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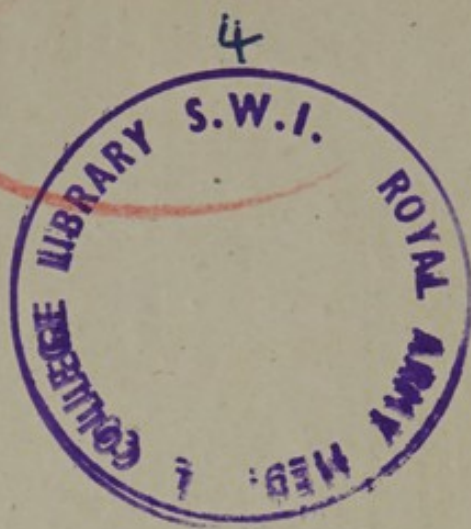


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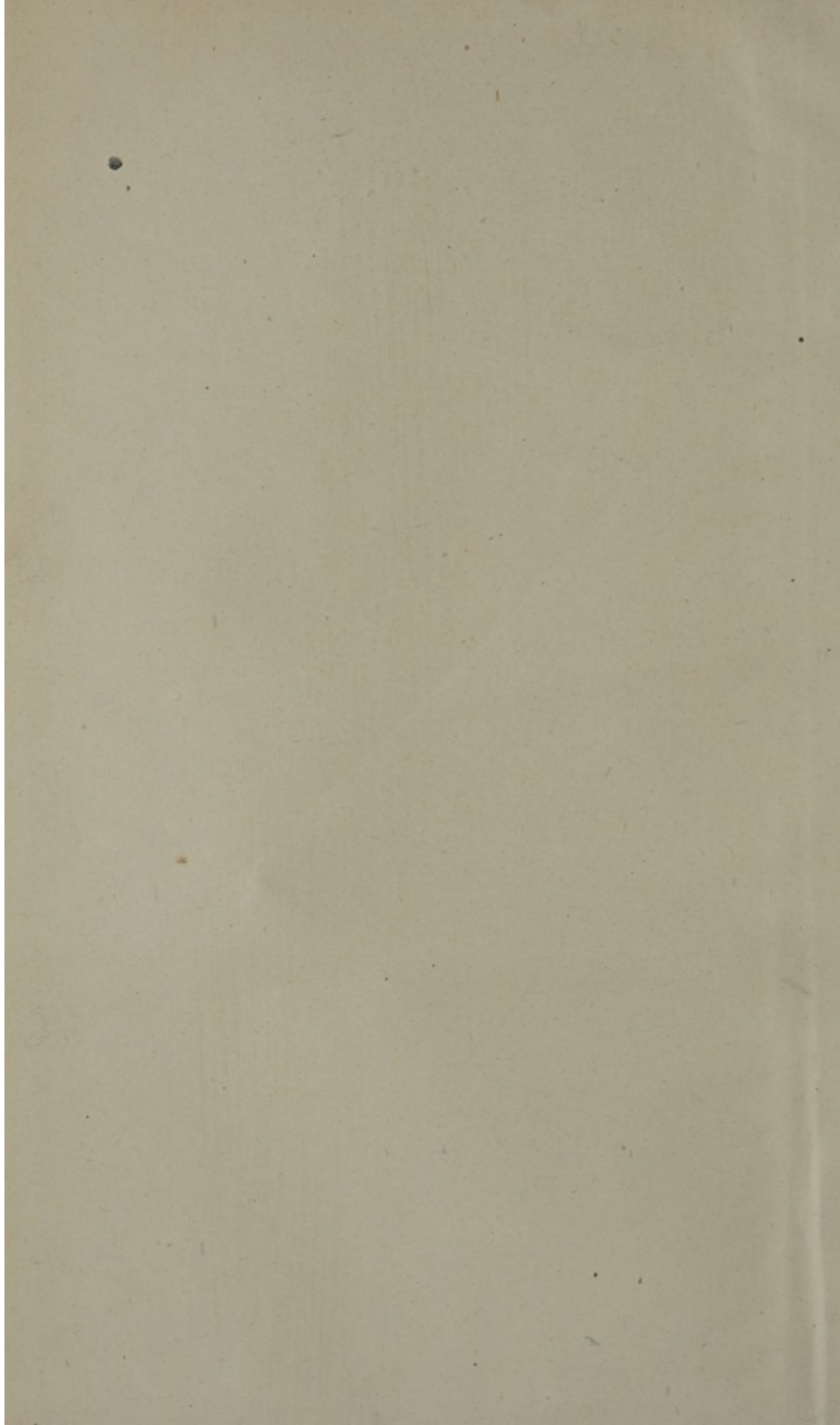
LUXEMBOURG

NAVAL INTELLIGENCE DIVISION



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GEOGRAPHICAL HANDBOOK SERIES
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September 1944

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PREFACE

IN 1915 a Geographical Section was formed in the Naval Intelligence Division of the Admiralty to write Geographical Handbooks on various parts of the world. The purpose of these handbooks was to supply, by scientific research and skilled arrangement, material for the discussion of naval, military, and political problems, as distinct from the examination of the problems themselves. Many distinguished collaborators assisted in their production, and by the end of 1918 upwards of fifty volumes had been produced in Handbook and Manual form, as well as numerous short-term geographical reports. The demand for these books increased rapidly with each new issue, and they acquired a high reputation for accuracy and impartiality. They are now to be found in Service Establishments and Embassies throughout the world, and in the early years after the last war were much used by the League of Nations.

The old Handbooks have been extensively used in the present war, and experience has disclosed both their value and their limitations. On the one hand they have proved, beyond all question, how greatly the work of the fighting services and of Government Departments is facilitated if countries of strategic or political importance are covered by handbooks which deal, in a convenient and easily digested form, with their geography, ethnology, administration, and resources. On the other hand, it has become apparent that something more is needed to meet present-day requirements. The old series does not cover many of the countries closely affected by the present war (e.g. Germany, France, Poland, Spain, Portugal, to name only a few); its books are somewhat uneven in quality, and they are inadequately equipped with maps, diagrams, and photographic illustrations.

The present series of Handbooks, while owing its inspiration largely to the former series, is in no sense an attempt to revise or re-edit that series. It is an entirely new set of books, produced in the Naval Intelligence Division by trained geographers drawn largely from the Universities, and working at sub-centres established at Oxford and Cambridge. The books follow, in general, a uniform scheme, though minor modifications will be found in particular cases; and they are illustrated by numerous maps and photographs.

The purpose of the books is primarily naval. They are designed first to provide, for the use of Commanding Officers, information in a

comprehensive and convenient form about countries which they may be called upon to visit, not only in war but in peace-time; secondly, to maintain the high standard of education in the Navy and, by supplying officers with material for lectures to naval personnel ashore and afloat, to ensure for all ranks that visits to a new country shall be both interesting and profitable.

Their contents are, however, by no means confined to matters of purely naval interest. For many purposes (e.g. history, administration, resources, communications, etc.) countries must necessarily be treated as a whole, and no attempt is made to limit their treatment exclusively to coastal zones. It is hoped therefore that the Army, the Royal Air Force, and other Government Departments (many of whom have given great assistance in the production of the series) will find these Handbooks even more valuable than their predecessors proved to be both during and after the last war.

J. H. GODFREY

Director of Naval Intelligence

1942

The foregoing preface has appeared from the beginning of this series of Geographical Handbooks. It describes so effectively their origin and purpose that I have decided to retain it in its original form.

This volume has been prepared for the Naval Intelligence Division at the Cambridge sub-centre (General Editor, Dr H. C. Darby). It has been written by Mr K. C. Edwards with the assistance of Mr F. J. Monkhouse, and with a contribution from Mrs B. J. Edwards. The maps and diagrams have been drawn by Miss K. S. A. Froggatt and Miss M. Hart.

E. G. N. RUSHBROOKE

Director of Naval Intelligence

September 1944

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Chapter I

GEOLOGY AND PHYSICAL FEATURES

Introduction : Geological Formations : Regional Divisions : The River System : Note on the Geological History of Luxembourg : Bibliographical Note

INTRODUCTION

The Grand-Duchy of Luxembourg is one of the smallest sovereign states in Europe, having an area of 998 sq. miles (2,586 sq. km.), which is comparable with that of the English county of Derbyshire. Its greatest length from north to south is 51 miles (82 km.), and its



Fig. 1. The position of Luxembourg in relation to neighbouring countries
Based on the 1 : million, G.S.G.S. 4327, Paris sheet (London, 1942).

maximum breadth is 35 miles (57 km.). Of the total population of just under 300,000, nearly 60,000 reside in the capital city. The

economic significance of the country however is greatly out of proportion to its size, and its capital is an important railway centre through which several international trunk routes pass.

The Grand-Duchy is situated about 155 miles (250 km.) in a south-easterly direction from the Belgian seaboard (Fig. 1) and occupies a position in the 'marchland' between the Rhine and the Meuse. As a result, it forms part of the territory whose troubled history reflects the age-long conflict between France and Germany.

The country consists of part of the southern Ardenne uplands and a portion of the adjoining plateau of Lorraine, thus providing two distinctive and contrasting types of landscape. The Ardenne portion, often called the *Oesling*, forms nearly one-third of the whole, while the remainder, on account of its lower elevation and better agricultural conditions, is known as the *Bon Pays*, or, in German, *Gutland*. An abrupt descent to the Bon Pays along the southern edge of the Ardenne serves to sharpen the distinction between the two regions, although access to the upland is made possible by valleys which run far into the massif (Fig. 3).

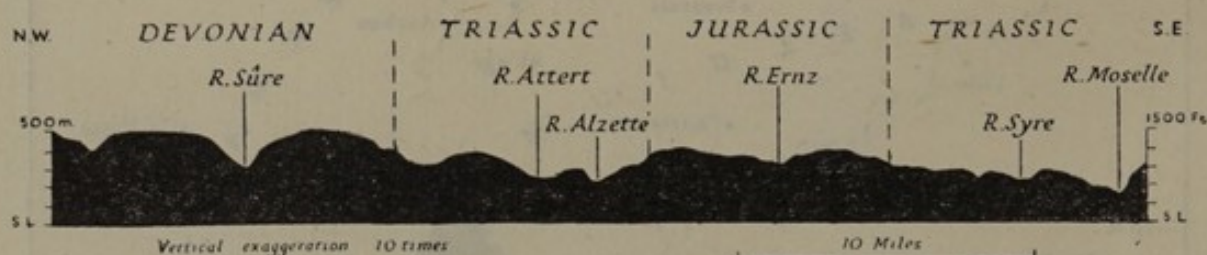


Fig. 2. Profile section through Luxembourg from north-west to south-east
Based on the 1 : 200,000 *Carte de France*, Sheet 11 (Longwy) (Paris, n.d.).

The Ardenne, which varies in altitude from 1,300 to 1,600 ft. and attains its maximum height in the low rounded summits of the Burgplatz (1,847 ft.) near Huldange and Napoléonsgard (1,821 ft.) near Grevels, is composed of older Palæozoic (mainly Devonian) rocks. The Bon Pays has a mean elevation of about 900 ft., although parts of the Moselle valley are little above 500 ft.; it consists of Mesozoic sediments. Both parts of the country are very much dissected by deep river valleys, which has resulted in an irregular undulating relief (Figs. 2, 4); the bolder forms and more rugged scenery prevail in the Ardenne uplands.

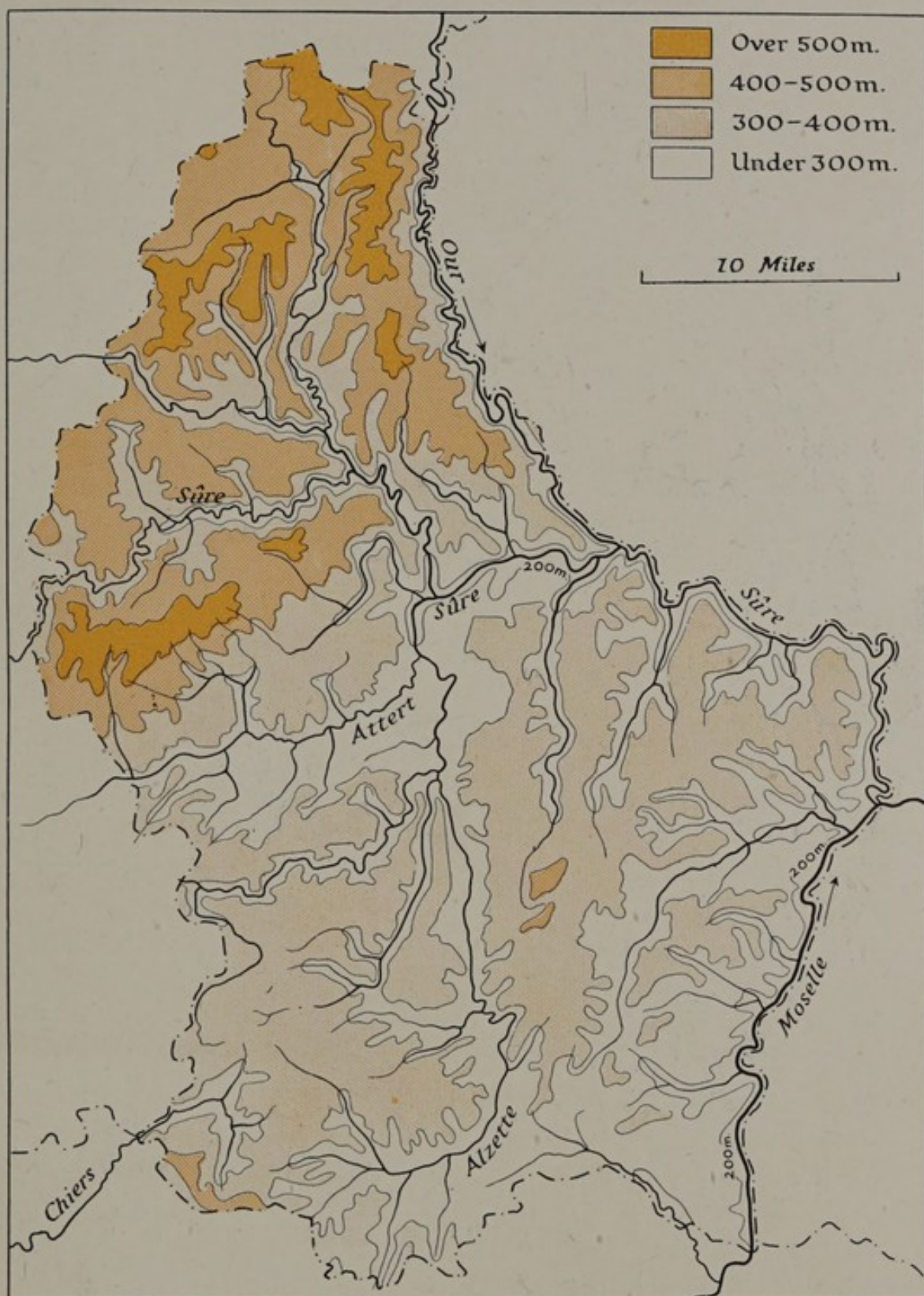


Fig. 3. The relief features of Luxembourg

Based on the 1: 500,000 *Carte Oro-hydrographique de Belgique*, compiled by A. de Ghellinck, M. A. Lefèvre, and P.-L. Michotte (Turnhout, 1937).

GEOLOGICAL FORMATIONS (Fig. 5)

*Palæozoic Rocks**Lower Devonian*

The Palæozoic rocks are represented in Luxembourg solely by those of the lower Devonian formation, which give rise to the upland country of the Ardenne. These beds, which are of great thickness, are composed of grits, quartzites and slates, with the last predominant, and, as in the main mass of the Ardenne in Belgium, they have been intensely folded.

Table of Geological Divisions represented in Luxembourg

Quaternary	{ Recent Pleistocene	
Mesozoic	{ Jurassic	{ Lower Dogger (Oolite) Lias
	{ Triassic	{ Keuper (with Rhætic) Muschelkalk
		{ Bunter
Palæozoic	Lower Devonian	Coblencian

They may be grouped into definite series which occupy belts of country running south-west to north-east, in accordance with the structural trend of the Ardenne (see p. 24). In the extreme north are the Bas-Bellain Slates, which are of a sandy nature, followed by others of a darker and more clayey character called the Troisvierges Series. The latter are repeated in a broad belt to the south as the Kautenbach Series. In both cases they have been worked for roofing slates. Then quartz phyllites, with quartzites and gritstones (Heinerscheid and Schuttbourg Series), form a group of rocks of great hardness owing to the high proportion of silica present. They are valuable in providing road-making material and at Merkholtz in the valley of the Wiltz there was at one time a large quarry and crushing plant worked by the State. Two other series of slates, the Red Slates of Clervaux and the Wiltz Slates, can be distinguished—the former on account of their relatively bright colours (red, green, light grey, with the red predominating), and the latter owing to their softer, less resistant character, as well as their darker appearance. Lastly comes the Berlé Quartzite which, apart from a number of separate occurrences in the Wiltz and Hosingen districts, forms an exceptionally narrow but continuous strip of country just

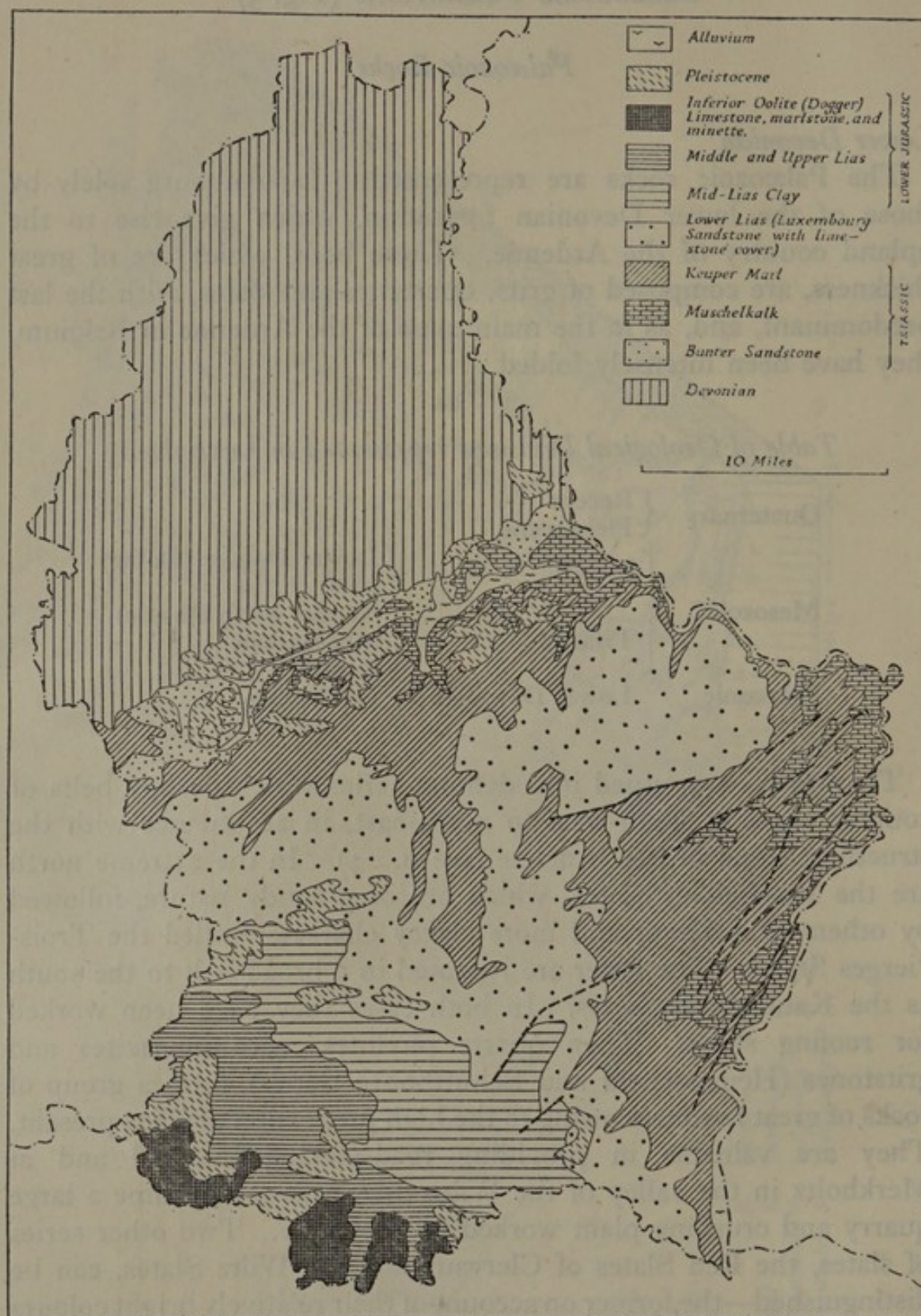


Fig. 5. Geology

Based on the 1 : 100,000 *Geologische Übersichtskarte des Luxemburger Landes*, edited by J. Robert (Luxembourg, n.d.).

The pecked lines indicate faults.

south of these places. Containing 90% of quartz, this is the hardest rock found in the Grand-Duchy. Generally of a light, almost whitish colour, it has been worked in many places (as at Berl , Bockholtz and Hosingen) for road metal. The quartzite was for a long period quarried from the mass forming the summit of the Schwarzenh gel near Marbourg and exported for the manufacture of fire-proof materials.

Mesozoic Rocks

The Bon Pays region is composed of Triassic and Lower Jurassic rocks. The former occupy two belts, one extending across the country in a west-south-west to east-north-east direction immediately south of the Ardenne, and the other running roughly parallel with the Moselle valley, forming a broad tract along the south-eastern border. The Lower Jurassic rocks cover the centre and south, with an eastward extension between the two zones of Triassic rocks reaching to the valley of the S re between Reisdorf and Echternach.

Triassic

The *Bunter sandstone* formation consists of a thick, reddish sandstone, in parts rather clayey in character, forming a narrow irregular belt along the southern border of the Ardenne, appearing again along the lower S re valley at Steinheim and Born. The broadest portion of the outcrop lies in the west around Redange, where, however, the surface is partially masked by patches of superficial fluvio-glacial material. Close to the Ardenne, the Bunter contains large accumulations of pebbles. Though it was once used fairly widely as a building-stone, the only quarries worked in recent years are those at Mertzig, west of Ettelbruck.

The equally narrow and irregular outcrop of the *Muschelkalk* succeeds that of the Bunter southwards along the foot of the Ardenne, and in addition it runs continuously along the lower S re and Moselle valleys from Echternach to Remich, reappearing in the extreme south-east corner of the country at Schengen. Over the much faulted area enclosed by these valleys, especially between Echternach and Grevenmacher, are many local exposures of the Muschelkalk, their extent and distribution being largely controlled by the faults. Though in most other parts of Europe the Muschelkalk consists almost exclusively of limestone, in Luxembourg the lower layers in particular, especially those nearest the Ardenne,

are composed of sandstone, marls and dolomitic limestone. The last-named is worked at quarries near Born. The middle layers comprise relatively unresistant materials of a sandy character to the west of Ettelbruck, while eastwards they are both marly and dolomitic, containing gypsum and rocksalt. The mineral salts present in the springs at Mondorf-les-Bains are derived largely from these beds. The upper part of the series consists of thick layers of dolomite, though near the Ardenne from Reisdorf westwards their sandy character is repeated. Along the Sûre and Moselle, however, massive cliffs of limestone are a feature of the landscape. Their slopes provide the terraces for the vineyards, besides giving rise to a good deal of quarrying, and in former times to lime-burning, which was carried on near Echternach, Ettelbruck and Diekirch. The dolomitic sandstone is worked at Gilsdorf and Bettendorf for building stone and road metal.

