical remittances from relatives abroad, or work intermittently in the neighbourhood of their homes, as carters, road menders or on larger farms. Most of the people are obviously poor, yet the many changes of the past century and especially of the past fifty years have removed the spectre of destitution to some extent. Emigration, however, is still proceeding at a comparatively rapid rate and some parts of this region lost as much as 10% of their population between 1936 and 1946.

POPULATION (FIG. 83)

The total population of this region is 157,000 (1946), 84 to the square mile, compared with 254,000, 137 to the square mile, in 1891, a decrease of 38%. The loss of population has been, and remains, heavy, but detailed investigations show that it has been curiously varied from one area to another (Fig. 84). Some areas have lost more than 50% of their population in fifty years, others a mere 10%, but these discrepancies, though defying interpretation, make little difference to the general picture of heavy emigration. The town and village population has remained fairly stable around 29,000, and therefore the loss in the rural areas has been 43% since 1891: the rural density of population is now 69 per square mile or 96 per square mile of improved land, against 120 and 169 respectively in 1891. The 'town' population covers 18% of the whole against 11% in 1891. The

maintenance of the town and village populations is characteristic of most parts of Ireland, but the low proportion of people in towns and villages emphasises both the dispersion of settlement and the humble economic status of this population, who depend almost entirely on agriculture. Most farmers have some family helper working on the land, though he may be a seasonal migrant for part of the year, but there are very few labourers: around Sligo, one farmer in four has a paid labourer; in northeast Mayo,

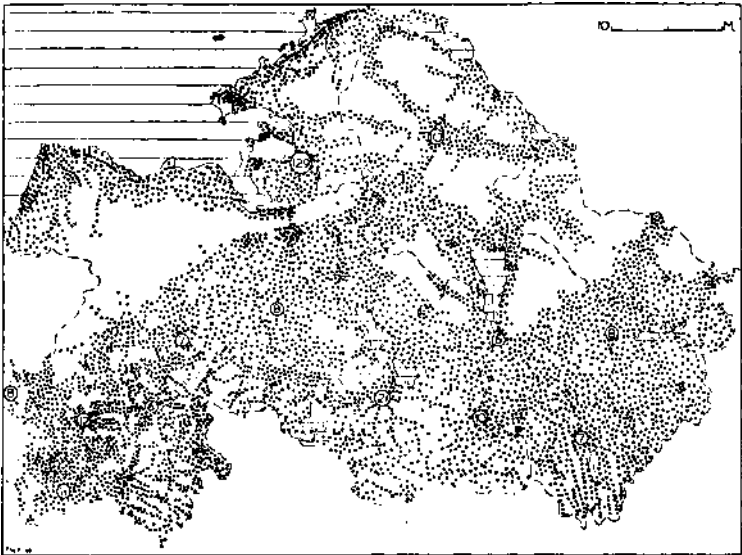


FIG. 83.—POPULATION DISTRIBUTION, WEST PART OF THE
DRUMLIN—DRIFT BELT

One dot to 25 persons.

The settlement is comparatively close, though significant blank areas include the Carboniferous uplands and stretches of lowland bog. There is some measure of similarity between this map and Fig. 79 (p. 417), which shows the population distribution in East Connacht.

only one farmer in twenty. Over most of the lowlands the settlement pattern is fairly even and interrupted only by stretches of bog (see Fig. 83). In some places the farmhouses line the roads that pierce the reclaimed bogs, conspicuously in the northeast and northwest of Co. Sligo, and in many cases the houses are placed on the roads around the drumlins, over which the cultivated fields extend continuously. While the density of population is much lower than that of west Donegal or West Connacht,

it is higher than that of the east of Ireland, where the larger farms support fewer people than a similar extent of land divided into smaller holdings.

The towns are merely market centres serving large areas of country with a low buying power, and there is little sign of rural industry, except for a few scattered creameries with branch separating stations and a few small

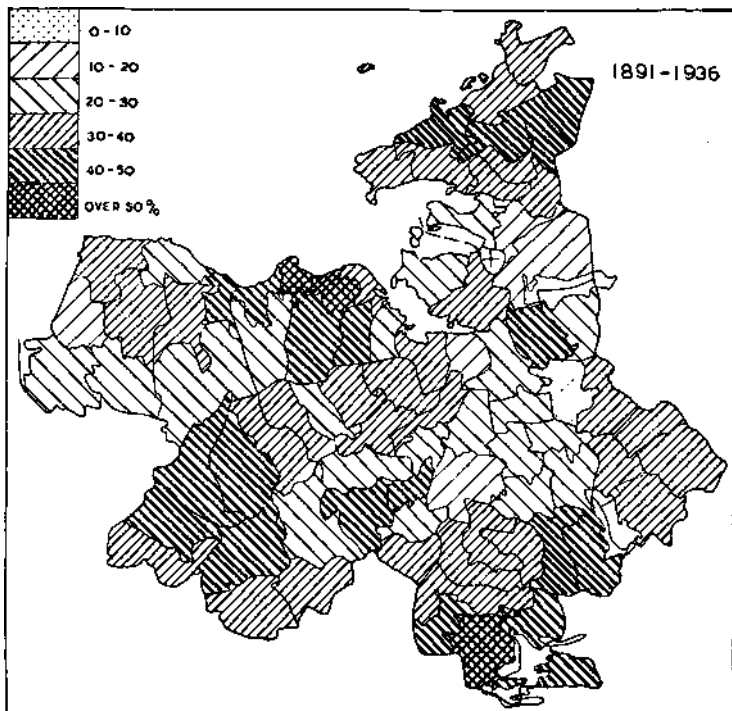


FIG. 84.—CO. SLIGO, POPULATION, 1891-1936

An increase was found only in the town of Sligo; elsewhere each district electoral division had a decrease, strangely varied from one area to another.

Originally published in 'Journal of the Statistical and Social Inquiry Society,' Dublin, vol. 17, 1943-1944, p. 260.

mills. Co. Leitrim is almost devoid of industry, except for a small bacon factory at Manorhamilton, though there are a few creameries, some of which deal in eggs and bacon as well as butter. The town of Sligo (12,900), one of the minor regional capitals of Ireland, has a well-developed wholesale and retail trade, and is a small port. There is a bacon factory

capable of absorbing 500 pigs each week, and the milling of maize, oats and wheat is a second agricultural industry, located both in the town and in the immediate neighbourhood at Ballysadare and Collooney. The mills are long-established, and one at least dates back to the eighteenth century, but the use of the port has steadily declined. There are few signs of growth in Sligo and it seems likely to remain merely one of the larger Irish market towns rather than an industrial centre, though it is also an administrative centre and an important road and rail junction, with buses travelling through Mayo as well as the adjacent counties of Leitrim and Donegal. The remaining towns and villages have few industries, though a shoe factory has recently been established at Tobercurry (800) and there is a mill at Boyle (2,100 in 1946).

SUBREGIONS

This region falls into four subregions, each of which is a distinct morphological unit and in some ways a human entity also. The Ox mountains, with their clear Caledonian southwest-northeast line, divide the drift-covered lowlands into two parts, linked only by a few deep gashes to which the name 'alt*' is given. The Carboniferous uplands stand up as plateaus above the wide valleys drained by tributaries of the Erne, the upper Shannon and the Bonnet river: smooth summits, sandstone and limestone scarps, drift-strewn valleys and lakes in glacier-scoured troughs, all combine in a hilly landscape with a population farming small holdings in remote glens. Everywhere agricultural activity dominates the scene, villages are few and small, and towns insignificant, apart from Sligo and Boyle; for this is a country of simple farming, almost untouched by industry and economically at the stage of primary production from the land.

1. THE SLIGO-LEITRIM COASTLANDS

A continuous belt of lowland extends from the mouth of the Moy estuary to the mouth of the Erne, with a coast mainly composed of low cliffs of Carboniferous limestone interrupted by sand dunes, notably at Strandhill and Rosses Point, on Sligo bay. The coast is broken by three estuaries, which allow tidal waters to reach Sligo, Ballysadare and Drumcliff. The lowland belt, generally two to five miles wide, is a closely farmed, densely settled drift landscape, with many drumlins over a rock floor of Carboniferous beds. The population depends almost exclusively on farming, as fishing has been profitable only intermittently; in 1936 only forty-two men were returned as fishermen though many more fish **occasionally and Sligo salmon is widely famed.**

The farms average 20-30 acres, but many are very much smaller and the houses are very closely spaced along the main roads and almost equally

frequent along the subsidiary roads. Almost entirely congested in 1891, these lowlands have experienced a very high loss of population, varying from 10% to more than 50%. The reduction of numbers has made more land available per farmer and some of the small farms have been united, for example at Grange near the foot of Ben Bulbin, where the Congested Districts Board made a series of strip farms with a road lined by farmhouses at its upper limits. The holdings, all of which slope down to a common salt marsh grazing on the seashore, were originally one field wide, but approximately one-third of them have since disappeared by successive amalgamations. Though extreme congestion has vanished from this lowland, it is still primarily one of small farms having little cropping and depending mainly on cattle, sheep and poultry, with access to peat bog and hill grazing on the Ox mountains and the Carboniferous plateaus. Some farmers cut turf for sale, especially on the large bog flanking the Ox mountains, and many work seasonally on the roads; near the shore, farmers use seaweed and sand as manure, but the kelp burning industry is extinct here. Along the coast there are a few hotels, especially at Rosses Point, which has a famous golf course on the sand dunes, and at Strandhill.

2. THE OX MOUNTAINS

This Caledonian ridge is an uninhabited moorland cutting across the region from the Moy valley to Benbo mountain, near Manorhamilton. Monotonously even in outline, it is composed of varied metamorphic and igneous rocks, and is bog-covered almost everywhere; in addition, a bog covers approximately twenty square miles of drift-covered Carboniferous limestones on the north of the ridge, interrupted only by narrow ribbons of farmland along the valleys. Towards the Collooney gap, quartzites appear in low ice-moulded hills 500-900 ft. high and the ridge overlooking Lough Gill is broken by a number of 'alts,' or deep gashes. These hills are either bare rock, heather moor, or rough natural woodland, some of which will shortly be replaced by neat plantations. Three railways, each with a separate station, meet at the village of Collooney and then join forces to reach Sligo: the stations have train services to Manorhamilton and Enniskillen through the Carboniferous uplands, to Dublin through Longford and Mullingar and finally through Tobercurry to Tuam and Limerick. Collooney as a railway focus, however, is more reminiscent of remote Welsh mining valleys with their duplicated shabby stations than of Crewe.

3. THE CARBONIFEROUS PLATEAUS AND VALLEYS

Two worlds are here: deserted, generally bog-covered uplands 1,500-2,000 ft. high, and valleys, mostly a mile or more wide, with small farms,

numerous roads, and the light railway running from Collooney to Enniskillen. Where the valley sides are less steep than in Glencar or Glenade farms climb to an altitude of 600 ft. or more, but for the most part the plateau provides only sheep pastures or remotely placed reserves of peat. The Coal Measures preserved here include workable seams in the Arigna district, east of Lough Allen (see below).

Although the population in most parts of this upland has declined by at least one-third since 1891, and in some places by one-half, the holdings remain small, with an average of 15-30 acres, and the population density is 100-150 per square mile of improved land. On each farm a few acres are tilled with the spade, and sown with oats and potatoes, but the economic staples are farmers' butter, young cattle, sheep, poultry and eggs. The monthly fairs are of considerable importance for stock sales in this area and the ordinary commercial life depends very largely on periodical visits to the market villages which, though small, perform the functions of towns. Co. Leitrim, for example, had (in 1936) only 5,400 people in towns and villages out of 51,000 (but 44,600 in 1946), and the largest single centres are Carrick-on-Shannon and Manorhamilton, each with approximately 1,000 people.

The Arigna Coalfield.—This coalfield stands second in production and employing capacity to the Castlecomer field, but its exploitation has been accelerated by wartime fuel shortages and it now has some 300 miners. There are two main seams which yield coal of semi-bituminous type and a third or upper seam is now being mined. The seams, which outcrop on the flanks of hillsides around Lough Allen, have been subject to very little structural disturbance, but are so narrow and of such limited economic value that their working is restricted mainly to periods when imported coal is scarce. As a result, there have been sharp fluctuations in fortune: in 1926, only 109 miners were employed, but in 1936, 239, as home supplies were favoured. In any case, the output is unlikely to be much more than 60,000 tons per annum. The coal is transported to Arigna station, the terminus of a branch line from Ballinamore. Though of limited value, many of the outcropping seams have been used locally for domestic fuel and such past enterprises as the ironworks of Drumahaire, which flourished in the middle of the nineteenth century.

4. THE DRUMLIN-DRIFT LOWLANDS

These lowlands stretch from the upper Moy valley across the Shannon to the upper Erne and are bounded on the north by the Ox mountains and the Carboniferous plateaus, but on the south merge gradually into the lowlands of Central Ireland, from which they are distinguished by their numerous drumlins and their exceptionally close settlement. Most of this

lowland is limestone-floored, and its drumlins are fertile, well-drained mounds sown mainly to arable crops with cattle pastures on bogs in the depression between them. The drumlin landscape may be seen in a well-developed form around the Curlew mountains, part of a ridge of Old Red sandstones and igneous rocks 700-800 ft. high that intersects the lowland around lough Key and lough Gara. It may also be seen near Kcishcorran and Carrowkeel mountain, two limestone hills 1,000 ft. high to the west of lough Arrow. The drumlins farther east around the Shannon and towards the Erne have so disorganised the drainage system that a complex of peat bogs, marshes and lakes separates them one from another. But more detailed survey work is needed to distinguish gravel drumlins from those with rock cores, or again from sheets of drift plastering the many low ridges of solid rock that floor this lowland.

As a whole, the lowland is a drift-covered expanse, mainly 200-400 ft. high, with a complex interpenetration of cultivable land and rough pastures or lakes. The proportion of rough pasture decreases from west to east: in Swineford rural district (Mayo) it covers 30%, in Mohill, Co. Leitrim, 15%. This contrast is closely reflected in the population distribution map (see Fig. 83); but Swineford still (1946) has 164 persons to the square mile of improved land as compared with 109 in Mohill. Both rural districts have lost more than 40% of their population since 1891 and are losing it still, but Swineford, with an average farm size of 17 acres, remains nearer to the level of a congested district than Mohill, with a mean farm size of 28 acres. Everywhere the loss of population has been heavy, and everywhere small farms run by the holder with some family worker dominate the scene. This subregion, however, can only maintain so dense a population by agriculture on a small farm basis with low cash incomes derived from the sale of milk or butter, young beasts, poultry and eggs.

Rural industries are almost unknown, but the few creameries so far established provide a useful economic outlet that removes poverty from some farms. The towns and villages in this lowland have only one-tenth of the population: the largest of them is Boyle, in the centre of a good pastoral district, and the others are mere villages (1936 populations) such as Swineford (1,200) and Kiltamagh (1,000) in Co. Mayo; Tobercurry (800) and Ballymote (700) in Co. Sligo; Carrick-on-Shannon (1,000), Ballinamore (800) and Mohill (700) in Co. Leitrim. Each of these 'towns' has its own market area and is separated by several miles from its nearest neighbour, but, though indispensable, they must inevitably remain small centres of ordinary shopping enlivened by periodical fairs. The fairs also take place at various small villages, most of which have 100-300 **inhabitants, and at other chosen points in the countryside which are dignified by long-standing tradition.**

B. THE EASTERN HILLS AND LOWLANDS

This region includes the whole of Co. Monaghan, all of Cavan except the northwest, the northern part of Co. Louth and the Carlingford peninsula. The county boundaries which form part of the Border are regional limits only in a political and economic sense for they show a supreme disregard of physical features: thus, the Cavan-Fermanagh boundary crosses the upper Erne valley lowland, and the Monaghan boundary winds through the wide Finn corridor-valley, climbs to the top of the Slieve Beagh at 1,200 ft. and then descends to cross the Blackwater valley. In effect the county boundaries divide the Erne valley, a natural corridor, between the two political units, and also make a frontier in the middle of the closely settled Blackwater valley half-way between Monaghan and Armagh. The boundary between the counties of Armagh on the one hand and Monaghan and Louth on the other also passes through a densely peopled agricultural landscape; having penetrated within four miles of Dundalk, it swings round the base of the Carlingford peninsula and runs through Carlingford lough where, during the 1939-1945 war, the inhabitants of Warrenpoint looked from their darkened homes to the lights of Omeath across the water.

Generally hilly, this region consists almost entirely of improved farmland: it differs from the western region discussed on pp. 448-458 in various ways. In the first place, it is of much greater agricultural productivity, for its soils bear better crops and the land is assessed at approximately twice the valuation per acre of areas farther west. More land is cropped and the agricultural scene is similar to that across the Border where the farms, though small, are very actively cultivated and support a considerable number of cattle in proportion to their area. A second difference between the eastern and western parts of the drumlin-drift belt lies in the proportion of the rural and town populations: in the west only 15% live in towns, but in the east 30%. The market towns are larger, more industrialised, and in most cases increasing at least slightly in population. Dundalk, the largest centre, is a more active town than Sligo, its equivalent as a minor regional capital and port in the west. Arising out of this more equitable balance between towns and farmed countrysides, one may note a third difference: this eastern region shows traces of an industrial tradition spread through the whole area, though now concentrated in the towns. The flax processing and milling are widespread and it is possible to recognise at least some traces of that interpenetration of farming and rural industries that is associated with northeast Ireland or, in effect, the historic province of Ulster.

STRUCTURE AND LANDFORMS

Ordovician and Silurian beds, comparable with those forming the Southern Uplands of Scotland, form irregular hills from 400 to 900 ft. high in a band of country approximately twenty miles wide between the Dundalk lowland and the Monaghan corridor. This hilly country, with its east-northeast trend, is continued through Armagh and Down and finally appears on the south side of Belfast lough (see pp. 496-497). In the main its irregular outline, described as 'knotty*' by Hallissy, is due to the uneven nature of the rockfloor, whose sharp features have been modified rather than accentuated by the drift cover. The drifts consist largely of local materials, and the soils are light and stony where derived from sandstones but heavier where originating from shales. The post-glacial drainage is complicated, with a number of small lakes and peat flats. Around Dundalk, Silurian rocks form a lowland, but in the Carlingford peninsula igneous rocks, intruded in Tertiary times, form rugged mountains.

The lowland that stretches from the upper Erne through Monaghan to the Blackwater valley is floored by Carboniferous limestones covered by drifts, mainly in the form of drumlins. In central Ca van the Erne spreads out into lough Oughter, a lake which is an intricate series of channels separating drumlins one from another: several smaller lakes lie between drumlins, but some of them are mere ponds and in many places there is merely a peat flat. Within the lowland corridor, the drumlins are orientated quite independently of the rock floor, but their trend, southwest around Clones, south around Monaghan, and southeast around Carrickmacross, bears a direct relation to the glacial striae. In some instances the drumlins coalesce into one another, forming a landscape of numerous little hills with highly varied conditions of soil and drainage. It is not certain, however, that all the so-called drumlins consist entirely of drift for some may possess a rock core: nor is it possible to make a clear distinction between actual drumlins and ground moraine plastered on an uneven rockfloor, such as that existing in the Ordovician and Silurian belt.

LAND USE

There are few relics of the natural vegetation in this region, as almost the entire area has been absorbed by farmlands. Cultivated land occupies virtually all the Ordovician and Silurian hilly country, and also extends up the Carlingford mountains to an altitude of 700 ft. on suitable slopes, though in these mountains many of the steeper slopes are uncultivated and some of the level ground is also left as rough pasture on account of its waterlogged condition: it is the moderate slopes that are favoured, because

they possess good natural drainage. The Carlingford peninsula has the largest forestry plantations within the region; already they cover two and a half square miles. Another large forestry estate, at Cootehill, consists of demesne land with woodlands covering three square miles, most of which has already been planted. Smaller demesnes of c. 300-700 acres have been acquired and at least partially planted at Monaghan, Belturbet, Killa-shandra, Bailieborough and Virginia. There are other demesnes that might be used for forestry plantations if they cannot be maintained by their owners, or divided into fields by the Land Commission, but this region will never possess large forests. Typically, it is one of small farms interrupted only by a few patches of bog-land and by very occasional woods.

Farms of 30-40 acres are the main element in the agricultural landscape, and most of them include a few fertile fields given to crop production. Mixed farming prevails and the main economic staples are young cattle, milk, eggs, pigs and poultry. There is a general average of some 30 cattle per 100 acres of improved land: in Co. Cavan and Co. Monaghan, where more than half the milch cows are on farms supplying the creameries and 25-40% of all the cattle are milch cows, the specialisation is clear, yet less complete than in the Munster dairying belt, partly because the trade in young stores is also important and favoured by many farmers. The young stores are sent to grazing and fattening pastures, chiefly in Co. Meath and its appendage, Co. Westmeath, or to areas around Dundalk. Some of the store cattle are exported through Greenore, a small port in the Carlingford peninsula, from which there are three sailings of cattle boats to Holyhead each week. Sheep rearing is prominent in the Carlingford peninsula, which has the only upland pastures of any considerable extent within the region.

Arable farming is fused with livestock production, especially toward the east. Interesting transitions, or agricultural gradients, may be observed: in the west, four-fifths of the land is in pasture or meadow, but in the east only two-thirds. There is also an increasing dependence on arable feed-stuffs as one moves eastwards; very gradually, but none the less clearly, the transition to the intensive small-farm economy characteristic of Northern Ireland is seen. The main arable crops are oats and potatoes, but barley and turnips are grown very infrequently except in the east around Dundalk and Carrickmacross. Some farmers have a surplus of oats or potatoes, and in a few cases a considerable part of the annual income is derived from their sale: oats are ground locally in various mills scattered through the countryside. Flax growing has had varied fortunes, but small areas are devoted to it in most years and there are a few flax scutching mills in the area.

During the war of 1939-1945 the arable acreage was increased very

substantially, in some parts by as much as one-half, but wheat, though grown on more land than ever before, covered less than one-tenth of the arable area. Much more land was sown to oats than in 1939 and this region was perhaps better able to solve the feedstuffs problem than many others, for arable farming has a definite place in its agricultural way of life and the adjustment to wartime demand for home-grown crops was therefore easier than in areas where the land was almost entirely in grass. A fairly usual rotation is oats on lea, followed by potatoes or roots, and then oats for two years; in the second year grass seeds are sown with the oats and the land returns to grass for several years. Such land is, in the estimation of the farmer, arable land, and the extent to which it is sown depends on the manure supply, the labour available and the enterprise of the farmer.

The whole of the drumlin-drift belt has small farms, but in the eastern part the productivity per acre is almost double that of the western part. Hallissy, writing of the area around Ballyhaish, says that farming on a large scale with labour-saving machinery is impossible in a countryside of steep-sided hummocks, either of drumlins or ground moraine separated one from another by hollows with peat or alluvium; in some places, spade cultivation alone is practicable. Even a single drumlin may possess varied soils, which may be well-drained and coarse-textured near the top, clayey and water-logged towards its foot: if the slope of a drumlin is steep, cultivation may be so difficult that pastures appear a more reasonable use than crops. In addition to these natural obstacles to mechanised farming, no farmer of 30 acres can afford a considerable outlay on machinery, and therefore the agricultural methods are likely to remain of a simple character. In the counties of Monaghan and Cavan, half the land is in farms of less than 30 acres, and the remainder in larger farms, chiefly those of 30-50 acres. There is an average of 70-80 family workers and 20-60 labourers per 100 farmers, with rather more labourers around Dundalk.

INDUSTRIES

This region shares with the remainder of Ulster a tradition of home industry, chiefly in linen making. The farmers of Co. Monaghan grew their own flax, prepared it, and made it into linen until the early part of the nineteenth century, when factories acquired the trade. The small farms provided food as well as flax, but most of the income came from the domestic industry and the fields were in some cases neglected. Today more than nine-tenths of the 'producers and repairers' in the countryside depend on agriculture, but there are a few interesting survivals of rural industries, such as flax scutching mills and grain mills, many of them long-established. These mills are placed in various villages, most of which have populations of 100-500: such centres are relatively numerous in the region, and among

them are Ballyconnell and Shercock in Co. Cavan, Newbliss and Glaslough in Co. Monaghan, all with populations of less than 300. The creameries are scattered through the countryside in villages and provide, here as elsewhere, a direct contact with Irish ports and export butter markets. A few of the villages have factories; shirts and pyjamas are made at Rockcorry (100), men's boots at Emyvale (200), clogs and wooden handles at Killashandra (500).