The *Keuper* division of the Triassic series consists predominantly of clays and marls of a loamy but impermeable nature, which vary in colour from red or purple to light grey. These rocks occur in two main belts running parallel to the outcrop of the Muschelkalk, though of considerably greater width. The lowest beds, which occupy much of the surface in the east, comprise the characteristic marls, together with overlying deposits of dolomite in some places. The marls are uniformly developed over a large area, and only in the west, as in the Attert valley, do they become a sandy formation. They even become conglomeratic towards the Ardenne. Next come alternating beds of sandstone and marl, forming the Middle Keuper; this also contains abundant gypsum, which is worked at several places, such as Heisdorf, Steinsel and Walferdange in the Alzette valley, and at Remich. Above these come further layers of red marl, and finally a yellowish sandstone, which represents the Rhætic phase of deposition. The middle and upper series occur as a relatively narrow fringe along the outcrop of the lower marls, though they are frequently exposed along the lower portions of valleys which cut deeply across the central (Lias) plateau of the Bon Pays.

Jurassic

The base of the *Lower Lias* is formed by a somewhat feeble development of limestone and marl, above which comes the thick light-yellow sandstone known as the *Luxembourg Sandstone*. This deposit covers a large part of the Bon Pays, forming a rough

quadrilateral with its corners at Eischen, Beaufort, Echternach and Mondorf, as well as providing the remarkable setting for the capital (see p. 318). The sandstone, which exceeds 300 feet in thickness and contains innumerable fissures running perpendicular to the bedding, forms the central plateau of the Bon Pays, covering about a fifth of its total area. The quartz grains of which it is composed are cemented by a calcareous matrix, though in parts a siliceous cement is found imparting additional hardness and durability to the stone. Commonly, however, the action of rainwater containing carbonic acid, by dissolving the lime in the cement, causes the disintegration of the rock into sand. In this way the fissures are widened and deepened, until ultimately a landscape carved into winding defiles with cliffs, chasms, buttresses and rock pillars is produced. On bold lines this is well seen in the neighbourhood of the capital, while on a smaller scale and more intricate pattern it is repeated in the famous Petite Suisse (Müllerthal) area west of Echternach.

As it has a moderately high porosity, the Luxembourg Sandstone holds an abundance of water. Supplies are obtained from springs in the valleys where the water-table approaches the surface, or from wells. Copious springs at Kopstal now provide the capital with much of its requirements, while many other towns derive their supplies from the sandstone, such as Ettelbruck, Diekirch, and Remich, as well as the inter-communal water undertaking for the canton of Esch (see p. 120). The sandstone is quarried in many places. A valuable freestone is worked at Ernzen and Dillingen; stone for buildings is found widely, while building-sand is also readily obtained.

In places, the Luxembourg Sandstone is covered by a thin limestone (Grypæa Limestone). It occurs chiefly in the east, mainly between the Ernze Blanche and Ernze Noire valleys, in irregular patches occupying the higher ground.

The *Middle* and *Upper Lias* series consist of a succession of deposits, mainly of relatively soft materials (clays, marls and shales), which form the surface in the south-west of the country between the Luxembourg Sandstone and the 'Minette' escarpment. The sandstone is succeeded to the south-west by a narrow outcrop of clay, which is broadest in the west around Capellen. Overlying this, to the south-east of the capital, is a band of limestone which appears at the surface from Itzig as far as Weiler-la-Tour without, however, affecting the relief. Elsewhere, the clay is followed by a

broader belt of marls (Mid-Lias Clay or Marl), running from the Lorraine border in the neighbourhood of Frisange across to the Belgian frontier at Kleinbettingen, with its maximum breadth between Luxembourg and Bettembourg. Next comes a tract of sandy material extending north-westwards from the left bank of the Alzette between Bettembourg and Schiffange, reaching the Belgian frontier near Clemency. The outcrop is irregular in shape and includes an inlier at Sanem. Lastly comes a belt of shales (Upper Lias), which occupies a comparatively narrow zone south-west of a line joining Bettembourg and Clemency. They are succeeded, close to the frontier, by the 'Minette' formation. Along the valleys which cut into the 'Minette' at Esch, Rumelange and Dudelange, however, the shales actually reach the frontier. In places, especially near Bettembourg, an organic content gives them a bituminous character, and experiments in distillation to obtain petroleum have met with some limited success.

The ferruginous beds comprising the 'Minette' formation comprise the lower layers of the Dogger (Oolite) division of the Jurassic rocks. Their appearance in the Grand-Duchy represents simply the northern fringe of the extensive outcrop in Lorraine; in fact, out of a total extent of about 390 sq. miles, the Luxembourg portion, confined entirely to the canton of Esch, occupies only about 14 sq. miles. Despite their restricted occurrence, these iron-bearing strata are of the utmost economic importance to the country. The 'Minette' series is of considerable thickness, and consists of alternating limestones and marls separated at intervals by bands of ironstone which vary in thickness and value.

The 'Minette' zone is divided into two parts, generally referred to as basins, by the upper Alzette valley. To the east is the Esch-Rumelange-Dudelange basin, and to the west the Belvaux-Differdange-Rodange basin, these being commonly referred to as the Esch and Differdange basins respectively (Fig. 51). The prevailing reddish colour of both rock and soil in these areas, owing to the presence of iron oxide, has earned for the entire district the name of *Terres-Rouges*.

Quaternary Deposits

The youngest geological materials consist of superficial deposits of gravel, sand and loam laid down through the agency of surface water. According to their age and situation, two types are distin-

guished—the older Pleistocene materials (sometimes known as Diluvium) and the newer Alluvium.

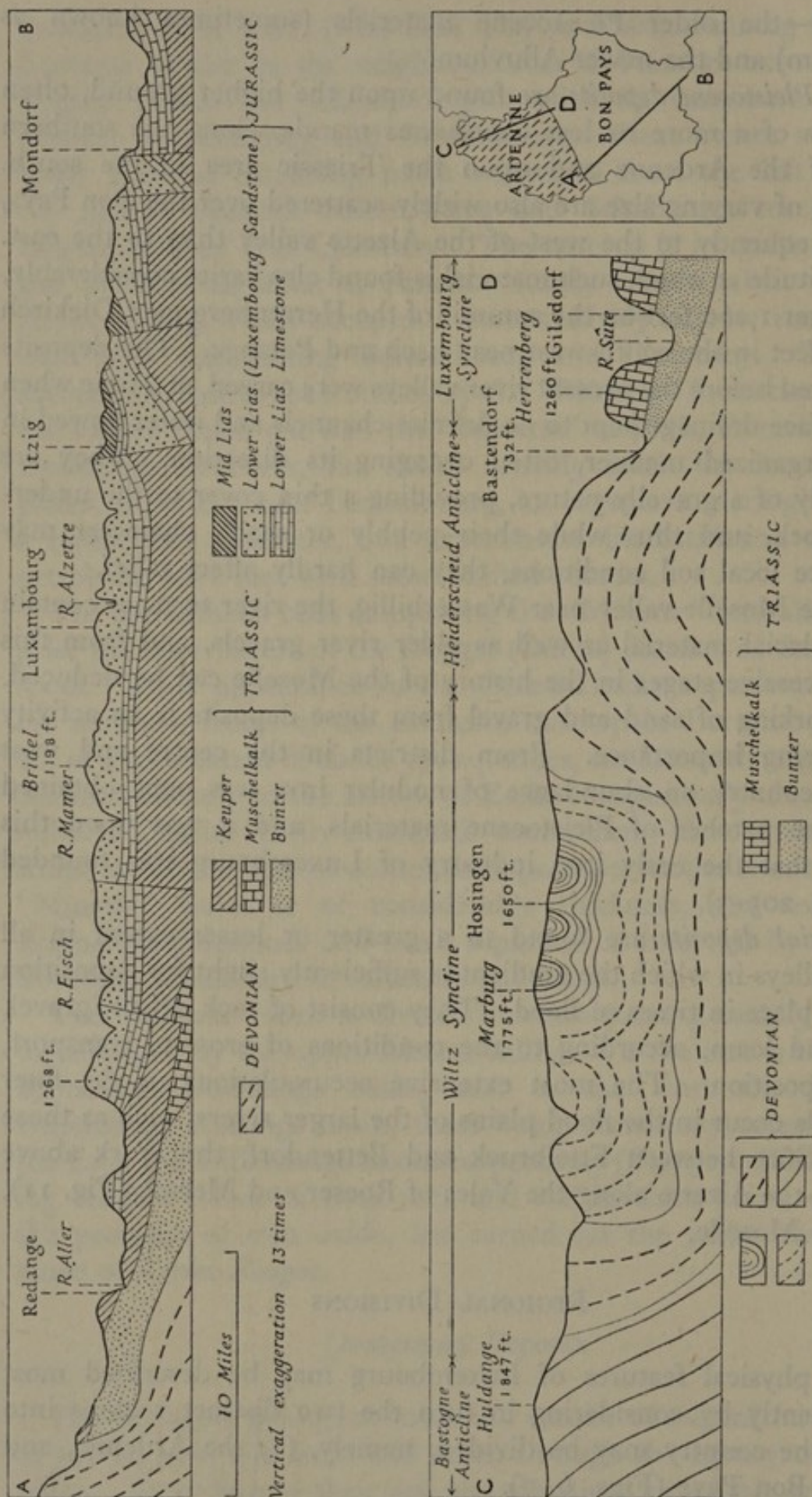
The *Pleistocene deposits* are found upon the higher ground, often as relics of a more or less continuous mantle, along the southern edge of the Ardenne and upon the Triassic area to the south. Patches of varying size are also widely scattered over the Bon Pays, more frequently to the west of the Alzette valley than to the east. The altitude at which such material is found also varies considerably, from over 1,260 feet on the summit of the Herrenberg near Diekirch to 900 feet in the south-west near Esch and Pétange. The deposits originated before the present river valleys were carved, at a time when the surface drainage kept to no definite channels and water flowed in an unorganized manner, often changing its direction. They are generally of a gravelly nature, providing a thin cover to the underlying rock, and thus while their pebbly or sandy character may influence local soil conditions, they can hardly affect relief.

In the Moselle valley near Wasserbillig, the river terraces contain fluvio-glacial material as well as older river gravels, and from this the successive stages in the history of the Moselle can be deduced. The working of sand and gravel from these deposits is an activity of growing importance. From districts in the centre and west of the country an abundance of nodular iron was once obtained from the patches of Pleistocene materials, and it was upon this source that the early iron industry of Luxembourg was founded (see pp. 205-7).

Alluvial deposits are found to a greater or lesser extent in all river valleys in which the gradient is sufficiently slight for deposition to take place in times of flood. They consist of rock débris, gravel, sand and loam, according to the conditions of erosion, transport, and deposition. The most extensive accumulations of the finer materials occur in the flood plains of the larger rivers, such as those of the Sûre between Ettelbruck and Bettendorf, the Wark above Feulen, the Alzette along the Vales of Roeser and Mersch (Fig. 11), and the Moselle.

REGIONAL DIVISIONS

The physical features of Luxembourg may be described most conveniently by considering in turn the two distinct regions into which the country may be divided, namely, (1) the Ardenne, and (2) the Bon Pays (Figs. 6, 7).



Figs. 6, 7. Geological sections across the Bon Pays (above) and Ardenne (below)

Based on the 1 : 100,000 *Geologische Übersichtskarte des Luxemburger Landes*, edited by J. Robert (Luxembourg, n.d.).

(1) *The Ardenne* (Plates 1-4)

The Luxembourg Ardenne forms part of the westward continuation of the Eifel region of Germany, and occupies about one-third of the total area of the Grand-Duchy. Its southern limit is defined geologically by the boundary between the Devonian rocks of which it is composed and the Trias sediments which form part of the Bon Pays. This runs from the Belgian frontier near the hamlet of Roodt, through the villages of Folschette, Grosbous, Feulen, Erpeldange and Bastendorf, to the river Our a little below Vianden. Topographically, however, the sharp descent which marks the edge of the upland lies a little further south, leaving a narrow fringe of Trias materials overlooking the depression which unmistakably separates the northern region from the Bon Pays. Thus the Herrenberg (1,260 feet) near Diekirch, marking the edge of the upland, is a feature composed of Triassic limestone (Muschelkalk). To the west, however, the passage from the Ardenne to the Bon Pays is more gradual, the descent towards Redange being made by comparatively gentle slopes.

In general, the Luxembourg Ardenne shares much of the character of the Belgian Ardenne. It is, however, of considerably lower average and maximum elevation; the highest point in Luxembourg is the Burgplatz (1,847 feet), whereas in Belgium the Botrange rises to 2,277 feet and Baraque Michel to 2,215 feet. In both, the surface consists largely of low flat-topped or rounded eminences, separated by wide shallow depressions; the summits are usually quite inconspicuous. The upland surface is extensively wooded, although there are tracts of open moorland.

Many of the features of the present-day landscape of the Luxembourg Ardenne are due to the work of the streams. The relative elevation of the region and the hard impermeable nature of the rocks of which it is composed promote a rapid run-off of the surface water. Consequently, especially towards the south, it is deeply dissected by the larger rivers and by the numerous torrents which form their tributaries. At first, they flow at the level of the general surface, but followed downstream they become increasingly incised, and flow in narrow V-shaped valleys, sometimes with precipitous rocky walls, sometimes with steep but thickly wooded slopes. The drainage pattern has been emphasized by the uplifts of the plateau in late Tertiary and Quaternary times. As a result, the gradient of the river beds has been steepened, and therefore

their rate of flow and their erosive power have been greatly increased; this process is known as rejuvenation, and has been responsible in Luxembourg for some very striking relief features. As a result, the rivers have deepened their valleys and entrenched themselves in narrow winding defiles. The Our above Vianden (Bivels and

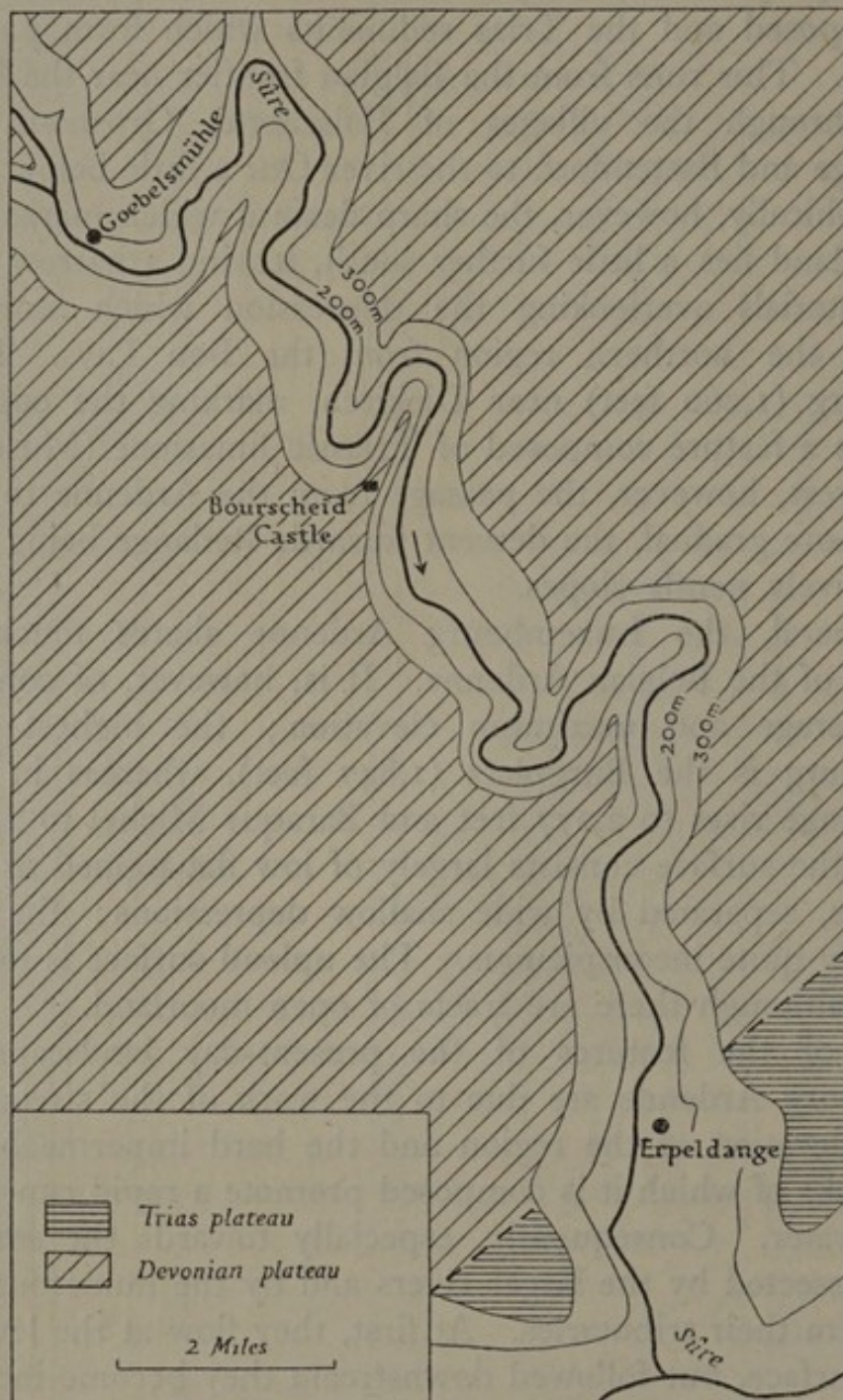
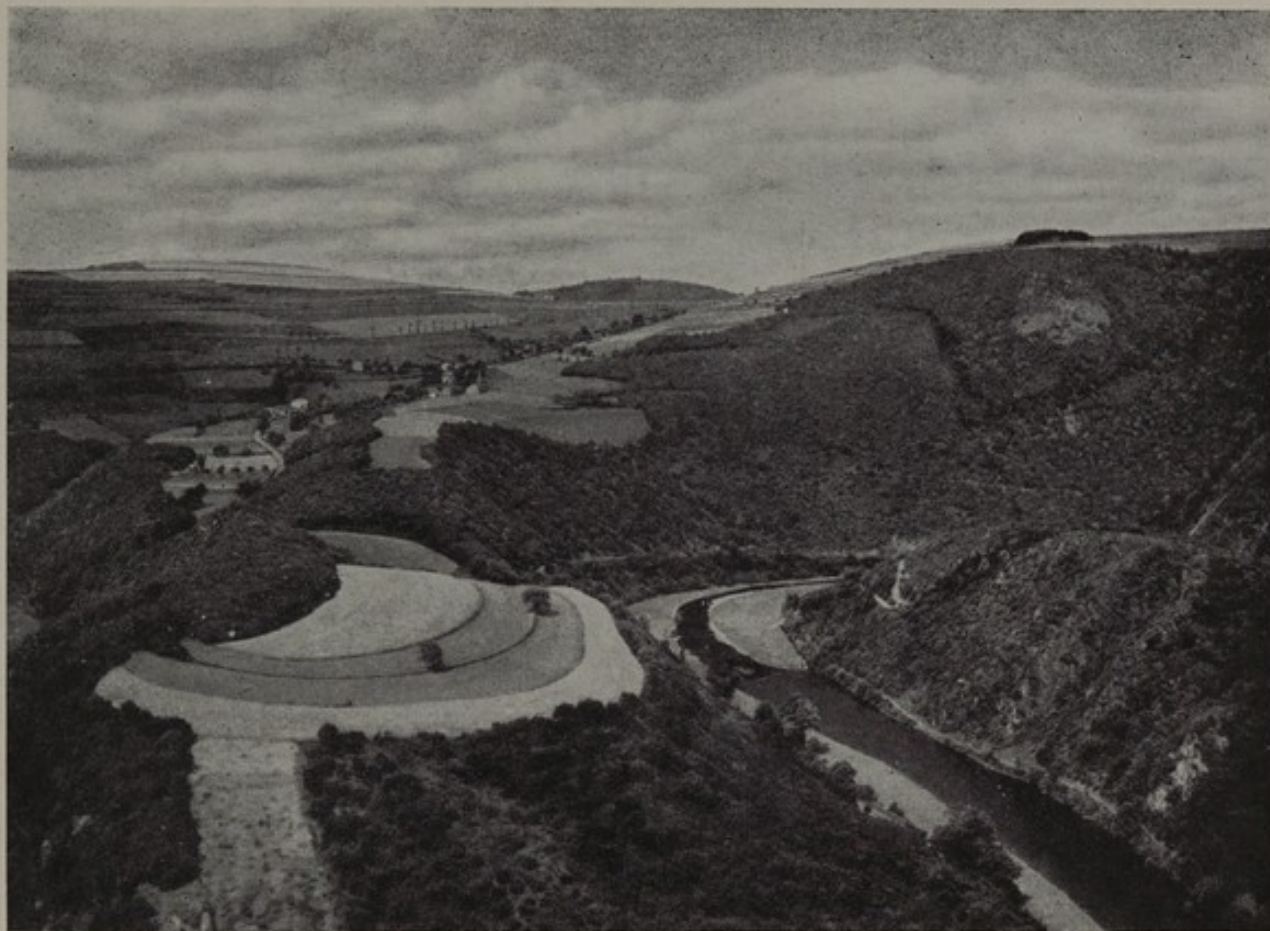


Fig. 8. The valley of the river Sûre in the Ardennes

Based on J. Robert, *Geologische Heimatkunde von Luxemburg, Tafel II* (Luxembourg, 1906.)

A typical example of the deep winding valleys eroded in the resistant rocks of the Devonian plateau. The geology of the plateau surface only is shown.



Plates 1, 2. ARDENNE LANDSCAPE

The upper view is from Bourscheid Castle across the Sûre valley; the lower is of the village of Bourscheid upon the plateau. Both show the striking contrast between the wooded valley slopes and the open, largely cultivated plateau surface.



Plates 3, 4. VALLEYS OF THE ARDENNE

The Our (above) and Sûre (below), like other Ardenne streams, have worn deep winding valleys across the plateau. See also Plate 29.

Stolzembourg), and the Sûre between Bourscheid Castle and Goebelsmühle (Fig. 8) and again at Esch-sur-Sûre, afford superb examples of this type of valley. The river in each case lies about 600 feet below the plateau level. The torrents, of which the Our in particular has an abundance, are vigorously etching the main valley slopes with their gullies and carving the edges of the plateau, leaving bold spurs and narrow steep-sided promontories, as at Vian-den and Bourscheid, which have provided natural sites for castles (Plate 46). The valleys of the larger rivers, however, are being widened at some points as the meanders shift downstream, as in the case of the Our near Bettel and of the upper Sûre at Esch-sur-Sûre. The floor of each valley is often exceptionally narrow, so that the frequent meander loops make routes extremely tortuous. Railways are obliged to tunnel through the spurs and to bridge the stream, often twice on each loop, and to utilize either the flood plain or a terrace, where the river flows along a relatively straight stretch. Thus between Ettelbruck and Clervaux, the main line northwards requires eight tunnels, and crosses the Sûre and the Clervaux (Clerf) more than thirty times. Upon the surface of the plateau, where most of the villages are situated, there is a network of roads, but seldom do these descend to the valleys, except as poor-class roads and tracks. Recent years have seen great improvements, nevertheless, in the highways which thread their way along the defiles of the chief rivers (Plate 29).

The streams, by their vertical erosion following the re-elevation of the region, have thus produced the existing valley forms. The planing of the slopes by other agents of erosion, a much slower process, has not had time to proceed far. Yet some of the valley slopes and spurs exhibit fragmentary platforms or bench-like features, indicating a succession of uplifts which caused the rivers to repeat the cycle of erosion. Over the plateau as a whole, it is possible to distinguish a general erosion level at about 1,500 feet, formed in early Tertiary times. This feature can be traced westwards into Belgium as far as St. Hubert and in the opposite direction to the Eifel uplands. Relics of another level extend along the valleys of the Sûre, Wiltz and Clervaux as a series of platforms at about 1,300 feet. These appear to represent a surface of mid-Tertiary origin which is found more continuously over the Bon Pays. Finally, a fragment of a much earlier erosion surface survives as a single rounded summit known as Napoléonsgard, near Wahl, which reaches a height of 1,821 feet.

The Bon Pays (Plates 5-8)

The Bon Pays consists essentially of a low plateau covering an area of some 680 sq. miles, with an elevation of 800 to 1,200 feet. The area is a continuation of the Arlon district of Belgium and the adjoining part of Lorraine, as it is composed of the same geological materials and exhibits the same scarpland type of landscape. The whole area is really an extension of the Paris basin, but, as it has a synclinal structure of its own, it is sometimes regarded as a small replica of that region.

The Mesozoic rocks (Triassic and Lower Jurassic) which form the region have been gently folded, and in parts, especially towards the Moselle, considerably faulted. The area owes its physical features to the differential erosion of a succession of gently inclined Jurassic strata, the more resistant limestones and sandstones standing out as escarpments, separated by areas of clays, marls, and shales, which form the vales. Broadly speaking, the Bon Pays comprises the lower Jurassic plateau (formed largely by the Luxembourg Sandstone), bounded by two marginal depressions, one to the north and the other to the east, formed of Triassic rocks. Three main physiographic divisions can thus be distinguished :

1. The Northern or Sub-Ardenne Depression
2. The Central Plateau
3. The Eastern or Moselle Depression

1. *The Northern or Sub-Ardenne Depression* (Plate 5)

This division forms a belt of less elevated country between the southern edge of the Ardenne and the northern escarpment of the Luxembourg Sandstone. The main axis of this trough, running south-west to north-east, is followed by sections of three different rivers, the upper Attert, the Wark and the Sûre (see p. 19). Southward of these, the Muschelkalk limestone gives rise to a line of hills within the depression. Though towards Redange the limestone no longer appears at the surface, this feature is continued along the valley of the upper Attert by the Keuper sandstone. At Ettelbruck the Muschelkalk escarpment is broken by the Alzette, which comes from the south to join the Sûre, but eastwards it regains its boldness and towers massively above the Sûre, with equally impressive heights on the other side formed by some outliers of the limestone. The latter give rise to the three summits of the Goldknap (1,076 feet), the Herrenberg (1,260 feet), and



Plate 5. THE SUB-ARDENNE DEPRESSION IN THE NEIGHBOURHOOD OF ETTTELBRUCK

Ettelbruck, often known as the 'Porte des Ardennes,' is situated between the Ardenne and the Bon Pays. The large building on the right is the State Agricultural School. In the foreground is the Alzette, in the background the valley of the Wark.



Plate 6. BON PAYS LANDSCAPE NEAR MERSCH

The little village of Schönfels, with its château, lies in the well cultivated valley of the Mamer, about two miles south of Mersch.



Plate 7. BON PAYS LANDSCAPE NEAR HESPERANGE

The view is looking south-east from the fault scarp of the Luxembourg Sandstone, which is crowned by the castle ruins (right) and cut through by the valley of the Alzette (left). See also Fig. 11.



Plate 8. THE MOSELLE VALLEY AT WORMELDANGE

The broad river is overlooked by vine-clad slopes; Wormeldange is one of the principal wine-producing centres. Behind the little town rises the height known as Köpchen, from which comes a well-known wine.

the Niederberg (1,348 feet). Towards the eastern frontier, the Triassic scarp, which is breached by the Ernzt Blanche (or Weisse Ernzt) on its approach to the Sûre at Reisdorf, merges with that of the Luxembourg Sandstone.

Southwards, the dip slope of the Triassic rocks is likewise broken into two sections by the Alzette. The western section is drained by the Attert, in the valley of which lies the large village of Redange, the administrative centre of the canton of that name, while the principal stream crossing the eastern section is the Ernzt Blanche.

Situated in the sub-Ardenne depression on the line of contact between the upland and the Bon Pays are the towns of Diekirch and Ettelbruck.

2. *The Central Plateau*

Much of the central part of the Bon Pays is formed by the Lias (Luxembourg) Sandstone, the surface of which gives undulating territory, though the horizon is sometimes broken by more vigorous slopes and more sinuous curves. The margin of the outcrop generally forms high ground often dropping abruptly outwards in the form of an escarpment like that overlooking the sub-Ardenne depression. This feature is continued from the Arlon district in Belgium, where it is known as the *Côte des Grès de Luxembourg*, and represents one of the main escarpments of the Bon Pays. At Wallendorf it continues across the Sûre into Germany, but swings back again and recrosses the river at Echternach. From this point the scarp swings southwards and then westwards, becoming less prominent where it overlooks the Triassic belt of the Moselle depression. The valley of the Sûre between Reisdorf and Echternach is deeply incised, and the wooded cliffs which fall abruptly from the edge of the plateau and dominate each curve of the river present one of the most beautiful features of the landscape.

Elsewhere, as in the western part of the country, the Luxembourg Sandstone gives rise to less conspicuous surface features, though locally it may be marked by higher ground. At Hesperange there is a striking change in the valley of the Alzette which, after flowing through the broad Vale of Roeser, cuts its way through a fault scarp marking the southern edge of the sandstone and enters a winding defile which continues through the heart of the capital, where the river is joined by the Pétrusse in a similar defile (Fig. 11).

From the point of view of geology as well as topography, it should be noted that to the north of the capital the sandstone plateau is

divided by the comparatively broad valley of the Alzette. Beyond Walferdange the river has cut through the sandstone, thus exposing the Keuper marl along each bank. This results in a broadening of the valley (Vale of Mersch), with the sandstone slopes still rising fairly abruptly but often far back from the river.

Finally, to the south-west, the Bon Pays is formed of less resistant materials, chiefly of clays and shales alternating with thin bands of limestone, and the relief is correspondingly more subdued. One of these bands of sandstone corresponds to a continuation of the minor escarpment formed by the Habergy Sandstone (*Côte des Grès de Habergy*) in Belgium. In the extreme south-west, the 'Minette' escarpment presents a bolder feature, and along the Lorraine frontier provides some of the highest ground of the Bon Pays. Detached from the main feature are several outliers of the Upper Lias, forming isolated hills such as the Butte de Soleuvre.

The Petite Suisse. The most interesting details of scenery in the Bon Pays are those associated with the district known as the Petite Suisse (Little Switzerland). This area lies to the west of Echternach on either side of the Müllerthal, the name given to the lower course of the Ernz Noire (Schwarze Ernz). The texture of the Luxembourg Sandstone varies at different levels; as a rule, it is moderately coarse-grained, but there occur layers of hard, compact, and finely cemented material which offer resistance to both stream erosion and to weathering. Thus the falls in the Müllerthal known as the Schiessentümpel are due to the existence of such a layer in the bed of the river many feet in thickness. The smaller cascades of the Hallerbach are due to similar circumstances. Generally, however, vertical erosion proceeds rapidly and in most cases the streams have cut deep ravines into the sandstone. The Ernz Noire and its tributaries, the Consdorferbach and Hallerbach, as well as other streams like the Halsbach, frequently flow through narrow gorges more than 100 feet below the plateau surface. Among many remarkable valleys may be mentioned the Sept-Gorges near Grundhof and the Labyrinthe of the Halsbach.

The Luxembourg Sandstone is not of uniform thickness in the Petite Suisse. To the north, around Berdorf, it is thicker than in the neighbourhood of Consdorf, and partly on that account gives rise to more rugged conditions. Another characteristic is the manner in which, though deeply dissected by the streams, it resists the agencies of weathering. Frost and wind are responsible only for the details of sculpture, and the giant cliffs, bluffs and partially



Plate 9. THE HAMLET OF MÜLLERTHAL (VALLEY OF THE ERNZ NOIRE) IN
THE PETITE SUISSE

This is surrounded by some of the finest woodland scenery in the Grand-Duchy.

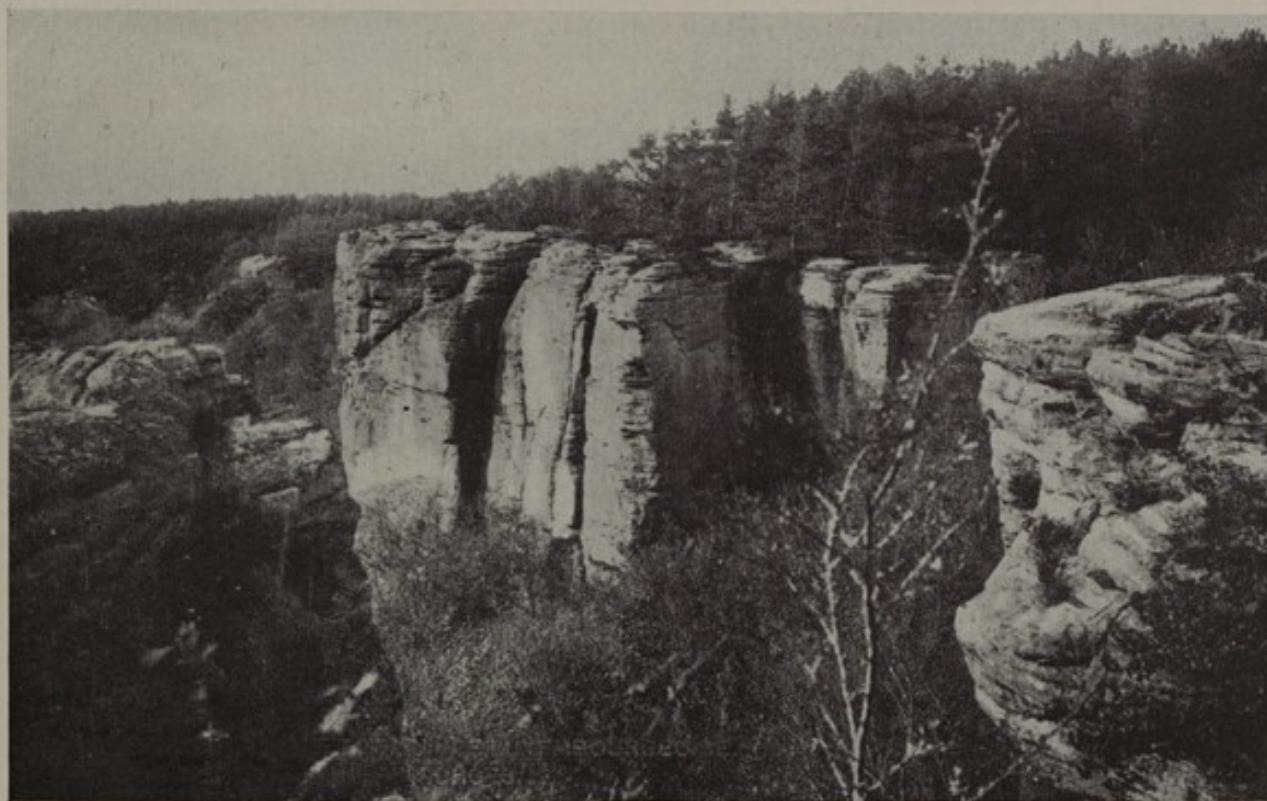


Plate 10. ROCK SCENERY IN THE PETITE SUISSE

The Luxembourg Sandstone in this district gives rise to many striking natural features ; this view shows part of the ' Sept-Gorges ' near Berdorf. See also Plate 30.



Plate 11. ECHTERNACH FROM THE GORGE DU LOUP

The Gorge du Loup (Wolfsschlucht) is a crevice some 150 feet deep through which a glimpse of the Abbey of St. Willibrord may be seen.



Plate 12. THE SCHIESENTÜMPEL FALLS ON THE ERNZ NOIRE

The woods, torrents and crags of the Petite Suisse combine to form one of the most attractive tourist districts in the Grand-Duché.

detached masses of rock appear to be suffering little from existing weathering. The Petite Suisse thus provides a most attractive district of rock scenery, exhibiting a multitude of striking forms; deep crevices like the Gorge du Loup (Wolfsschlucht), caves and grottoes as at Hohllay, and grotesquely carved bluffs and pinnacles like the Perekop and Schnellert in the Müllerthal. Accompanying these are the streams and oak and beech woods, which together make a landscape of great beauty, much visited by tourists (Plates 9-12).

3. *The Eastern or Moselle Depression*

The eastern part of the Bon Pays, i.e. the area lying approximately eastwards of a line joining Echternach, Junglinster and Mondorf, is formed of the Keuper and Muschelkalk divisions of the Trias. The former is represented mainly by marls and sandstones, in which the fertile valley of the Syre is developed, as well as the productive districts of Osweiler near Echternach and that marked by a line of villages, Bech, Zittig, Hemsthal and Rippig, lying close to the eastern edge of the Luxembourg Sandstone. Towards the Moselle, the Muschelkalk limestone is more in evidence, and a system of faults running north-east to south-west gives rise to more or less parallel ridges. Along the Moselle valley itself these assume a step-like arrangement, and the heights immediately dominating the river furnish valuable slopes for the cultivation of the vine (see p. 176). As these are much dissected, it is the southward and south-eastward facing portions which are mainly chosen for this activity and each section of heights has its name (e.g. Köpchen at Wormeldange, Palmberg at Ahn, Kreuzberg at Grevenmacher, etc.), and is known for its particular vintage.

THE RIVER SYSTEM

The outstanding feature of the surface drainage of the Grand-Duchy is that, apart from one instance, the water of all the rivers is ultimately discharged into the Moselle and conveyed to the Rhine, so that the country exhibits a virtual hydrographic unity. The exception is the Chiers (Korn), which rises near the south-west corner and flows to the Meuse. By far the greater part of the drainage is collected by the Sûre and emptied into the Moselle at Wasserbillig, the confluence town on the eastern frontier. Part of the eastern Bon Pays is drained to the Moselle by the Syre and

its tributaries and by a number of small independent streams flowing directly to the main river. Another little stream, the Altbach, crosses the frontier at Mondorf-les-Bains and reaches the Moselle through French territory.

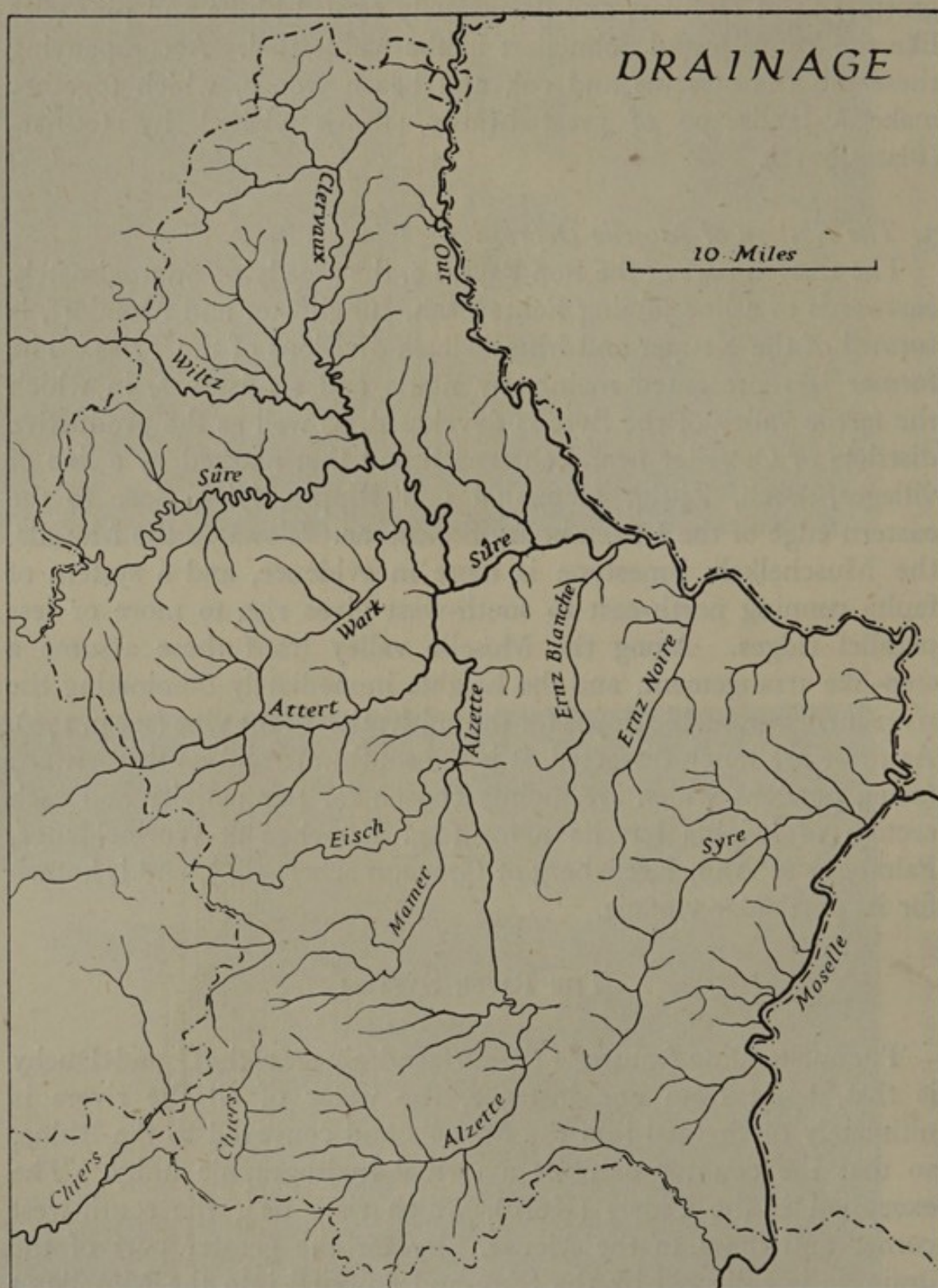


Fig. 9. The river system

Based on the 1 : 200,000 *Carte de France*, Sheet 11 (Paris, n.d.)

Almost the entire length of the eastern boundary confronting Germany is formed by rivers—from a point east of the village of Weiswampach in the north as far as Wasserbillig along the Our and Sûre (with the exception of a small salient across the Our near Vianden), and from Schengen at the south-eastern corner to Wasserbillig by the Moselle itself. A short distance below Wasserbillig the Saar enters the Moselle from the south and a little further downstream lies the city of Trier; the river continues north-eastwards to its confluence with the Rhine at Coblenz.

The pattern of drainage over the greater part of Luxembourg (Fig. 9) is of unusual interest. It is mainly composed of two stream systems flowing in opposite directions and uniting at Ettelbruck in the depression along the foot of the Ardenne. From the north come the Sûre, the Wiltz and the Clervaux, the principal rivers of the Ardenne, and from the south the Alzette and its tributaries the Mamer, the Eisch and the Attert bring much of the water of the Bon Pays. At Ettelbruck, however, this drainage axis is joined by a third system, that of the Wark, which collects water from little streams flowing from the edge of the Ardenne and conveys it along the depression. From the double confluence the combined discharge, now forming a considerable stream, continues as the Sûre and follows the depression until, after receiving the Our, it winds southwards on its way to the Moselle. Along the depression between Ettelbruck and the Belgian frontier, two circumstances modify the simplicity of the drainage pattern. In the first place, towards the west streams from the Ardenne flow to the upper Attert and not to the Wark, the upper course of which has been captured in successive stages by tributaries of the Attert (Fig. 10). In fact, at a point near the village of Grosbous, another such tributary—the Vichtbach—now threatens the Wark with a further capture. Secondly, within three miles of Ettelbruck, the Wark itself turns north, re-enters the Ardenne country in a deep sinuous valley carved out of the Devonian slates, then, after flowing some distance towards Bourscheid, turns sharply south again and leaves the upland to join the Alzette on the east side of Ettelbruck.

Of the remaining rivers, the two chief are the Ernz Blanche and the Ernz Noire which, flowing northward to the Sûre, carry the drainage of a portion of the Bon Pays lying to the east of the Alzette. In its lower course, the second of these forms the main channel through the rugged area known as the Petite Suisse, the last few miles of its valley being termed the Müllerthal.

The main watershed separating the drainage of Luxembourg from the rivers of the neighbouring countries lies at a varying distance beyond the frontier with France and Belgium. Thus the Alzette has its source three miles inside Lorraine, the Eisch and Attert come from the Arlon district near the headwaters of the Semois, while the Sûre and the Wiltz originate at Bastogne near

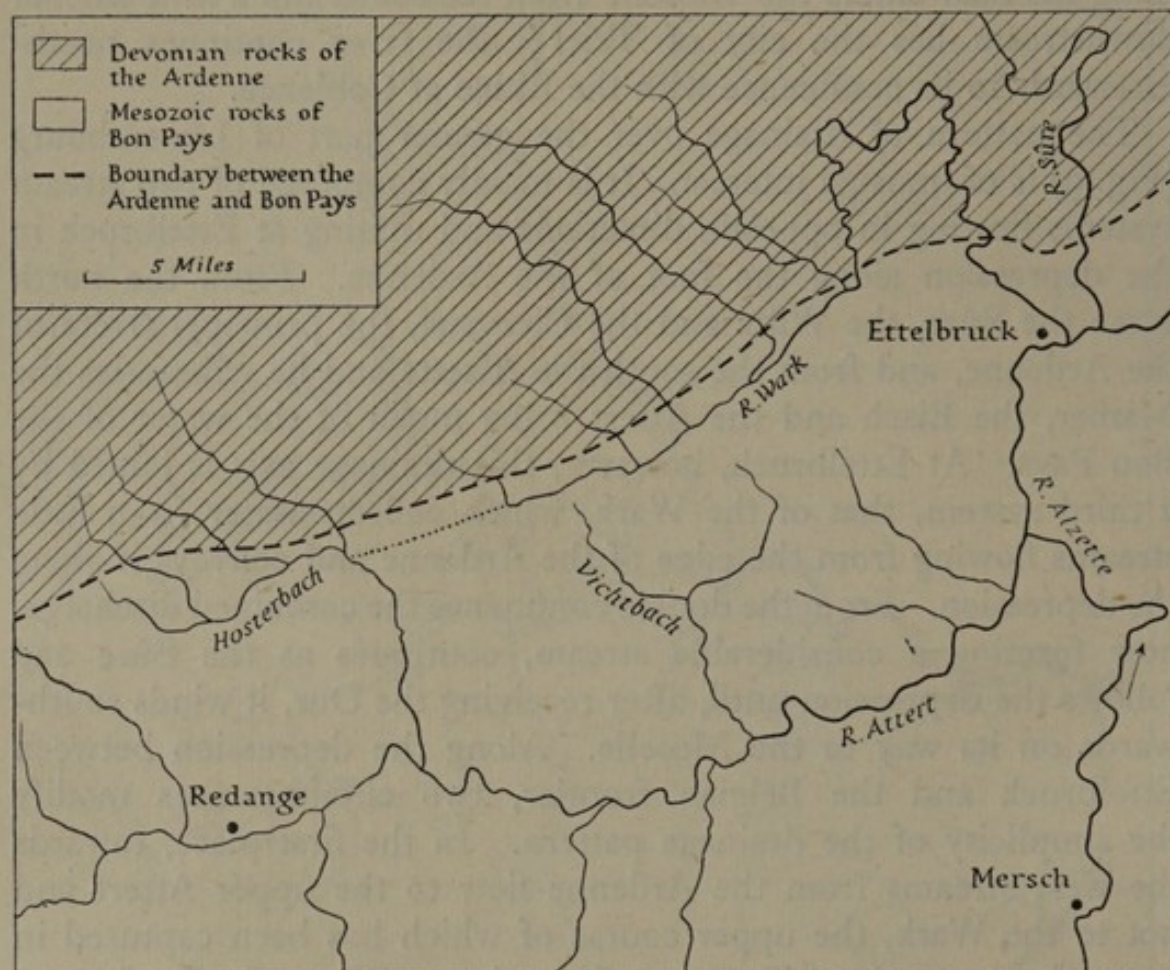


Fig. 10. River capture in central Luxembourg

Based on (i) G. Baeckeroot, 'Contribution à l'Etude de la Dépression périphérique de l'Oesling,' in *Bulletin de la Société belge d'Etudes Géographiques* (Louvain, 1932); and (ii) A. Hegenscheidt, 'Captures possibles dans la Vallée de la Wark,' in Flemish (with a French summary) in *Bulletin de la Société belge d'Etudes Géographiques* (1931).