Most of the factories are in the towns, and Dundalk is the largest and most fully industrialised centre. The remaining towns are market centres, varying in size from Bailieborough (900 in 1936) or Ballybay (1,000 in 1936) to Monaghan, with 4,700 people in 1946. In Co. Cavan, Bailieborough has a sawmill and a shoe factory, and Belturbet (1,300 in 1936) has a shoe factory with 100 workers. Cavan has a bacon factory, established in 1916. Boots and shoes are made in Castleblayncy and Carrickmacross, Co. Monaghan: the latter town has a large modern factory with nearly 300 workers. Clones has a clothing works producing coats, costumes and skirts, a creamery and an old-established factory making spades and shovels: this last is of particular interest as there is a great variety in the types of spades used through the country. Monaghan has a wider range of industry than the smaller towns, and among them are milling of wheat, oats and maize, bacon curing, furniture making and linen weaving. These market towns show traces of indigenous industry, chiefly in milling, spade-making and linen manufacture: there is also some agricultural processing in the creameries and the bacon factories, and finally there are indications of the modern industrial expansion, especially in the boot and shoe trade.

Dundalk (18,500), a minor regional capital, a port, and a thriving commercial and industrial town, gives employment far beyond its boundaries. As a port it is used mainly by coal boats and the railway brings most of the raw materials to the town, which stands half-way between Dublin and Belfast and is the junction for the line to Londonderry; it has the engine and carriage works for the Great Northern Railway and there is also an ironworks in the town. Many of the manufactures are allied to the distributive trades; among the products are beer, mineral waters, furniture, motor bodies and sawn timber. Agricultural demands are met by factories making chemical manures, oil and cake feedstuffs, and even sheep branding fluid. Agricultural processing is seen in mills producing meals and wheat foods and also in bacon curing. A Belfast tobacco factory has a branch in Dundalk, and the textile industry is also represented by two large works making a variety of cotton and linen goods. But the largest factories, which have up to 500 employees, are those making boots and shoes, ranging from the heaviest types worn by farmers to the smartest

ladies' wear. There are, in all, several thousand factory workers in Dundalk, but it remains essentially a market town in appearance and lacks any definite factory quarter. In size, and in its industrialisation, it is comparable with Drogheda (see p. 301), but Dundalk's port and river hide themselves discreetly from the town whereas the quay-lined Boyne dominates Drogheda.

POPULATION

Fig. 85 shows that the population is distributed fairly evenly through almost the entire area included in the region: the only marked gaps are

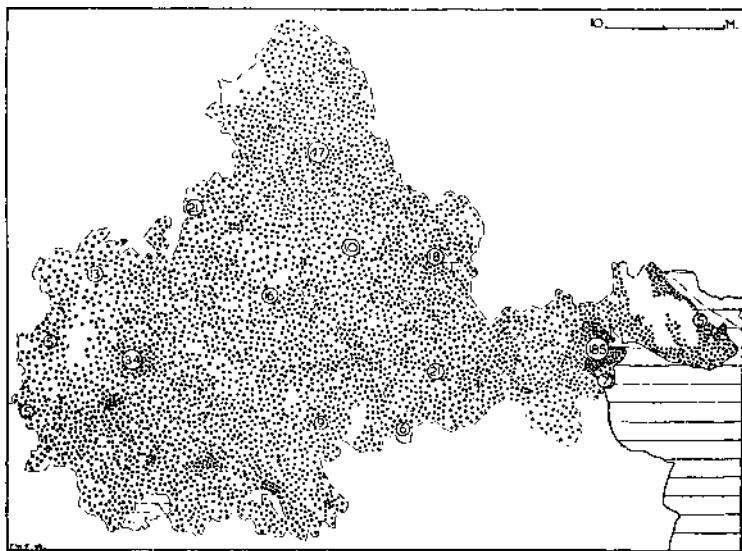


FIG. 85.—POPULATION DISTRIBUTION, EAST PART OF DRUMLIN—DRIFT BELT

One dot to 25 persons

This small-farm country has a remarkably close and even settlement pattern, very similar to that across the Border in Northern Ireland (see Fig. 92, p. 505).

the mountains of the Carlingford peninsula, though there are a few other unoccupied patches, generally of small extent. The relatively close settlement is typical of a rural economy dominated by small farms: south of Dundalk there is a gradual transition to the sparser type of settlement associated with the large farms of south Louth and of Co. Meath. There are a number of small villages in the region, but more than 90% of the rural population lives in isolated farmhouses or cottages and the villages are merely small clusters of houses with a few shops and, in some cases, a mill

or factory. Close as the settlement may appear both on the map and in the field, the rural population is now 41% less than in 1891. This decrease is remarkably high, even by Irish standards; 180,000 lived in the rural areas in 1891 as compared with 107,000 in 1946 and the density was reduced from 150 to 89 per square mile, or 183 and 109 respectively per square mile of improved land.

While the rural areas show phenomenally high decreases of population, the towns have remained fairly stable since 1891: they now have 45,000 people as compared with 39,000 fifty years ago. Several of the smaller centres have declined, but the major market towns such as Cavan and Monaghan show increases, and Dundalk has expanded from 12,400 in 1891 to 17,400 in 1936 and 18,500 in 1946. The long-standing industrial tradition of this region accounts in part for the general maintenance of the town populations which, as a group, now include 30% of the whole against 18% in 1891; but a number have been revived by new industries recently. In summary, the decline from 219,000 in 1891 to 152,000 in 1946, a loss of one-third, is due to heavy rural emigration and the failure of the towns to absorb their natural increase. As a result the overall density is now 125 per square mile as compared with 180 in 1891.

SUBREGIONS

Five subregions may be distinguished in the eastern part of the drumlin-drift belt: the upper Erne lowland, the corridor lowland of Monaghan, the drift-covered hilly country of Ordovician and Silurian strata, the lowland around Dundalk, and most distinctive of all, the Carlingford peninsula. The essential unity of the area lies in its farming pattern, in its drift-derived soils, and in its mixture and interpenetration of pastoral and arable farming. Its many agricultural transitions, discussed above, modify its uniformity without destroying its unity. Finally, all its five subregions, though fairly clearly defined on the south, are artificially limited by the Border on the north.

1. THE UPPER ERNE VALLEY

The Erne, which rises in the hilly country of Co. Cavan, spreads into a series of 'lakes*' which are an intricate maze of channels between cultivated peninsulas and islands. Almost the whole of the Erne lowland is covered with drumlins and drift ridges, which are spread over a Carboniferous rockfloor around lough Oughter and a rockfloor of Ordovician and Silurian strata between lough Oughter and the southern shores of lough Gowna. Many of the peat flats in hollows are developed on the site of former lakes or fens. The lowland, mainly around 200-400 ft. high around the Erne, rises as low hills to 850 ft. near lough Gowna. The countryside is

divided into small farms, averaging 32 acres, and approximately two-thirds of the land is in pasture, with meadow and crop land, chiefly oats and potatoes, sharing the remainder. A few demesnes with woodlands diversify the scene, but less than one-tenth of the area is bog, and the main products of the farms are young cattle, milk for the creameries, poultry and eggs. The largest market centre is Cavan (3,400).

2. THE MONAGHAN CORRIDOR

This corridor leads from the Erne valley to the lough Ncagh basin and is used by roads, the railway from Clones to Armagh and the Ulster Canal. On the northwest the Slieve Beagh, of upper Carboniferous strata, rises to 1,255 ft.; on the southeast the Ordovician strata forms a hilly edge rising above the corridor, which is mainly 200-400 ft. high. An intricate mass of drumlins covers Carboniferous limestones and provides highly varied soil conditions and a drainage pattern almost as complicated as that of the Erne lowland. The indeterminate divide between the Erne and the Bann drainage systems runs through the centre of the lowland, which has numerous small lakes and peat flats. There are, however, no peat bogs of large extent to interrupt the agricultural scene, which is dominated by small farms averaging 30 acres. Mixed farming prevails with milk for creameries, young cattle, poultry and eggs as the main products, though arable farming becomes more prominent towards the east. The peculiar position of Clones (2,100) and the bisection of its market area is indicated in Fig. 95, p. 527; it is a market, railway and minor industrial centre. Monaghan's market area, on the other hand, was left undisturbed by the establishment of the Border and the town remains a commercial and small industrial centre.

3. THE HILL COUNTRY OF CAVAN AND MONAGHAN (FIGS. 86, 87)

The hilly country between the Dundalk lowland and the middle Erne valley is plastered with drifts, chiefly in drumlin form. The underlying rocks are mainly Silurian slates and grits, but a basin floored by beds of Carboniferous and Triassic age occurs around Carrickmacross, Ardee and Kells. In this basin the upper Carboniferous strata stand out as hills 400-600 ft. high, but the limestones and the lower Triassics have been worn down to 200-250 ft.; to the west, the Silurians rise in sweeping lines to more than 1,000 ft. with a general level of around 500-600 ft. Everywhere lakes or peat bogs exist in the hollows and cultivated fields cover the drumlins and hillsides. Most of the farms are small and consist only of a few fields, with a total extent of around 30 acres. As much as one-quarter of the land is arable, and almost one-fifth of the grassland becomes hay. The potato harvest is a source of income on most farms and both cattle rearing for sale and for milk to the creameries are sources of profit; in addition

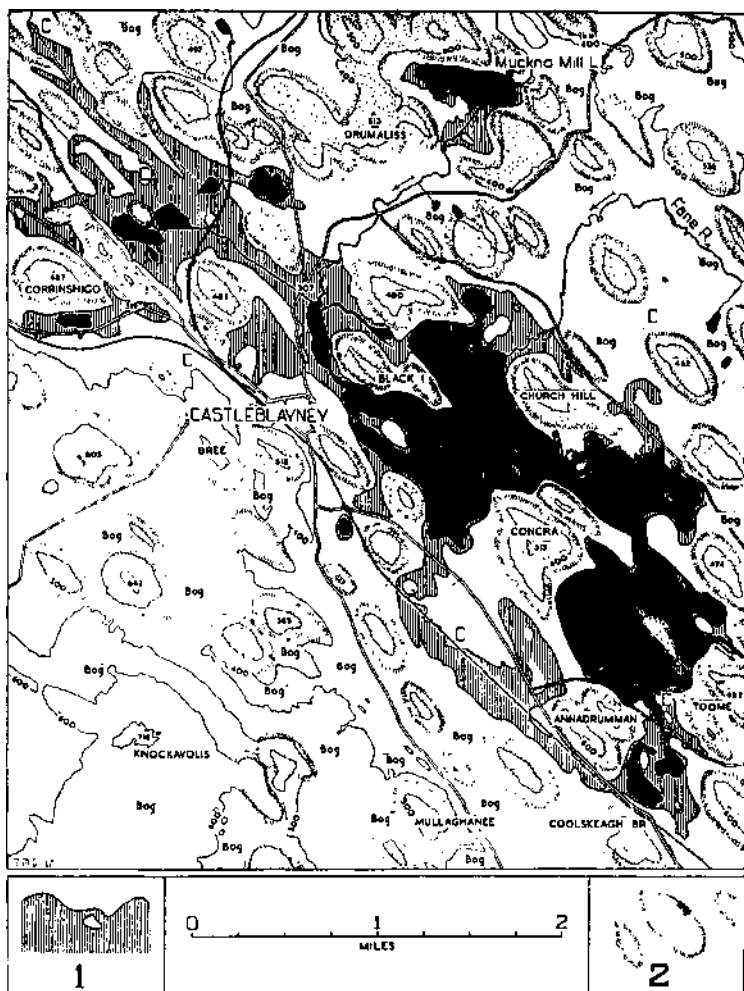


FIG. 86.—THE CASTLEBLAYNEY AREA, PHYSICAL FEATURES

1, Area of former lake bed; 2, Drumlins; C, Crag and tail formation.

Like many other lakes in the drumlin-drift belt, lake Muckno has been substantially reduced by sedimentation: the area of the former lake bed was 3 square miles but it is now merely 1-4 square miles. The drumlins are aligned from northwest to south-east; in some cases several are joined to form an impacted series.

Based on the Ordnance Survey 25" to one mile 1909-1901, and 6" to one mile 1910, by permission of the Minister for Finance of Ireland.

The fieldwork was done by members of the Geographical Society of Ireland, 1946; map drawn by F. M. Synge, and originally published in 'Irish Geography,' vol. 1, p. 107.

poultry are kept in large numbers. The rural density of population is still more than 100 per square mile, compared with 150 some fifty years ago: while the decline has been heavy, the density remains relatively high and is fairly typical of a small-farm region. Carrickmacross (population 2,100 in 1946), Castleblayney (1,800) and Cootehill (1,600) are the largest of the numerous market centres, most of which are mere villages scattered through the area at distances of about ten miles from one another.

4. THE DUNDALK LOWLAND

The present position and recent expansion of Dundalk have been discussed on p. 463: it is a town of sufficient size to show a markedly uneven edge, partly through its planless spread along various roads from the compact Georgian nucleus. The countryside around the town consists of drift-covered Silurian strata, reaching an altitude of 200 ft. and diversified by drumlins rather than dominated by them. In this lowland the farms are mainly medium-sized, with cattle grazing and arable cropping, largely for potatoes and oats: the small-farm economy of Ulster and the large-farming grazing country of Meath meet in this lowland. The cattle are exported through Greenore, the arable crops used on the farms and, in the case of potatoes, sold locally or in the Dublin market, and the dairy cows supply milk to the town. Inspection of Fig. 85 will show that the rural population around Ardee is lower than in subregion 3 or in the settled parts of the Carlingford peninsula (see below).

5. THE CARLINGFORD PENINSULA

This peninsula takes its name from the historic town of Carlingford, which clusters around an ancient castle and abbey. It is made up of Silurian and Carboniferous strata through which basic lavas, chiefly gabbros and acid granites, have been intruded (see Fig. 88). The ringdyke of gabbros stands up as a remarkable double line of crests with Slieve Foye (1,935 ft.), but the granites form lower hills such as Clermont Cam (1,674 ft-) or else are eroded into a basin between the gabbro hills. These hills have a large extent of bare rock stripped of its soil by the earlier Irish glaciation and by heavy erosion ever since: no peat bogs have accumulated on the craggy slopes. The smoother granite hills, on the other hand, have a deep peat-cover, actively cut in recent years. These negative areas of settlement are used only for timber plantations or for sheep grazing: below them the boulder clay of the second glaciation stretches from the coastal lowland into the valleys as a cover at least 50 ft. thick, in which the present rivers are deeply trenched: there are also numerous traces of meltwater channels, especially on the south side of the peninsula.

While the limit of cultivation has receded on the hillsides and many

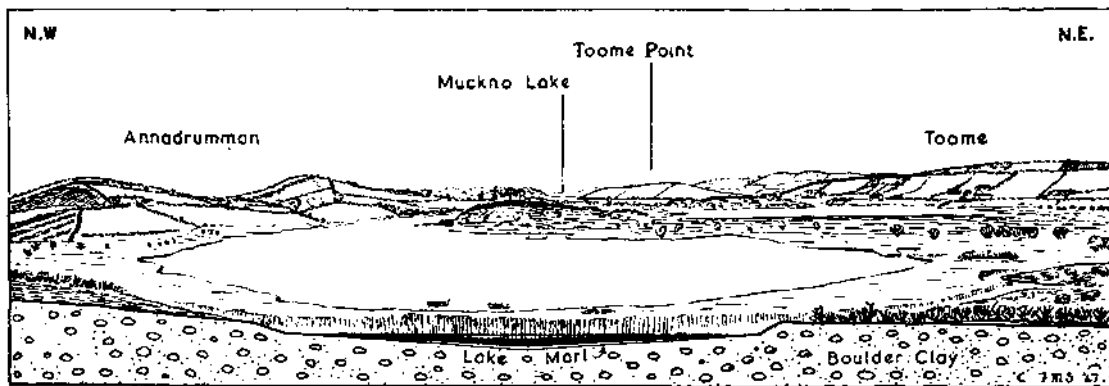


FIG. 87.—DIAGRAM OF AN AREA IN THE MUCKNO LAKE BASIN

The viewpoint is Coolskeagh bridge (see Fig. 85) and the lake in the foreground has been separated from lake Muckno by sedimentation. There is a crag-and-tail formation in the centre, immediately below the words 'Muckno lake,' but elsewhere drumlins occur. Lake marls rest on boulder clay throughout the area of the old lake bed.

Drawn by F. M. Syge, and originally published in 'Irish Geography' vol. 1, p. 109.

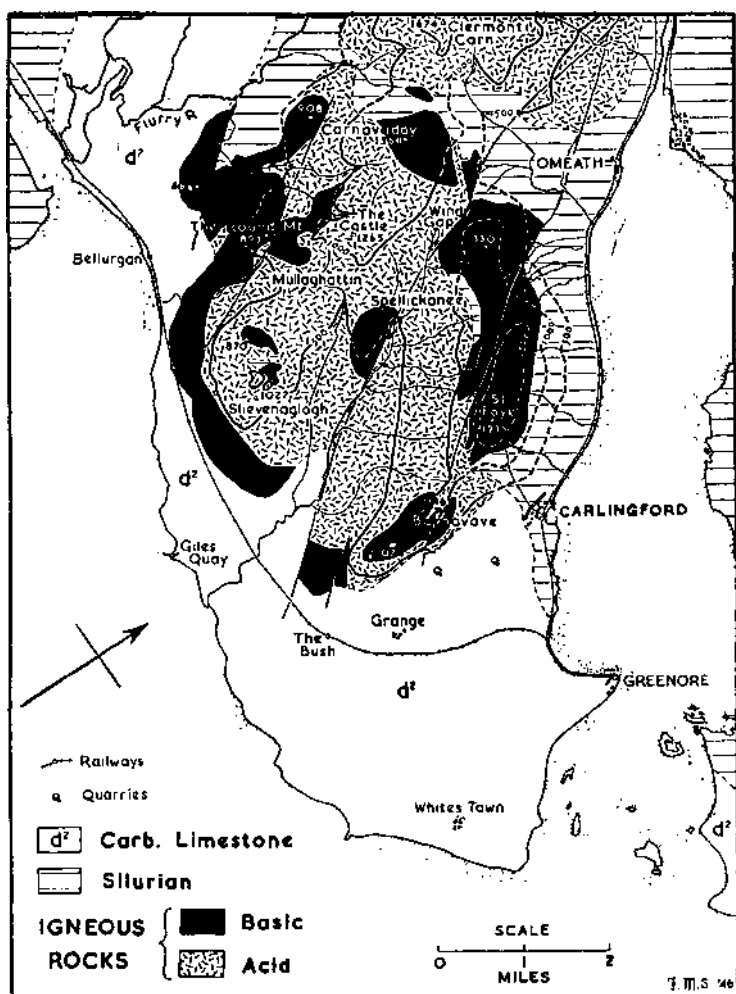


FIG. 88.—GEOLOGY OF THE CARLINGFORD PENINSULA

Carboniferous limestones form a lowland, the Silurian beds the lower hillsides facing Carlingford lough, and the igneous rocks the sharp and jagged hills which give the peninsula its mountainous appearance.

Map drawn by F. M. Synge and based on data in Rickey, J. E., and Thomas, H. H., *Quart. J. Geol. Soc. Lond.*, vol. 88, 1932.

traces of abandoned farms may be seen, the combination of fertile soils, moderate rainfall (Greenore average 32") and the accessibility of home and overseas markets has induced comparatively intensive farming. Almost two-fifths of the land is arable and large quantities of potatoes are grown: an alcohol factory at Riverstown absorbs a large part of the crop, as its removal from the area is prohibited on account of 'black scab'. Oats, barley and turnips are also grown in considerable quantities. The economic staples include lambs, young cattle, poultry and butter, and the general picture is one of mixed farming similar to that of the Cavan-Monaghan country. The farms, however, are too small to provide more than a simple living for the population and most of the houses dotted through the landscape are little more than cottages, many of them thatched. Each farmhouse is surrounded by a few fertile fields, many of which are bounded by wide stone walls made of the innumerable stones thrown up in ploughing. The whole peninsula, which has a population of 7,000, is part of the market area of Dundalk. The villages, which have only one-tenth of the population, include Carlingford (500 in 1936) and Greenore (200), both fishing and tourist centres. Greenore still preserves the atmosphere of a packet station, and is served by railways from Newry and Dundalk, but its hotel now lives by visitors seeking golf instead of travellers to England.

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CHAPTER XXI

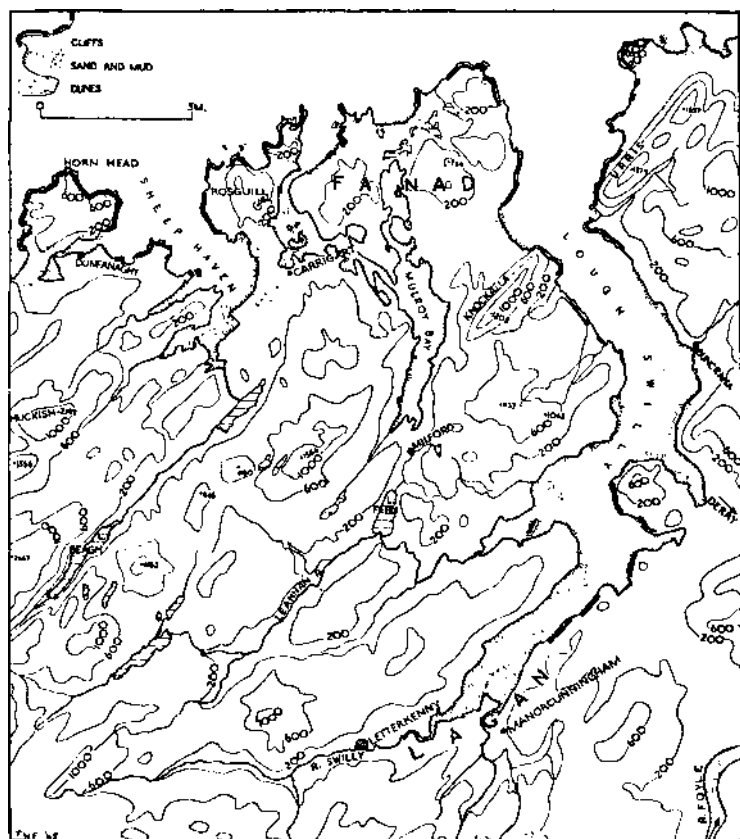
DONEGAL

THE POLITICAL separation of Donegal from Co. Londonderry is a factor of major geographical significance, for the richest areas of Donegal lie in the Foyle basin, where its natural regional capital, Londonderry, is also situated: yet the Foyle basin is divided between two states and Londonderry has become a frontier town. The east of Donegal is a fertile agricultural lowland, but the west is a hard environmental school in which the population wrings a meagre return from poor land and can only maintain even a simple standard of living by seeking extra sources of income through seasonal or permanent emigration, home industries, intermittent labouring or factory employment. Access to the western seaboard is given by roads and light railways, some of which are now replaced by buses, but the communications of Donegal all focus on Londonderry or Strabane; all the railways between the towns of Co. Donegal and Dublin run through Northern Ireland, and motorists generally find the routes through Enniskillen or Londonderry preferable to the long journey through Eire territory.

STRUCTURE AND LANDFORMS

The rocks of Donegal consist primarily of schists, quartzites and granites, and the influence of the Caledonian folding is clearly seen: the northeast-southwest line in the mountains and valleys has in places an almost diagrammatic emphasis. Quartzites, weathered into their not unusual conical form, make sharp lines of hills in the Errigal-Muckish range, the Mulmosog-Aghla hills, the Knockalla mountains with the Urris Hills (separated by lough Swilly), and the Slieve Snacht in Inishowen (Fig. 89). The Caledonian trend is almost as striking in the granite hills on either side of the Gweebarra depression. The Dalradian rocks forming Donegal were already invaded and metamorphosed by igneous masses when they were rearranged by the Caledonian folding: structurally similar to the Scottish Highlands and to the country forming West Connacht, they have been steadily denuded through most of geological time, though there have also been a few marine transgressions, one of which is recalled by the presence of Carboniferous strata at 1,900 ft. on Slieve League.