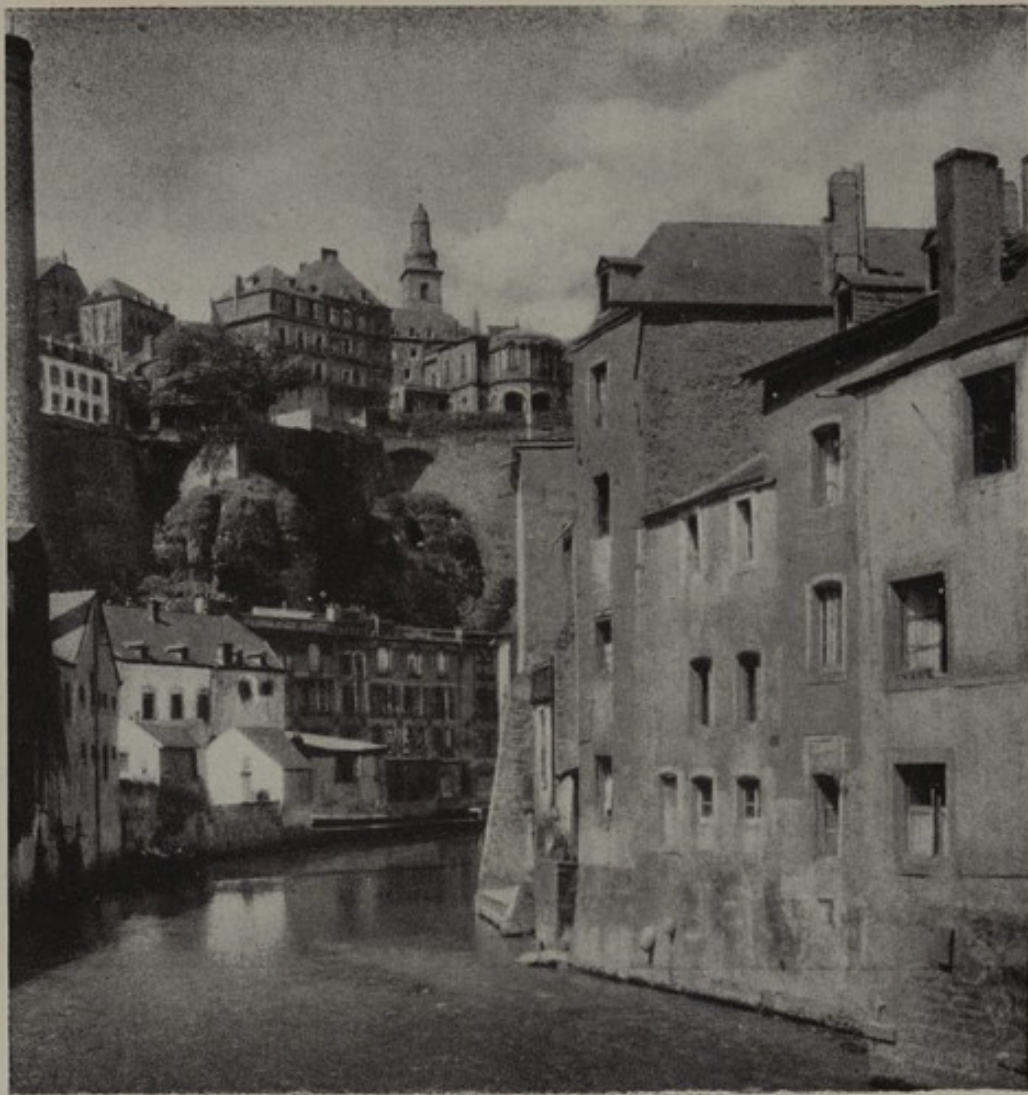
The former headstreams of the Wark have been diverted through river capture by the Hosterbach, a tributary of the Attert; the dotted line shows the former course of the Wark. The Vichtbach, another tributary of the Attert, is in process of cutting back, and in due course will capture the present headstream of the Wark.

the headstreams of the Ourthe. The exception, as already noted, is the Chiers—a tributary of the Meuse—which rises in the 'Minette' scarp within the Grand-Duchy.



Plates 13, 14. THE RIVER SÛRE

The upper course (above) of this river winds in a deeply incised valley ; the little township of Esch-sur-Sûre is confined to the narrow neck of land enclosed by a meander. In its lower course, as near Echternach (below), it is broader and shallower, but still comparatively swift.



Plates 15, 16. THE RIVER ALZETTE

The river winds through the capital (above), in a partially regularized channel, confined between the old buildings beneath the ramparts of the city; further north, at Colmar (below) it flows in a wide valley which is followed by the Luxembourg-Liège railway.

The Moselle (Plate 8)

From Schengen to Wasserbillig, the Moselle pursues a relatively straight course, the two loops between Remich and Wormeldange and the sharp bend south of Grevenmacher affording the only resemblance to its tortuous section below Trier. Throughout this stretch of twenty-five miles the gradient is slight, and in summer when the water is low, flowing at a slow pace and exposing the gravel banks, the river is not impressive. Earlier in the year and after prolonged rains, the level is higher and the current moves swiftly along, inundating the low ground near the banks and sometimes flooding portions of the highway, which follows the river closely between Remich and Grevenmacher. The Moselle, on account of its fluctuations in velocity and depth as well as the variability of its current, is unsuitable for navigation, and over considerable stretches the only craft to be seen are the rowing boats of the fishermen and ferrymen, together with an occasional dredger. Numbers of skiffs and canoes are found at boating centres such as Remich and Stadtbredimus. At low water there is a depth of only 2.5 to 3 feet up to Sierck beyond the French frontier, though above Metz the river is canalized. Save for the movement of hay in small barges, there is virtually no commercial traffic on the Luxembourg section (see p. 296).

The Syre

This stream, whose relatively broad valley is one of the most fertile in the country, follows a course roughly parallel to the Moselle for twelve to fifteen miles before turning eastwards to join it. The river provides power for some small works at Wecker, and its valley is followed by the main line from Luxembourg to Wasserbillig and Trier. At Merttert, where the Syre enters the Moselle, a small delta has been built out; this has been reclaimed, and the fields and orchards are intersected with dykes and drainage channels.

The Sûre (Plates 4, 13, 14)

On account of its length and its function as the main outlet for most of the surface drainage, the Sûre may be regarded as the principal river of the country. From its source in Belgium to its junction with the Moselle at Wasserbillig, its total length is 102 miles. Between the upper course in the Ardenne and the lower course from

Ettelbruck to the Moselle there is a marked difference in gradient. From the point of entry into the Grand-Duchy (1,200 feet) to the point near Ettelbruck where it leaves the uplands (640 feet) there is a fall of 560 feet, whereas from Ettelbruck to Wasserbillig (435 feet) the fall is little more than 200 feet. As a rule, the Sûre is confined to a narrow channel; where it widens into shallow reaches, parts of the stream shrink noticeably in dry weather. In the upland, where numerous torrents pour into it, the Sûre is relatively swift, but in the lower section, apart from a few rapids, the flow is much diminished. Floods occur periodically and are most serious along the stretch between Diekirch and Echternach, particularly near the latter, for not only has the swollen river to carry the drainage of most of the country, but in this section it is burdened by the arrival of the Our. In Echternach itself high-water marks with dates of occurrence may be seen on a number of buildings commemorating some of the worst floods.

The chief tributaries entering the Sûre in the Ardenne are the Wiltz and the Clervaux (known in its upper portion as the Woltz). Both of them wind through deeply incised valleys, though neither is quite as tortuous as that of the Sûre itself. The two headstreams of the Woltz unite to form the Clervaux just below Troisvierges, and flow southwards through the small town of Clervaux, joining the Wiltz at Kautenbach, while the latter enters the Sûre at Goebelsmühle. Parts of these streams are excellent for fishing, with Goebelsmühle and Michelau ranking among the chief centres for anglers.

Another tributary, the Blees, rises south of Hosingen and flows directly to the middle Sûre below Diekirch. From its source at about 1,640 feet, the gradient drops sharply to 630 feet, giving a fall of over 1,000 feet in little more than twelve miles. Though it shrinks to a trickle in summer, the Blees quickly becomes swollen and turbulent after heavy thunderstorms and the melting of snow.

The Alzette (Plates 15, 16)

The Alzette is the principal river of the Bon Pays and carries the drainage of nearly one-half of that region. Rising near Audun-le-Tiche in France, it enters the Grand-Duchy, breaking through the 'Minette' scarp at Esch-sur-Alzette and then flows north-eastwards towards the capital. Across the outcrop of the Lias clay the river runs in a broad and almost level floodplain (Fig. 11)—the

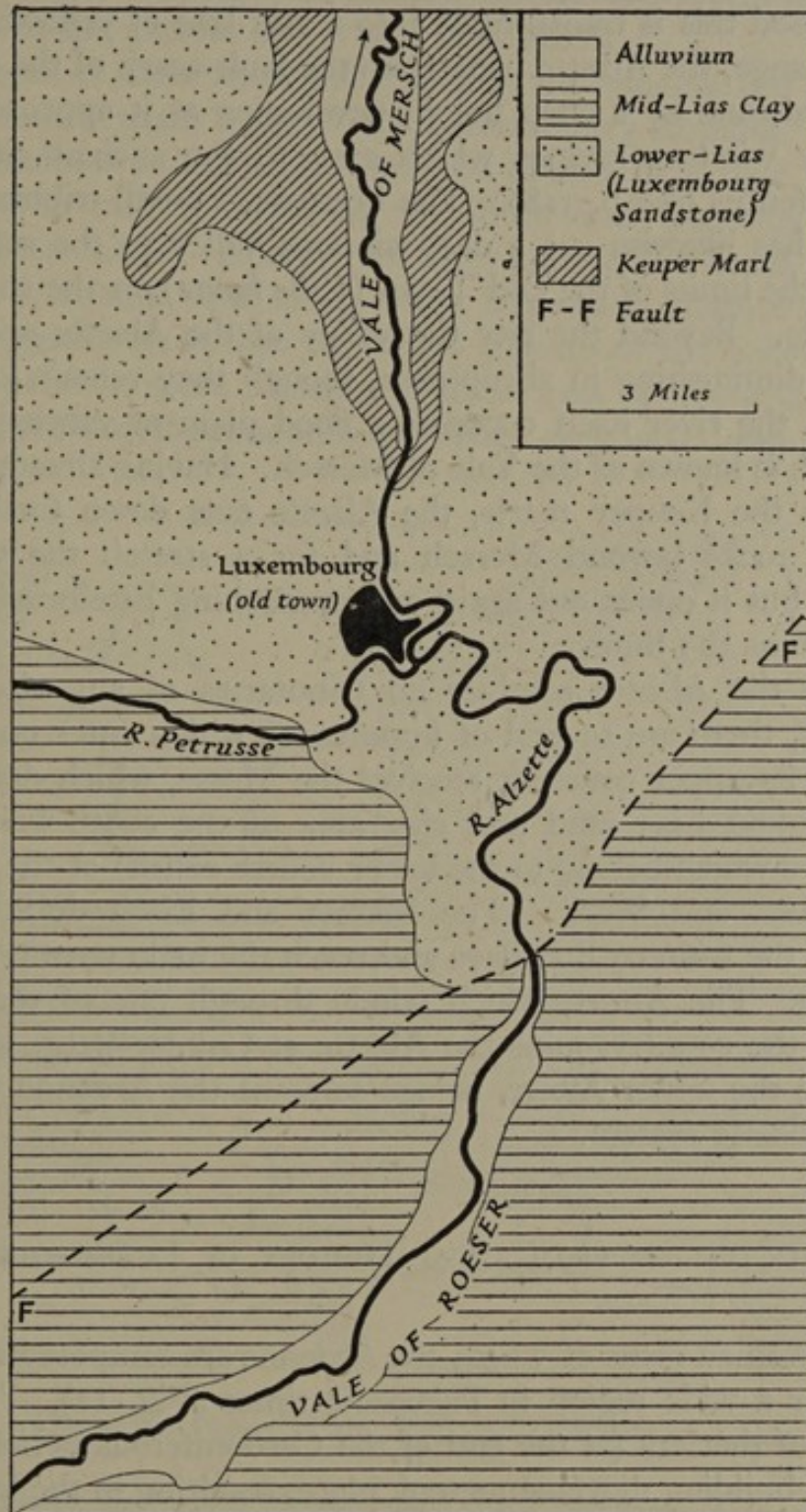


Fig. 11. The valley of the river Alzette in relation to geology

Based on the 1 : 100,000 *Geologische Übersichtskarte des Luxemburger Landes*, edited by J. Robert (Luxembourg, n.d.)

There is a marked contrast between the gorge eroded in the Luxembourg Sandstone and the broader, more open vales in the Clays and Marls.

Vale of Roeser—which provides first-class pastureland, though in times of flood this is transformed into a vast lake of yellowish mud. At Hesperange, the Alzette penetrates the fault-scarp of the Luxembourg Sandstone by a deep notch, developing as it approaches the capital the winding ravines which gave to the ancient citadel its natural defences (see p. 318). The Pétrusse, a small tributary from the west, has likewise cut a deep sinuous valley in the sandstone, confining the limits of the Old Town (*Ville haute*) on the south side by its cliffs. Beyond the city the valley of the Alzette opens out, its slopes diminishing in abruptness, though they remain relatively steep, and the river itself occupies a flood plain of varying width; this section is known as the Vale of Mersch. Having already eroded down into the Keuper marls, the Alzette cuts down further into the Trias rocks beyond Mersch and for a stretch the valley is narrower, but it opens out again on approaching Ettelbruck, where the river joins the Sûre.

Though the Alzette receives no tributaries of any size on its right bank, there are several of importance which enter on the left bank. In its upper course it receives the Messe, which drains part of the Middle Lias sand and clay area of the south-west. The other rivers which belong to the lower course consist of the Mamer, Eisch, Attert and Wark. The Mamer and Eisch drain a large portion of the western Bon Pays and reach the main stream together at Mersch. The Attert, which winds through one of the richest valleys in the country, joins the Alzette at Colmar-Berg, while the Wark, like the upper Attert, brings some of the Ardenne drainage into the Alzette system.

NOTE ON THE GEOLOGICAL HISTORY OF LUXEMBOURG

The Devonian rocks of which the Ardenne are composed were laid down over a wide region in Palæozoic times (Fig. 12). Towards the close of that era (at the end of the Carboniferous period), great mountain-building movements took place, resulting in the formation of an impressive range, known as the Hercynian system, which stretched across what is now western and central Europe. The rocks of the present Ardenne are everywhere steeply inclined, being traversed by a series of roughly parallel folds running south-west to north-east. Similar trends occur in Brittany and South Wales to the west, and in the Rhenish Highlands and Bohemia to

the east. All these uplands in present-day Europe reveal the roots, as it were, of the ancient Hercynian mountains.

The effects of these mountain-building movements can be seen on a small scale at many places in the Luxembourg Ardenne. Steeply pitched anticlines and synclines may be observed in road cuttings and along the railway following the Sûre and Clervaux valleys northwards to Liège. Apart from this intense but local folding, features of a similar, but much more large-scale, nature may be traced. It seems clear that the broad aspects of the relief of the area correspond in some measure to these axes of disturbance, for despite the prolonged denudation by which they have been severely

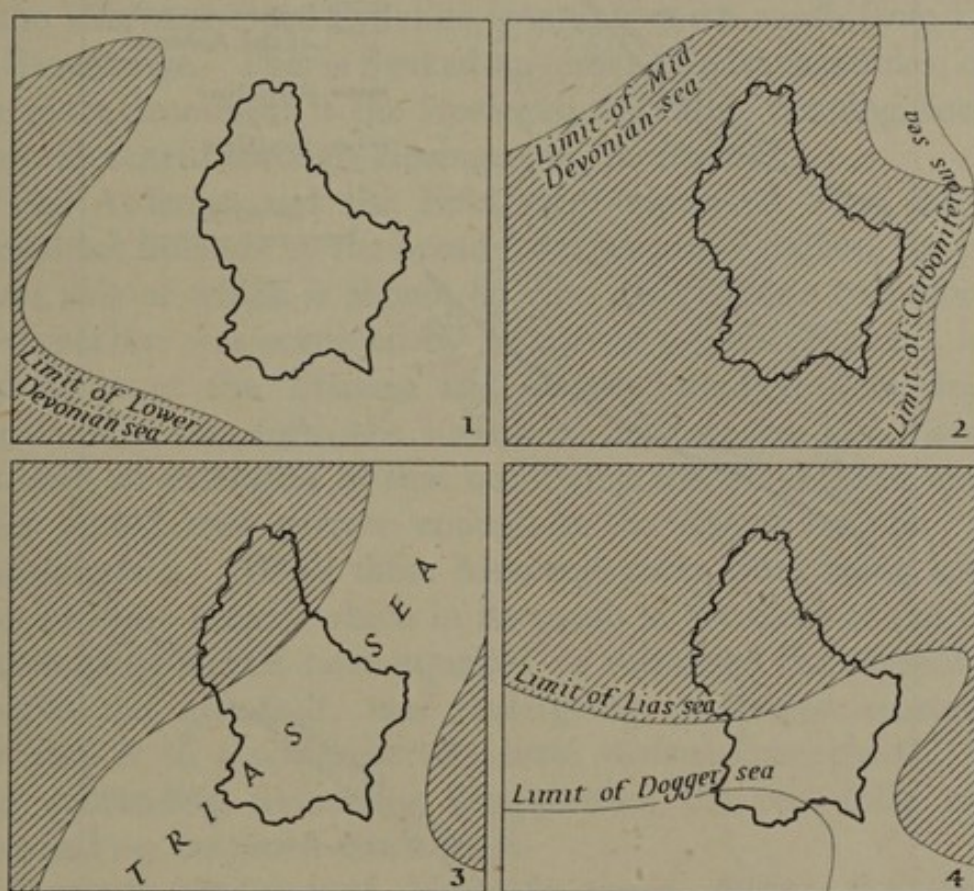


Fig. 12. The main stages in the geological history of Luxembourg.

Based on J. Robert, *Geologische Heimatkunde von Luxemburg* (Luxembourg, 1906.)

The former area of sea is left white in each case.

worn down, they still exert some influence upon surface relief. The succession of major anticlines and synclines is shown on Fig. 13. Three main axes may be traced in the Luxembourg Ardenne, although

it will be realized that each is by no means a single fold but a complex arrangement of minor upfolds and downfolds within the major feature :

(1) The Bastogne Anticline, which forms part of the southern flank of the main Ardenne Anticline in Belgium, enters from that country and curves north-eastwards through Troine towards Huldange, now forming the highest ground in the extreme north.

(2) The Heiderscheid (or Givonne) Anticline, which is roughly parallel to the first, forms the southern portion of the massif, the

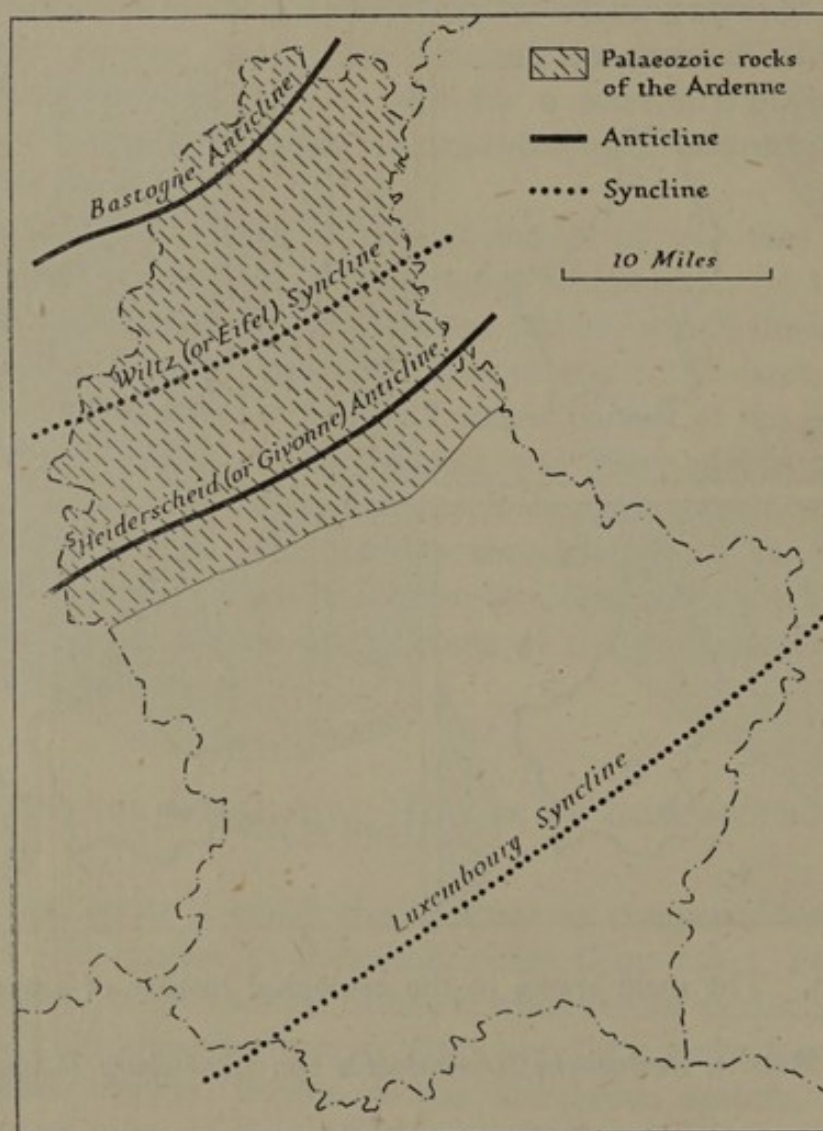


Fig. 13. The main axes of folding in Luxembourg

Based on the 1 : 100,000 *Geologische Übersichtskarte des Luxemburger Landes*, edited by J. Robert (Luxembourg, n.d.)

rocks of its southern flank disappearing beneath the Mesozoic sediments of the Bon Pays. The high ground around Vianden and to the west of Heiderscheid, including Napoléonsgard (1,821 feet) comes within this zone.