Long-continued denudation of the Caledonian mountains in Donegal produced an erosion surface, possibly Devonian in date, at c. 800-1,000 ft., which has yet to be thoroughly explored. It is widely represented,



HG. 89.—NORTH DONEGAL, PHYSICAL FEATURES

The Caledonian line is clearly revealed in the topography of this area, and three long inlets, Sheep Haven, Mulroy bay and lough Swilly, add to the diversity of the landscape.

however, and many of the peaks in the mountain heartland rise from it, notably in the Errigal-Muckish range. Faulting and igneous activity, seen in many dykes, probably accentuated the Caledonian line in Tertiary times: in addition, the erosion surface around 200 ft. may have developed during the Tertiary era. This surface is seen in many districts such as the lowland around Donegal bay, the extreme western end of the Slieve League peninsula, the Rosses, and a narrow coastal strip around the Bloody Foreland. Hills of quartzite rise sharply from this surface, and probably represent monadnocks similar to those in the heart of the mountains. The 200-ft. surface falls gently towards the present coast and also spreads into the valleys of various rivers that now have incised courses and are cutting down to the present sea level. It truncates rocks of varying resistance to erosion, including Carboniferous strata, schists and gneisses.

Donegal shows the strong structural imprint of the Caledonian folding because erosion, though so long-continued, never succeeded in masking completely the influence of rock-structure or in reducing the area to a common base level. The drainage pattern shows the interplay of rivers following the Caledonian trend with those at right angles to it. Those rivers flowing northeast-southwest, or the reverse, probably follow subsequent lines; the consequent direction, northwest to southeast, is also strongly represented. Complicated as the drainage pattern may appear, it is in the main rectangular, due to adjustment to Caledonian structures.

The severe glaciation to which Donegal was subjected so modified the landscape that almost all the detailed features show its influence. At its fullest extent the ice may have covered the whole mountain area, sending out tongues to the surrounding lowland fringes, now partly submerged. The valleys were widened, deepened, and filled in places with morainic material: some are narrow U-shaped troughs, especially in the granite area, while others are wide and open, especially in the schist country. The drifts on the moorlands have now a thick peat cover, through which large erratics appear in places. On the lowlands there are sharp contrasts: the lowland peneplane around Donegal bay is covered with drumlins as far west as Killybegs, and smaller drumlin 'swarms' occur around Ardara and also around Milford; drift of various types is widely distributed and forms some rich soils in eastern Donegal. In the west, however, glacial erosion, rather than deposition, is more apparent as large areas, notably in the Rosses, have bare rock surfaces strewn with erratics or very thinly covered with drift. Heather moors cover much of this drift, but a considerable area is reclaimed and farmed, with black-soiled damp fields from which stones have been removed and piled into walls or laid in heaps here and **there**. Many hollows **are** filled with small lakes which, in parts of **the** Rosses, **are** almost as numerous as **the** peat bogs of Co. Mayo.

LAND USE

The treeless nature of western Donegal is due to many factors, including the persistence of moderate winds, chiefly westerly in origin, with occasional gales. There are traces of halophytic vegetation on cliffs: thus, C. F. Trapnell¹ has drawn attention to conditions on an exposed patch of coast at Kinclassagh head, where flecks of spray are driven inland by the west winds even on fine days so that the whole air is moist and salty: salt marsh vegetation competes with alpine, peat and rock plants to make a curious local association conditioned by the 'spray-level,' here around 100 ft. (for comparable areas, see pp. 52, 430). At times spray may be carried several miles inland by heavy winds: near the coast this would at least favour bog-land vegetation rather than trees. In short, most of the climatic conditions of the west coast are suited to bog development, which depends largely on an excess of ground water. West Donegal has a heavy rainfall, infrequent sunshine and a scarcity of drying winds, both of which result in deficient evaporation. The bog accumulation is most marked on level or gently sloping areas such as the discontinuous peneplane surfaces about 200 ft. high, and on uplands 800-1,000 ft. high. In effect, the present land use of Donegal shows very clearly the combined effects of climate and slope.

Towards the east of Donegal, the degree of saturation becomes less acute, though much depends on local conditions of exposure. The sheltered inlets of the north coast have a certain amount of semi-natural woodland, now reduced by clearing for fuel and structural timber: in the neighbourhood of Dunfanaghy, Creeslough and Carrickart, and along the shores of Mulroy bay, ash, alder, hazel and oak appear in that order of relative frequency, with willows and birch, as the most abundant constituents of the natural woodlands that survive along the sides of sheltered creeks and valleys. Around Mulroy bay, much of the rocky land near the shore and on the islands has semi-natural woodlands, chiefly oak and birch with holly, bracken, heather and mosses as the field layer. In places gorse (*Vlex europa*'its) makes a continuous scrubland similar to that seen in many parts of western Donegal. Generally woodlands and scrublands in a semi-natural state have survived only in fairly steep and rocky hillsides. Plantations of conifers and birch are frequent, and sycamore, both planted and sub-spontaneous, is very common. The Forestry Commission has three estates in Donegal, at Ards (between Dunfanaghy and Creeslough), near Stranorlar and at Pettigo.

The proportion of land under crops and pasture has declined steadily and continuously since 1851, and the intensification of agriculture during

¹ *Irish Nat. J.*, Belfast, vol. 1, 1926, pp. 73-74.

two wars did not arrest the decline: 58% of the area was improved land in 1851 but only 36% in 1945. As the area taken over for afforestation is very small and very little land has been covered with buildings, these figures are extremely significant. The area sown to crops declined from 16% of the whole county in 1851 to 10% in 1931, with a rise to 11% by 1945. A similar rise was noted during the war of 1914-1918, but the extra land under crops during both wars was taken from meadowland and pasture rather than from newly reclaimed land. The restriction in the improved land is obviously related to the decline in population by 47%, from 255,000 in 1851 to 136,000 in 1946. Every stage of land-degeneration may be seen, from fields recently invaded by bracken, heather or gorse to long-abandoned holdings where the former cultivation is suggested only by remains of walls or a few stones which were once part of a house.

While the area actually cropped is small in relation to the whole area of Donegal, it is large in proportion to the area of improved land. In the extreme northwest, over half the improved land is under arable cultivation, chiefly of oats and potatoes: this feature shows a subsistence economy rather than cash-crop farming. The farmer of 8 acres, which is the average holding in the northwest, must devote at least half of it to oats for his stock and potatoes for his family. In east Donegal, approximately one-third of the improved farmland is tilled, largely for foodstuffs and feedstuffs, though most of the farms here are far above the subsistence level. In south Donegal, however, only one-tenth of the improved land is cropped. Few farmers in the west and north employ any labour, though the majority have the assistance of some unpaid member of the family, and even in the richer east there are only 74 labourers per 100 farmers, partly because seasonal workers may be drawn from the west at busy periods. The manpower on the farms appears to be considerable when expressed in numbers, but an assessment in terms of working days would show a very different picture because many of the men are away from the farms for a substantial part of the agricultural year.

In west Donegal the bogs and moors are an important resource for the community. They provide pasture and bedding materials for cattle and sheep, and are an invaluable source of fuel. The struggle to maintain the farmlands is desperate in some places, as heather, bracken, gorse and hawthorns are ever ready to creep into the pastures from the moorlands and hedgerows and many of the fields are already so closely covered with *Juncus* that they slip very easily into a semi-wild condition. In human terms, old age, ill-health or the migration of workers often means in time the almost imperceptible but yet certain reversion of the land to a wild or semi-wild state. As a rule, the farmers cling very tenaciously to the arable land, which is sown mainly to oats and potatoes in western Donegal.

Sand, shells and seaweed are brought from the shore to manure the land; and artificial manures are also used. The perpetual battle with saturated and acid soils goes on in the little fields surrounded by high walls built to keep out animals. Towards the east, the farmlands become progressively richer, with larger fields, more machinery and fewer very small farms. One difference between west and east in Donegal is that the amount of labour necessary to raise i acre of oats and potatoes in the west is vastly greater than that necessary in the east: it follows, therefore, that the farms are smaller on the poorer lands of the west, and the density of population in relation to the cultivated area is remarkably high.

Oats are the main 'corn' crop of Donegal, but under wartime conditions a few thousand acres of wheat have been grown: barley and rye (once a familiar crop in the west of Ireland) are now comparatively rare. Of the root crops, mangels and sugar beet are unsuited to the climate and hardly cultivated at all, but potatoes are found on almost every farm, though cabbages are not now as widespread as in the latter part of the nineteenth century, when almost every farmer had his quarter- or half-acre sown for use in the household. Turnips are grown mainly for feedstuffs: flax, still a cash crop, is found mainly in the drier east.

Cattle are the mainstay of Donegal farming and their numbers have remained fairly even during the past hundred years: there are normally between 140,000 and 170,000, of which more than one-third are milch cows. Donegal has few creameries and most of the butter produced is consumed at home or sold locally. Cattle are sold mainly when less than two years old to dealers from the eastern counties, and Donegal shares very fully in the internal cattle trade by which calves and young cows make their first journey to pastures farther east in Ireland and their second to slaughter either in Dublin or in Great Britain.

Pigs and poultry have had varied fortunes, but are a useful adjunct to the farm resources in every part of Donegal, especially among the poorer communities. Poultry production has been of particular benefit and the total head rose from 300,000 in 1851 to more than four times as many in the present century. The Reports of the Congested Districts Board show that many of the poorest people in the west would have been almost destitute but for the sale of eggs, but the increased success of poultry raising has affected all types of farms profitably. The lack of feedstuffs in the 1939-1945 war caused a decline to slightly under 1,000,000 as compared with 1,400,000 in most inter-war years, but this is probably merely a temporary setback to poultry keeping, which will offer lucrative returns so long as egg grading and rapid transport to market centres can be maintained.

Sheep rearing has been subject to sharp fluctuations: in 1851 there were

82,000 sheep, but the number increased rapidly to 214,000 in 1871. During the war of 1914-1918 the number was 145,000, but the inter-war period saw a rise to 230,000, since when the number has been stabilised around 170,000-190,000, most of which are found in the uplands. The number of horses is around 18,000 and there are over 5,000 donkeys, generally used as draft animals by the poorer farmers.

The marked fall in the area given to improved pastures, as distinct from meadows, is perhaps the most serious factor in Donegal farming. Since 1851 the improved pasture land has decreased almost to half, from 456,000 acres to 243,000 acres (1945). This is offset to some extent by the increase in the area given to hay, which rose from 31,000 acres in 1851 to 54,000 acres in 1945. While it is clear that additional land for hay or, in some slight degree, for other crops has been taken from pastures, the sinister fact remains that the area given to crops and pasture has decreased by 38% since 1851. The decline still continues and it seems reasonable to relate it to the steady emigration which, though less severe in Donegal than in most other counties, has reduced the manpower on the farms to less than half its former level. Donegal is not farmed to its maximum capacity, partly because the financial interest of many families lies largely in migratory labour, local odd jobs, fishing, or the small industries. Another source of income is turf-cutting: in 1945, 329,000 tons were drawn by farmers from the bogs, partly for home consumption and partly for sale. The intensification of agriculture would mean a considerable expansion in the growth of fodder crops, including hay, and the improved drainage of pastures. More labour would be needed, but here the possibilities of future development rest with the potential emigrant as surely as they rest with the agricultural reformer.

INDUSTRIES

Donegal has an industrial development of considerable social value with its roots in the widespread domestic production reported by the Congested Districts Board. In 1891 there was home sewing (chiefly of shirts), weaving, knitting and 'sprigging* or hand embroidery. Various charitable attempts to establish 'sewing rooms' for girls formed a link in the chain of development from home to factory industry; many of the 'factories' still have outworkers and some are little more than receiving depots for home-made goods. The home workers of fifty years ago were shamelessly exploited; they tramped many miles to collect wool, shirts or linen from depots and then worked ceaselessly for a few shillings a week. Each of their activities has led to a definite type of industry, and more than 3,000 people were employed in textile work in 1936, of whom over two-thirds were women.

Home knitting is now definitely subsidiary to the factory production, but its present location reflects its origins. In east Donegal the industrial development began in association with Londonderry, but since the Border was established, factories have been established in various small towns and villages of Donegal. There is a large knitwear factory in Buncrana, and a firm at Letterkenny normally employs 200 indoor workers and a number of outworkers. A hosiery factory was also established in Ballyshannon recently. At Carrickart in the north a 'home industries*' factory makes a variety of woollen goods, and there are also a number of enterprises in the villages of Ardara and Glenties: one firm at Glenties has 150 workers and the co-operative society in Dunglow (Rosses) has about 100 employees. The tweed industry has developed from the home weaving of former years, and many small enterprises are found in Donegal, though the largest is an old-established concern at Convoy which provides tweeds, serges, worsteds, blankets and rugs, and employs 350 workers. Similarly, the home shirt industry has been replaced by factories, with Buncrana as the main centre. Other factories exist at Muff, just inside the Border, at Lifford, at Castlefinn, at Ballybofey in the Finn valley, at Carndonagh in the north of Inishowen, and in Donegal town: several of these have been established since 1922.

The embroidery industry has preserved its tradition of fine handwork against all machine-made imitations, and the largest single factory, with 200 workers, is at Mountcharles in the south. This firm specialises in altar lines, household goods, clothes and handkerchiefs and, established fifty years ago, is the oldest of its kind. Another firm at Mountcharles employs 25 'indoor' and 500 'outdoor' workers, and there are smaller concerns in Ardara and Donegal town, in all of which a number of outworkers are employed.

The remaining industries of Donegal are small enterprises serving local needs, and the only specialisation is the oatmeal production of east Donegal, which is established in small towns such as Letterkenny and Buncrana, or villages such as Moville, Lifford, Castlefinn and Ballindrait. All these mills make other products such as wheat flour, maize meal, bran, linseed cake, and one also has flax scutching.

POPULATION (FIG. 90)

Co. Donegal had 136,000 people in 1946, 73 to the square mile. The population has declined by 54% since 1841 and by 26% since 1891: this decrease is less severe than in many other primarily agricultural counties of Ireland. The explanation of this relatively low rate of emigration lies in many factors such as the opportunities for seasonal migration within the county itself from west to east and also to Great Britain (primarily to

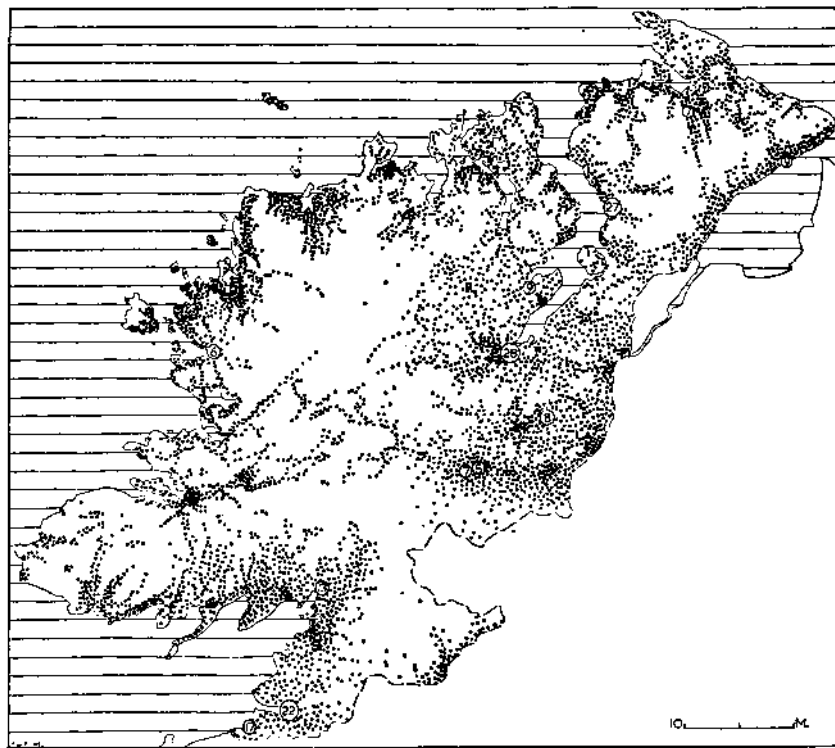
Scotland), the development of domestic and factory industry, fishing, and, it is commonly said, the resource and enterprise of the people themselves. However, over 200,000 people have left Donegal in a hundred years and the loss has been spread through the whole county with no possible correlation between the relative wealth or poverty of the different districts and the rate of migration, for the richer east has lost as severely as the poorer west. The decline has been greatest in the mountains and the south-west peninsula: it is also high in the east of Inishowen, but less marked in the west and northwest, the districts which were regarded as poorest in the investigations of the Congested Districts Board, but which have a firm foothold in the seasonal labour market and some local industrial developments. In consequence, half the congested area of 1891 would still be congested on a 1936 reassessment. Although the west of Donegal appears to be over-populated on any reasonable statistical basis, the inhabitants cling tenaciously to their homes, aided by the profits of industry, seasonal migration, fishing, turf cutting and remittances from affluent relatives abroad.

The density of population in relation to the area of crops and pasture shows an extraordinarily high concentration in the west and nordiwest, which is comparable with that of west Mayo (see Figs. 22, 80). In many of the limited areas farmed and settled there are as many as 400-500 per square mile of improved land. This density of population seems fantastically high, but even so it is approximately half the density of a century ago. It could not be maintained without the resources already mentioned and the widespread use of 'mountain pastures' (moorlands and bogs at any altitude) for grazing sheep and cattle. In Dunfanaghy rural district and in Glenties rural district nearly three-fifths of the farms are of less than 15 acres. In these areas, the proportion of people in towns and villages is only 6-8%, but some of the small farms are so close together that an area of nominally dispersed population strongly resembles one continuous settlement, especially where most of the farms line the roads. Similar conditions occur in various valleys, though in many cases the settlement is less continuous and is concentrated in certain areas with favourable soil and drainage.

In the drumlin country of south Donegal settlement is much more widespread than in the Congested Districts of the western coastlands, but at the same time less intense in relation to the area of improved farmlands. The farms are larger on the average than in the west: in the Donegal and Ballyshannon rural districts, one-third are of less than 15 acres, one-third of 15-30 acres, and the rest mainly of 30-50 acres, with a small number of large farms. Towns and villages have 16% of the total population in Donegal rural district: these include local market centres which have small industrial developments, such as Donegal, Mountcharles and Killybegs.

HG. 90.—POPULATION DISTRI-
BUTION, DONEGAL
One dot to 25 persons.

On the west coasts and on some of the islands there are remarkably high densities; in the south the settlement is mainly near the sea, though there is also some occupation of the mountain valleys. The east has larger farms than the west and the population distribution may usefully be compared with that of areas east of the Foyle.



Ballyshannon (2,500 in 1946), at the mouth of the Erne, has similar functions, but Bundoran (1,700 in 1946) is one of the few places in Eire to derive its income mainly from holiday traffic.

The east of Donegal resembles the south of the country rather than the west in its distribution of population. It has a few very closely settled areas, notably in the northern peninsulas, some parts of which are not unlike the Congested Districts of the west. In the main the density of population is 100-200 per square mile of occupied land, spread fairly evenly over the lowlands and the mountain valleys. The Finn valley is typical of these: it has a number of market centres with a few small industries, such as Lifford, Castleforn, Stranorlar and Ballybofey, all with populations of less than 1,000. Letterkenny (2,800 in 1946) and Buncrana (2,700) on lough Swilly are also industrial and market centres. The towns and villages have about one-fifth of the total population. The high densities of population are in part a reflection of the prevalence of the small farm, even in the east of Donegal. This richer east receives a number of servants and labourers from the west, some of them seasonally: even so, it has lost over one-fifth of its population since 1891.

SUBREGIONS

Donegal may be divided into eight subregions, with many transitional areas between them.

1. THE DRUMLIN BELT AROUND DONEGAL BAY

This subregion stretches from the south of the Erne to Fintragh bay, west of Killybegs. Carboniferous rocks consisting of limestones, shales and sandstones form a band of low-lying country five to seven miles broad; and the long finger-like peninsula ending in St. John's point is the last outpost of Carboniferous rocks in this part of Ireland except for a small exposure in Fintragh bay. This subregion, structurally part of the Irish Central Lowland, derives its unity from the presence of drifts: there are remarkable drumlin swarms between Ballyshannon and Donegal, where the landscape is closely settled and industriously farmed, but to the south of Ballyshannon the drumlins are interspersed with patches of bare limestone. West of Donegal town, drumlins and farmlands prevail in the valleys, but the ridges between them have windswept peat bogs with only intermittent agricultural settlement. On the westward journey, every valley seems less fertile than the one before it; trees become fewer and the soils begin to possess the black colour of land wrested from the bogs. East of St. John's point, the drumlins overlie limestone; west of it, they cover schists and gradually give place to *roches moutonnies*.

The farming is mainly cattle rearing and dairying, some sheep raising,

with oats and potatoes as the main crops. Most of this area was congested in 1891, but would not be on a reassessment as the loss of population by emigration since 1891 has been more than 30%. The local home industries, embroidery and knitting, have led to industrial developments in Donegal and Mountcharles. Fishing was important in the latter years of the nineteenth century but has declined since: the St. John's peninsula, Inver and Killybegs are the main centres.

2. THE HILL BASTION OF THE LOWLAND

Around the South Donegal lowland there stretches a moorland and hill area almost without inhabitants, though some farms exist on the valley sides which penetrate it and separate one line of hills from the next. Few farms are found above 600 ft. and most of the level or gently sloping areas above the valleys are desolate peat bogs, crossed only by lonely roads: the only pass is the Barnesmore gap at 550 ft. through which a railway runs from the Finn valley to the Donegal lowland. The hills are formed mainly of schists and rise in places to 1,500 ft., but the Blue Stack mountains overlooking lough Eske are a rocky granite range with summits over 2,000 ft. Hidden away to the north of lough Erne is a small lowland area of drumlins covering Carboniferous rocks, chiefly famed for the village of Pettigo, half in Eire and half in Northern Ireland, the centre for excursions to lough Derg, where pilgrims perform austere penitential exercises.

3. THE SLIEVE LEAGUE PENINSULA

This is best known for the precipices, rather than cliffs, that fall 1,900 ft. from the top of Slieve League, and over 1,000 ft. from the top of Slieve Tooy, into the sea. Quartzites form these hills and several others, such as Mulmosog to the south of Ardara. The remainder of the peninsula consists of mica-schists, moulded into lowlands and ridges, of which the most striking is Crownarad, to the west of Killybegs and Fintragh bay. Drift deposits are covered with peat except in the limited areas that are cleared and settled.

The settlement, though limited to a small part of the peninsula, is surprisingly dense, especially in the valleys drained to Tawny bay, which include the Glendarragh, a U-shaped glaciated valley to the west of the Crownarad ridge, the Ballaghdoon river valley, the Glen river valley through Carrick, and Glengesh, a valley west of Mulmosog. Other settled lowlands include the Glencolumbkille area and the peneplained area around Malinmore and Malinbeg in the extreme southwest. All these areas have more than 250 persons per square mile of improved land and therefore show that peculiarly high concentration of population which marks many districts in the west of Ireland. This southwestern peninsula, one of the

poorest districts in the country in 1891, would still be congested on a 1936 reassessment though the loss of population has been as much as 40% in some areas. Fishing employs some men around Tawny bay and at Glencolumbkille: there have been small developments in home industries at Carrick, Kilcar and Teelin, but the population is still supported partly by 'American money/ which in 1891 was the most important item in many family budgets.

The least favourable areas for settlement are the extensive peat bogs developed on the level patches of land around 200 ft., 400 ft. and 800 ft., all of which appear to be fragments of peneplane surfaces. There are, however, some cultivated areas in the valleys cut deeply into these level surfaces, for example in Glengesh, which has farms on the valley floor and on the gentler hill slopes where the valley opens out northwards towards Ardara. These farms consist of a few fields divided mainly between meadow and pastures, with some sown to oats and potatoes; in some cases these crops are found only on plots within the fields. Most of the fields are divided by stone walls, but there are a few hedges of hawthorns and hazels though windbreaks are rarely seen, yet elderberry bushes have been known to resist all storms and winds. Here, as elsewhere in Donegal, the peat bogs provide pasture for animals as well as fuel.