(3) The Wiltz or Eifel Syncline occupies a zone between the two anticlines mentioned above. Though there is a good deal of less elevated land, as for example around the little towns of Wiltz and Clervaux, the resistant slates produce the heights situated north of Hosingen, the Schwarzenhügel (1,785 feet), and elsewhere.

Some mention should also be made of the interrupting of these fold-lines by transverse movements which appear to have influenced the direction of some of the principal valleys. The chief of these is the Clervaux-Sûre Syncline, running north-south from Drauffelt to Erpeldange. This is flanked on either side by anticlines, of which the more prominent is the Hosingen Anticline, running northwards from Hoscheid through Hosingen to the frontier.

The Ardenne and the Eifel were separated from the present Hunsrück uplands by the broad Luxembourg Syncline, the probable main axis of which is shown on Fig. 13. During Mesozoic times, this syncline was occupied by an arm of the sea (Fig. 12), in which sediments of the Triassic and Jurassic periods were deposited; these rocks now form the surface of most of the Bon Pays. This sea was an extension of that occupying the Paris Basin and in the Lias period was narrow enough to be known as the 'Gulf of Luxembourg.' While these Mesozoic rocks were being laid down, the Ardenne massif, which in its youth at the close of the Carboniferous period must have equalled or surpassed the present Alps in height and grandeur, was undergoing prolonged erosion which reduced it to a comparatively level surface (peneplain). Though the upstanding mountains disappeared, the rock-folds now outcropped on the worn-down plain.

Towards the end of Mesozoic times, during the Cretaceous period, the peneplain subsided beneath a widespread encroachment of the sea, and was covered by a layer of Cretaceous sediments. Subsequently, in both Tertiary and Quaternary times, successive stages of uplift caused the whole region to be re-elevated to a height considerably above its present altitude. Then ensued another long period of denudation, during which the Cretaceous sediments were removed, revealing the ancient worn-down surface of the Ardenne and the Mesozoic sediments of the Bon Pays, which form the present landscape of the Grand-Duchy.

Faulting

In parts of the Grand-Duchy, the development of the existing surface features has been strongly influenced by numerous faults. These occur principally in three groups: (a) in the Ardenne, (b) in the central Bon Pays, and (c) in the Moselle region.

The Ardenne is much fractured, with faults trending in all directions, those running S.S.E.-N.N.W. being predominant, though their effect upon the landscape is no longer noticeable. In the Bon Pays, faults are infrequent, except in the central area where a few which exercise an effect upon the configuration can be traced over a long distance. Two of these follow a S.W.-N.E. direction and may be termed the East Central and West Central Faults respectively. The former enters the country from Audun-le-Tiche (Lorraine), and runs through Esch-sur-Alzette to Rosport on the Sûre, while the latter runs from Differdange to Bissen, whence it strikes eastward across the Alzette valley to Schrandweiler. A third runs from the Alzette valley at Lorentzweiler to the Sûre at Echternach in a W.S.W.-E.N.E. direction and may be termed the Lorentzweiler-Echternach fault.

An example of their influence upon surface features is seen in the abrupt scarp occasioned by the East Central fault between Hesperange and Itzig, where the Middle Lias marls are brought against the massive Luxembourg Sandstone. The same fault also brings about a striking change in the character of the Alzette valley, for after flowing through the broad Vale of Roeser the river enters the sandstone country abruptly by a deep notch at Hesperange which heralds the tortuous defile through the capital (Fig. 11). An effect of another kind caused by the same fault is seen between Esch-sur-Alzette and Audun-le-Tiche, where it sets a sharp limit to the eastern part of the 'Minette' basin.

The Moselle region is marked by a system of faults following the trend of the valley. These either run parallel to one another or intersect at low angles, and the configuration both along the valley itself and to the west of it owes much to their occurrence, for the Middle Keuper is repeatedly brought up against the Mid-Muschelkalk limestone in a series of step-like ridges.

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2. An introduction to the geography of Luxembourg is *Luxembourg Studies*, edited by K. C. Edwards, and published by the Le Play Society (London, 2nd edition, 1937).

3. The most detailed studies of the relief and geology of the Grand-Duchy are by J. Robert; his two chief works are *Geologische Heimatkunde von Luxemburg* (Luxembourg, 1916), and *Kurzgefasste Geologie der Luxemburger Heimat* (Diekirch, 1906).

4. A valuable summary, embodying the most recent views about the structure of Belgium and Luxembourg, is given by M. Lefèvre, *Notice sur la carte oro-hydrographique de Belgique* 1 : 500,000 (Turnhout, 1937).

5. A considerable body of information is given by C. H. Stevens, *Notes sur la morphologie du Grand-Duché de Luxembourg interprétée d'après la carte hypsométrique à 1/200,000 de J. Hansen* (Strasbourg, 1928).

6. The available geological maps covering the Grand-Duchy are listed on p. 314. Mention should be made of the 1 : 100,000 *Geologische Heimatskarte des Luxemburger Landes*, compiled by J. Robert (Luxembourg, n.d.), which includes a number of very clear cross-sections.

Chapter II

CLIMATE

General Features : Winds : Temperature : Precipitation : Snow and Snow-Cover : Bibliographical Note

GENERAL FEATURES

The climate of the Grand-Duchy is transitional in character between the maritime type of north-west Europe and the semi-continental type experienced further in the interior. While conditions are more extreme than in the British Isles, the 'continental' features are not so definitely marked as in Lorraine and in the Rhenish lands. Differences naturally occur between the Ardenne and the less elevated Bon Pays, though these are not so marked as might be expected; however, they are nevertheless sufficiently appreciable to promote differences in agricultural conditions. In detail, these differences may be summarized with reference to four subdivisions:

(i) The Moselle valley (including the lower Sûre valley), which varies in altitude from 450–650 feet, and is characterized by warm summers, mild winters and relative dryness; the rainfall varies from 27.5 to 29.5 in.

(ii) The greater part of the Bon Pays, i.e. that part with an altitude between 800 and 1,250 feet, is cooler and moister (rainfall 31.5 to 37.5 in.) than the Moselle valley.

(iii) The high ground in the extreme south-west, along the 'Minette' escarpment (see p. 16), forms a narrow belt 1,000 to 1,450 feet above sea level. Though temperature conditions are similar to those of the rest of the Bon Pays (except in the Moselle valley), the rainfall is somewhat heavier (37.5 to 40 in.).

(iv) The Ardenne (1,300–1,850 feet) has on the whole cool summers and relatively severe winters; the precipitation is not excessive (from 31.5 to just under 40 in.). Marked differences in rainfall occur between the higher parts and the deep sheltered valleys.

As with the rest of western Europe, weather conditions over the Grand-Duchy are essentially variable throughout the year. Unsettled or rainy weather, associated with depressions, interspersed with settled periods of longer or shorter duration, is the prevalent feature. Thus there may be a spell of three weeks or more in the

winter with temperatures consistently below normal, or, again, most of the rainfall for two months might fall in one intermittent spell of ten days or so at the end of one month and the beginning of the next, with a period of drought lasting three or four weeks on either side.

WINDS

Since the Grand-Duchy lies within the zone of prevailing westerly winds, many features of its climate are attributable to them. South-west winds predominate at every season and constitute over 30% of the total winds recorded for the year, while winds from between south and west constitute 55% of the total. These account largely for the general mildness, the high humidity and the abundant precipitation. Of the winds from other quarters, the north-easterlies, though far less frequent, constitute nearly 15% of the total. They blow chiefly in the early part of the year from January until May, and are associated with spells of cold weather. The following table analyses the percentage of winds during the year, according to direction, at Luxembourg (period of observation, 1854-88):

N	NE	E	SE	S	SW	W	NW
6.4	14.8	8.4	5.6	12.6	30.6	12.1	9.5

Source : H. Flohn, 'Zur Klimakunde der Grossherzogtums Luxemburg,' in *Meteorologische Zeitschrift*, Band 53 (Berlin, 1936).

TEMPERATURE

As the table below indicates, the mean monthly temperatures for the city of Luxembourg vary from 32.5° F. in January to 63.0° F. in July, giving a mean range of 30.5° F., some 9° F. greater than the average range in the British Isles. On the other hand, the extremes are not severe, for no month has a mean temperature as low as 32° F. and only three—June, July and August—have means exceeding 59° F. Temperature distribution, however, is not uniform over the country. While the Moselle valley enjoys warm summers and relatively mild winters, temperatures over the rest of the Bon Pays are somewhat lower, especially upon the higher ground in the extreme south-west. In the Ardenne, owing to elevation and exposure, still lower figures are recorded, the summers being cool and the winters relatively severe. The January mean is a little below 32° F. in

most parts of the north. The following table summarises the mean monthly temperatures at Luxembourg (period of observation, 1854-88):

	Jan.	Feb.	Mar.	Apl.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.	Av. for year
C°	0.3	1.3	3.4	8.1	11.9	15.6	17.3	16.5	13.5	8.4	3.5	0.5	8.3
F°	32.5	34.5	38.3	46.5	53.3	60.2	63.0	62.0	56.4	47.2	38.3	33.0	47.0

Source : H. Flohn, 'Zur Klimakunde der Grossherzogtums Luxemburg,' in *Meteorologische Zeitschrift*, Band 53 (Berlin, 1936).

Frost

Though no detailed figures for frost are available, spells of frost occur in all parts of the Grand-Duchy, more particularly in the Ardenne, where not only their severity but their untimely visitation may prove dangerous to agriculture. Thus in 1875 and on several occasions subsequently, sharp frosts at an unusually early date ruined the harvest in northern districts of the country. They are common, too, in the Bon Pays, and are largely responsible for fluctuations in the vine harvest of the Moselle valley (see p. 179). On the terraced slopes during cold spells the ground may be frozen to a depth of three feet, and fringing ice may appear along the river. Though local situation accounts for many vagaries, it can be stated broadly that frosts are liable to occur onwards from the third week of October until the end of April, while the number of days with frost ranges from 40 to 50 in the Moselle valley to 100 or more in the Ardenne. The following table shows the number of days of severe frosts, i.e., days on which temperatures of 22° F. or less were recorded at Luxembourg-Strassen in a succession of recent years :

1932	1933	1934	1935	1936	1937	1938
27	46	12	20	12	10	35

Source : *Aperçu Statistique*, 1940, p. 4 (Luxembourg, 1940).

PRECIPITATION

In Luxembourg, the distribution of precipitation is markedly influenced by the surface configuration. The map showing the mean annual rainfall (Fig. 14) indicates a general decrease in amount from

west to east and from the higher parts in the north and south-west to those of lower elevation in the centre and east. The amount of rain received in the Ardenne, however, exceeds that of the Bon Pays by a surprisingly small figure, despite the differences in altitude and

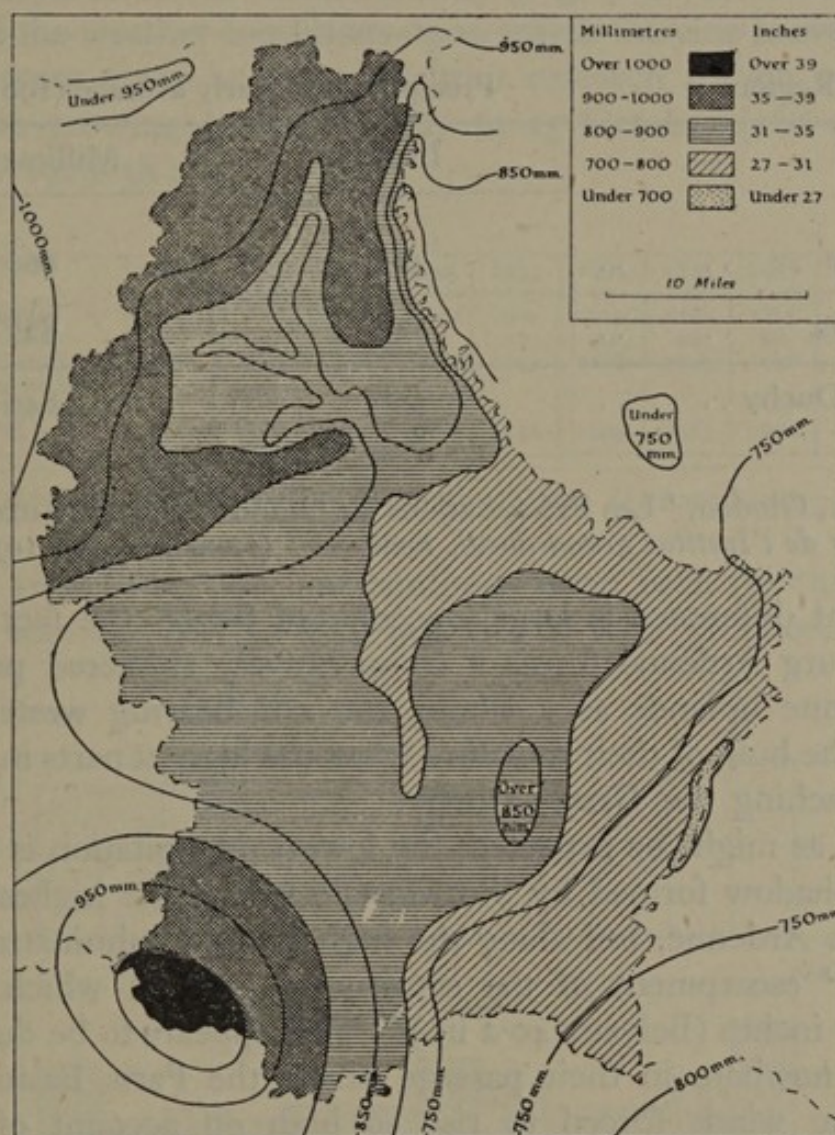


Fig. 14. Distribution of mean annual rainfall

Based on the 1 : 140,000, *Carte pluviométrique du Grand-Duché de Luxembourg*, compiled by A. Gloden (Brussels, 1937.)

The rainfall map was constructed from the mean annual figures of twenty-one stations relating to the period 1907-22, giving one station per 48 square miles of surface area. With the aid of records for several German stations situated close to the frontier, these were reduced for the period 1901-30, this being made possible by the standardization of the rain-gauges and of recording conditions. The map is in close agreement with the relevant portions of the rainfall map of Germany (based on the period 1891-1930); along the western frontier, however, there is some discrepancy when compared with the rainfall map of Belgium prepared by E. Vanderlinden (Brussels, 1927.)

relief. The elevation of the Ardenne varies from 650 to 1,850 ft. (mean altitude 1,550 ft.), and that of the Bon Pays from 450 to 1,450 ft. (mean altitude about 1,000 ft.). Yet over a period of thirty years (1901-30), the difference in mean precipitation was only 1.3 inches per annum, as the following records show :

Region	Precipitation, yearly average (1901-30)	
	Inches	Millimetres
Ardenne	34.0	860
Bon Pays	32.7	827
Grand-Duchy	33.1	840

Source : A. Gloden, ' Les Précipitations au Grand-Duché de Luxembourg,' in *Archives de l'Institut grand-ducal*, tome XIV (Luxembourg, 1936).

This slight difference is largely accounted for by the fact that the Luxembourg Ardenne forms a comparatively sheltered portion of the Ardenne uplands as a whole, the rain-bearing westerlies depositing the bulk of their moisture upon the highest parts in Belgium before reaching the Grand-Duchy.

Whilst, as might be expected, the lowest precipitation is found in the rain-shadow formed by the Moselle valley, the highest occurs, not in the Ardenne, but along the high ground culminating in the 'Minette' escarpment of the south-west, part of which receives over forty inches (Belvaux 40.2 in.). This appears to be due to the fact that nowhere in their passage across the Paris Basin are the rainbearing winds forced to rise so high on account of surface features. Thus the mean annual variation is greater over the Bon Pays (27.5-40 in.) than in the Ardenne (31.5-40 in.), and in fact there is a greater difference between Wasserbillig (27 in.) and Belvaux (40.2 in.), both in the Bon Pays, than between Luxembourg (30.5 in.) in the Bon Pays and Clervaux (32 in.) in the Ardenne.

The considerably lower rainfall in sheltered valleys is demonstrated by those of the Wiltz, Clervaux, Sûre and Our in the Ardenne, and of the Alzette and the Moselle in the Bon Pays. How far the tongue of low rainfall extends up the Alzette valley is uncertain owing to lack of data, although this could be determined if figures for a station in the neighbourhood of Lorentzweiler were available. Along the

Moselle between Wormeldange and Grevenmacher is the driest district of the country, with a mean annual figure of under 27.5 in. At Canach, the average over the period 1907-22 was only 26.6 in. The low rainfall of this valley is an important factor in the location of the vineyards of the Grand-Duchy (Fig. 40). Records of those aspects of the weather conditions upon which the vine harvest largely depends were made at the viticulture research station at Remich during the growing period, 1 May to 15 October (168 days), for the years 1929-38 :

	1929	1930	1931	1932	1933	1934	1935	1936	1937	1938
Rainfall in inches	—	—	16.1	13.0	9.0	12.2	12.6	12.4	13.4	12.9
No. of rainy days	—	—	67	49	47	42	42	66	62	68
Sunshine in hours	1016	793	968	1003	1144	1168	1099	940	1000	971
No. of hours of temperature exceeding 59°F. (15°C.)	2134	1997	1914	2062	2156	2299	2083	1690	1761	1560

Source : *Aperçu Statistique* for successive years (Luxembourg, annually).

Of these years, 1934 was outstandingly good both for the yield of fruit per acre and for the total quantity of wine produced, and the

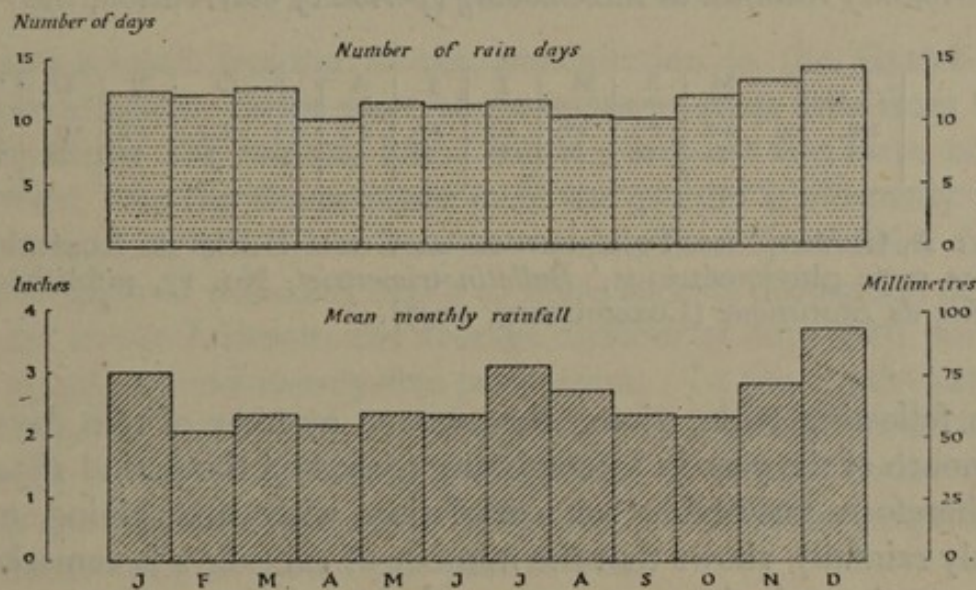


Fig. 15. The mean monthly distribution of rain days (above) and of rainfall (below) at the city of Luxembourg

Based on statistics in A. Gloden, 'Les Précipitations au Grand-Duché de Luxembourg,' in *Archives de L'Institut grand-ducal*, tome xiv (Luxembourg, 1936.)

The period of observation for the distribution of rainfall is 1907-36, for the number of rain days is 1854-88.

A rain day is defined as a day on which 0.1 mm. of rainfall is recorded.

records confirm that the season was favoured by comparatively little rain, combined with abundant sunshine and warmth.

The monthly incidence of rainfall is on the whole uniform, the monthly means for Luxembourg varying between 1.9 in. in February and 3.1 in. in December (Fig. 15). The distribution is closely related to the frequency and intensity of low-pressure systems, autumn being the wettest period, and that from February to April, i.e. late winter and early spring, being the driest. February and March with 1.9 and 2.1 in. respectively have distinctly the lowest monthly figures. December with the highest monthly total is closely followed by July. This secondary maximum indicates the tendency towards a continental régime which is commonly found at inland stations, and is even more pronounced a little further south in Lorraine. As it is, there is little or no difference between the amount of rain received in the summer half-year and that in the winter half-year. This uniformity is strikingly shown on Fig. 15 and in the following table:

Mean Monthly Rainfall at Luxembourg (period of observation, 1907-36)

	J	F	M	A	M	J	J	A	S	O	N	D	Year
Inches	2.6	1.9	2.1	2.3	2.6	2.4	3.0	2.7	2.3	2.7	2.8	3.1	30.5
Mm.	65	50	51	59	66	61	76	69	59	71	72	78	777

Source : A. Gloden, 'Les Précipitations au Grand-Duché de Luxembourg, avec une carte pluviométrique,' *Bulletin trimestriel*, No. 17, published by the *Office de Statistique* (Luxembourg, 1937).

The following table, giving the average number of rain days for each month of the year in Luxembourg (based on the period 1854-88 and therefore unsuitable for correlation with that giving mean monthly rainfall), shows that the number of rain days is remarkably consistent through the year, no month having fewer than ten and none more than thirteen.

J.	F.	M.	A.	M	J	Jy	A	S	O	N	D	Year
12.4	12.3	12.7	10.2	11.5	11.1	11.5	10.3	10.1	11.9	13.2	14.3	141.5

Source : H. Flohn, 'Zur Klimakunde der Grossherzogtums Luxembourg,' in *Meteorologische Zeitschrift*, Band 53 (Berlin, 1936).

The number of rain days, however, varies considerably from year to year, as shown by the figures for the years 1933-39; it is noticeable that all these years, with the exception of 1933, had a total of rain days greater than the average of 141.5 for the period 1854-88.

Annual Variation in Number of Rain Days at Luxembourg-Strassen

Amount of rain per day	1933	1934	1935	1936	1937	1938	1939
0.1-1.0 mm.	31	46	55	52	53	57	79
2.1-10.0 mm.	82	102	113	114	118	102	103
10.1-15.0 mm.	9	9	16	12	10	11	15
Over 15.0 mm.	2	5	6	10	7	6	10
Total ..	124	162	190	188	188	176	207

Source : *Aperçu Statistique*, 1940, p. 4 (Luxembourg, 1940).

SNOW AND SNOW-COVER

Only a small fraction of the precipitation in the Grand-Duchy occurs as snow. Over most of the country, snow falls from time to time during the winter, often coming only in the form of slight showers. As the temperature near the ground is normally a little above freezing-point, the snow-cover is generally of brief duration and is rarely of sufficient depth to cause serious dislocation of traffic. Except in the Ardenne, the average number of days with snow does not greatly exceed twenty-five per annum. In the south-east, along the Moselle valley and in the district of Mondorf-les-Bains, the number is still less, varying from fifteen to twenty days. On the lower ground, however, great differences occur in the frequency and in the amount of snow from year to year.

Snow falls more heavily in the Ardenne and remains longer on the ground as a normal feature of the winter conditions. The higher parts receive snow on thirty to forty days in the year between mid-October and mid-May. Though it may be expected to lie for about six weeks on heights reaching to 1,650 ft., relatively sudden changes accompanied by rain may soon cause it to disappear, except in sheltered corners. On some exposed roads snow-drifts occur every winter, requiring the use of snow-ploughs to prevent them

becoming impassable and thus isolating villages. In both the Ardenne and the Bon Pays, snow showers occur not infrequently in early spring as an uncomfortable feature of short cold spells.

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- (2) A. Gloden, 'Les Précipitations au Grand-Duché de Luxembourg,' in *Archives de l'Institut grand-ducal*, tome xiv (Luxembourg, 1936).
- (3) A. Gloden, 'La Carte pluviométrique du Grand-Duché de Luxembourg,' in *Bulletin Société Royale Belge de Géographie* (Brussels, 1937).
- (4) A. Gloden, 'Les Précipitations au Grand-Duché de Luxembourg, avec une carte pluviométrique,' in *Bulletin trimestriel* No. 17, published by the *Office de Statistique* (Luxembourg, 1937).

Short summary statistics are contained in the official *Aperçu Statistique* (Luxembourg, annually).

There are five fully equipped meteorological stations in the Grand-Duchy. These are at Luxembourg, Clemency, Berdorf, Strassen and Vianden (the Sanatorium), while some readings are also taken at Remich (*Station viticole*) and at Mondorf-les-Bains (the thermal spa).

Chapter III

THE PEOPLE

General Features : Languages : Religion : Social Conditions and Services:
Bibliographical Note

GENERAL FEATURES

At the time of the Roman conquest, between 57 and 50 B.C., the region of which Luxembourg now forms part was inhabited by Celtic tribes collectively known as Belgæ. One of these tribes, the Treveri, occupied the lands on either side of the Moselle from the Rhine to some distance upstream from Trier (*Augusta Treverorum*), including the greater part of Luxembourg. Following the invasion by Julius Cæsar and the establishment of the Rhine frontier, the population received a considerable Roman admixture, and for several centuries this Celto-Roman strain continued to flourish, as it did also in Lorraine and in the Walloon area of Belgium. After A.D. 400, Germanic invaders, such as the Franks, began their penetration from the north-east, and their advance through the Moselle region, followed in turn by permanent settlement, brought a new element into the ethnic situation. No further intrusion on a significant scale occurred subsequently, however, and the population of Luxembourg may therefore be regarded as the product of the impact of Germanic invaders upon a Celto-Roman people.

Some light is thrown upon the settlement of the region by the Germanic peoples by the speech boundary and place-name endings. Though the invaders spread far over Gaul (France and Belgium), it was only in the marginal areas such as Flanders, Alsace and part of Lorraine (including Luxembourg) that they were able to impose their language. Among Germanic—not necessarily Frankish—place-name endings, *-ingen* (= *-ange* in Fr.) is considered to indicate the earliest phase of settlement. On the other hand, *-weiler* (cf. *villa*), which is common in clearings in wooded districts, sometimes represents an early Germanic settlement on a Roman site, but may often indicate a later Germanic arrival in an area not formerly occupied by the Romans. Similarly, *-heim* is frequently found, but what period of settlement it signifies is uncertain. As shown in Fig. 16, there would appear to be a close relation between the occurrence of Germanic place-names and the distribution of

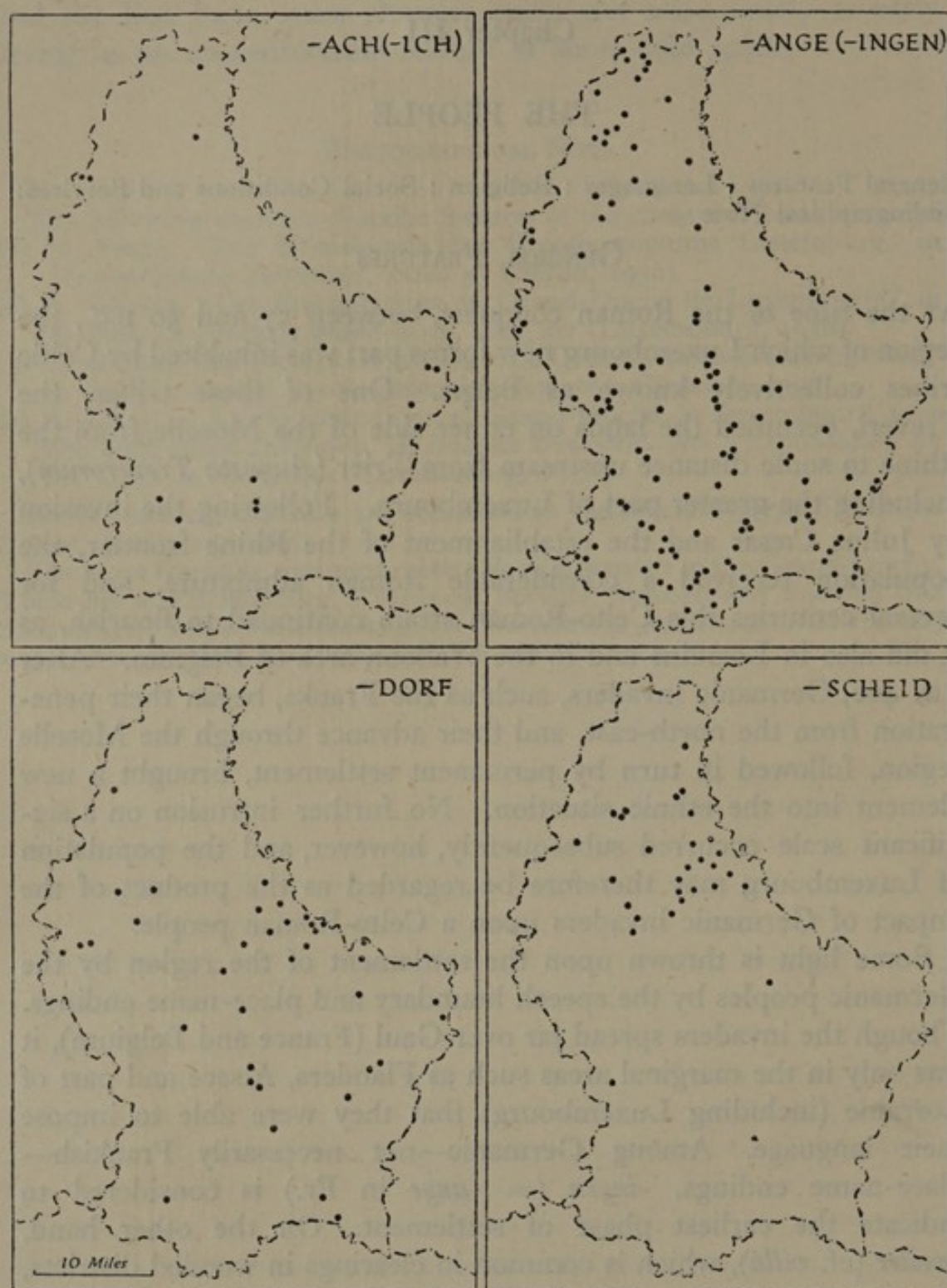


Fig. 16. Distribution of place-name suffixes

Based on J. Meyer, *Studien zur Siedlungsgeschichte Luxemburgs*, pp. 174, 176 (Berlin and Leipzig, 1932.)

cultivated land, for such names are much less frequent where arable land gives way to dense forest or pasture.

Though it is no longer possible to distinguish between the original physical types, the inhabitants of the Grand-Duchy are mainly broad-headed, are of medium stature, and are dark rather than fair.

In temperament, the Luxembourgers retain many of the qualities of a peasant people. They are hard-working and thrifty ; phlegmatic yet hospitable ; and somewhat conservative in outlook. Less dour than the German and less animated than the French, their essential feature is perhaps their good-natured robust individualism. Though enduring through history the impact of many nations upon their frontiers, the people have a strong sense of patriotism. This sentiment of nationality, fortified by tradition on the one hand and by an earnest desire for independence on the other, springs largely from a strong community awareness. As a characteristic of both the individual and the group, it inspired the courage with which Luxembourg has resisted the Nazi tyranny since the German occupation of May 1940 (see Appendix I, pp. 303-9).

LANGUAGES

The Grand-Duchy, situated on the speech-boundary between the French and German languages, is of necessity a bilingual nation, or trilingual if the universally used dialect is included. This condition is as old as the country itself, and the influence of the two great neighbours, readily exerted through the continual use of both languages, is felt in all branches of life.

In the course of history the relative importance of French, German and other foreign languages in Luxembourg has varied considerably. Thus, in the thirteenth century, when Latin began to be superseded by the Western languages, charters and official documents in Luxembourg were drawn up much more frequently in French than in German. The influence of the French language and culture at the Luxembourg court, when the country was ruled by the Counts of Namur and again under later dynasties, is mentioned on p. 61. French was made the official language in 1443, at the beginning of the period of Burgundian rule. Both before and after the French Revolution, close association with the Netherlands caused Dutch to be used considerably, and in the early part of last century this language was taught in the *Athénée*. After 1815, moreover, a knowledge of Dutch was necessary for candidates seeking public offices.

During the period of French administration (1797-1814), French was the only official language, but with the change of régime following the fall of Napoleon, German was given the status of an administrative language. In 1830, however, both became official languages, and bilingualism, surviving the cession of the Walloon-speaking territory to Belgium nine years later, was confirmed by the Constitution of 1848. Since the Luxembourg dialect is more closely related to German than to French, the former has, on the whole, predominated among the mass of the people in the past; in modern times this predominance was enhanced by the close relations with Germany during the long period of the *Zollverein* (1842-1918). Following the war of 1914-18, however, the orientation of the Grand-Duchy towards France and Belgium in economic affairs gave encouragement to French.

French and German

It is important to realize that in the Grand-Duchy there are no distinct areas where either French or German is spoken predominantly to the exclusion of the other, and largely for this reason the question of language does not promote political cleavage as in many European countries. To some extent, French and German serve different purposes. Elementary education is given mainly in German, correspondence is written chiefly in German, sermons in church are delivered in German and, as shown on p. 112, nearly all newspapers are printed in German. French, on the other hand, is the language of the Courts (see p. 89), including the pronouncement of sentences, although cross-examinations are often conducted in the Luxembourg dialect. Laws are published in both French and German, and to that extent both are official languages, but in the event of a divergence, the French is the accepted text. Indeed, for legislative and judicial purposes, French has been used from early times. In the Chamber and in the Luxembourg municipal council, the official language is French, though many representatives use either German or the dialect, the latter being used almost exclusively in the commune councils through the country.

Education must therefore be systematically bilingual. While German is the language of general instruction in the elementary schools, French is taught mainly by the direct method from the second year onwards, and is continued in a compulsory post-school course. Though undoubtedly much is soon forgotten, especially by those in the country districts, the language is used fairly widely in the towns.

In the secondary schools, French and German are both used for instruction, German in the lower classes and French in the upper, so that in all the number of lessons given in the two languages is about equal. The result of the educational policy is to maintain a more or less balanced bilingualism, although the affinity between the dialect and German gives the latter a predominance in everyday life. Even among the educated, where complete bilingualism is found, the majority of people find greater facility in the use of German.

The Luxembourg Dialect

The native dialect, *Letzeburgesch*, is a Moselle Franconian dialect belonging to the West Middle German group. It is spoken not only in the Grand-Duchy, but in the border districts of Germany, Lorraine and the Belgian province of Luxembourg, but beyond these frontier areas it is understood neither by the Germans nor the French. As the mother-tongue, *Letzeburgesch* is used in Luxembourg by all classes of the community, though not until the nineteenth century did it become the written and printed language of writers and poets. In 1847, there appeared the first dictionary of the dialect, the work of J. F. Gangler. However, except for *belles-lettres*, not a great volume of work has subsequently been published in the dialect. Partly as a result of the political situation following the outbreak of the present war, a decree of October 1939 made the Luxembourg dialect a third official language of the country. In any case, to the inhabitants it remains, as it has always been, an enduring symbol of their nationality.

The Luxembourg Dialect outside the Grand-Duchy

Germanic speech, in the form of the Luxembourg dialect, extends almost everywhere for a short distance beyond the frontiers of the Grand-Duchy, but least of all along the north-west in the Belgian *arrondissement* of Bastogne. Even here, however, the commune of Beho (Bocholz) is predominantly dialect-speaking to the extent of nearly 75% of its population, but, since some 60% also speak French (Walloon), it is typically bilingual. Further south, the *arrondissement* of Arlon is also largely bilingual, the Germanic element being especially preponderant in many of the border communes; Bonnest, Habergy, Hachz, Heinsch, Hondelange, Martelange, Messancy, Nobressart, Sélange, Thiaumont, Toernich and Tontelange are all dialect-speaking to the extent of at least 90% of their population. The town of Arlon itself is over 50% bilingual, but of the rest con-

siderably more speak French alone than the dialect alone. Thus in everyday matters the town is bilingual, with a balance in favour of French and not the dialect, as it has been claimed. The following table summarizes the number of people speaking the Luxembourg dialect and French in parts of the *arrondissements* of Arlon and Bastogne :

No. speaking dialect only	11,340	No. speaking French only	7,677
No. speaking dialect mainly	19,818	No. speaking French mainly	2,012
	<hr/> 31,158		<hr/> 9,689

Source : P. Langhans, in *Petermanns Mitteilungen*, vol. 62, pp. 96-7 (Gotha, 1916).

To the south of the Grand-Duchy the Franco-Germanic speech-boundary reaches as far as Uckange on the Moselle, so that in Thionville and neighbouring places both French and the Luxembourg dialect are in common use, whereas Metz is wholly French. Equally bilingual are the mining and industrial communities clustered near the frontier towards Longwy.

On the eastern borders, the dialect survives most strongly in the districts which, like Thionville, formerly belonged to Luxembourg. These include the areas of Bitburg, Neuerburg, Prüm, and in particular the villages on the German banks of the Our, Sûre and Moselle (Fig. 21). Although this fringe was not surrendered to Prussia until the settlement of 1815, it is only the peasantry who speak the dialect ; they also speak German, which, of course, they learn at school.

It is interesting to note that on the occasion of the celebrated Whitsuntide Procession at Echternach (see p. 326), villagers from the German side of the frontier also participate, thus demonstrating an ancient affinity of interests.

Results of Bilingualism

The bilingual character of Luxembourg is of obvious utility for a country so situated, and an additional advantage arises from the fact that educated people, accustomed to the use of foreign tongues, readily become good linguists. Many are fluent in such languages as English, Italian and Spanish, which enables them to secure responsible positions abroad, particularly in the U.S.A. and in South America. Familiarity with the contemporary language and culture of two great nations and the continual and inevitable comparison one

with the other, may well encourage such mental qualities as objectivity, impartiality and shrewdness. To what extent bilingualism is detrimental to originality and to the free development and expression of personality is an unsolved psychological problem. There are those who fear the effects of bilingualism in this direction upon the small community, but there appears to be little evidence in support of this view. There is, moreover, assuming the permanent integrity of the Luxembourg State, no danger that either of the foreign languages will supplant the mother-tongue, and the position, as with other national aspirations, is adequately summed up by the expression ' *Mir welle bleiwe wat mir sin* ' (' We wish to remain what we are. ')

NOTE ON THE LUXEMBOURG NATIONAL SONG

The national song, *De Feierwon*, provides an example of the written *Letzeburgesch* dialect. The author was the poet Michael Lentz, who wrote it on the occasion of the opening of the railway connecting the city of Luxembourg with Thionville in 1859. The tune, composed by Antoine Zeum, is said to be derived from an old French sacred melody. There are six stanzas in all; one of these, with the refrain, is quoted to show the nature of the dialect, together with a translation :

De Feierwon dén as berêt	The train stands still, strong in repose—
E peift durch d'Loft a fort et gêt	The whistle sounds ! The engine goes !
Am Dauschen iwer d'Stroz fun Eisen, An hie gêt stolz den Noper weisen, Dat mir nun och de Wé hun font,	Now along the iron streets It rushes on, each neighbour greets, And proudly shows, we've found the way
Zum ëwég grosse Felkerbond,	To union with the World today !
Kommt hier aus Frankreich, Belgie, Preisen,	Come ye from Prussia, Belgium, France,
Mir wellen iech ons Homécht weisen:	To view our land with friendly glance,
Frot dir no all Seiten hin, We mir eso zefriede sin. Mir welle bleiwe wat mir sin.	And learn how here, on every side, No discontentment does abide ! We will remain just what we are

From R. Putnam, *Luxemburg and her Neighbours*, p. 443 (New York and London, 1918).

RELIGION

In the Grand-Duchy of Luxembourg religious liberty and equality are recognized by the Constitution of 1868 (Article 19), which provided for complete freedom in the exercise of religion. The great majority of the inhabitants are Roman Catholics. According to the census of 1935, out of a total population just short of 300,000, no

fewer than 281,450 were of this faith. Of the remainder, there were 3,216 Protestants and 3,144 Jews, together with 450 belonging to other sects and 5,653 of unspecified religion.

The Church and the State

The fundamental basis of the relationship between Church and State in Luxembourg was furnished by the Concordat between Pope Pius VII and Napoleon in 1801, and by the Constitution of 1868, followed by a law in 1873. The first dealt only with principles, though details contained in certain articles (*articles organiques*) were added at the time. The provisions of this Concordat, though the country then formed a *département* of France, have never been abrogated, but most of the supplementary articles have become obsolete or have been modified. In the Constitution, however, an attempt was made in Article 22 to define the limits of State control, while the question of interference was left to future conventions, decisions from which could be submitted to the Chamber. Since this has never occurred, the State in practice leaves the Church entirely free as to its organization, administration, and appointment of leaders. In fact, the law of 1873 stipulating that only a Luxembourg cleric can be appointed as bishop is the sole important instance of State control, apart from the general provision by which the existing relations between Church and State are to be maintained. While the Church is thus independent, the State has assured the protection of the religious liberty of the subject. A law of 1869, for example, makes it a punishable offence to print or publish anything that will outrage or bring into derision any religion established in the Grand-Duchy.

The three principal confessions of faith in Luxembourg—Catholic, Protestant and Jewish—to-day all receive State support. The salaries and pensions of all ministers of religion are a charge upon the Treasury, and are regulated by law, though clerics, of course, are not public officials and do not represent the civil authorities. In the case of the Catholic Church, since the Chapter was not specifically included in the law relating to the organization of the bishopric, it is not officially recognized by the State, and the expenses must be borne by the Church.

It is likely that the law of 1873 was deliberately vague in respect of detail, since the intention was primarily to secure agreement between the two powers, Government and Church, and to create a favourable situation for the organization of the new bishopric. A tacit under-

standing, rather than a strict definition of the relationship, was aimed at, and the resulting compromise persists to this day.

The Roman Catholic Church

As already shown, the development and organization of the Roman Catholic church in Luxembourg rests primarily upon the Concordat of 1801 and the decrees of 1873. Though in earlier times many bishoprics were established throughout this part of western Europe, Luxembourg itself never became the seat of a diocese, and even when the Grand-Duchy was much larger in extent than it is to-day, it was divided among the archbishoprics of Trier, Cologne and Reims and the bishoprics of Metz, Liège and Verdun. Most of the parishes belonged to the dioceses of Trier and Liège. During the period of personal union with the Netherlands (1815-31) the country formed part of the bishopric of Namur, while various attempts to create a separate diocese were frustrated, largely owing to opposition from Trier. An important step towards the formation of an ecclesiastical union was taken in 1840, when the Grand-Duchy was raised to the status of an independent *vicariat apostolique* by Pope Gregory VI.

At length, in 1870, following the granting of independent political status by the Treaty of 1867, a see was created in Luxembourg. This was at first directly under the control of Rome, but three years later was formally recognized by the State in the law of 1873, which also authorized that the office of bishop should be held only by a cleric of Luxembourg nationality. The parish church of Notre-Dame in the capital became the cathedral.

The bishopric covers the entire country, and is divided into thirteen deaneries, each under a *curé-doyen*, and into 265 parishes, each under a *curé* or *désservant*; four of the parishes—Ehlerange, Esch-St. Henri, Esch-Frontière and Lasauvage—are, however, not recognized by the State. To the parishes are attached 190 curacies and chapels. The bishop is assisted by a Chapter, consisting of a provost (*prevôt*), who is also Vicar-General, and seven titular canons. The bishop nominates all priests, though he cannot establish a church or chapel, which would be a responsibility upon State funds, without the passing of a law. The clergy receive their training at the Episcopal Seminary in Luxembourg, founded in 1845. The means and revenue of each parish are administered by a council called the *Fabrique d'église*, consisting of nine members in parishes with a

population of 5,000 or more, and five in those with under 5,000. The priest and burgomaster are *ex officio* members.

There exist in the Grand-Duchy a large number of religious houses belonging to various Orders and Congregations. These communities have been freely established, despite a prolonged controversy over the interpretation of a clause in Article 26 of the Constitution which declares that the establishment of a religious corporation can only be authorized by law.

Protestants

Protestants were officially recognized by the State by a decree of 1894, and their Church is now supported by the State. This community includes all who belong to the Reformed and Augsburg Confessions, and have their names on the register of the Consisting Church of Luxembourg. Protestant administration is effected by a body consisting of six representatives, which chooses the Pastor (submitting the nomination to the Sovereign), maintains discipline, supervises the practice of the Faith, and administers the goods of the Church. There is a second Pastor at Esch-sur-Alzette. There are three presbytery councils (*conseils presbytéraux*) at Luxembourg, Esch-sur-Alzette and Differdange.

Jews

The status of the Jews was officially recognized in 1808. A synagogue was established in the capital, with the right to elect a consistory of seven members, though actually the congregation was placed under the chief consistory of Trier. In 1939, the Jewish community in Luxembourg had its own consistory, which elects a Rabbi, again submitting the nomination to the Sovereign; the salary of the Rabbi, like that of the Protestant Pastor, is paid by the State. Elsewhere, there are smaller Jewish communities at Esch-sur-Alzette, Ettelbruck, Differdange, Grevenmacher, Medernach (an almost purely agricultural village), Mondorf, Echternach and Remich. Persecutions in Germany during the years preceding the present war brought a considerable influx of Jews to the Grand-Duchy, a large proportion of whom gravitated to the capital.