4. THE COASTAL LOWLANDS AND ISLANDS OF WEST DONEGAL

These lowlands and islands between the hillfoot at Ardara and the Gweedore river are built mainly of granite, though quartzites form isolated hills at Maghera, near Dunglow and on Aranmore. The coastline is one of submergence in middle youth, with many islands, some of them linked together by spits, and the bays are being filled with detritus. Along the coast, cliffs alternate with low shores and stretches of sand dunes. The lowland as a whole is seared with rocky hills and smaller outcrops, many of them ice-moulded, and strewn with lakes among peat bogs. The fields have black bog-land soils, fertilised with sand and seaweed, and the stones lifted from the fields have been piled into heaps or made into walls.

The lowland may be divided into two sections:

(a) *From the hillfoot south of Ardara to the Gweebarra river.*—These lowlands have intermittent agricultural settlement with a density of 150-250 per square mile of improved land. There are mountain valleys with farmlands on hillslopes around Ardara and Glenties, two villages which are route and market centres with tweed and hand knitting industries. In 1891 three-quarters of the population in this lowland lived on holdings valued at less than £4, each of which consisted of about 6 acres divided equally between meadow and the two main arable crops of the west, oats and potatoes. Seasonal migration was hardly known in this area as there was a local

demand for labour on large estates. Sheep and cattle were pastured on the extensive 'mountain* (i.e., bogland) pastures. About two-fifths of the annual income came from the knitting of the women and children... 'they all knit, down to the tiny children of five or six; they knit in the fields, they knit in the houses, they knit as they walk along the roads/¹ The men, however, did not knit and in fact had a comparatively easy time while at home, for some did little beyond setting the crops and taking in the harvest. Since 1891 this area has lost about one-third of its population, so that only part of it would be congested on a reassessment. But the type of life remains fundamentally similar to that of 1891, even though the factory development is more apparent and the returns from seasonal labour are vastly increased.

(b) *The lowlands from the Gweebarra river to the Gweedore river.*—This area consists of peat bogs with innumerable lakes in hollows and areas of discontinuous settled land in between. There are also some farmlands in river valleys, such as the Gweebarra river. The density per square mile of improved land is generally over 150 and reaches 300 in places, notably along the coast where sand and seaweed are available. The entire area was congested in 1891 and would still be congested on a reassessment: the poor farmland areas to the south of Dunglow have lost from 20 to 40% of their population since 1891, but those to the north of Dunglow have actual increases (to 1936), a most unusual phenomenon in Ireland. Even so, this area, the Rosses, is one of emigration as the rise in population is not equal to the natural increases. In parts of the Rosses it is difficult to believe that any population at all could be supported, but among the stony lands one may see a couple of fields with black soil, a cottage (generally with only two rooms), and the pile of turf gathered for the maintenance of the constant fire.

The Rosses were very closely studied by W. L. Micks, whose report for the Congested Districts Board was a model of its kind.² Only 3% of the holdings were valued at more than £4, and 84% were rated at less than £2, yet only 4% of the families were described as Very poor.' The holdings consisted of about 2½ acres, of which 1 acre or a little more was devoted to potatoes, ½ acre to 1 acre to oats, and 1 rood each to green crops and meadow. A form of seasonal migration to mountain grazing (transhumance) was practised and in some cases there was a second holding on higher ground. Less well endowed in natural resources than almost any other part of Donegal, the inhabitants could not possibly exist on the

¹ Congested Districts Board, Base Line Reports, 1891: report on the Glenties district.

² This report on the Rosses is given in Micks, W. L., *An Account of the Constitution, Administration and Distribution of the Congested Districts Board*, Dublin, 1925, pp. 241-258.

produce of their holdings alone. Mr. Micks gives an example... 'in Keadue there are exactly 100 families, while the valuation of the townland is .£103 4s. The population is 505, so that the valuation per head of the population amounts to four shillings and one penny! And yet, owing to the wages earned in migratory labour, the people of Keadue are in ordinary years well fed according to the standards of the district, and also comfortably housed and clad/ The women cared for the home and farm during the summer, knitting and sewing at all possible times, while almost all the able-bodied men, girls and even children went away as migratory labourers. The men went to Scotland primarily for agricultural work, but also to industrial occupations. The girls and children went to farms in east Donegal, Londonderry and Tyrone, especially to the Lagan. Micks suggests that some men came back with as much as £20 saved, but in any case more than half the annual cash income of £43 came from the migratory labour (say £10 from Scotland and £6 from the Lagan) and the knitting and sewing of the women (say £7 10s.).

The success of the local co-operative movement has done much to maintain the comparative prosperity of this area. There are now factories for knitted goods at Dunglow and Kinclassagh, one of which has nearly 100 workers, and farm produce is marketed through the Templecrone Co-operative Society. The movement was in origin an attempt to remove the evil of the 'gombeen man' who, calling at the cottages, gave the minimum price for eggs and butter and charged the maximum price for sugar and tea. In most cases his commercial activities were conducted solely on a barter basis.

The railway from Strabane to Burtonport was closed in 1940 owing to the successful competition of road transport. The change was not achieved without some local disturbance: people rose up to prevent the removal of the rails (see p. 249). Burtonport is a centre for boat traffic to the various islands. The largest of these is Aranmore, which has about 500 persons per square mile of cultivated land. The remainder of the island consists of heather moor, heavily grazed. The type of life is similar to that in the Rosses, but fishing is perhaps a more important resource than on the mainland. Many of these islands receive useful goods from wreckage at times.

5. THE LOWLAND FRINGE OF NORTHWEST AND NORTH DONEGAL

These lowlands consist of land sloping from about 200 ft. to the present sea level, with coastlines of sand dunes, battered rocks or low cliffs. Hills rise steeply from the 200-ft. surface, and the underlying structure is of great complexity, with granites, diorites, quartzites (which form a hill over 1,000 ft. high at the Bloody Foreland), and many types of metamorphic rocks, including limestones, seared by dykes. Off the coast there are a

number of inhabited islands, including Tory seven miles out to sea, and Horn head, a magnificent tombolo linked to the mainland by sand dunes, which climb its southern slopes to a height of over 200 ft. Horn head has cliffs over 600 ft. high on its northern shores.

Settlement in this area is, with few exceptions, limited to the better drained areas less than 300 ft. high. To the south of the Bloody Foreland there is almost continuous agricultural settlement along a winding road where the farms are so small and the cottages so close together that the resemblance to a village street is striking. Tracks lead off to other settlements and the density is about 400 per square mile of occupied land. Potatoes and oats grow in black-soiled fields surrounded by walls as much as 5 ft. high, and there are patches of meadowland and green vegetables. On the coast there are sand dunes and bog-lands, inland there are mountain pastures. This area was congested in 1891 and would be congested today: the decline in population has been slightly over 10% from 1891 to 1936. Eighty-seven per cent, of the holdings in this area were valued at less than £2 in 1891 and it was estimated that two-fifths of the whole population found employment annually as seasonal labourers. The men went mainly to Scotland but also to the Lagan: the women and children went exclusively to die Lagan. The people were reported to be more industrious and energetic than in many areas of Donegal. The maintenance of this community in such numerical strength is of striking significance, but the people inevitably depend upon their extra sources of income, and the landscape includes some ruined cottages surrounded by fields reverting to rough pasture.

Tory island, little more than a square mile in area, is made up of bog-covered granites rising to nearly 200 ft., and quartzites in the east forming ground nearly 300 ft. high, with striking cliffs. The population of nearly 300 people lives by fishing and farming their starved fields: in a desperate search for fuel the people sometimes burn the very sods ('scraws') which form their pastures. No lime occurs on the island, but the shells of limpets are stored and burned inside a hollow square of turf: as the turf burns it is replenished and after about two days a very fine white lime remains. The limpets, it may be noted, had previously been fed to ducks. The island owes some of its amenities to wrecks: such articles as iron plates, bolts, screws, and even a quantity of flour which is said to have lasted the entire population for one year, appear from time to time. The closest link with the outside world is provided by seasonal migration to Scotland.

East of the Bloody Foreland peat bog covers the gently sloping coastal lowland, but farmlands reappear at Meenaclady, and around Gortahork and Falcarragh there are signs of that increasing richness towards the east of the county which is a feature of northern, as well as southern, Donegal.

The farms are mainly of 5-8 acres, of which more than half is divided between oats and potatoes, the former predominant, and the remainder is grazing. The density of population on the farmlands is high, and in places reaches 300 per square mile. Through all this area there was temporary migration to Scotland and the Lagan of nearly one-third of the population in 1891 and other resources included home weaving and fishing, especially in the Dunfanaghy district. Seasonal migration is still widespread though home weaving and fishing have declined: fishing employed 155 men in 1936 (in Dunfanaghy rural district). The Dunfanaghy area around the market village had a considerable demand for local labour on estates, one of which, on the south-facing slopes of the Horn head peninsula, has since been divided by the Land Commission, and stands out as a rich fertile area with a well-drained red soil in marked contrast to the black-soiled fields of the smaller farms in the higher parts of the peninsula. If the Congested Districts were reassessed Dunfanaghy area would be excluded, partly because it has lost one-third of its population in fifty years.

6. THE MOUNTAIN HEARTLAND OF DONEGAL

The southern part of the Donegal mountains has been treated above as the bastion of the south Donegal lowlands (subregion 2, p. 483). The remainder of the mountain area interpenetrates closely with the coastal lowlands of the north and is cut by a number of deep glaciated valleys with some agricultural settlement. In this area the peneplane around 700-800 ft. is extensively developed, mainly as desolate bog-covered moorland though there are some bare rock surfaces: from it rise lines of hills, which include three ranges in the north, the Muckish-Errigal line of seven quartzite peaks, 1,500-2,500 ft. high, the Derryveagh rounded granite hills of similar altitude and the Glendowan mountains, 1,000-1,800 ft. In this northern part of the subregion, the Caledonian line is shown with particular emphasis: to the south there are lower hills of granites and schists and a prominent quartzite peak, Aghla mountain near Glenties, almost 2,000 ft. high, but the Caledonian trend is less clearly emphasised.

Settlement is restricted to the valleys and is continuous only along the Finn, the Swilly, the Leannan and their tributaries. Some small and isolated agricultural communities exist in remote parts of the mountain mass. E. E. Evans has described two settlements near Errigal: at Meenacreevagh, on the north slopes, six farmers had 3-5 acres of arable land each and shared 300 acres of 'mountain' or common pasture. The fields were sown to oats and potatoes alternately for ten years and then left as pasture for about five to seven years. Manuring was done partly by the winter pasturing of animals. Each holder possessed two cows, ten to thirty sheep and a

number of hens. A similar routine was observed at Glentornan, near Dunlewy.

The central mountain area was thinly peopled in 1891 and had some very poor communities. Seasonal migration to Scotland and the Lagan, widespread in 1891, persists today, but the loss by emigration has been heavy: in some districts the population has declined by 40% within fifty years. As a result of this movement, many parts of the mountain region would no longer rank as congested districts if reassessed on the 1891 basis.

7. THE NORTHERN PENINSULAS

These northern peninsulas are deeply penetrated by arms of the sea, Sheep Haven, Mulroy bay, lough Swilly, and lough Foyle. The peninsulas increase in grandeur and size from west to east; Mulroy bay is a delicate miniature of lough Swilly which in its turn is much less spacious than lough Foyle. The uplands of central Donegal have their structural continuation in these peninsulas, which have lines of hills of Caledonian trend in quartzites and schists. The populated areas are coastal lowlands and hill slopes, continuous along lough Foyle but discontinuous elsewhere, and some lowlands and valleys which penetrate the mountains. The general picture is one of extreme fragmentation in topography and settlement.

(a) *Rosguill*.—Rosguill is a tombolo consisting of hills of granite and quartzites rising to nearly 700 ft. The coast is rocky, with cliffs and islets. Small farms are scattered along the few roads and there are isolated holdings on the hillsides; the area, congested in 1891, would still be congested today. Rosapenna, at the southern end of Rosguill, is a small tourist centre offering among its attractions a magnificent golf course on the sand dunes separating Mulroy bay from Sheep Haven. Carrickart, at the southern end of the sand dunes, is a much commercialised village selling Donegal tweeds and rugs. South of Carrickart there are some settled agricultural lands on patches of lowland and in valleys around the quartzite hills that dominate Mulroy bay. The density of population on the settled land is high, generally over 250 per square mile, with small farms, extensive areas of mountain grazing, and conditions very similar to those in other congested districts of Donegal. Migratory labour to Scotland and the Lagan is an additional source of income, and domestic industries include tweed making. In the past fifty years, the loss of population has been nearly 30%.

(b) *The Fanad-Knockalla Peninsula*.—The peninsula between Mulroy bay and lough Swilly falls into two parts, the Fanad and the Knockalla range. The Fanad, a hilly area of great topographical variety almost bisected by a tributary arm of Mulroy bay, is a clearly marked entity possessing its

own regional name. Few acres are of greater structural complexity: granites and quartzites form low but jagged hills, most of which are less than 700 ft. high, diorites and felstones have been intruded, and there are bands of metamorphic limestone which are recognisable from the replacement of heather by gorse. Bare rock surfaces and *roches moutonnies* moulded by ice are widespread, but drumlins occur near Mulroy bay. An extensive area of sand dunes holds up shallow lakes. The result is a country of extraordinary diversity with frequent changes of scenery, heather-covered hills, bog-lands, sea, small lakes, but few areas of good agricultural land. The population lives mainly by farming small holdings having black peaty soils manured by sand and seaweed. Most of the houses are scattered along the roads, with a number of hamlets but no villages, and some of the farms are very isolated. The density per square mile of cultivated area is about 250, although the Fanad has lost nearly one-third of its population since 1891. Seasonal movement to Scotland and the Lagan has been a constant feature in this district, which would still be congested on a reassessment.

Knockalla is a tangled hill mass formed of mica-schists, quartzites and various intruded igneous rocks, with a general altitude of 500-1,200 ft. Settlement is restricted to the lower hillsides and to the lowlands, which are of considerable extent on the lough Swilly side, especially around Rathmullan, a market village with ferry connections to Inishowen. Kerrykeel, on the west, is a village in a small amphitheatre of agricultural land. The farmlands among the hills have been wrested from the prevailing peat bogs, but in the lower parts of the valleys and along the lough Swilly coast there are some fertile soils. As a general rule, the upland farms are small and the lowland farms larger. The density of population is about 150-200 per square mile of cultivated land on the lower slopes, and over 250 in the upper parts of the valleys; the area has lost one-third of its population since 1891.

(c) *Inishowen*.—Inishowen, or Owen's island, is a mountainous peninsula lying to the north of the Burnfoot depression, through which the railway runs from Londonderry to Buncrana. This depression is eight miles long, and consists of an old seabed elevated in geologically very recent times. Schists form the greater part of the Inishowen peninsula and are moulded into hills rising to nearly 1,600 ft. from a moorland about 800 ft. high, which is broken by various valleys filled with glacial and glacialfluvial deposits. Two lines of quartzite hills dominate the peninsula, the Slieve Snacht range between Buncrana and Carndonagh, and the Urris hills in the northwest: each of these ranges shows the Caledonian trend. There are also quartzite hills in the Malin area rising to 900 ft., and in Dunaffhead at the entrance to lough Swilly. The settled lowlands are discontinuous

except around Carndonagh in the north, but many of the hillsides and interior valleys are covered with farmlands.

The population density reaches 300 per square mile of cultivated land towards the north. Although this area was congested in 1891, and part of it would still be congested today, it has not the poverty of many districts farther west. The smallest farms consisted of about 7 acres as against 4 acres in the Slieve League area or the Rosses. The sources of extra income were numerous: labour was in demand locally, in the Lagan or in Scotland, fishing was practised and the domestic occupations included weaving, spinning and sewing for shirt factories in Londonderry. Things are very much the same today, though the population has declined by about 30% in the past fifty years. The home industry has been largely replaced by shirt-making factories in Buncrana and Carndonagh (700 in 1936). These places, with Moville (900 in 1936) on lough Foyle, are the market centres for Inishowen.

The peninsula is the most easterly outpost of the Congested Districts in northwest Ireland. Lough Foyle divides it from the basaltic plateau area of Northern Ireland and also separates it politically from Co. Londonderry. The Burnfoot depression defines Inishowen on the south, but belongs to a very different region, the more fertile lowlands and valleys of east Donegal.

8. THE LOWLANDS OF EAST DONEGAL

These lowlands extend from Mulroy bay to lough Swilly and lough Foyle and consist mainly of mica-schist country overlaid with glacial deposits in various forms such as drumlins around Mulroy bay, boulder clays, gravels and sands farther east. Alluvium, generally ill-drained natural pasture, occurs chiefly along the Foyle and its tributaries, and there are intakes' of reclaimed land along lough Swilly and in the Foyle valley: but level areas are comparatively infrequent and the lowland scene is diversified by isolated hills 600-900 ft. high, some of which are formed of quartzite, metamorphic limestones or igneous intrusions. The Swilly, flowing dirough Letterkenny to lough Swilly, with the Deelee and the Finn, two tributaries of the Foyle, carry tongues of lowland into the mountain heartland of Donegal.

The lowlands are not of uniform fertility: the area around Mulroy bay has some good lands and some poor lands, but the large farms are invariably found on the good lands. The Lagan, the area to which so many seasonal labourers go annually from the poorer districts of Donegal, lies around Letterkenny and Manorcunningham (see Fig. 89). The term 'Lagan' is sometimes applied also to the Burnfoot depression. West of the Foyle, moorlands on the Small hills break die continuity of settlement only

to a slight extent, and the farmlands reach 600 ft. in places. The density of population on the improved land is between 100 and 200 to the square mile. In Stranorlar rural district, one-eighth of the farms are of more than 100 acres and the remainder are divided fairly equally between medium and small-sized farms. The position around Letterkenny is similar and comparisons with neighbouring regions exhibit the usual paradox of Irish farming—the poorer the land, the smaller the farm.

Mixed farming is practised, with oats, potatoes, some wheat and a little flax as the chief crops, along with cattle for meat, dairy produce and sheep on the higher ground. As a relatively rich agricultural region, east Donegal is served by market villages almost reaching the status of small market towns, such as Stranorlar, Ballybofey and Raphoe. Some of these as well as other centres, such as Convoys, have small industries, chiefly textiles, which employ several hundred people. 18% of the population in Stranorlar rural district was in towns and villages in 1936, as compared with 6-8% in Dunfanaghy and Glen ties.

Although east Donegal absorbs labour from other parts of the county, it has lost one-fifth to one-quarter of its population since 1891. Three observations may be made here. Firstly, a prosperous rural area may lose population through the desire of farmers' sons and daughters to enter professions or occupations in towns and cities elsewhere in Ireland, in Great Britain, or in America. Secondly, the poorer farms in such an area are likely to be taken over by richer farms as subsidiary holdings. Thirdly, it may seem strange that these richer eastern lowlands should show a marked population decline when the congested districts of the Rosses and the northwestern coastlands show virtual stability in population, but the secret lies largely with the experience and wishes of individuals: the social geography of Donegal derives its fascination from the perpetual revelation of paradox or possibilism.

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CHAPTER XXII
EAST ULSTER

THIS REGION is inhabited by almost one-quarter of the population of Ireland, and forms, in the three counties of Antrim, Down and Armagh, half the governmental province of Northern Ireland. Nearly half its people live in Belfast, since 1921 a capital city as well as Ireland's greatest industrial town, but the heart of Ulster is its farmed countryside, which was settled, mainly in Stuart times, by immigrant Scots and to a lesser extent by English, who have given most of the country its distinctively Protestant way of life and outlook, though the descendants of the Catholic Irish or Scots from the western isles predominate in such areas as the Glens of Antrim, south Down and south Armagh, and form a substantial minority almost everywhere else. East Ulster has been transformed from a land of poverty to one of wealth in the last four centuries by the labour of its inhabitants, and two phases of its history are crucial, the plantation and immigration of the seventeenth century and the industrialisation of the nineteenth. It is a country of careful farming and industrial towns, strongly individualistic, and differs so markedly from the rest of Ireland that its 'regional consciousness' is entirely beyond question.

Over almost all the area, the rural landscape prevails, and even the Belfast conurbation, though grimmer than Dublin, is in no sense a Black Country, for less than three miles from the City Hall there is open country over 1,000 ft. high in Divis and Cave Hill, and on the east side of the city the transition to a farmed countryside is almost equally sharp. Placed on the reclaimed land around the Lagan, the raised beaches, and the low ridges between the rivers, Belfast has become the great economic and political focus not merely of three counties but of all the territory now known as Northern Ireland. The rise of Belfast to the status of a major city within the past hundred years is the most significant of many geographical changes within the period. In the middle of the nineteenth century, Belfast was an important market town with some industries and a population approaching 90,000: it was already drawing to its factories the flax processing of the countryside, and attracting to its estuarine port the shipping that was to prove the basis of its later prosperity. No other town in Ireland is so vivid an expression of the Industrial Revolution in bricks and mortar, factories and shipyards: Belfast is a unique phenomenon in Irish life whose analogues must be sought in Glasgow and Liverpool, Newcastle-on-Tyne and Hull. All the three counties Antrim, Down and Armagh

still have less than one-third of their population in towns and are, in spite of numerous factories, almost as distinctly rural in their life as the rest of Ireland.

The difficulty of drawing satisfactory regional boundaries in Northern Ireland is considerable, though Belfast, with its immediate hinterland of suburban settlement and satellite towns, is itself a clearly marked small regional entity. Looking beyond the city, easy passage-ways lead beside the basaltic scarp to the sheltered glens of Antrim, to the drumlin-covered lowlands of east Down and the Ards peninsula, or through the Lagan valley to the Bann, which is crossed at Portadown. From the lough Neagh area ways open to the Erne valley with its spreading lakes, to the middle and lower Bann with their bogs and settled farmlands, to the hilly country of Tyrone, and, on the south through the passes between the Carlingford mountains and Slieve Gullion, to Dundalk and the Irish Central Lowland. Physically the lough Neagh lowland is apparently designed by nature to draw travellers from many sources by road and rail to its focus in Portadown or to the ancient and dignified ecclesiastical capital Armagh. But Belfast is now a focus of more economic and administrative importance than either of these and therefore the Ulster Basin is merely a passage-way having no regional capital even though it is densely peopled, intensively farmed, and of some industrial importance.

Two rivers, the Blackwater and the lower Bann, with lough Neagh between them, provide a possible western boundary for this region. As diocesan and county boundaries that originated several hundred years ago, these rivers, almost as difficult to cross as the Shannon, still separate the closely settled east of Ulster from the less intensively occupied west. But no clear southern boundary exists, for Co. Armagh meets Monaghan in what is generally a farmed landscape, lacking any sharply defined hills except Slieve Gullion, and also devoid of any major rivers comparable even with the lower Bann or the Foyle. When the six counties were separated from the remaining twenty-six, it was not intended that the Border should retain its present position, and the British Government set up a commission to make a readjustment based on social, including economic and geographical, factors. The Report of the Commission was ready in 1925 but never published or implemented: therefore, the Border has itself acquired sufficient importance in the life of the region to be, in human terms, a major geographical and economic divide, which one is obliged to accept as a southern limit for the region.

STRUCTURE AND LANDFORMS

The Lagan valley divides this region into two main structural units, each of which has its own characteristic landforms. To the north lie the

plateaus of basalt, which are marked by a scarped edge that is continuous from the Lagan to Red bay, Co. Antrim, where ancient schists and gneisses appear at the surface. The basalt plateaus on either side of the Bann and Main valleys generally form a somewhat monotonous landscape: they also underlie the two valleys, which are separated by a ridge some 500 ft. high. To the south of the Lagan lies the Caledonian country that is the structural continuation of the Southern Uplands of Scotland.

Sedimentary strata beneath the basalts range in age from the Carboniferous beds exposed to the east of Ballycastle through Permian, Triassic, Jurassic and Cretaceous beds: the lough Neagh clays, though not precisely dated, are later than the basalt outpourings. The main exposures of the sedimentary rocks are in the escarpments, where the Cretaceous chalks, soft Liassic clays, red Triassic marls and sandstones contrast both in colour and in hardness with the overlying black basalts beneath which they are preserved. In many places, however, there have been landslips as the blocks of basalt slide down easily over the Triassic clays. The Cretaceous chalks normally form only a thin ribbon and lack even a distinctive calcicole flora, though they have been a useful source of lime: on the high ground between Murlough bay and Torr head, there is an area recalling the chalk downlands of England, at approximately 900 ft.; this down-like area is immediately adjacent to a typical piece of basalt country covered with a peat soil and flora which is advancing steadily on the chalk with a raised and rounded edge about 1 ft. high. Elsewhere, drifts and glacial fluvial gravels mask both the thin exposures of Liassic clays and the Triassic clays, marls and sandstones that floor the Lagan valley. The Triassic clays have been used for brick-making near Belfast, a city of red brick, and the sandstones, too soft for building materials, form gathering grounds for waters tapped by wells for the whiskey distilling and mineral water manufacturers of *the* city.

South of the Lagan-Bann corridor, Ordovician and Silurian rocks, with granitic intrusions, form a hilly lowland that extends from the coast through Down and Armagh into Co. Monaghan. This belt consists generally of low hills which, however, rise up to 1,200 ft. in Co. Armagh. The main uplands, on the other hand, are of igneous origin and include the Slieve Croob, a granite mass reaching 1,735 ft on which the Lagan rises, the Mourne mountains, a sharply peaked mountain range with several summits over 2,000 ft. and the Slieve Gullion ring-dyke, which is adjacent to the similar ring-dyke in the Carlingford mountains. These uplands all stand up decisively above the surrounding lowlands: they are of very diverse history, for the Slieve Croob and the associated Newry granites are of early Devonian age, and the Mournes are of Tertiary formation. Consequently the Mournes show a much more youthful type of topography, with its sharpness accentuated by a local glaciation that left a

number of cirques in the heart of the mountains, especially on the east and north-facing slopes. Another remarkable feature of the countryside is its hundreds of drumlins, spread over areas below 1,000 ft. and especially numerous on the lower ground in Armagh and north Down: in the south, around the Mourne mountains, they become less distinct and grade into crag-and-tail formations or even thin plasterings of drift on an irregular rockfloor. Within a single square mile of this Palaeozoic country there may be numerous drumlins, a heathery crag with a boulder clay tail, a peat bog and a small lake; wide views are rare and the scenery seems to some dreary and monotonous in its constricted horizons, but to others fascinating in its constantly changing vistas.

The river valleys which provide the main lines of route through East Ulster are all thickly plastered with drifts and with glaciﬂuvial sands or gravels associated with the far greater rivers and lakes that were fed by meltwaters. The 'glacial' lough Neagh was, according to Charlesworth, considerably larger than the present lake, which occupies a structural basin dating from pre-glacial times and is therefore, it is claimed, the oldest lake-basin in the British Isles as well as the largest. The Lagan was ﬂded by a large lake impounded by ice near the coast, and smaller lakes were formed in all the eastern valleys of the Antrim plateau and on the north coast in the valleys near Ballycastle: a remarkable series of deltas in the Carey valley, east of the town, at 680 ft., 510 ft., 430 ft. and 340 ft., with others at lower levels, indicate stages in the lake's history.

The present drainage is merely a faint copy of the glaciﬂuvial system, but perhaps comparable in its general arrangement, though Charlesworth has suggested that the Bann has missed its pre-glacial course from lough Neagh to the sea. One of the most striking routeways through the area, from Portadown to Newry and Carlingford lough, is probably a meltwater channel: it carries the main road and railway between the two towns. Carlingford lough, a fiordic inlet which now separates Northern Ireland from Eire, was filled by a powerful glacier which has left some massive erratics weighing several tons.

LAND USE

Non-agricultural land in East Ulster is restricted to the uplands of the Antrim plateau, the Mourne mountains, the Slieve Croob, hills such as Slieve Gullion and patches of lowland bog, together with some interesting fenlands around lough Neagh. The intensive occupation of this region has restricted both forest and bog to those areas where farming is either impossible or barely remunerative, and many of the smaller lowland bogs have been entirely removed by a population in need of fuel and unable to afford imported coal, though bogs still survive in parts of the Bann valley and on

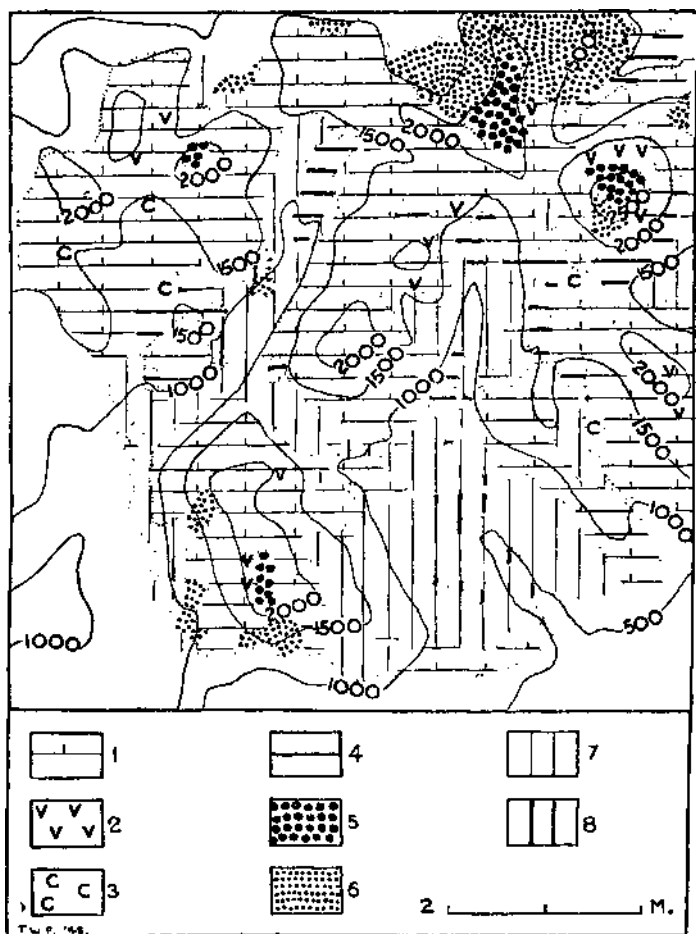


FIG. 91.—THE MOURNE MOUNTAINS: DOMINANT VEGETATION

1, Heather moor (*Calluna*, *Erica cinerea*); 2, Bilberry (*Vaccinium myrtillus*); 3, Cotton grass (*Eriophorum* sp.); 4, Sedge (*Scirpus*); 5, Summit grassland (*Rhacomitrium lanuginosum*, *Festuca ovina*, and dwarf *Vaccinium*); 6, moor mat grass (*Nardus stricta*); 7, Purple moor-grass or 'flying bent' (*Molinia* sp.); 8, Bracken (*Pteris*).

Note that except in the case of summit grassland, *Ericetum* and *Pteridium*, sharp boundaries of vegetation types do not exist. The bracken is found on sheltered hill-sides; in the valleys there is cotton grass, *Molinia* or *Scirpus*, the first named in the wettest places. Periodic burning for ameliorating sheep grazing may have modified the vegetation, cf. Fig. 50, p. 273.

Map redrawn and slightly generalised from Armstrong, J. I., Ingold, C. T., and Vear, K. C., 'Vegetation map of the Mourne mountains, Co. Down, Ireland,' *J. Ecol.*, vol. 22, 1934, pp. 439-444.

the ridge between the Bann and the Main. Peat covers most of the Antrim plateau and even shows the power of encroaching over an area where Cretaceous chalk is exposed at the surface (see above p. 496). Similarly, the Slieve Croob and the Mourne mountains are also peat-covered, though in the latter drainage channels are eroding the peat so rapidly that already it has disappeared from the principal mountains where the 'summit heaths' (or 'grasslands') are developed on a soil consisting of 'black earth' and granite gravel. At the same time, peat is accumulating in certain places, such as a col near Slieve Donard, where the cotton-grass communities have engulfed some old peat-hags. While there is every reason to suppose that the present rate of erosion is greater than that of peat-accumulation on sloping ground, areas of a level character may still see the development of peat. Fig. 91 shows that the higher mountains are dominated by *Rhacomitrium* and *Festuca*, that the stream valleys and flatter cols have *Molinia* and *Scirpus*, and that approximately half the area is covered with heather, which reaches an unusually high altitude of 2,300 ft.

Around lough Neagh, especially in the south, there is an area of fen which is probably the most extensive in the British Isles still remaining comparatively unspoiled. The climate of the area is considerably moister than that of the English Lowland as the annual rainfall is around 32" as compared with 20-25": most Irish lowlands are characterised by peat bog rather than fens, though it is now believed that most of the Irish raised bogs, the type general in the Central Lowland, are developed on a fenland base. Here, however, the fen appears at the surface and is subject to flooding by waters rising as much as 4-5 ft. above the ground level in winter and early spring: in summer the ground-waters are normally several inches below the surface. The presence of fen rather than bog is due, in part at least, to the fact that the waters of lough Neagh are neutral or only very slightly acid in reaction (*pH* 6-6.5), as the rivers draining into the lake are plentifully supplied with basic materials (largely sodium bicarbonate) derived from basalts through which they flow. Marsh and fen also occur in small patches between the drumlins, in many cases around the small lakes or ponds that develop in such areas of impeded drainage. As yet these marshes and fens, though a familiar feature of the landscape, have not been ecologically studied: like the fens of lough Neagh they are in most cases used for local peat supplies.

The intensive agricultural occupation of East Ulster has reduced the woodland almost to extinction, but the carpets of bluebells and primroses seen in spring on the slopes of the basalt escarpment, the Glens of Antrim and elsewhere, are evidences of the field layer of vanished woodlands. In the Mourne mountains, where there are several old woods and some new plantations, *Rhododendron ponticum*, originally introduced as undergrowth

in a wood near Hilltown, has spread wild over many acres of stony hillside. Imagination may justly clothe most of East Ulster with trees, except for the upper parts of the mountains, some areas of natural marsh, fen and peat bog and, historically not least important, the 'raised-beach' along the greater part of the coast.

The existing woodland consists of groves of trees on some of the better-drained bogs (see p. 66), a few thickets of hawthorn, blackthorn, whin and blackberry on some of the poorer clay soils together with the plantations of the demesnes and of the Ministry of Agriculture's afforestation programme. Most of the demesne woods are on fertile soils and consequently good timber has been produced even though the attention given in many cases has been comparatively slight: the original plantations were probably mixed, but the conifers were cut out early in the life of the woods with the result that deciduous trees were able to reach their full height. As yet, the Ministry has acquired only some 200 acres in Co. Armagh, which is in many ways the most closely farmed county in Ireland. In Co. Antrim some 3,000 acres are scheduled for planting, and while there are a few old woods of considerable extent, such as those around Knocklayd hill, near Ballycastle, the county remains comparatively treeless, partly because the hillslopes in the glens have such a high grazing value that it has not been possible to acquire any large block of land at an economic price. In Co. Down the extension of forests is much more likely, as already the Ministry owns 7,000 acres and there are a number of demesnes in the area east of Belfast around Bangor and Newtownards. On the lower slopes of the Mourne mountains, the main forests are at Rostrevor, beside Carlingford lough and at Newcastle, where beech of fine quality has been produced and conifers such as larch and silver fir have been equally successful in the valleys leading to the Slieve Donard summit. But it seems improbable that the hillslopes and valleys of the Mourne mountains will ever possess the forested character that marks the Wicklow mountains and various other ranges in the south, as most of the granite soils are infertile and support only a thin covering of peat.

Extreme fragmentation of the land characterises the farming of East Ulster: in Armagh the average holding is only 16 acres and more than half are of less than 15 acres; in Down, with a mean farm size of 24 acres, almost half the holdings are of less than 15 acres, though in Antrim, farms of around 30 acres are more usual and the average size is 3.5 acres, the largest for any of the six counties in Northern Ireland. The fields vary in size from c. 2 acres on the smaller holdings to c. 6 acres on the larger, and the general effect is to make the use of tractors difficult; again, in some landscapes the actual space taken up by hedges and ditches is a comparatively high proportion of the total area. On some of the higher ground towards the upper

limits of cultivation the hedges spread into the fields as thickets of hawthorn, holly, gorse and blackthorns, but in general the farmers give careful attention to their land and maintain a high proportion of arable cultivation. In Co. Down, for example, at least one-quarter of the farmed land was cropped even in the middle of the inter-war period and the combination of official encouragement with expediency has since raised this almost to one-half. The farms, though generally small, are so intensively cultivated that the standard of living is much higher than one might expect. The existence of so many small farms is commonly ascribed to the traditional union of farming with flax processing; many of the holdings, in the domestic phase of the linen industry, were merely of sufficient size to grow food for the family and flax for die fabric manufacture.

Agricultural life in East Ulster has three main qualities: first, it is based on the output of farms that are generally small but markedly arable; second, it possesses a traditional link with the linen industry and in spite of many economic crises flax growing has never been completely ignored; and third, it has a ready market in the towns of the region. Again, East Ulster has immediate access to British markets and the farming population shows a quick adaptation to government planning, especially when it is accompanied by subsidies and grants. Although the farming is mixed, the arable side is prominent and East Ulster had, even in the agricultural depression of the inter-war period, a lower proportion of permanent pasture than any other part of Ireland. In Co. Armagh, pasture covered 53% of the improved land in 1930, in Down 59% and in Antrim 56%: the remaining farmland was divided fairly evenly between meadow and crops. During and since the war of 1939-1945 the proportion of the farmland sown to crops has been practically doubled under the stimulus of guaranteed prices and emergency conditions. The arable production is intended for home foodstuffs, feedstuffs for the stock, and cash crops. Oats and potatoes are more suitable crops than wheat or barley, as they are more accommodating to the damp conditions and the comparatively low proportion of sunshine. Both crops are extensively used for feedstuffs; potatoes are also staple articles of diet for the farm families and in addition command a sale in the towns and overseas markets; again, some farmers, especially in the Ards peninsula, specialise in seed production. Flax cultivation has diminished considerably since 1945, as it did after 1919, for during the inter-war period imported fibres were sufficiently cheap to depress prices and make the difficult process of flax cultivation unprofitable in the farmers' estimation. But the crop has a strong traditional association with the Lagan and Bann valleys, together with the area around Strangford lough, and has never been obliterated from the agricultural scene. The wartime restrictions of imports made it profitable once again. Another

crop of considerable importance is grass seed, chiefly Italian rye-grass, some of which is exported to Great Britain for planting one-year leys.

The stock on the farms is normally the main source of cash income and the number of animals kept is high in proportion to the area farmed. In most rural districts there is an average of 25-35 cattle per 100 acres of farmland, of which one-quarter to one-half are milch cows, up to 40 pigs, 200-600 poultry and a varying number of sheep. The last are most numerous on and around the various uplands, especially the Antrim plateau, the Mourne and Slieve Croob, and least numerous in the Lagan and Bann valleys. The general tendency is for the number of cattle to remain fairly even and for the sheep and pigs to be reared in greater quantities: there has been an extraordinary increase in the number of poultry, now seven times as numerous as in the middle of the nineteenth century. Lambs, which are cheaper to rear than calves, commonly begin life on the upland farms of Down and Antrim and are fattened on the surrounding lowlands. Similarly, calves are moved from the higher mountain farms or the small lowland farms to larger holdings for fattening: as explained on p. 200, many of the cattle pass through several farms before they reach the abattoir or the docks. As the supplies of meat for the Belfast market cannot always be met from home supplies, partly because many farmers concentrate on the export market, there is normally an import of cattle from Eire. Near Belfast, both in the Lagan valley and around Comber, market gardening is prominent; here also the dairy cattle are more numerous than elsewhere, and commonly number at least half the total head of cattle.

Nowhere is the possible specialisation of a mixed type of farming more fully seen than in Co. Armagh, to the south of Lough Neagh, where most of the holdings average less than 20 acres. Many of the smallholders in the Montiagh's area near the lake have land consisting entirely of reclaimed peat bog, on which they grow sufficient potatoes, beans, peas and cabbage for the year, as well as soft fruits, especially strawberries, raspberries or red currants and rhubarb. Many of these holders are also farm labourers for a few months of the year, chiefly in the spring and at the harvest, and some draw unemployment benefit during the winter. Other farmers having slightly larger holdings that include both bog-soil and clay drumlins grow fruit, potatoes and oats on the reclaimed bogs and graze cattle on the drumlins. Some farmers devote nearly all their land to cattle grazing, and others concentrate almost exclusively on apple growing, which is more fully developed here than anywhere else in Ireland. Again, on a number of farms, apple growing and cattle grazing are combined, with the result that in years of poor apple yields the farmers have at least the resource of the cattle. Further, there are farms near Portadown

concentrating exclusively on poultry, or on dairy-cattle, or on cattle and sheep together. This area, too, has poultry, often in very large numbers, on nearly every farm; it shows, perhaps, a wider range of specialisation than other areas in East Ulster but at the same time illustrates a surprising combination of resources among a hard-working and enterprising people favourably placed near to town markets.

INDUSTRIES

The Belfast area is, as previously explained, the one highly industrialised area in Ireland, and is associated more than any other area in the British Isles with the linen industry. The survival of this industry in East Ulster is due to many causes, not the least of which has been the enterprise of its inhabitants throughout the nineteenth century. Flax growing was introduced into Ireland during the eighteenth century and was soon found in every Irish county, though by the middle of the nineteenth century, when the first agricultural statistics appeared, it was already concentrated mainly in the old Ulster province. At the present day, travellers might almost mark their arrival in the old province of Ulster by the sight of the first field of flax or by the retting troughs in the streams with the scutching mills dotted through the countryside, some of which are still used. In the early part of the nineteenth century cotton manufacture seemed likely to dominate the industrial life of East Ulster, but this phase passed relatively quickly (see pp. 231-232), though to this day a few firms in Belfast make cotton piece goods, or print, embroider, or in some way finish articles made of cotton. In West Ulster the shirt-making industry of Londonderry and its environs absorbs cotton as well as linen goods (see pp. 233, 523).

Linen spinning is concentrated mainly in Belfast, which has 85% of all the spindles in Northern Ireland: weaving is also located mainly in Belfast and its environs, though there are a number of mills farther south, notably in small centres near the Border between Keady and Hillsborough. The major towns of East Ulster all have one or more mills engaged in one or both of the preparatory phases of spinning and weaving: these towns include Lisburn, Lurgan, Dromore, Banbridge, Portadown and Newry to the south, and Larne, Ballymena, Antrim and Ballymoney to the north. In addition some of the mills are in industrial villages, such as Darkley, near Keady, a group of houses around a mill, with a population (1937) of less than 500. Bleaching of the linen was formerly done in the open air and the long strips of material laid out in the fields were a characteristic feature of the landscape, but now almost all the processing is chemical, though 'bleach greens/ some still in use, are found throughout East Ulster as a relic of the former practice. The maintenance of the linen industry depends

on a continued demand for goods of high quality made from fully bleached cloth for shirtings, sheets, damasks and cambrics, and also on the sale of unbleached materials such as canvas, duck and drills for army, sports and other clothing: during the war of 1939-1945 nine-tenths of the shirts for British forces were made in Northern Ireland.

The second major industrial complex in East Ulster centres around shipbuilding, which depends on the import of coal and (formerly) ores from the west of Scotland and Cumberland. Although the Belfast shipyards stand third to the greater Clydeside and Tyne-Wear-Tees areas, they have seen the building of numerous cargo and passenger liners. The docks and shipyards are built on reclaimed land in the Lagan estuary and are served by dredged channels 21 ft. deep, which are able to receive all save the largest liners afloat. Belfast shipbuilding is liable to the booms and slumps that affect the industry elsewhere: exceptionally prosperous during the wars of 1914-1918 and 1939-1945, it was badly depressed during the nineteen-thirties, when unemployment in the industry rose to 57%. It depends chiefly on male labour and is therefore the complement of the linen industry, which employs more women than men. These two industries together are the basis of the economic life of Belfast, and both have various ancillary trades, among which rope and cable making is prominent. One large firm in the city employs nearly 4,000 people and produces ropes, linens and twines ranging from rope-cables to string. In addition, various firms at Belfast, Portadown, Newry, Larne and Ballymena make machinery, part of which is absorbed by the shipyards and the linen trade.

A wider range of industrial enterprise in East Ulster is now thought to be socially desirable, as the depressions in the major industries bring great distress: aeroplane manufacture is probably a natural successor to shipbuilding. East Ulster already has its own well-established domestic and export industries, such as distilleries at Belfast, Comber and Bushmills, a large tobacco factory in Belfast, bacon-curing works at Belfast and Portadown and mills at a large number of places scattered through the countryside. There are furniture factories in Portadown and some neighbouring villages, and a carpetworks in Portadown has been conspicuously successful. Personal enterprise has been largely responsible for such developments, for there are no home resources of coal adequate for industrial use: local foresight with perhaps an element of luck gathered the linen trade into the northeast from the whole of Ireland and added other manufactures of agricultural origin. Even so, careful planning will be needed to ensure that the existing advantages are not dissipated as other products enter the market, for it may well prove that shipbuilding and linen have reached their maximum expansion.

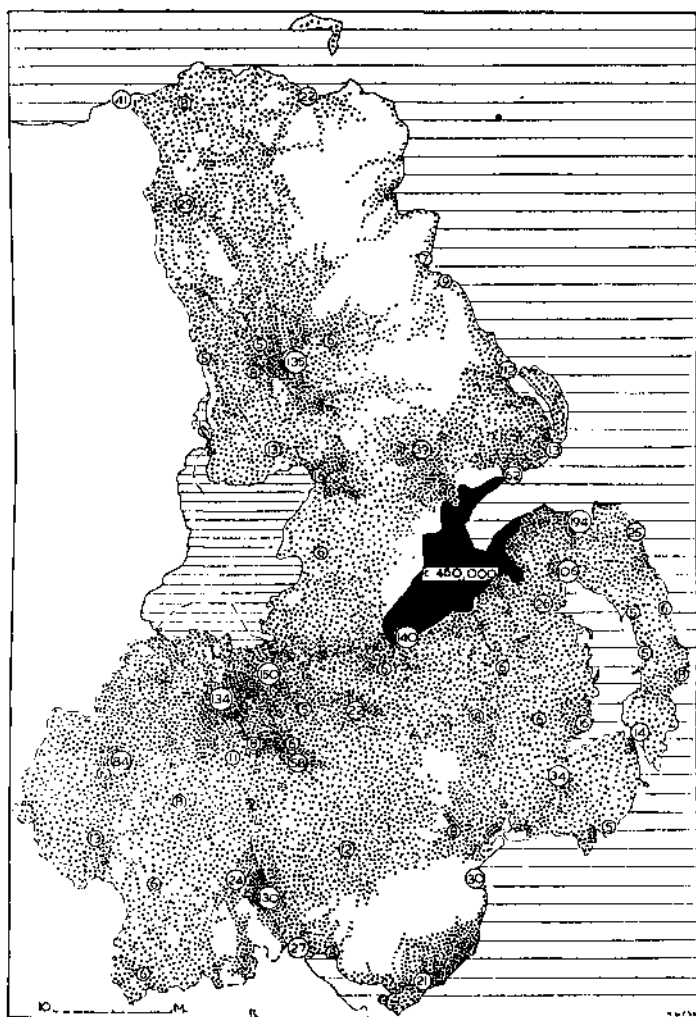


FIG. 92.—POPULATION DISTRIBUTION, EAST ULSTER.

One dot to 25 persons.

Apart from the uninhabited islands and some lowland bogs, the density of population is high almost everywhere, especially in the Lagan valley and the lowland to the south of lough Neagh.