SOCIAL CONDITIONS AND SERVICES

Luxembourg society differs from that of Britain in the relative absence of social classes. There are, of course, rich and poor,

though the extremes are not so pronounced, but there is no nobility, apart from the family of the Sovereign. This results mainly from the small size of the country and from the fact that, with a common system of education, children from all sections of the community attend the same schools. A strong democratic spirit in consequence pervades the public and administrative life of the Grand-Duchy.

The population is mainly urban, for nearly 180,000 out of the 300,000 inhabitants live in the two most populous areas, that is, in the capital and in the iron and steel districts (see p. 136). But the distinction between town and country is not so marked as in the larger industrial regions of the continent, since even the biggest towns are small by European city-standards, and all the inhabitants live within easy reach of the countryside. Many who work in the towns live outside and cultivate a small plot of land (see p. 191), while in the newer residential quarters for workers each family rents a house, generally semi-detached, which has its own garden. Among the rights of the individual guaranteed by the Constitution and by the law are the privacy of his home, his freedom of speech and the right to his possessions.

Since the beginning of the present century, there has been a steady development of social legislation in the Grand-Duchy, with the result that in 1939 the country was one of the most tranquil and contented in Europe. Utter destitution is unknown. Both State and commune assist in financing the social services, while voluntary organizations play their part. Industry has to bear high charges towards health insurance, workmen's compensation, etc., but these are fully justified by the resultant good relations between employer and worker. Thus, since the General Strike of March 1921, there has only been one serious strike which occurred in 1933, involving fifty-nine men and lasting for three weeks. The keystone of this system is social insurance and in this field Luxembourg excels; its considerable development is described on pp. 128-34.

Housing

In recent years, much has been done to establish a reasonable standard of housing in the Grand-Duchy. Slum clearance has proceeded rapidly, and the Government by special legislation has encouraged the artisan to possess his own house. Loans to individuals and public bodies (commune authorities, trade unions, etc.) are made through the *Caisse d'Epargne et Crédit foncier* (see p. 268) by a law of 1906. The State further authorized in 1929 the

formation of the *Service des Logements populaires*, an organization through which loans at a low rate of interest could be made available to people of moderate means (that is, those with an income of not more than 30,000 *fr. lux.*) for the purchase of houses and gardens. The *Service* was guaranteed by the State and administered for it by the governing body of a limited liability company. The *Service* also concerns itself with the problems of maintenance and repair of such houses, with improvements to existing property, especially in the matter of sanitation, and with the provision of household fittings.

In 1935, a Housing Act co-ordinated all previous legislation from 1906 onwards. In addition to loans to private people, the *Service* was empowered to grant loans at low rates of interest to any society holding a guarantee from the commune in which its head office was situated, on condition that it agreed (1) to reserve 10% of houses built for it for large families at an annual rental of not more than 3% of the cost price, and (2) to reserve 10% of houses built for acquisition by hire purchase.

The extent to which advantage is taken of these facilities is shown by the fact that in the period 1907-38, 7,961 loans were granted to a total of 186.3 million *fr. lux.*

Loans granted up to 31 December 1938

Occupation of borrowers	No. of loans	Amount mill. <i>fr. lux.</i>
Non-artisans (clerical, etc.)	5,056	113.4
Artisans	721	11.6
Farmers	141	2.2
Merchants	2,033	46.1
Companies	10	13.0

Source : *Aperçu Statistique*, p. 76 (Luxembourg, 1940).

In addition to these forms of assistance, the principal industrial undertakings devote a good deal of attention to the housing of employees. *Arbed-Terres Rouges*, for example, own more than 2,000 dwellings in which their operatives live, besides a number of dormitory centres. Funds are available to assist workmen in building their own homes, using materials bought cheaply through the firm. Clubs and canteens have also been provided in many places.

The growth of the number of houses as recorded at various censuses is shown in the following table ; the greatest increase has been

in the cantons of Esch and Luxembourg-Ville, to meet the greatly increased industrial and commercial population.

Canton	Number of inhabited houses			
	1910	1927	1930	1935
Capellen	3,289	3,558	3,702	3,792
Clervaux	2,796	2,808	2,827	2,857
Diekirch	3,652	3,776	3,842	3,935
Echternach	2,340	2,345	2,347	2,413
Esch-sur-Alzette	8,457	13,204	16,112	17,295
Grevenmacher	2,977	3,117	3,157	3,221
Luxembourg-Campagne	2,590	2,796	2,964	3,167
Luxembourg-Ville	5,802	7,737	8,468	9,574
Mersch	2,615	2,755	2,845	2,897
Redange	2,921	2,793	2,767	2,755
Remich	2,434	2,446	2,429	2,505
Vianden	604	590	591	599
Wiltz	2,997	2,949	3,003	3,059
Total	43,474	50,874	55,054	58,069

Source : *Aperçu Statistique*, 1940, p. 10 (Luxembourg, 1940).

Conditions of Work

From 1870 onwards, Luxembourg steadily underwent transformation from being an almost exclusively agricultural country to one in which the majority of the population came to depend either directly or indirectly upon industry. As in other countries, this change was accompanied by the growth of movements concerned with the improvement of labour conditions and with advancing generally the interests of the worker.

In Luxembourg the eight-hour day has been in force in all industrial establishments since 1920, while one day per week free from work, usually Sunday, is also compulsory. Holidays with pay were enforced by law in 1926, largely as the result of Trade Union activity. With the exception of domestic, agricultural and seasonal workers, to whom the benefit is not compulsory, all workers without distinction of age or sex are entitled to holidays with pay, the number of days varying with the number of years of service.

Numerous regulations exist which aim at safeguarding the health and well-being of the worker, particularly in the mining industry; these are enforced by a system of inspection established in 1902. Night work by women and young people under eighteen is forbidden,

as well as the employment of women in mines and quarries. The employment of women in hotels and cafés is supervised by the various commune authorities. The legal minimum age of employment of young people is fourteen, with the exception of employment in mines and quarries, where it is sixteen for surface work and eighteen for work underground. In general, the Grand-Duchy conforms to the conventions resulting from various International Labour Conferences.

The position of the professional and clerical worker in private employment is also safeguarded by various Government regulations.

Unemployment

Owing largely to the withdrawal of foreign labour (see p. 217), Luxembourg workers did not suffer so severely during the world depression of the early 'thirties as did those in other countries. Though unemployment figures were high for a time, recovery was fairly rapid, and by 1936 the *malaise* had virtually disappeared, except for regular seasonal interruption in certain trades. Unhappily, the deterioration in the political conditions of Europe caused its reappearance two years later (see p. 202).

The payment of unemployment relief has been in force since 1921, for a maximum of twenty-six weeks in a year, the cost being borne jointly by the State and the communes, the former paying three-quarters. The relief paid is not less than half the wage, up to a certain maximum per week. As a result of the economic crisis, not only industrial workers, but owners of small businesses who were deprived of their means of existence, together with Luxembourgers returning from other countries, were also granted relief. In order to obtain relief, the employee must be sixteen years of age, and must have worked for a minimum of 200 days in the twelve months preceding his discharge.

The mobility of labour is maintained by Labour Exchanges (*Bourses de Travail*) at Luxembourg (established in 1906), at Esch-sur-Alzette (1908) and at Diekirch (1916); the number of workers registered at these three centres in 1938 was 22,539, 18,314, and 10,796 respectively. These are inter-communal and are supervised by a commission representing the Government. The Exchanges also arrange for the provision of lodgings for workers. A General Assembly, consisting of representatives of the Government, of the Trade Unions, of the *Caisses régionales de maladie*, of employers and of workers, serves as a consultative body in matters of general

interest, including the election of the employers' and workers' representatives on the Government commission. In 1925, a Grand-ducal decree provided for the establishment within the various industrial organizations of workers' delegations elected by the employees themselves. Their task is to assist the employers in promoting the material and moral well-being of the workers, and thereby the smooth running of the industrial system.

The Trade Unions

The right of association was granted to workers by the Constitution of 1868 and since that time they have succeeded in building up strong organizations. The history of the Trade Unions in Luxembourg, owing to participation in the *Zollverein*, has been closely bound up with those of Germany, though it has also been influenced by the special character of industry in the Grand-Duchy, i.e., its control by a few powerful groups. During the war of 1914-18, the Unions obtained consent from the Government to form a committee to supervise their interests. This was the predecessor of the *Chambre de Travail*, which in turn became primarily concerned with social legislation, undertaking research into various labour problems, both social and economic, and working in close touch with the International Labour Office at Geneva. But the *Chambre de Travail* in no sense replaces the Trade Unions, which are concerned above all with the material interests of the workers. The two organizations, however, work together, and their joint efforts have produced good results in the interests of those employed in industry.

The oldest Trade Union, the *Association typographique*, was founded in 1864. Though small in numbers, having only some 200 members, it nevertheless became influential as it admitted only skilled and fully-trained employees, and in 1871 was successful in obtaining the principle of collective bargaining. But the movement did not become really important until the war of 1914-18, when, in 1916, it spread to the iron and steel workers. In 1920 the *Syndicat des Ouvriers mineurs et métallurgistes luxembourgeois* was formed, thereby including a very large proportion of the industrial population.

These two unions, together with those of the workers in brewing, glovemaking, building, food industries and tobacco, textiles and tanning, those employed by the State and communes, and the *Fédération nationale des Cheminots luxembourgeois* (National Federation of Railwaymen) are the 'free' unions, which form the *Union luxembourgeoise des Fédérations syndicales (U.L.F.S.)*. This organi-

zation in 1939 grouped together some 25,000 workers out of a total for organized labour of about 32,400, and was very influential. The *U.L.F.S.* in turn is affiliated to the *Fédération syndicale Internationale* and has an organ, *Der Proletarier*.

In addition to this group of unions, there are also the Christian Trade Unions, *Union des Syndicats Chrétiens (U.S.C.)*, which originated in 1906 as a number of small groups concerned with protecting their professional interests and with studying labour questions. Without cohesion or vigorous direction they made little headway until 1922, when a federation of small unions was formed. At this time the *cheminots* (railwaymen) created on a 'Christian basis' the *Syndicat professionnel des cheminots luxembourgeois (S.P.C.L.)*. Three organizations, composed of the *S.P.C.L.*, *Les cherches Ouvriers* and the *Syndicats Chrétiens* then grouped themselves into the *Confédération luxembourgeoise du Travail*, which is affiliated to a similar international body having its seat at Utrecht. The total number of members in Luxembourg in 1939 was about 6,250. Its weekly newspaper is *Der Soziale Fortschritt*.

The *Fédération des Employés privés*, to which are affiliated various workers in commerce and industry, remains outside the two principal groups, pursuing a neutral policy with regard to them. Its organ is *L'Emploie*. Finally, there are the so-called 'yellow syndicates,' formed under the patronage of the *Arbed* company at Esch-sur-Alzette, and including a total of some 800 metallurgical workers.

Besides the workers' unions, there exist various employers' organizations, which are of more recent origin. The *Fédération des industriels luxembourgeois* was formed in 1920, and includes, in order of importance, those in the iron and steel, mining and engineering, brewing, building, printing and quarrying industries. The *Fédération* issues a weekly paper, *Echo de l'Industrie*. An association of business men, the *Fédération des Associations commerciales du Grand-Duché*, formed several years before the war of 1914-18, failed to arouse much support, as was the case with a similar organization founded in 1906 on behalf of the highly skilled technicians. But after the war of 1914-18, concern for stability of status among the middle classes led such people to take greater interest in the conditions of their profession and for some years the federations were more active. Their journal is the *Handels-und Gewerbeblatt*.

Trade Unions are also numerous among agricultural workers, and at least seven federations of small local organizations existed before the present war. The multiplication of groups, however,

reflects the traditional individualism of the peasant, and there is no general confederation for all the unions, and consequently no group which can voice the opinion of the whole body of agricultural workers, a main disadvantage in view of the fact that agriculture in Luxembourg, as in other countries, is faced with tremendous problems of readjustment to modern needs and conditions. The two most important organs of the agricultural unions are the *Mitteilungen* and the *Luxemburger Weinzeitung*.

Broadly, the Trade Union movement in the Grand-Duchy reflects the general character of modern economic development throughout western Europe, that is, the notable tendency to substitute group action for that of the individual. Certainly it has to its credit many tangible successes in promoting favourable relations between capital and labour.

The following table summarizes from various official sources the approximate numbers of workers in the major Trade Union organizations of each main industry in 1939 :

Industry	Total no. of workers	U.L.F.S.	U.S.C.	'Yellow Unions'	Not organized in Unions
Transport ..	8,200	6,800	1,400	—	—
Mines ..	3,500	2,500	500	—	500
Metallurgy ..	17,500	10,500	2,500	800	3,700
Building ..	4,800	2,500	700	—	1,600
Wood ..	2,200	1,100	400	—	700
Textiles ..	350	200	100	—	50
Ceramics ..	1,200	650	250	—	300
Leather ..	1,500	800	300	—	400
Brewing ..	600	300	100	—	200
State and com- munal employees	2,000	Not available	Not available	—	Not available
Totals ..	41,850	25,350	6,250	800	7,450

Based on official sources.

BIBLIOGRAPHICAL NOTE

General Features

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(Mainz, 1921); J. Steinhausen, *Archaeologische Siedlungskunde des Trierer Landes* (Trier, 1936); and J. Meyers, *Studien zur Siedlungsgeschichte Luxemburgs* (Berlin-Leipzig, 1936).

Though somewhat old, a useful reference dealing with the social aspects of Luxembourg is J. P. Glaesener, *Le Grand-Duché de Luxembourg, historique et pittoresque* (Diekirch, 1885).

An interesting study dealing with the character of the people is that by N. Ries, *Essai d'une Psychologie du Peuple luxembourgeois* (Diekirch, 1911).

Language

The following references provide fuller treatment of the problems of bilingualism, especially in education: (i) 'Le bilinguisme et l'éducation,' in *Travaux de la conférence internationale de Luxembourg*, 1928, *Bureau International d'Education*, (Geneva, 1929); (ii) N. Braunshausen, 'Le bilinguisme et les méthodes d'enseignement des langues étrangères,' in *Cahiers de la Centrale* (Brussels, 1933).

Religion

A summary of the numbers of people of each religion is contained in the various censuses, *Résultats du Recensement de la Population* for 1922, 1927, 1930 and 1935, and in a more summary form in the *Aperçu Statistique* (Luxembourg, annually).

Social Conditions

Statistics of unemployment, Trade Unions, etc., are contained in the *Aperçu Statistique* (Luxembourg, annually).

Much detailed information on problems of labour may be found in the various volumes of *The International Labour Review* (Geneva, 1920-39), and *Industrial and Labour Information* (Geneva, 1920-39).

Chapter IV

HISTORICAL OUTLINE

The Luxembourg Dynasty : The Period of Foreign Rule : Towards Independence, 1815-39 : The Grand-Duchy, 1839-67 : Independence and Neutrality, 1867-1918 : The Quest for Security, 1919-40 : Bibliographical Note

The troubled history of Luxembourg is essentially related to the situation of the country in the 'marchland' zone between France and Germany. Its history is very largely the history of Europe, the march of events having dealt severely and persistently with the frontier territory of which it forms a small part. This oft-disputed ground lies to the west of the Rhine and extends from the North Sea coast to the Alps. As a region of varied configuration, including considerable areas of highland, it lacks natural cohesion and is readily penetrated from outside by routes which follow the principal valleys. Upon this stage the interplay of political forces has resulted in the emergence of a number of states and provinces whose integrity has endured unchallenged only for comparatively brief periods. Ethnic and linguistic inter-penetration has further aggravated the political instability by retarding the formation of national sentiment. Thus both French and Germanic speaking peoples are found in Belgium, Luxembourg, Alsace-Lorraine and Switzerland, the dialect forms in both Flanders and Luxembourg having developed into separate languages distinct from modern German.

Of the existing states in the 'marchland,' Luxembourg is by far the smallest, although its economic importance is considerable. Its strategic position, however, coveted and repeatedly assaulted by stronger powers, the neighbouring countries in particular, secured for it a conspicuous and sometimes dramatic rôle through the course of history ; consequently its relations with France, Germany, the Netherlands and Belgium provide the key to its political evolution in the modern period.

THE LUXEMBOURG DYNASTY

As early as A.D. 843, some thirty years after the death of Charlemagne, the treaty of Verdun gave concrete expression to the idea of a Middle Kingdom which at first extended as a belt of varying width from the

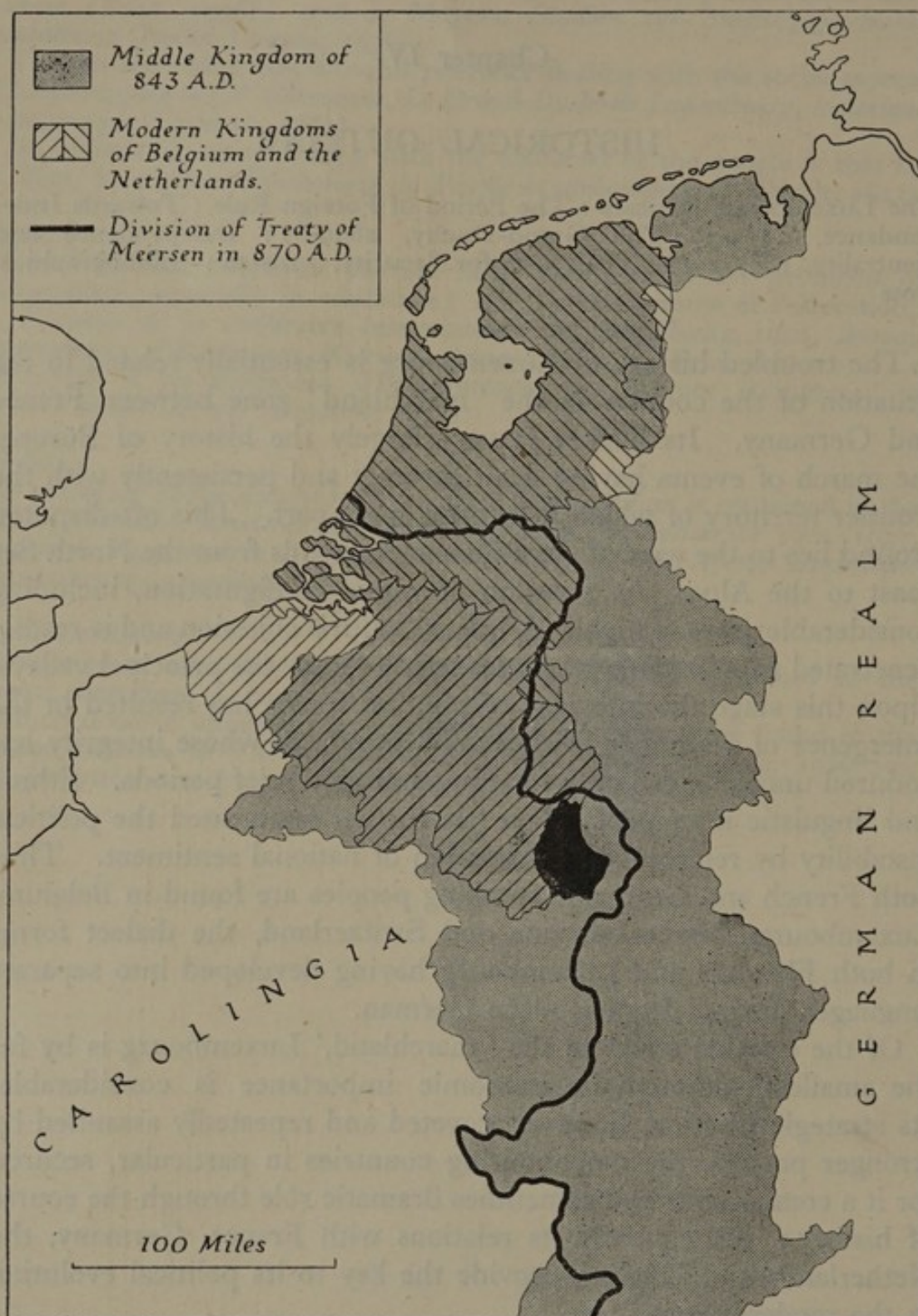


Fig. 17. The present-day position of Luxembourg in relation to the Middle Kingdom in A.D. 843

Based on *Geschiedkundige Atlas van Nederland*, volume 1, plate 10 (The Hague, 1913-32.)

The present territory of Luxembourg is in black. This map follows the original in showing the present-day coastline.

North Sea coast, between the mouth of the Rhine and that of the Weser, southwards across the Alps to the Mediterranean (Fig. 17). The northern portion of this territory included the valleys of the Meuse, Moselle and lower Rhine, so that in effect the Middle Kingdom was the central portion of what had been Charlemagne's Frankish empire. Under Lothair II (855-69), this kingdom was reduced in compass to the region lying between the North Sea and the Jura, and from its ruler derived the name Lotharingia, of which Lothringen and Lorraine are modern forms, although having a much restricted territorial application. Following the death of Lothair, the kingdom was long in dispute between the rulers of the lands to the east and west. In 925, part of Lotharingia, which later became Luxembourg, was attached as a fief to the kingdom of Germany, thus establishing a connection which lasted throughout the Middle Ages.

Under the Emperor Otto I of Germany, Lotharingia was divided into two dukedoms, Upper and Lower Lotharingia, the boundary between them passing through the region of Luxembourg in such a manner that the Ardenne portion of the present Grand-Duchy fell to the northern (Lower) dukedom and the Bon Pays to the southern (Upper). Shortly afterwards, in the year 963, Siegfried, Count of Ardenne, secured the old defensive site at Luxembourg '*castellum quod dicitur Lucilinburhuc*' (*Lucilin-burhuc* = little fortress), where he built a feudal stronghold. The exact site was a narrow rock promontory known as the Bouc or Bock (German *Bockfels*), forming a spur in the gorge of the Alzette, upon which fortifications appear to have existed from Roman times (see p. 318). Around this centre grew the *seigneurie* of Luxembourg. While the latter was situated in Upper Lotharingia among the lands of the Bon Pays, Siegfried also possessed considerable estates in the rugged Ardenne, though these were poor and thinly inhabited, and under him the two types of country became united. In fact, he not only extended the limits of his domain, but established a dynasty which during the Middle Ages became one of the most powerful in Europe. Despite Siegfried's title, however, the status of Luxembourg as a *compté* (*Grafschaft*) was not officially acknowledged until the twelfth century. There exists nevertheless a reference to Conrad as *comes de Luccelimbruc* and a seal of the same ruler also bears that inscription. The historian J. Vannerus quotes the expression '*Comes Henricus de Lutzelburg*' (referring to Conrad's successor), as the first documentary mention of the title, dated 1089.

Soon after Siegfried's death, the status of Luxembourg was advanced by the marriage of his grand-daughter Cunegonde to a German prince who became the Emperor Henry II. In 1136, the male line of heirs having failed, the succession fell to Henry, Count of Namur, the son of a Luxembourg-born countess, who brought a further gain of territory. Henry was succeeded by his daughter Ermesinde, whose reign of more than fifty years marked a golden era. By her marriage to the Duke of Limburg and Arlon, much of the area forming the present Belgian province of Luxembourg was brought to the *compté* and remained closely integrated with the original territory until it was ceded to Belgium in 1839. Towards the end of the reign the town of Luxembourg received its municipal charter. With the descendants of Ermesinde, the Luxembourg dynasty attained to a new brilliance. Her son, Count Henry VII, was elected Emperor in 1308, thus initiating a period of closer relations with Germany which continued until the middle of the fifteenth century. To his son John the Blind, Henry gave the crown of Bohemia as well as the stewardship of Luxembourg, and arranged the marriage of his daughter to the King of France. John the Blind, a picturesque figure of medieval chivalry and adventure, married a French princess, Beatrice de Bourbon, and died on the field of Crécy (1346) fighting for the cause of France. Edward the Black Prince, moved by his heroism in the battle, took the three ostrich feathers from John's helmet and adopted the motto 'Ich Dien,' which has remained the device of the Prince of Wales.