POPULATION

The combination of relatively favourable conditions for agriculture and a well-developed industrial life make East Ulster an important population unit in Ireland, and over 1,000,000 people live in the region. The area is 2,573 square miles, less than one-tenth of Ireland but with one-quarter of the population: the overall density is (1947) 394 to the square mile

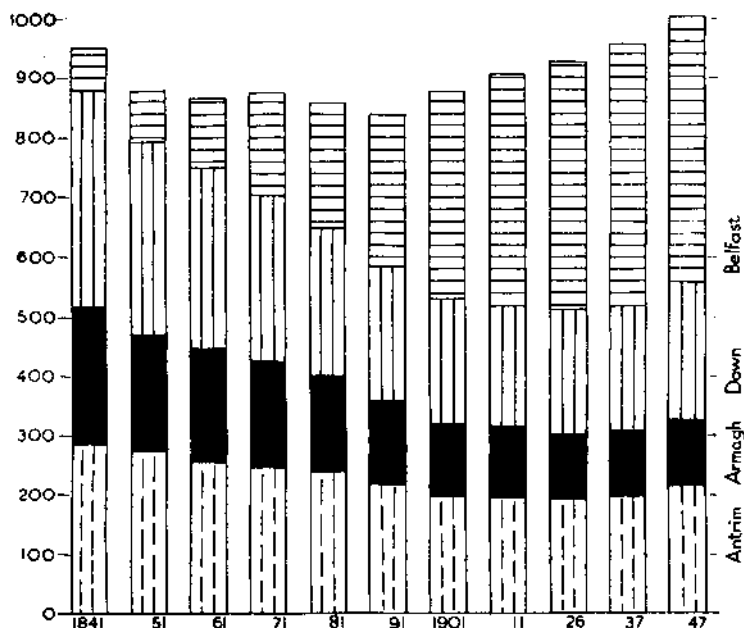


FIG. 93.—POPULATION, 1841-1947, IN BELFAST AND THE COUNTIES OF ANTRIM, DOWN AND ARMAGH

The main trends have been (a) the decline in the predominantly rural counties to the 1937 Census, and (b) the steady increase in Belfast, especially during the nineteenth century.

which, though less than that of England, Holland or Belgium, is higher than in any other part of Ireland except the county of Dublin. In 1947, of 1,002,000 people, 448,000 were in Belfast; in 1937, of 955,000 people, 438,000 were in Belfast and another 148,000 in twenty smaller towns, several of which are industrial or residential satellites of the capital. The three counties, Armagh, Down and Antrim, each have approximately seven-tenths of their numbers in rural areas with an average density of

148 per square mile which is, by Irish standards, a high concentration of population. The boundary between industrial and agricultural activity is difficult to draw in East Ulster, as several thousand people live in industrial villages, each with a few hundred people, or go to work from rural homes and small farms, in some cases combining their employment at the mills with smallholding. In some ways the complexion of the economic life is comparable with that of Belgium, where workers are drawn into neighbouring towns with such facility that industry enters deeply into the social fabric of some countrysides. In Ireland labour is easily attracted from any rural area if it is needed, for the cash returns of town employment seem considerable to a community of small farmers who rarely allow for the fact that wages do not include food and that on farms incomes may be low but the family subsistence is assured.

East Ulster's population was 951,000 in 1841, and only 838,000 in 1891, and throughout the past century it has experienced a decline in rural areas comparable with that in the remainder of Ireland. Fig. 93 shows that Belfast now has almost half the population of the region and that the county of Armagh lost steadily in numbers to the 1937 Census, though the spread of Belfast into the neighbouring areas of Antrim and Down obscures the fact that their essentially rural districts have also declined. From 1891 to 1937 the loss of population in the countryside by 20% was more than offset by the increases in the towns, with the result that there was a net increase of 16%: Belfast accounts for almost all of this, though there are substantial increases in some holiday centres, such as Bangor and Portrush, and some market towns with industries, such as Larne, Ballymena and Portadown. But most of the towns in East Ulster have changed very little in population during the past fifty years and the natural tendency of industry has been to gravitate to Belfast with its immeasurable advantages of good transport and marketing facilities, and above all its port. Figs. 92 and 22 (p. 134) both show that the Lagan valley, from Belfast southwestwards to Portadown and Armagh, is one of the few densely peopled parts of Ireland, and also illustrate the spread of the city into the adjacent countryside. Other densely settled areas include the slopes of the Mourne mountains (a small farm district), the neighbourhood of Ballymena, and the district around Newry and Bessbrook: the two last have several industrial villages. The gaps are mainly uncultivated bogs together with some hills in South Armagh, the Mournes, the Slieve Croob and the Antrim plateau. Only in a few areas are there less than 100 people to the square mile: generally the density is somewhere between 100 and 200 per square mile. Where it is above 200 to the square mile, the concentration is usually due to the admixture of industry or residential development with farming, though the concentration on the seaward

side of the Mourne mountains is almost entirely agricultural as the profit from fishing and holiday trades is not sufficient to affect the population density to any marked degree.

Towns in East Ulster fall into three main groups: first, market and industrial; second, residential; and third, holiday resorts. Some towns combine more than one of these functions and are, for example, both market centres and holiday resorts, or residential and holiday towns. Larne¹ (11,200), the terminus of the short sea-crossing from Stranraer, has an aluminium works and is a market centre: it has doubled its population within the last fifty years. Newtownards (10,600), Lisburn (14,000), Lurgan (15,000) and Portadown (13,400) are all industrial satellites of Belfast with a considerable retail trade. More remote from Belfast, but comparable in its general features with the towns just mentioned, is Newry (13,000), practically stationary in population, at the head of the Ship Canal, still used by coasters and small craft from Carlingford lough. To the north lies strongly Scots Ballymena (13,500), centrally placed in the Main valley. Many of the smaller towns such as Banbridge (5,800) and Dromore (2,200 in 1937) in Co. Down, Ballymoney (2,900) in Co. Antrim, Tanderagee (1,100 in 1937) and Keady (1,300 in 1937) show little sign of expanding in population, for the steadily increasing efficiency of transport militates against their trade and they are generally less likely to attract new factories than the larger centres, though industrial planning may arrest decay in some cases.

The residential towns include some Belfast suburbs such as Holywood (6,400) and Bangor (19,400), which has increased fivefold in the past sixty years and may be compared, in position and functions, to Bray, near Dublin. Armagh (8,400) is most famed as the major Cathedral city of Ireland and has a strongly residential atmosphere: it lies off the main railway routes as its less lovely neighbour, Portadown, became the important railway centre of the lowland. Holiday resorts are spread along the coasts at intervals of a few miles from Portrush to Warrenpoint and include many villages with houses let for a few months in the summer. Portrush, (4,100) receives thousands of visitors: Ballycastle (2,200 in 1937), a town with its centre one mile from the sea, has added holiday catering to its market functions and a number of villages along the Antrim coastroad, such as Cushendun, Cushendall and Glenarm, also receive numerous tourists. Whitehead, at the northern entrance to Belfast lough, is a centre for day visitors, who also frequent Bangor and various other places on the more residential south side of the lough. On the Ards peninsula there are various holiday centres of which the largest is Donaghadee (3,400): farther south the main tourist centres are Newcastle (3,000) and Warrenpoint (2,700),

¹ All figures for 1947, unless otherwise stated.

at each end of the Mourne mountains. The natural attractions of the East Ulster coasts are so great, especially around the Antrim plateau and the Mournes, that the continued growth of its tourist traffic, fed primarily from Belfast but also from Great Britain, seems virtually certain.

SUBREGIONS

Physically the heart of the Ulster province is the area around the Lough Neagh basin; economically the nodality of Belfast is so firmly established by road and rail communications that it is a feature of major importance in its regional geography. The subregions distinguished here have some physical, economic and even social individuality though they are integrated into the regional entity of East Ulster by a measure of commercial co-ordination greater than that normally found in Ireland. Even so, the quality of remoteness characterises several parts of East Ulster, not least the seaward flank of the Mournes, the Ards and the Antrim glens. The post-war co-ordination of transport services in Northern Ireland may, if successful, remove this measure of at least partial economic isolation and provide the farmers with better access to fairs, markets and other commercial facilities.

Of the six subregions here distinguished, three, (1) the Mournes, (2) the southwest, and (3) the Ards and Down, lie in the belt of Ordovician and Silurian rocks, which, from its granitic intrusions, has been termed the 'Newry axis': one, (4) the Belfast corridor, is the great lowland artery of the Province and is floored by some of the most recent sedimentary rocks of Ireland, and two belong to the basaltic lava country of Antrim, (5) the Antrim plateau, and (6) the Bann and Main valleys. Every subregion could be further divided into a multitude of smaller units, as the glaciation has left its mark firmly on the landscape, and the soils, mainly derived from drifts, differ widely within quite small areas and the drainage is similarly varied. Even one square mile of farmland normally has fields with a wide range of fertility owing to differences in soil, aspect and drainage, and the smallness of the farm units accentuates the diversity of the landscape. East Ulster as a region shows the frequent changes of scene which characterise the drumlin-drift belt described in Chapter 20.

1. THE MOURNE MOUNTAINS

The Mourne range is thirteen miles long by five miles broad, aligned from northeast to southwest, and formed of granites intruded during Tertiary times into Silurian grits and slates. More than a dozen summits exceed 2,000 ft. and the highest, Slieve Donard, 2,796 ft., stands at the northeastern end of the range. The valleys are deep and the moorland country above them is smoothly moulded and open, though a corrie

glaciation of late date has left a number of cliffed basins, some of which are lake-floored. On the east, between Newcastle and Kilkeel, the hills rise steeply from the surrounding lowland, but to the southeast, southwest and north there are various foothills formed of metamorphosed Silurian sediments. The deep valleys have been both accentuated and softened by glaciation: typically U-shaped in, for example, the Silent Valley, they have thick ground moraine accumulations on their floors. Borings for the dam constructed in the Silent Valley penetrated 172 ft. of ground moraine, which consisted of granitic sands, gravels, very fine silts and huge boulders up to 15 ft. long of the local granite. The lowlands around the mountains consist of Silurian grits and slates thickly plastered with ground moraine.

Agriculturally the Mourne are little more than an open sheep-run, though forestry plantations are now being developed on some of the lower slopes, especially around Newcastle. There is little settlement above 600 ft., but the coastal lowland is as closely settled and actively farmed as any area of Ulster and normally has at least one-third of its area in crops, chiefly oats and potatoes, and large numbers of cattle and poultry as well as sheep. Kilkeel, its main market centre, has a population of 2,100 (1937). The agriculture on the north and west sides of the mountains is similar, as sheep, cattle and poultry are all prominent and the amount of land under crops is relatively considerable: the sheep fairs of Rathfriland (1,200 in 1937) are of special importance. Around the mountains the population has declined by 30% since 1891, but the density per square mile is still 150 near Rathfriland and over 300 between Newcastle and Kilkeel, even though there are few non-agricultural resources except a modicum of fishing and some catering for summer visitors. Warrenpoint at the southern and Newcastle at the northern end of the range are small centres, each of them at a rail terminus: no railway ever penetrated to Kilkeel and its closely settled countryside. In outlook, most of the people of this area are strongly Roman Catholic and Nationalist.

2. THE SOUTHWEST (CO. ARMAGH)

From the western flanks of the Mourne mountains to the river Blackwater the country is diversified by numerous hills, covered by great swarms of drumlins, and lacks any closely marked regional limits. Structurally it consists mainly of 'Newry axis' country, of Ordovician and Silurian slates and grits, penetrated by a magnificent ring-dyke with Slieve Gullion as its centre: this feature is of Tertiary age and stands immediately beside the ring-dyke forming the Carlingford peninsula (see pp. 468-471). The Newry axis country is generally hilly, and rises up in smooth lines to 1,200 ft. near Newtown Hamilton; its edge runs parallel to and south of the main road from Monaghan to Armagh and Portadown, where the

Carboniferous, Permian and later rocks appear in the lowlands, though Tertiary basalts cover a considerable area around Portadown. In short, all the four main structural elements of the northeast, the Caledonian floor of the Newry axis country, the sedimentary beds of the lowlands, the Tertiary igneous hills and the basaltic cover, are represented in this subregion, yet the extraordinary wealth of drumlins gives it its main character as a landscape. Towards lough Neagh, however, glacial gravels and sands are spread out in large sheets to provide a fertile soil. The clearly defined valley running from Portadown through Newry to Carlingford lough cuts as a ribbon-like gash through the hill country: this ill-drained valley is followed by a canal connecting Carlingford lough and the Bann at Portadown, but its chief town, Newry, is not on the main Dublin-Belfast railway as the line, having climbed from Dundalk through the Slieve Gullion ring-dyke, does not descend into the valley to reach the town.

This subregion is marked by an intensity of agricultural production on a small-farm basis, and all save a small fraction of the country is farmed, for the limit of settlement reaches 1,000 ft. and even higher in places. The small farms have a mixed economy in which at least one-quarter of the acreage is sown to crops, a substantial part of the remainder is meadow, and the rest pasture. Oats and potatoes are the main crops, but many farms also grow flax or grass seed: the animals include sheep, cattle, pigs and a high proportion of poultry. Creameries were strongly established in south Armagh but are now superseded by milk-collecting depots: dairying is merely one of several economic resources. It is, to some extent, also industrial, as linen weaving is established in various towns and villages such as Newry and its neighbour Bessbrook, with Keady and Portadown. Many of the smaller towns and villages have a somewhat desolate appearance, as their trade has moved to the major centres: while the larger towns have remained stable in population or even increased, the country population has declined by 30-40% since 1891. Even so, the density per square mile is still around 120-150, rising to 300-500 per square mile around Portadown and Armagh through the fusion of intensive agriculture, including fruit growing near lough Neagh, and industry, both in the towns and in a number of villages. This high density of population suggests the transition to the Lagan valley.

Through this subregion runs the boundary between the dominantly Catholic and Protestant communities, but it traces no clear line. Portadown, for example, is three-quarters Protestant, Armagh city, three-fifths Catholic and Newry even more strongly Catholic. If, as is sometimes maintained, religious allegiance is a possible basis for a revised border between the two political units, the actual line would be hard to draw, though it would probably run from the northern end of the Mourne

mountains to a point somewhere in the neighbourhood of Armagh city.

3. THE ARDS AND MID-DOWN

On either side of Strangford lough there stretches a countryside of low hills reaching up to 600 ft., with numerous drumlins, which are seen around the lough in various stages of submergence. This countryside is floored by the Silurian slates and grits which appear occasionally at the surface, especially along the coasts: it has one small upland, Slieve Croob, a granitic intrusion of Caledonian structure and possibly Devonian age. Slieve Croob is a treeless moorland, cultivated to an altitude varying from 600 to 1,000 ft., with a clear 'hill-pasture zone' forming a girdle of rough grassland partly covered by gorse, holly and stunted blackthorn around the mountain. Elsewhere the agricultural lowland prevails: laid out in small fields, it has little rough pasture except in the marshy depressions between the drumlins, which at one time held peat but are now almost entirely cleared for fuel. Small farms predominate though there is a sprinkling of medium-sized and large holdings. The proportion of land in crops is generally at least one-third, with about one-sixth in grass, some of which is grown for seed. The mixed farming pattern shows, on the whole, a more advanced stage of specialisation than that of the regions discussed above: the Ards, for example, has an important sale of seed potatoes and of grass seed, and lambs, sheep and cattle are fattened for the market or fed for the export store trade. The fairs at Ballynahinch, Crossgar and Saintfield, all small places but on a railway, attract numerous buyers for the meat markets: to a great extent the farmers buy young stock from the Mourne mountains or south Armagh and then feed it for some months before its final sale. In this respect their function is similar to that of the 'graziers' in Co. Meath, but with the essential difference that the stock are fed on the small and medium-sized farms of a strongly arable character rather than on 'ranches.' Poultry-rearing is also a vital resource on most farms and pig production has tended to increase.

Most of the towns are small, with the exception of Newtownards, an industrial appendage of Belfast. Downpatrick (3,500) has the Cathedral of the Down diocese and a reputed grave of St. Patrick. Along the coast of the Ards peninsula there are several holiday resorts and in the south, at the entrance to Strangford lough, is the small town of Portaferry (1,400). The density of population ranges from around 100 to nearly 200 per square mile, and is that of an agricultural community living mainly on small farms without any marked industrial development. Since 1891, the population has declined by approximately one-quarter.

4. THE BELFAST CORRIDOR

The entrance to Belfast from the sea runs through the lough for nearly twelve miles before passing through the deep artificial waterways that lead to the harbour. Some four square miles in the centre of the city is reclaimed land, occupied partly by docks and warehouses and partly by houses. To the west of the city lie the basaltic scarps of Divis and Cave hill, to the east the drumlin-covered hills formed of Ordovician and Silurian slates and grits; between these two clearly marked limits is the Lagan valley, floored by Triassic sandstones and marls covered with drifts, lacustrine sands and gravels of glacial origin and, near the coast, estuarine silts. The development of Belfast is intimately linked with its emergence as a great port, but it also possesses a natural nodality that has been steadily accentuated by the building of modern trunk roads and railways: on the northwest a low pass leads from the lough into the fertile valley of the Six Mile water and on to the town of Antrim; to the east there is the Dundonald gap, an old east-west fault valley in the Ordovician and Silurian hill-country, having Triassic sandstones comparable with those of the Lagan valley. All round the lough shores there is the lowland fringe occupied by seaside suburbs, and to the south and west there is easy access to the middle Bann valley and the country around lough Neagh.

Belfast city has spread from its original nucleus over the lower slopes of the basaltic escarpment, around the lough shores, especially on the south side towards Bangor, into the Dundonald gap, and along the Malone (sands) ridge which stands between the Lagan and the little river Blackstaff, a marshy area largely avoided by settlement and therefore isolating the south suburbs of the Malone ridge from the smoky western industrial districts of Belfast. The continued growth of the city may eventually engulf such independent centres as the ancient town of Carrickfergus, the modern seaside resort of Bangor, and the linen spinning and market town of Lisburn, for all these, and several others even farther from the city, such as Donaghadee on the Ards coast, are already its dormitory towns. It is possible to recognise a Belfast 'conurbation' extending from Lisburn to central Belfast and then bifurcating into two long fingers on either side of the lough to Carrickfergus and Bangor respectively, a south-north distance of twenty miles; the maximum east-west extent of settlement, from Legoniel to Dundonald village, is hardly ten miles.

The Lagan valley has at once an industrial, a residential and an agricultural character, and to the south of the somewhat congested city these three elements in its life are closely intermingled. Several of the bleach mills and weaving factories are in rural surroundings, some of them on the canalised Lagan which, only a short distance from the centre of the city,

flows through a pleasantly wooded and secluded glen cut in the glaciﬂuvial sands of which the Malone ridge is also made. The beech woods of this valley, and those of the numerous demesnes in the vicinity, are almost the only woodlands in the lowland, though the country has a well-wooded appearance due to the hedgerow trees, with occasional shelter belts and small groves planted for ornamental purposes.

Farming is favoured by the combination of light, generally sandy soils, a moderate rainfall (Lisburn mean annual, 34") and the accessibility of the Belfast market. More than half the cattle are dairy cows, and some of the rest stores received from other parts of Northern Ireland for fattening or export from Belfast. Normally eight- or nine-tenths of the farmland is in grass, and the main arable crops are oats and potatoes. Market gardening is a specialisation found in the neighbourhood of Lisburn and also to the east of Belfast in the Dundonald gap. Towards Lough Neagh, however, the more typical Ulster farming based on arable cropping combined with cattle grazing is found with a certain amount of horticulture. The density of population is high, mainly over 400 to the square mile, but the rural areas unaffected by industry or by the spread of Belfast have declined in population by 10-20% since 1891. An urgent need of the moment is the control of Belfast's spread beyond its present boundaries, for though the inter-war period saw the erection of various housing estates of some order and plan, much of the building has spread in a ribbon pattern along the roads, and not least between Belfast and Lisburn.

5. THE ANTRIM UPLAND

The greater part of this upland is formed of basalts, though part of the ancient crystalline floor and various Palaeozoic sedimentary rocks, including some Carboniferous Coal Measures of little value, occur in the extreme northeast (see p. 24). Beneath the wall-like basalt outcrops the Cretaceous, Jurassic and Liassic beds appear, and many of the soils around them are derived from a variety of components, including glaciﬂuvial sands and gravels. The plateau surface, around 1,000-1,500 ft., with a few rounded hills such as Trostan, 1,817 ft., is a dreary peat bog redeemed by the glens and the narrow coastal fringe: in these sheep are the major resource, though at least one-quarter of the land is tilled, chiefly for oats, potatoes and hay. In 1930, for example, Ballycastle rural district in the extreme northeast had 78 sheep, 26 cattle, over 200 poultry, but a mere 10 pigs for each 100 acres of improved land.

Although the population per square mile in the inhabited areas is around 100-150 to the square mile, the decline of population since 1891 has been as much as 40% around Ballycastle, a neighbourhood with a Roman Catholic majority both in the town and the glens. Farther south towards

Belfast there is an agricultural transition towards dairying and cattle rearing, though the plateau between Larne and Carrickfergus is mainly a sheepwalk. From Larne southwards, the coastal fringes have a steadily increasing density of population, which reaches 300-400 to the square mile: even on Island Magee, a peninsula flanking Larne lough, the density of population, almost wholly agricultural, is around 150 per square mile. The town of Larne is a packet-station, market and industrial centre, and also a railway terminus and the gateway to the Antrim coast road: it stands at the seaward end of the wide gap leading to Ballyclare and Antrim.

6. THE BANN VALLEY

The Bann rises in the Mourne mountains and flows across the lowlands around Portadown to enter lough Neagh which, with an area of 155 square miles, is the largest lake in the British Isles. Formed in Tertiary times, probably Eocene, it lies, everywhere except on the north, over the 'lough Neagh clays,' the last and not least puzzling of the sedimentary formations in Ireland (see pp. 10, 24). Several other streams flow into the lake, including the Blackwater from the southwest, which traverses a limestone valley from Monaghan, the Six Mile Water from central Antrim, numerous streams from the west, and finally the important river Main, which flows parallel to the Bann itself, but from north to south. The Bann leaves the lake as a considerable river and flows through the collapsed centre of the basaltic plateau to the Atlantic.

This area has been called the Ulster Basin by W. Fitzgerald, and the towns of Armagh and Portadown figure in his account as major inland centres, the former the ancient ecclesiastical and the latter the modern commercial focus of far-spreading lowlands. There is easy communication between the Bann and the Lagan valleys, but both streams are county boundaries over part of their courses: the Bann is still in many ways a barrier as there are extensive bogs around it and the bridges are placed at intervals of eight to ten miles. The main northward route by road and rail avoids the Bann valley and runs through the Main from Antrim to Ballymena to reach the Bann at Coleraine, Co. Derry. Therefore this subregion may be thought of as including the western flanks of the Antrim upland, the Main valley, and the low ridge forming the interfluvium between this routeway and the Bann itself.

As a whole, this subregion presents a great range of agricultural types, some industrial development, and landscapes that owe their variety partly to the influence of glaciation and post-glacial developments. Around the southern shores of lough Neagh there are fen peats in many stages of reclamation, with an agricultural life focused partly on cattle grazing but also on fruit production: patches of uncleared bog are intermingled with

intensively farmed and densely peopled enclaves, and the whole scene, so complex a memorial to human effort, demands, according to Praeger in 1944, detailed research to unravel its floristic and ecological mysteries. East of the lake, in central Antrim, the farmlands have arable cropping, mainly oats and potatoes, intensive hay production and cattle both for milk supply and for meat: the population density is around 100 per square mile and the only town, Antrim, is a small centre (1,600 in 1937). To the north of Lough Neagh, the peat bogs are interspersed with farmed drumlins. The Main valley, on the other hand, is far more closely settled, and the town of Ballymena is the market centre of a wide area that includes the valleys cut in the western part of the Antrim upland. Twenty miles separates Ballymena from Ballymoney, the nearest market town to the north; eleven miles to the south is Antrim. Ballymena is the centre of a mixed farming district in which almost half the improved land is divided between crops and hay, and cattle are reared both for the store trade and for dairying: sheep production is also important, especially near the uplands, and there is also a considerable number of pigs and poultry. Ballymena has linen factories and the farms of the Main valley generally have fields of flax on the well-drained and rich basaltic soils. Flax is also grown in considerable quantities in the Bami valley itself, and this subregion stands out as the main flax-growing area of Ireland.

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WEST ULSTER

WEST ULSTER, in its fullest extent, is the country of hills and lowlands that extends from the river Bann to the treeless shores of the Atlantic in Donegal: so viewed, it is the basin of the Foyle and the Strule, together with various smaller river valleys approached by passes through cols in the hills that surround the basin. Londonderry town is its natural focus and the Foyle its great artery of commerce by river, road and railway, but the political boundary of 1921 has separated Donegal from the remainder of Ulster and insulated Londonderry from part of its natural hinterland. The Border follows Lough Foyle from the sea to a point near Londonderry, circles the town just outside its suburbs, follows the Foyle for several miles and then winds through uplands, generally sparsely populated, to the Erne, which is crossed at Belleek and recrossed just south of the upper lough, with the result that part of the Erne basin is in Northern Ireland, though the mouth and the upper part of the course is in Eire.

Any Border would be difficult to establish in an area such as West Ulster, which is essentially a passage land, physically of some complexity but consisting primarily of lowlands through which roads and railways are engineered with little difficulty and agricultural settlement is continuous, except in the Sperrin mountains and a few lesser uplands. There is here no desolate waste available to separate Northern Ireland from Eire and therefore the political division rests on an assessment of differences in outlook, based partly on religion. But the divergences here do not enable a sharp line to be drawn as Roman Catholic and Protestant communities are so completely intermingled that any line of demarcation would be unsatisfactory even if one accepts as in general tendency true the widespread assumption that in this region Roman Catholics desire a united Ireland and that Protestants wish to remain within the United Kingdom. In fact, the old county boundaries have been elevated in status to a customs frontier which inevitably acts as a divide for economic and social orientations.

Having noted the existence of the compromise boundaries made in this country of passage-ways and transitions, it is possible to recognise a type of life that is characteristic of West Ulster. In this region, the impact of industry has been less sharply felt than in East Ulster, yet the agricultural life shows elements of the same intensity, with small farming units having a substantial acreage of arable crops, except in Co. Fermanagh where dairying **and** stock rearing depend mainly on grasslands. The density of

population is mainly around 100 per square mile except in parts of Fermanagh, and the commercial life is so well developed that the people are not mere subsistence holders but vigorous farmers, even if of small acreages, able to respond quickly to economic circumstances. They possess, in fact, much of the resilience associated with the intermediate group of Irish farmers, those having 30-100 acres, and are tied neither to the specialised cattle production of the large farms nor to the subsistence struggle of the small ones.

STRUCTURE AND LANDFORMS

The interpenetration of hills and lowlands is the salient feature of the landscape in West Ulster, which includes a variety of structural elements. Ancient metamorphic rocks form a definite mountain chain, with several peaks over 2,000 ft. high in the Sperrins, and a number of lesser peaks, many of them over 1,000 ft., elsewhere. This ancient floor is structurally analogous to the Scottish Highlands and is part of the Caledonian province of the northwest and north of Ireland (see pp. 11-15). The Palaeozoic sediments that cover the metamorphic floor include Devonian strata, seen in the hilly country to the northeast of Enniskillen, and a wide range of Carboniferous beds, of which the younger members, Upper Limestones, Yoredales, Millstone Grits and Coal Measures, form plateaus to the southwest of the two Erne loughs and, in Slieve Beagh, to the north of the upper lake. To the west of the lower Bann, Tertiary basalts form plateau-like hills with scarped edges made sharper by landslips, which have on the west side the same narrow outcrops of Triassic, Jurassic and Cretaceous beds that are so marked a feature of the comparable physical environment in the Antrim plateau. This is the western end of the great basaltic lava-flow that stamps so large a part of northeastern Ireland: both in the west and the east it forms a plateau, but in the centre it underlies the Bann valley as a basin-like floor.

All the various hills of West Ulster have a form that is generally characteristic of their structure: taking them in order of age, the schist-formed Sperrins have gently rounded outlines with long smooth peat-covered sides, and are traversed by valleys generally wide and open but including some deep glens; the basalt plateau-hills are flat-topped and scarred with landslips on their edges, and both sandstones and limestones among the Carboniferous beds appear as scarps at the edge of plateaus, notably on the west side of lough Erne and also on the margins of Slieve Beagh. The lowlands, floored by a variety of rocks from the ancient metamorphics to Carboniferous sedimentaries, are almost completely covered by glacial deposits, among which drumlins are clearly seen in the lough Erne lowland (see Fig. 4).

Over the greater part of its course, the Erne spreads into a maze of waterways called lakes for convenience: thus the two Erne loughs are separated only by the river crossing at Enniskillen and the upper Erne lough is divided only by a few miles of complex waterways from lough Gowna, in Co. Cavan. All these lakes have numerous islands and peninsulas and in effect form one vast sheet of water between various drumlins and low hills: around them is an extensive network of bog and alluvium in which a number of 'loughlets' exist. There is every indication that the growth of vegetation, clearly perceptible around the shores of existing lakes, has gradually reduced them to their present size; in times of flood, a rise of 10 ft. in the water level will enlarge upper lough Erne to twice its normal size. This lake has an area of twenty-nine square miles, of which 5·3 square miles consist of islands, and the shore is 100 miles long. The Erne has a normal level of c. 150 ft. in the two loughs, but at Belleek its concentrated waters, which drain a catchment basin of 1,689 square miles, descend in a course marked by rapids, now harnessed for a power scheme, to Balryshannon, three miles away. Lofty and thickly wooded banks stand on either side of this course.

Communications in West Ulster follow the various river routes: of prime importance is the Foyle, with Londonderry as its port and natural market centre. At Omagh several routes join and the railways bifurcate to run eastward to the lough Neagh basin and southwards to the Erne valley. To the north a railway from Coleraine to Londonderry passes the end of the basalt plateau and follows the raised beach, here mainly 15-25 ft. above O.D., to Londonderry. Access to many of the closely settled lowlands of West Ulster is given only by roads: Fig. 94 shows that there are many tongues of settlement stretching far into the mountains, some of which show a high degree of inaccessibility and even of isolation.

LAND USE

The moist climate of West Ulster, with an annual rainfall on the lowlands of 35"-40", January mean temperatures around 40° and July means of 58°, provides environmental conditions favourable to bog growth both on the flatter uplands and in the areas of impeded drainage in the Erne valley and elsewhere. The Sperrin mountains, for example, have large areas of bog in which the schistose rocks rarely appear at the surface, and the basaltic hills normally have a peat cover also. In each case, forestry plantations have been established successfully on many of the hillsides, even on peat, and the advocates of tree planting claim that this is a suitable form of land use, as much of the hill country is too wet for sheep. Co. Derry now has 13,000 acres (2·5% of its area) in government forestry plantations, and

Co. Tyrone, 9,000 acres (1% of area), but Co. Fermanagh less than 2,000 acres. The major woodlands in the lowlands are associated with various demesnes, such as Florencecourt, Co. Fermanagh, to the south of lower Lough Macnean, where the original Irish yew (*Taxus fastigiata*), now widespread in cultivation, was found around 1767 on limestone.

On the numerous islands of the two Erne loughs, and also around some of the lake shores, there are vestiges of a forest which is either natural or semi-natural: some of the islands have dense mixed woods in which oak, ash, alder, birch, aspen, hazel, hawthorn, holly and other familiar deciduous trees occur. Stewart (1945) suggests that the forest communities include ash-alder, ash-birch, ash-oak and the two main types of oak wood, moist and dry, and Prægl's investigations both on the islands and the lake shores have led him to state that individual species are often strongly developed over quite small areas though rare elsewhere. The woods on the bare limestone ridges to the west of the lake have sessile oaks, birch, hazel or ash locally dominant, and in spite of continuous cutting these deciduous woodlands remain one of the main scenic features of the lough Erne country.

The West Ulster landscape is essentially agricultural and the patches of mountain or lowland bog or of woodland appear as little more than an occasional interruption of the farmlands. For the most part the drumlins of the Erne lowlands and the varied morainic or glacial deposits of the valleys elsewhere provide soils that are reasonably well drained and frequently of good quality. There is an even spread of settlement (Fig. 94, p. 524) almost everywhere in the lowlands and also in the mountain valleys to a general level of c. 800 ft. The farms are mainly of small size: in all the three counties of Fermanagh, Derry and Tyrone, those of less than 30 acres predominate, though there are a number of medium-sized holdings of 30-100 acres and a few of more than 100 acres: the last-named includes some large farms on the lowlands, whose economy is directed to feeding cattle for the town markets or export through Londonderry; some of the large hillfarms specialise in sheep rearing and young cattle. The fields are generally small and the landscape shows the fragmentation that is also characteristic of East Ulster and indeed of the whole northern sector of Ireland from the drumlin-drift belt through the old Ulster province.

Production on the farms is mixed and a substantial part of the acreage is arable in the counties of Derry and Tyrone: in Fermanagh, however, there is less cropping and the pastoral side of farming is dominant. Throughout West Ulster there is an average of 25-30 cattle per 100 acres of improved land, less than half this number of pigs, but very large stocks of poultry, especially in the Bann valley. Sheep are numerically most

important on some of the better-drained upland pastures around Limavady, Strabane and Castlederg rather than in the Sperrin mountains, but only in rare cases are considerable numbers of sheep found in the lowlands. Derry and Tyrone have a type of mixed farming similar to that of East Ulster, in which one-fifth to one-third of the land is in crops, which include flax, the crop most likely to fluctuate in area according to prices, oats, potatoes and turnips, but hardly any wheat as the heavy rainfalls and the cool summers are unfavourable to its growth and ripening. Some seed potatoes are grown by the more enterprising farmers, and grass seed is also a cash crop of some importance. Meadow hay is grown on a substantial part of the improved land and in many districts little more than half the farmland is in pasture, a condition only equalled in Ireland in Co. Antrim and parts of the Lagan valley. Co. Fermanagh, more thoroughly pastoral in its farming activity, has in most years a mere 10% of the land in arable crops, chiefly roots, oats and potatoes; but at least one-quarter of the land is in hay which, with the pastures, provides the main sustenance of the cattle. But it will be noted that the parts of West Ulster where cropping is prominent, broadly speaking Derry and Tyrone, support as many cattle in proportion to the farmed area as the more pastoral Fermanagh.

Co-operation in West Ulster has been succesful in establishing creameries, especially in Fermanagh and Tyrone but also to some extent *in die east* of Derry: near the town of Londonderry most of the milk is collected for sale in the town. While many of the creameries have been successful, and a number have branched out into other lines of business such as egg-collecting, shopkepping or selling seeds and fertilisers, the returns to the farmer are far less than in the Munster dairy country and, according to an estimate made about 1930, averaged only about .£30 as against ^100 upwards. The farms of West Ulster are much smaller than those of Munster and may have as few as 5 or 6 cows, so that the milk supply is small and seasonal. Many of the farmers haul the churns for some miles by donkey cart or horse and trap, but even a small return, acquired with considerable expenditure of time and effort, is important on the holdings and the pig industry depends partly on the return of skim milk to the farms. It is difficult to forecast future developments, as during the 1939-1945 war the government collected milk for centralised plants, and a famous firm established a factory for milk products near Omagh. The farmers have a guaranteed price for milk on this basis, but there is no return of skim milk for feeding pigs and calves. The essential difficulty of providing co-operative facilities for the small farm survives and the creameries must be replaced by some kind of buying and selling organisation if the economic organisation of the small farm is to remain in any way secure.

INDUSTRIES

West Ulster has an industrial development which, though greater than that in many parts of Ireland, is of minor importance compared with that of East Ulster. It is, however, based primarily on flax and consists both of spinning and weaving and of shirt manufacture. There are spinning and weaving factories in Dungannon, Cookstown and various smaller centres in the east of the region and also at Sion Mills, an entirely industrial village on the river Mourne, near Strabanc, where experiments have recently been made in spinning rayon thread on flax machinery. The spinning and weaving of West Ulster use the flax grown locally, which is scutched in various small mills working only seasonally and employing a very small number of people. Efforts have been made to establish co-operative flax purchasing societies, but most of these had a difficult career in the inter-war period when the amount grown became slight: in any case, home-grown flax provides only part of the amount required.

Shirt and collar manufacture has been established in Londonderry ever since the middle of the nineteenth century and the large mills, in all about thirty in number, are a prominent feature of the town. In origin this industry was domestic, and associated with home sewing: a writer in 1912¹ shows that 7,000 were employed in the factories and some 10,000 in the surrounding districts, including the Inishowen peninsula and other parts of Donegal, and the rural areas of Co. Derry as far south as Strabane. The domestic sewing is practically extinct, having been killed partly by its own small returns to the worker, by the increasing accessibility of the factories from rural areas by motor-bus and bicycle, and by the establishment of the Border. Londonderry was a town with plenty of employment during the war years owing to the service demands, and numerous workers were drawn from Co. Donegal by the day. There are also shirt factories at Strabane and at Coleraine, where they have replaced spinning and weaving mills.

Various small industries are found in the West Ulster towns: Coleraine has a patent food factory and an engineering works at which farm implements are made, and Strabane also has an engineering works and a lingerie industry. The last is allied to the traditional hand embroidery of various centres in the western parts of Ulster, including especially Donegal: originally worked almost entirely on a domestic basis, hand embroidery is now found in factories at Dungiven and Enniskillen.

POPULATION

In 1937, West Ulster had a population of 325,000, a general density of 129 per square mile: one-third of the population lives in towns and villages

¹ See Riordain, E. J., *Modern Irish Trade and Industry*, 1920, pp. 122-123.

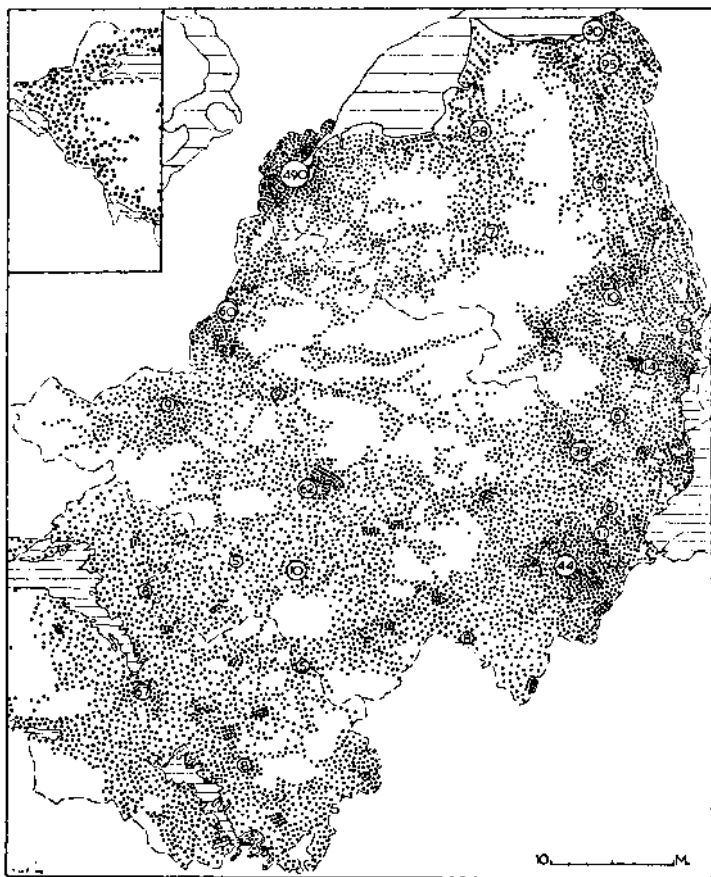


FIG. 94.—POPULATION DISTRIBUTION, WEST ULSTER

One dot to 25 persons

The general pattern is of settlement in lowlands, and in the valleys of the Sperrins and other uplands. The densities of population are higher in Londonderry and Tyrone than in Fermanagh.

with more than fifty houses (as defined in the Census), the rest in smaller villages or isolated farmsteads: the population numbered 333,000 in 1947. In relation to the area of land actually farmed, the density per square mile is high, generally around 100-170 except near Enniskillen, where it is 80: a square mile of improved agricultural land may have as many as twenty to thirty farmsteads and considerably more in some places; these figures generally represent an equivalent number of families, as very few labourers are employed. Unless the farms are united or enlarged, it is difficult to see how the land could be worked with fewer people and already there are various complaints of the shortage of manpower in agriculture. To some extent the farmers are solving such problems by removing hedges and making the fields sufficiently large for tractors to be used effectively, but the existing type of rural economy needs the presence of a relatively large number of people on the land, and the densities per square mile approximate closely to those in the agricultural parts of East Ulster.

A century of population decline has reduced the population by half in Co. Derry, by three-fifths in Co. Tyrone and by two-thirds in Co. Fermanagh. These decreases are not untypical of the Irish countryside and are similar to those in the non-industrial areas of East Ulster. Most of the towns have remained practically stationary in population or declined slightly during the past fifty years, though Londonderry has increased from 33,200 in 1891 to 47,800 in 1937 and 49,000 in 1947. Coleraine, in the Bann valley (9,500)/ Omagh (6,200) and Enniskillen (6,700) have also grown in size. Some of the larger market towns possessing good communications and a measure of industrialism have captured much of the trade of the smaller towns: it is said, for example, that Londonderry has acquired part at least of the trade of Strabane, fifteen miles away. Similarly Coleraine is in a relatively favourable economic position, as it is the strongest market town for many miles, and has some shipping; it exports potatoes and receives coasters from Liverpool, Glasgow, Whitehaven and Maryport.

Towns and villages account for one-third of the total population of West Ulster; thus in 1937, 110,400 people lived in places that are either boroughs, urban districts or places having, according to the Census definition, 'at least fifty houses but no legally defined boundaries.' This last group includes a number of centres that, though quite small, are yet of considerable importance in the countryside, but it does not include all the nucleated settlements. Fig. 94 shows the relative prevalence of nucleated and dispersed settlement in each of the three counties: Co. Derry has almost half its population in towns, chiefly in Londonderry itself. The proportion in

¹ 1947 figures unless otherwise stated.

towns and villages in Tyrone in 24%, and in Fermanagh 17%, both of which figures reveal the predominance of agriculture and of associated dispersed settlement. The market areas served by the various towns were considered carefully by various interested parties when the Border, with its inevitable economic dislocations, was established in 1921 (see Fig. 95); not only the towns but also the various villages are essential links in the general marketing scheme of the region.

Londonderry city stands out as the one regional capital in the west of Ulster, having, before 1921, a port hinterland that covered the whole of Donegal, a wide area of predominantly agricultural country stretching from Co. Monaghan to east Mayo and north Galway through the counties of Cavan and Longford, and also including the whole of Leitrim and Sligo. The Bann basin was served mainly from Belfast, which as a commercial port had a range of influence stretching far beyond the present six-county Northern Ireland. Londonderry and Belfast are at once competitive and complementary as ports, with the latter in a much stronger position than the former. Industrially the specialisation in shirt manufacture gives Londonderry a measure of individuality in its economic life which compensates to some extent for its weakened nodality. During the war of 1939-1945, Londonderry was a strongly guarded naval centre, as lough Foyle was used as an Admiralty anchorage instead of lough Swilly, in Eire since 1921. In addition, substantial improvements have been made in the harbour facilities and the town therefore faces the latter half of the twentieth century with certain recently acquired advantages to balance its frontier problems. Its very distance from Belfast, over seventy miles by rail or road, combined with the lack of any nearer competing town of comparable size, assures it of some economic strengdi. The only competing railway lines in Ireland run from Belfast to Londonderry: the Northern Counties Committee, a branch of the former London, Midland and Scottish Railway, owns the line through Ballymena and Coleraine, thence along the coast past the basaltic scarp and beside lough Foyle: the Great Nordiern Railway runs through Portadown, Dungannon and thence by an easy pass to the Strule valley at Omagh, where there are connections to Enniskillen and Strabane.

The chief market towns lie on these railways and are separated one from another by distances of as much as twenty miles. In Fig. 95 the market areas of these towns are shown and it will be seen that Strabane's trading contacts have been affected severely and that Clones, now on the Eire side of the Border, has lost that part of its market area which lay in South Fermanagh. The surprisingly large market area of Enniskillen will be noted: in the *Handbook of the Ulster Question* it is claimed that the town was frequented by peasants from the counties of Leitrim and Cavan,

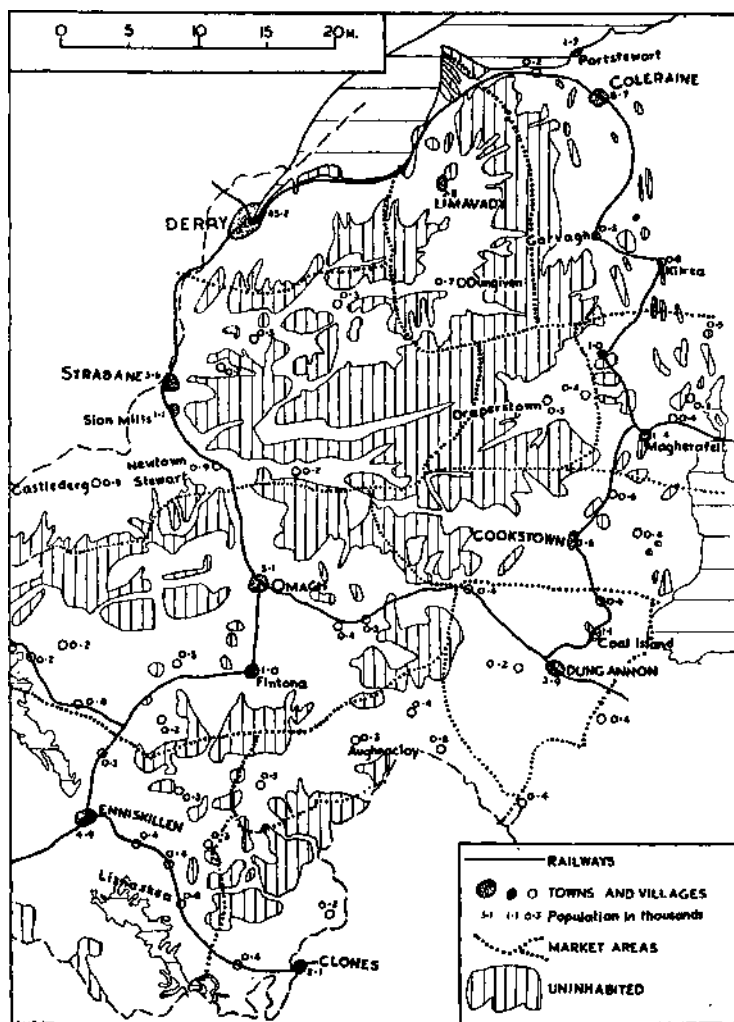


FIG. 95.—MARKET AREAS OF WEST ULSTER

The data is taken from the 'Ulster Handbook'; to it has been added the uninhabited areas. The Border cuts through the market areas of Londonderry, Strabane and Clones.

many of whom must have been drawn from the somewhat remote valleys to the south of the Erne basin. While many farmers will travel ten to fifteen miles to sell pork, flax, or any special commodities, much of the rural trade passes through the numerous subsidiary centres, most of them having only a few hundred people, which are tributary to the larger towns. In addition to the weekly markets there are monthly fairs not only in the towns but also in most villages. While the general dependence on horse transport and the practice of driving cattle along the roads for sale necessitates a fairly close network of rural commercial centres, the complaint is frequently made that many markets and fairs have become decadent, partly because the farmers deal directly with buyers rather than face the laborious journeys weekly to the markets or monthly to the fairs. In the remoter districts the main problem of the farmers centres around the communications, and the present distribution of population itself sets a problem for the planners of integrated transport services.

Social and political factors enter very sharply into the life of West Ulster and are inextricably bound up with the religious allegiance of the population. Taking the three counties as a whole, this shows comparatively little change during the period from 1861, when an enquiry into religion was first made on the Census form. At that date, 52.5% of the population were recorded as Roman Catholics, and in 1937 the figure was 52.4%, with little variation between. Meanwhile the population had fallen from 528,000 to 325,000. In Fermanagh 56.5% of the population were Roman Catholics in 1861 and 55.3% in 1937: in Tyrone the figures were almost identical, having ranged from a maximum of 56.5% in 1861 to a minimum of 54.6% in 1891, with 55.3% in 1937. In Co. Derry, however, the Roman Catholic population has increased from 44.4% in 1891 to 48.5% both in 1926 and in 1937.

Mere statistical assessment on a county basis gives an illusory simplicity to the problems involved but at least shows that up to 1937 neither group was achieving substantial dominance but rather that, in spite of all the changes and chances of emigration, the *status quo* was generally maintained. The origin of the complex political problems is beyond the scope of this work, though one may remark that the various plantations introduced a strong Protestant element which in general has maintained its faith with tenacity. There is a strong Protestant majority in the north of Co. Derry, from the Bann to the Foyle, with 79% of the population of Coleraine and 61% of Limavady, though only 39% of Londonderry. In the rural area immediately surrounding Londonderry there was a slight majority of Protestants in 1937 as in 1911: elsewhere the position defies simple statement though in most cases the proportion is almost even. West Ulster is

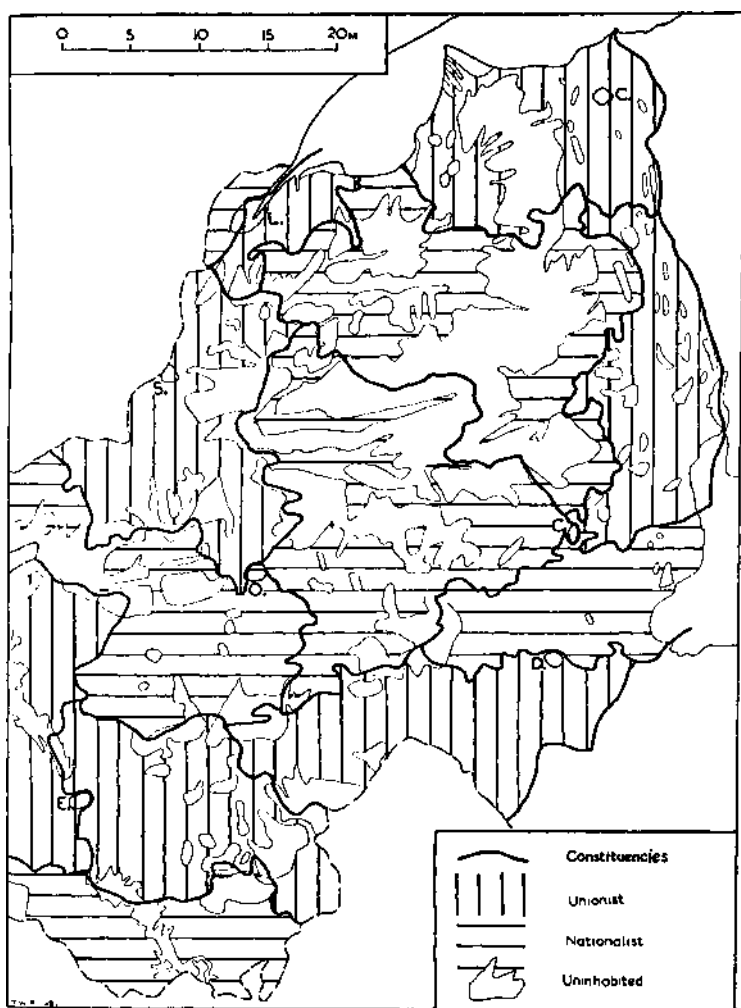


FIG. 96.—POLITICAL REPRESENTATION, 1948

This area of very mixed sympathies returns seven Unionists and six Nationalists to the Northern Ireland parliament.

represented in the Stormont parliament by thirteen members, of whom seven are Unionists and six are Nationalists (see Fig. 96).

As part of the province of Northern Ireland, this region is in many ways complementary to East Ulster: its population is mainly engaged in agriculture and much of the produce helps to feed the large town populations of the Lagan valley or is exported to overseas markets through Belfast. Again, the manufactures of Londonderry, Strabane, Coleraine, Cookstown, Dungannon and various smaller centres are primarily flax products, and Northern Ireland has some individuality as an industrial unit. If the present political arrangements are to survive, it could be maintained that this West Ulster region provides a natural balance to East Ulster, with its more complex industrial and commercial life. Within the province, the farms of Tyrone and Fermanagh send young beasts to the richer feeding pastures near Londonderry, Coleraine and Belfast, and the milk goes to the collecting depots and to factories which have, temporarily at least, replaced the creameries of former years.

SUBREGIONS

West Ulster can be conveniently divided into seven subregions, which are taken in such an order that one travels mentally from the Bann to the Foyle, and finally to Londonderry, which looks both seaward and landward.

1. THE WEST FLANK OF THE BANN VALLEY

Between the hill country of Derry and Tyrone on the west and the river Bann with lough Neagh on the east, there is a lowland some ten miles wide and fifty miles long, closely settled, actively farmed and commercially of some importance in West Ulster: its main line of communication is the railway from Coleraine to Dungannon, which passes through all the principal market towns and villages. The structure of this subregion is complicated: in the north, basalts floor the lowlands, but to the south, around Maghera, sedimentary rocks of Carboniferous and later ages appear at the surface. These include some Coal Measures around Coal Island, some Triassic and Cretaceous beds, and the lough Neagh clays near the lake. It is, however, the glacial and glacialuvial deposits that form the parent material of most of the soils, for, as Charlesworth has shown, there are swarms of drumlins, spreads of outwash gravel and sands, and, on the flanks of the uplands, lacustrine deposits laid down in ice-dammed lakes. There are no soil profiles available, but the soils of the farmed country are generally reported to be reasonably fertile and well drained, though some low-lying areas are covered with bogs, notably near the Bann, where they form appreciable gaps in the settlement pattern (see Fig. 94).

Agriculture has a strongly arable complexion in this subregion and one-quarter to one-third of the improved land is under crops, chiefly oats and potatoes, with as much as one-eighth to one-quarter under meadow hay; little more than half is permanent grass. Flax growing is associated with the farms here, and there are three other main cash crops—oats, potatoes and grass seed. The cattle include both stores and milch cows, and creameries formerly had some measure of success in the area; pigs, poultry and, near the uplands, sheep are also sources of income. Small farms of less than 30 acres predominate, and the rural densities of population, some 150 to the square mile of improved land, remain high in spite of a decline of 30% since 1891. The towns are market centres approximately ten miles one from another, all of some antiquity and partly revived during the seventeenth-century plantations and settlement, but with the clearer imprint of eighteenth-century planning and nineteenth-century industrialisation. Of these towns, the most northerly, and successful, is Coleraine, four miles from the mouth of the Bann, a port, market and industrial centre of 9,500 people, an increase of 35% since 1891. The other 'towns' include Kilrea (800 in 1937), Garvagh (500 in 1937), both now entirely subsidiary to Coleraine, Maghera (1,000 in 1937) and Maghcraft (1,300 in 1937), Cookstown (3,400), Stewartstown (600 in 1937) and Dungannon (4,400), all of which have remained stationary or declined in population during the past fifty years. Cookstown, laid out around 1750 by Mr. Stewart, the local landowner of the day, consists of a street one mile and a half long: Maghera also has one main street with subsidiary roads, but Dungannon, on a limestone hill, has another familiar Georgian plan, a square with four principal streets.

2. THE DERRY-TYRONE UPLANDS

TWO structural features appear in these uplands: first, basalt plateaus, almost flat-topped, with scarp edges overlooking the Roe valley; and second, the smoothly rounded Sperrin hills, which include several summits over 2,000 ft. and are made up of ancient schists and grits with various intrusions. The basalt plateaus are similar to those of Antrim and like them are covered with a dreary waste of peat: there is no great altitude, though considerable areas are above 1,000 ft. and in Benbradagh, near Dungiven, there is a summit of 1,535 ft., with 1,825 ft. in Mullaghmore. The Sperrin mountains are merely the main range in a wide hill belt which extends from Slieve Gallion, 1,735 ft. (north of Cookstown), to the Foyle and westwards into Donegal. With the basalt plateaus, they form an effective divide between the lower Bann valley and the Roe valley. No railway crosses these uplands, though roads climb through passes at 750-900 ft.

between the Bann valley on the east and the Roe and Foyle valleys to the west.

3. THE CLOGHER VALLEY

This wide open valley lies between Devonian uplands with summits around 1,000 ft. on the north, and a Carboniferous plateau, the Slicve Beagh, reaching 1,255 ft. on the south: it is floored by Carboniferous rocks overlaid by drifts and is an essentially agricultural area hardly touched by industry. The Clogher valley light railway, which runs through the heart of the area, has now been abandoned (see p. 248). The farming is mainly pastoral and normally at least three-fifths of the improved land is in permanent pasture, with meadow on most of the remainder: the transition from the type of farming with arable crops figuring prominently to the more purely grassland type of farming is apparent in a traverse of the valley from east to west. Cattle are kept for stores and milk and poultry-keeping is of particular importance. Most of the farms are small, of less than 30 acres, and the density of population is almost 120 per square mile of improved land. There are no towns and the market centres are villages such as Aughnacloy (800 in 1937), Ballygawley, Augher and Fivemiletown, all with populations of less than 500. In effect, this subregion is one of the many Irish backwaters, entirely agricultural and not unprosperous but off all the main routes.

4. THE ERNE VALLEY

Two lakes, upper and lower lough Erne, occupy the lower part of this valley, and Enniskillen, its one important town, stands at the crossing place between them. The railway and main roads avoid the centre of the valley for the lakes spread outward across the marginal bogs in times of flood and the water limit is difficult to draw. Drumlins on the valley floor are aligned from northwest to southeast and make a multitude of islands in the lakes or peninsulas on their margins: the valley is overlooked on the west by Carboniferous plateaus, some of which have scarped edges, but on the east side there are easy passage-ways into the Clogher valley and the Foyle-Strule basin. On the whole, this is an agricultural area, producing store cattle, having a considerable interest in dairying and a great development of poultry keeping; in some years less than one-tenth of its improved land is under crops, though at least one-quarter is meadow. The farms are mainly small with an intermingling of medium-sized and large holdings, and the density of population, 70-80 per square mile of improved land, is akin rather to that of the pastoral Central Lowland of Ireland than that of the more arable areas of Ulster. The rural areas have declined by 25% during the past fifty years. Enniskillen is the main centre: Lisnaskea

(700 in 1937) and Irvinestown (800 in 1937), respectively ten and twelve miles from Enniskillen, are the only other 'towns,' though the area around upper lough Erne has its natural market focus in Clones, Co. Monaghan. Viewed on a political map this part of Northern Ireland, itself highly mixed in political sympathies, is surrounded on three sides by Eire territory, which includes both the mouth and the upper reaches of the Erne river.

5. THE FOYLE-STRULE VALLEYS

The Strule and the Foyle together form the main north-south stream of this large basin and receive a number of important tributaries which join the river at right angles on each side: two of the major left-bank tributaries, the Film and the Deelee, are in Co. Donegal and join the river on the nine-mile stretch that is the boundary between Northern Ireland and Eire. As a whole the basin is a well-defined unit, having one main north-south arterial route along the main river, joined by several tributary routes, and its communications are focused on a number of market towns of which Omagh, Strabane and Londonderry are the chief. In spite of the Border, Strabane and Londonderry are still the main centres for communications for Co. Donegal as well as for the valleys of the uplands to the east: Omagh has road and rail connections with the Erne valley, the Cloghcr valley and the lowlands around lough Neagh.

Structurally the basin is formed of ancient metamorphic rocks from lough Foyle to a point a couple of miles north of Omagh and its valleys are separated by hills from 1,200-1,800 ft. high, of which those near Strabane continue the line of the Sperrins while others, such as Bessy Bell, 1,387 ft., near Newtown Stewart, stand up in isolation above the lowland. Around Omagh the lowland widens out into a basin, floored by Devonian and Carboniferous beds and comparable perhaps with parts of the Central Lowland of Scotland. Everywhere there are drifts and some glacial deposits, particularly in the valleys of the Sperrins, which ice held up marginal lakes: in general the soils are of considerable fertility and land is cultivated to an altitude of around 800 ft. The farming is mixed with at least half the land in permanent pasture and the remainder used chiefly for hay in the south towards the Erne valley, but for crops, especially oats and potatoes, farther north (see Fig. 38, p. 199). Financial returns are given largely by the stock reared both for the store trade and for fattening and sold mainly at the monthly fairs, together with milk production, partly for a new canning factory near Omagh. Sheep are kept in large numbers only near the mountains. Even in 1930, when arable farming was at a low ebb, the Strabane rural district had only half its improved land in pasture, 37% under crops and 13% under hay: the stock kept per 100

acres of improved land were 29 cattle (of which 10 were milch cows), 6 pigs, 280 poultry and 50 sheep, die last mainly around the Sperrins. These figures fluctuate considerably from year to year, but show the prevalence of mixed farming in the heart of the basin.

Small farm units of 30 acres or less are the most usual type, with an admixture of medium-sized and large farms. The rural density of population per square mile of improved land is 110-120 in the south of the basin around Omagh, 150 in the central area, including Strabane and Castlederg and higher still near Londonderry. The market centres include Omagh (6,200) and Strabane (6,000), and several smaller places that are mere villages. There is a ring of minor market centres approximately ten miles from Omagh, including Six Mile Cross (300 in 1937), Fintona (1,000 in 1937), Dromore (500 in 1937) and Newtown Stewart (900 in 1937), all of which have lost much of their trade to the larger centres. Strabane has shirt factories and a lingerie works but like Omagh is mainly a market town, though it has lost part of its trade to Lifford, a village in Donegal just across the river. Castlederg (900 in 1937) is a minor town ten miles from Strabane; the only other village is Sion Mills (1,200 in 1937), which grew up around a flax mill established in 1835. There are a few flax scutching mills in this subregion, but industry has been steadily drawn to Londonderry during the past century.

6. THE ROE AND FAUGHAN VALLEYS

Between lough Foyle and the west edge of the basalt plateaus lies a hilly area, with crests around 800-1,300 ft. and valleys in between them: the two main rivers are the Roe and die Faughan. The area is one of ancient metamorphic rocks, though there are Carboniferous sandstones around lough Foyle and in the Roe valley and Triassic beds also appear in die Roe valley with a thin band of Cretaceous rocks immediately below the basalt scarp. The coastal plain consists of raised beach and alluvium, wide spreads of glacial fluvial sands and gravels and there are also some 'intakes' or sloblands on the lake shores, formed by sedimentation behind walls or embankments. The entrance to lough Foyle at Magilligan point is marked by a long belt of sand dunes. Both along the coasts and inland, many of the soils are well-drained sandy drifts and the farms generally have at least one-third of their land under crops, with another tenth in hay and the remainder as permanent pasture. Cattle are kept primarily as stores, though there is some fattening for the meat market of Londonderry and formerly milk was sent to a creamery at Limavady. Sheep are far more numerous than cattle on the hills, and almost half die area is rough grazing, much of which is well suited to sheep. The density of population in the rural area is around no per square mile of improved land, and the main town market

is naturally Londonderry, though Limavady (2,800 in 1937) and Dungiven (700 in 1937), each seventeen miles away from Londonderry, are two ancient plantation towns and market centres in the Roe valley.

7. THE CITY OF LONDONDERRY

Derry is a town of great antiquity, chosen as the centre of the London Companies' plantation in the seventeenth century, as it was a defensible and often defended site on a hilltop over 100 ft. higher than the Foyle, here 300 yards wide. This hill, a rock-knoll of schistose sedimentary rock covered with boulder clay, is surrounded by the Mary Blues Burn, an old channel that is still below the level of high water at spring tides, which are kept back by retaining walls. The nucleus of the town is the old walled city with its Cathedral built in 1633 on the site of an earlier church, and its stately eighteenth-century buildings: this is still the main shopping, commercial and to some extent also residential part of the town, and the walls are well preserved. In the mid-nineteenth century, Londonderry had already spread beyond this nucleus along the ridge and also across the Mary Blues Burn to the rising ground beyond, and over the river to the suburb of Waterside. Derry was still, however, a town of merely 10,000 people and grew gradually during the second half of the nineteenth century to 40,000 in 1901 and 49,000 in 1947. The buildings spread across the rising ground on each side and Waterside became an industrial and residential suburb: docks and warehouses lined the river bank and four separate railway stations were built, two on each side of the river. The lack of planning is only too apparent in the city away from the original nucleus, especially along the riverside. The working-class suburbs occupy the lower ground with the stately old houses in the centre and the attractive modern suburbs spread out on high ground above them. The industrial strength of Londonderry is mainly in shirt-making, though its basis is the flax spinning and weaving of the early nineteenth century: its port was greatly improved during the war of 1939-1945 as it was used as a naval base, but, though the second port of Northern Ireland, Londonderry profits comparatively little from its nearness to the Atlantic as the commercial strength of Belfast is incomparably greater. Nevertheless, it remains the regional capital of the northwest and the London planters were not wrong in their judgement that a town on the Foyle must become a major centre, for only Dublin, Belfast and Cork have a larger population, so Londonderry, small as it may seem, is still the fourth town of Ireland.

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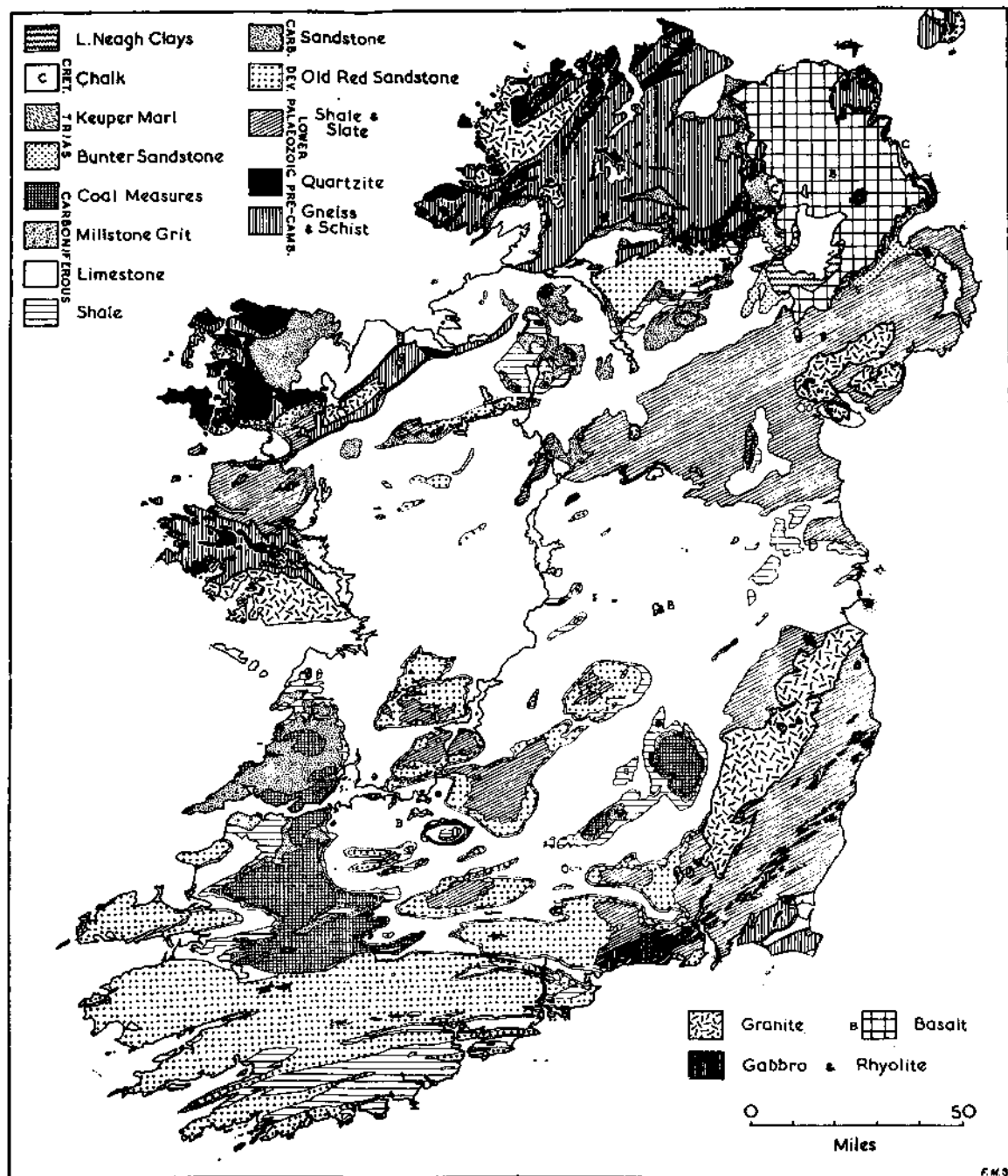
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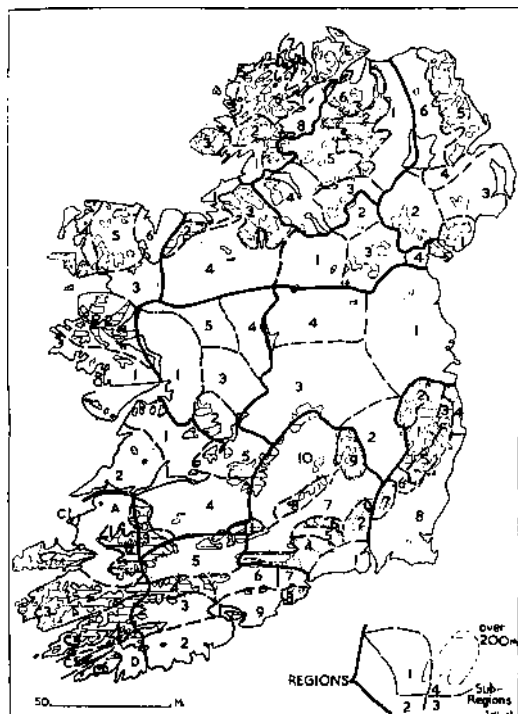
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The author is indebted to Mr. J. W. Darbyshire, M.A., and Mr. C. Campbell, M.A., for the use of their unpublished theses on this region.



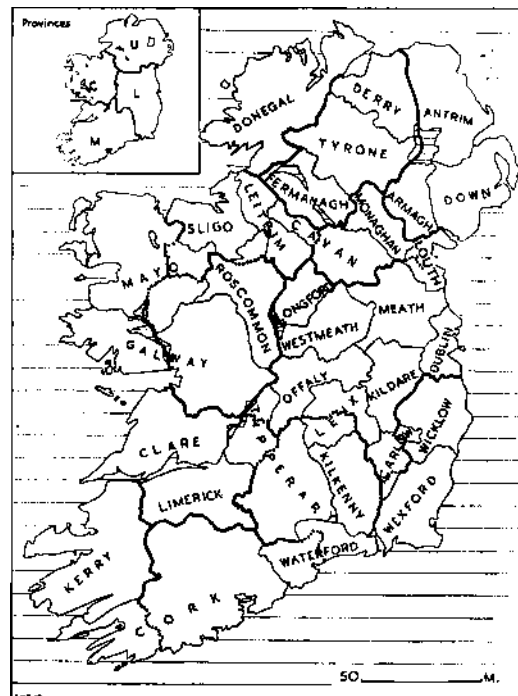
Carboniferous limestones floor the Central Lowland and the lowlands around the various uplands south of the Dublin-Galway line. Comparison of this map with figs. 1 and 2 will show how the main structural elements and trend lines are related to the geology.

Compiled and drawn by F. M. Sygne



(a) REGIONS AND SUB-REGIONS

This map shows the regions and sub-regions discussed in Chapters 12-23. Readers of the regional chapters will find the $\frac{1}{2}$ in. to 1 mile Ordnance Survey maps, or the $\frac{1}{4}$ in. to 1 mile Bartholomew series invaluable: failing these, reference should be made to the 1: 633,600 maps in the *Times Atlas*, which are also given in Bartholomew's *Tourist Atlas of the British Isles*. It can hardly be stressed too strongly that for students the ordinary atlas map are inadequate for the chapters in Part II of this book.



(b) PROVINCES, COUNTIES, INDEX TO POPULATION MAPS

The inset shows the four provinces, Ulster, Leinster, Munster and Connacht. The population maps in Chapters 12-23 correspond as nearly as possible to the regions distinguished, but to enable statistical comparisons to be made, each set of population figures refers to a number of rural districts. In this map, the limits of the population maps are shown by thick lines where they correspond to county boundaries, otherwise by dotted lines.

INDEX

Italics are used for personal names and for references to published works. In some major references the main treatment is indicated by italics, *e.g.* Agriculture, 103-106; Aran islands, 443-446; Belfast, 513. Those who use this index for information on particular counties are advised also to consult Folder II, which shows the relationship of the chapters in Part II to the counties and provinces.

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