Three other rulers of the house of Luxembourg occupied the imperial throne within the next hundred years, these being Charles IV, son of John the Blind (1346), Wenzel (1383), and Sigismund (1410). In 1354, moreover, Luxembourg was raised by the Emperor Charles IV to the status of an independent duchy. His half-brother Wenzel, the first duke, married the heiress of Brabant, and a famous charter known as 'la Joyeuse Entrée' secured his recognition as duke of that province. Wenzel administered his lands of Luxembourg, Limburg and Brabant from Brussels, which signalized an association of provinces and peoples whose later history is so closely interwoven. At this time, too, Luxembourg reached its greatest territorial limits, covering an area about four times the size of the present Grand-Duchy.

On the death of Wenzel without an heir in 1383, the great dynasty under which Luxembourg's strength and influence had so long been promoted, came to an end. From a humble origin amid the dis-

integration of Charlemagne's empire, there was forged through the ensuing centuries a political unit which attained to at least a nominal independence. Nor is there much doubt that during this era some of the foundations of nationhood, in the European sense, were laid. In 1443, however, there dawned an era of retrogression during which Luxembourg fell under foreign rule. In that year the Duchy was acquired through purchase by Philip the Good of Burgundy, and not only does this event mark the end of its connection with the Empire, but also of its existence as an independent province until the recovery of its status as the modern Grand-Duchy in 1815. From 1443, Luxembourg formed part of the Netherlands and belonged successively to the ruling houses of Burgundy, Spain, Austria and France.

THE PERIOD OF FOREIGN RULE

Burgundian Rule, 1443-1506

For a time resentment at the Burgundian intrusion ran high in Luxembourg, and Philip was able to occupy the town and fortress only after a siege. Possession of the Duchy gave him control over a continuous tract ranging from the Netherlands, together with Flanders and Artois, southwards through an isthmus of smaller duchies such as Bar and Lorraine to Burgundy itself. By their ambitious plans, accompanied by vigorous efforts to extend central administration over these heterogeneous units, Philip and his successor Charles the Bold revived the Middle Kingdom, though in a much modified form. This gave to Luxembourg a new orientation. French outlook and culture, already prominent to a degree among its rulers and their associates, now began to exert a stronger influence; French etiquette was more widely adopted; French became the official administrative language; and in due course the Duchy found itself not merely subject to influences from the west, but increasingly identified as part of the debatable region towards which the expansionist policy of France herself was directed. Meanwhile, with the division of their possessions in 1506, the rule of the dukes of Burgundy came to an end and was followed by that of the Spanish branch of the Hapsburgs.

Spanish Rule, 1506-1714

The long period of Spanish domination opened with the reign of the Emperor Charles V, during which attacks by the French upon

the Netherlands, including Luxembourg, were made with little success, though they anticipated the profound and impending struggle between France and the Hapsburgs which was to be fought out largely in this borderland zone a century later. On Charles's abdication in 1555, the Netherlands passed directly to Spain. In the revolt of the Low Countries against Philip II, through which Holland gained her independence, Luxembourg took no part and remained united with what is now Belgium, as the Spanish Netherlands (Fig. 18).

In the seventeenth century, principally during the reign of Louis XIV (1643-1715), the French made further incursions into Luxembourg, storming a number of its castles and threatening the city. By the Treaty of the Pyrenees (1659) the fortresses of Thionville, Montmédy, Rodemacher and several smaller towns were ceded, marking the first reduction of Luxembourg territory (Fig. 21). Luxembourg itself was besieged and captured in 1684. Its defences were elaborately built up by Vauban, who regarded its position as of paramount importance to French security. By the Treaty of Ryswick (1697), however, it was returned to Spain and, though seized again during the campaign of the Spanish Succession, was surrendered a second time in 1714. In that year Luxembourg, with the rest of the Spanish Netherlands, passed from the Spanish to the Austrian branch of the Hapsburg family.

During the period of Spanish rule, Luxembourg remained in a backward condition with regard to social and economic matters. Agriculture, the chief occupation, disturbed by intermittent warfare and raids by the French, made little advance, and often the provisioning of troops exhausted the resources of the villages. Plague added to the general misery during the 'Thirty Years' War and resulted in a marked decline in the total population, many villages being abandoned. A representation to the Netherlands Government in 1648 stated: '*la province de Luxembourg était dépeuplée au point qu'il n'y restait en vie pas même la trentième personne de celles qui y étaient avant les guerres.*' The beginnings of an iron industry were made in the middle of the seventeenth century, though attempts to set up small hand-machines to make ribbons were defeated by the claims of the Guilds in the Low Countries. The religious institutions continued to flourish, however, and the Luxembourgers remained steadfastly Catholic, despite Protestant influences in the Netherlands.



Fig. 18. The Netherlands in 1555

Based on (i) W. R. Shepherd, *Historical Atlas*, p. 117 (London, 1930); (ii) *Geschiedkundige Atlas van Nederland*, vol. 1, plate 49 (The Hague, 1913-32.)

It is difficult to be certain about many details of the boundaries, partly because they were changing continually, and partly because the status of some territories was ambiguous and can be given different interpretations.

Austrian Rule, 1714-1795

More settled conditions prevailed in Luxembourg after the transfer of sovereignty to yet another foreign Power. The title of Duchy was reasserted, and by an agreement with France the frontier with Lorraine was defined on a linguistic basis. Under the rule of the Empress Maria Theresa, the country recovered substantially from the disasters of the previous century. But peace was short-lived. The attempt of France to obtain security by driving towards the frontier of the Rhine was renewed in the wars of the Revolution. Like other parts of the Austrian Netherlands, Luxembourg was overrun in 1795, and after withstanding a siege for several months, the fortress itself capitulated.

French Rule, 1796-1815

The Netherlands territories, having been annexed by the French—a position formally recognized by the Treaty of Campo Formio in

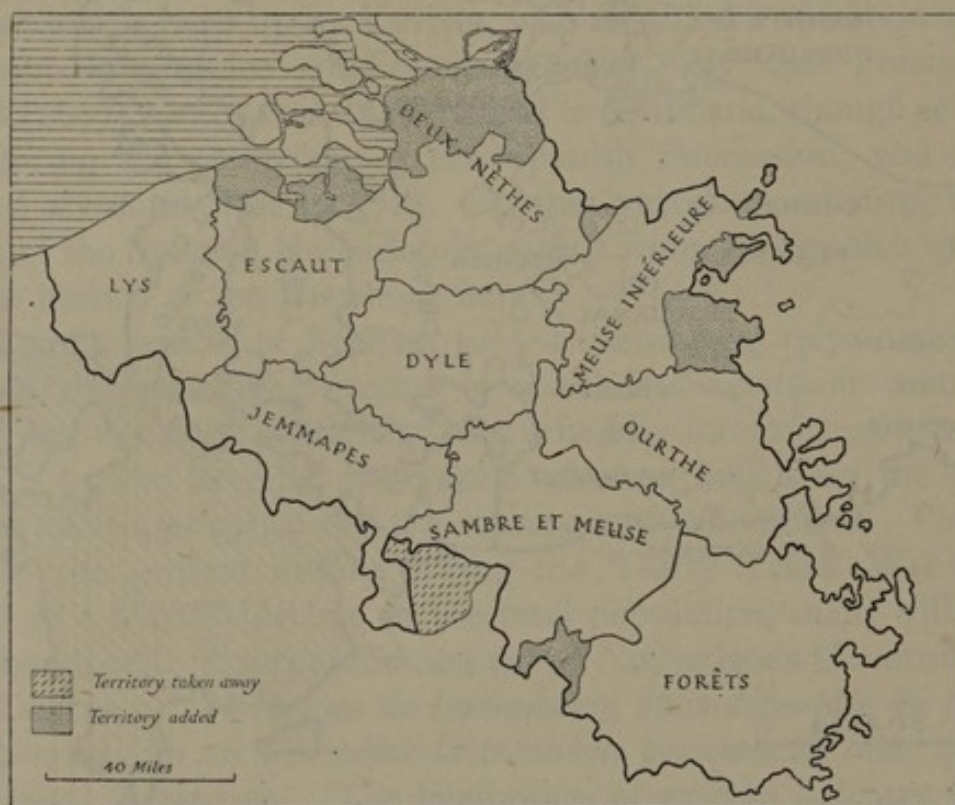


Fig. 19. Belgium and Luxembourg as departments of France, 1795-1814

Based on L. van der Essen, *Atlas de Géographie historique de la Belgique*, map xi (Brussels and Paris, 1929.)

In 1795, the whole of the Austrian Netherlands and the episcopal territory of Liège was incorporated into the French Republic by decree. There were certain changes, notably the addition of Dutch Flanders and of some enclaves in the east. Luxembourg formed one of the nine new departments (*Département des Forêts*) created by the French.

1797—were subsequently organized into *départements*. The greater part of the Duchy became the *Département des Forêts* (Fig. 19), so named from its heavily wooded character, while the fringe of territory lying beyond the rivers Sûre and Our containing the districts of St. Vith, Cronenburg and Schleiden were included in the *Département Ourthe*. The rule of the Directory promoted general discontent, while opposition to the new order inspired by the Revolution and heightened by Republican hostility to the Catholic Church, gave rise locally to revolt and guerilla activity among the peasantry. Resistance was greatest in the Ardenne, where an outbreak known as the *Klöppelkrieg* (= Club War, since clubs were the only weapons available to the countryfolk) is commemorated by a memorial stone at Clervaux bearing the motto of peasant integrity: 'Wir können nicht lügen!' Though the revolt was suppressed, the episode ranks high in the annals of Luxembourg patriotism.

With the ascendancy of Napoleon, bringing in turn the administrations of the Consulate and the Empire, conditions in the Duchy improved. A tolerant policy towards the Church, the introduction of the Code Napoléon, and the undertaking of various public works did much to reduce popular resentment against French rule. Commercial developments, which received some stimulus through an Industrial Exhibition held in Brussels, began to generate a feeling of security and even of prosperity. On the other hand, Napoleon's campaigns made conscription necessary, and much of Luxembourg's manhood was sent to fight in various parts of the the continent. Before the Concordat of 1801, the annexation by Napoleon of Papal lands, following his expedition to Italy, caused reaction in the Duchy, accompanied by a revival of national sentiment. Nevertheless, this period of rule strengthened French influences in the country, especially among the well-to-do who had received most benefit from the occupation. Throughout subsequent history these influences were never entirely obliterated. They formed instead a basis for the growth of a strong francophile sentiment which has lasted until the present day.

TOWARDS INDEPENDENCE, 1815-39

The Kingdom of the Netherlands

One of the primary objects of the European settlement following the fall of Napoleon was to guard against any future attempt on the part of France to reach the lower Rhine. Accordingly, by the Treaty of

Vienna (1815), Holland, which had successfully revolted against the French in 1814, received the provinces of the Austrian Netherlands, i.e., Belgium and Luxembourg, and in this way a buffer-state between France and the Rhineland of Prussia was created. The position of Luxembourg within this Dutch state became complicated owing to the ambitions of Prussia. Moreover, the Treaty enforced the surrender to the latter of the districts lying east of the rivers Moselle, Sûre and Our (districts of St. Vith, Bitburg, etc.) making the second reduction of territory (Fig. 21). In compensation the country was made a Grand-Duchy with the legal status of an independent state, but it was at the same time included as a member



Fig. 20. Belgium and Luxembourg, 1815-31

Based on L. van der Essen, *Atlas de Géographie historique de la Belgique*, map xii (Brussels and Paris, 1929.)

state of the German Confederation of the Rhine; William I, King of the Netherlands, a prince of the Orange-Nassau family, became the first Grand-Duke. It was arranged that the grand-ducal succession should conform to the Nassau Family Agreement of 1783, by which, in the event of a failure of male heirs, the line of Orange should pass to the Walramian branch of the family. The

dynasty of Orange-Nassau, more fully Orange-Nassau-Vianden, from which the present Netherlands royal family is descended, was founded by the marriage of Countess Adelaide of Vianden to Count Othon of Nassau-Dillenburg in 1351. The castle of Vianden in the Luxembourg Ardenne, for centuries one of the principal seats of the dynasty, was both in size and magnificence among the greatest of medieval strongholds. Its ruins are still among the most imposing in western Europe (Plate 46).

Prussian Influence in Luxembourg (1815-30)

Prussia's position was strengthened by the right granted under the Treaty of Vienna to garrison the fortress of Luxembourg, which became, if not a threat, at least a tangible reminder to France of the military strength of the Confederation and the supporting Powers. By agreement, three-quarters of the garrison, including the military governor, were to be provided by Prussia, while the Netherlands furnished the remainder, but in practice the latter did not supply its complement, so the garrison was wholly Prussian. Once more, therefore, a change in the balance of power resulted in a new orientation in Luxembourg affairs, though it could hardly be otherwise in view of the Grand-Duchy's strategic situation between the Rhineland and the Paris Basin. In civil matters, however, Prussian influence in Luxembourg was negligible during the period 1815-30.

The Revolt against the Netherlands (1830)

Although separate from the Netherlands by international agreement, in practice the country remained an integral part of that kingdom, and its deputies took their places in the Legislative Assembly at The Hague. Yet discontent with the situation grew, and public opinion gave strong support to Belgian opposition to William I's government. When in 1830 the Belgian provinces revolted, the majority of Luxembourgers joined in the movement, though the Prussian garrison prevented the fortress from taking an active part against the Dutch. Popular sentiment was expressed clearly when delegates were included in the Belgian National Congress which, besides declaring Belgium's independence, asserted that the Grand-Duchy was part of the new state, while preserving the rights of the German Confederation over the fortress. William I appealed to the Confederation to uphold his title in the Grand-Duchy, but the question, involving still wider issues, was eventually dealt with at a conference of the Powers (Great Britain, France, Russia, Prussia,

Austria and the Netherlands) held in London. The decisions were embodied in the Act of Twenty-four Articles, 1831, and at length ratified by the Treaty of London in 1839.



Fig. 21. The progressive reduction of Luxembourg territory, 1659-1839

Based on a contemporary map attached to the draft of the Treaty of London (1839).

The numbers in the key are as follows :

- (1) Territory taken by Louis XIV prior to 1659, and ceded to him by the Treaty of the Pyrenees in 1659 (French Luxembourg).
- (2) Territory about Orchimont, conquered by Louis XIV, and claimed as an exception at the cession of Luxembourg at the Treaty of Ryswick in 1697.
- (3) Territory accompanying Bitburg, ceded to Prussia by the Congress of Vienna in 1815 (Prussian Luxembourg).
- (4) The Duchy of Bouillon, ceded to Luxembourg by the Congress of Vienna in 1815.
- (5) The section of Luxembourg retained by Belgium at the Treaty of London in 1831, confirmed in 1839.
- (6) The territory of the Grand-Duchy as defined at the Treaty of London in 1831, and confirmed in 1839 and 1867; these are the present frontiers.

For the third time, Luxembourg suffered a reduction of territory, this time by the transfer of the western portion to Belgium. This territory, larger in extent than that which remained to the Grand-Duchy, became henceforward the Belgian province of Luxembourg, while the boundaries of the Grand-Duchy as determined by the Twenty-Four Articles have survived unaltered to the present day (Fig. 21). Both the political independence and the territorial integrity of the small State were guaranteed by the Powers, although membership of the Confederation was preserved, largely in order that the capital and fortress should remain under Prussian control. The King of the Netherlands remained the Grand-Duke, but the union of the two countries survived only on this personal basis, and even this tie was loosened in 1850 when William III appointed his brother Prince Henry to rule in the Grand-Duchy.

The partition of Luxembourg, whilst at first acceptable neither to the Grand-Duchy nor to Belgium, reduced the little country with its population of 152,000 to a linguistic unit in which all the inhabitants (except for two Walloon communes) were of Germanic speech. Similarly Belgian Luxembourg, with the exception of Arlon and a few villages, was wholly Walloon. Yet it should be noted that the majority of the inhabitants of Germanic speech wished neither to remain under the rule of the Netherlands nor to belong to the German Confederation, and many would have welcomed incorporation with Belgium. But the Powers saw otherwise, and the settlement, which confirmed Prussia's hold upon the frontier against possible French aggression, marks the beginning of the modern era in Luxembourg's history. Two political principles, each at variance with the other, thereafter provide the basis of the Grand-Duchy's relations with her neighbours. The first, upheld in a democratic system, is the right of nations, whatever their size, to conduct their own affairs. The second, born of centuries of warfare in the 'march-land' and sharpened by the cynicism of great Powers, is that small states, on the contrary, cannot exist in isolation, however, strong the will to be self-contained.

THE GRAND-DUCHY, 1839-67

During this period, in which peace was preserved among her neighbours, the Grand-Duchy was administered quite separately from the Netherlands, and in 1841 under William II received a

restricted constitution of its own. This was followed by a more liberal one in 1848, at a time when revolutionary outbreaks occurred in several European countries. A single Chamber was formed, comprising representatives of the people in the proportion of one for every 3,000 inhabitants, the franchise being extended to all male citizens paying a tax of 10 francs. The trend towards complete independence was emphasized by Prince Henry who, when deputed by his father William III to be governor of the Grand-Duchy in 1850, established his court in Luxembourg itself. Six years later, with the support of the Confederation, autonomy was brought a stage nearer by a revision of the constitution, which resulted in a substantial reduction in the powers of the Dutch legislative body.

Under Prince Henry, the government in Luxembourg served the best interests of the country and promoted general satisfaction. In consequence, the desire of many for a union with Belgium steadily declined. Equally, there was little public feeling for Prussia, for in fact the people of Luxembourg were becoming conscious of a new patriotism rooted in an ancient national sentiment. German influence, however, began to exert a powerful effect on the economic life of the Grand-Duchy, and its inclusion in the German Customs Union (*Zollverein*) in 1842 was a step of great consequence, despite the antagonism which it first aroused. For so small a country, limited in resources, could not develop in isolation, and material advantages, including an improvement in the standard of living, steadily accrued from the commercial progress which the Union made possible. In particular, the organization of the iron industry laid the foundations of the country's future prosperity. There were of course, the misfortunes of the 'fifties, a decade of poverty and need, during which some 6,000 Luxembourgers emigrated to the U.S.A. and many artisans sought employment in Paris, but on the whole progress did not slacken and the period saw the introduction and extension of numerous features of modern life ; railways, roads, bridges, newspapers, postal and telegraph services, schools and technical institutes. A people's savings bank, a theatre, gas and water services and the main railway-station were among the improvements to the city. In 1859, at a festival celebrating the arrival of the first steam locomotive, a hymn entitled ' De Feïerwon ' by the poet Lentz was heard. Set to an old French sacred melody, it became the national song, containing the line which expresses tersely enough the modest political aspirations of all Luxembourgers : '*Mir welle bleiwe wat mir sin*' (' We wish to remain what we are ') (see p. 45).

French influences in Luxembourg were exerted in a different field. Among educated people French culture was increasingly favoured, while the language became more widely used in the administration and in the professions. In one section of the economic field, too, French interests played their part, for by an agreement made in 1857 and ratified by the Grand-Ducal Government in 1865, the Eastern Railway of France took over the working of the *Guillaume-Luxembourg* company (see p. 283). Among liberals, belonging chiefly to the middle classes, there was considerable political sympathy for France, but only a small minority would have supported a union with that country; so, too, the commercial elements, while sensible of the benefits derived from the economic attachment to Germany, produced few pro-German enthusiasts. Though attempts were made by the clerical (Catholic) party and later on through the *Deutsche Schulverein* to develop a German feeling, such propaganda was rewarded with little real success. It certainly failed to mitigate the dislike of Prussianism among the majority of the people.

The Attainment of Independence

One of the principal results of the success of Prussia in the war against Austria in 1866 was the dissolution of the Germanic Confederation. From this it followed that the Grand-Duchy was politically no longer bound, even loosely, to Germany, though the Prussian garrison remained in the fortress. This anomalous situation, together with a revival of French ambitions in the direction of the Rhine under Napoleon III, brought about a series of intrigues by which France hoped to get Bismarck to agree to the transfer of Luxembourg. Now the Dutch Government, anxious lest the province of Limburg, formerly a member of the Confederation, should be made through pressure from Germany to join the new North German Confederation, was prepared to sacrifice its remaining interests in the Grand-Duchy. This three-cornered issue, though fundamentally a matter between France and Prussia, might well have brought war. Popular feeling rose high in both countries but after much activity in support of peace on the part of neutral states, including Great Britain, a conference of the Powers was called in London. In Luxembourg itself there was an atmosphere of alarm, for the situation was made the more perplexing by the maintenance of the Prussian garrison which, paradoxically, represented a Confederation which no longer existed. A few outbursts of popular feeling occurred in which the famous line of the national song, 'We wish to remain

what we are,' was changed to 'We do not want to become Prussian.' There was general opposition to a union with France, though this was admitted to be preferable to incorporation with Germany, while a proposal to unite with Belgium received little support on the grounds that it would provide less security than a union with France.

After lengthy deliberations, the conference of Powers which met in London drew up the Treaty upon which Luxembourg's existence as a state has since rested. It was signed on 11 May 1867, by the representatives of Great Britain, France, Prussia, Austria, Italy, Russia and the Netherlands, and its main provisions were as follows :

(a) The Grand-Duchy to be recognized as a perpetually neutral state under the collective guarantee of the Powers.

(b) The sovereignty of the Grand-Duchy to remain hereditary in the house of Nassau, according to the conditions of succession laid down in 1815 and 1839.

(c) The Prussian garrison to be withdrawn from the fortress, which was afterwards to be totally dismantled.

Thus by negotiation a solution was found to this particular phase of the Franco-Prussian problem, and at the same time the Grand-Duchy secured a wide guarantee for its independence. Much doubt, however, has subsequently been cast upon the interpretation of the collective guarantee. In the event of an attack upon Luxembourg by one of the Guarantor Powers, the British government were prepared to implement their guarantee only if the remaining guarantors would also act. Foreign governments, on the other hand, have often maintained that the collective guarantee included an obligation to separate action if collective intervention were found impossible.

INDEPENDENCE AND NEUTRALITY, 1867-1918

Luxembourg and the Franco-Prussian War

The position of Luxembourg during the Franco-Prussian war of 1870 was unenviable but, despite occasional displays of sympathy for the French by popular elements and several allegations by the Prussian Government of unneutral behaviour on the part of the authorities, both belligerents respected their guarantees under the Treaty of London. The settlement which followed hostilities, however, had important consequences for the Grand-Duchy, for with the transfer of Alsace-Lorraine the little state became enclosed on three sides by German territory, the frontier with France being

reduced to a short stretch of six miles in the neighbourhood of Longwy.

The strategic advantages thus gained by Germany were further strengthened by taking over from the French Eastern company the working of the *Guillaume-Luxembourg* railway, which gave control over a continuous system of lines in both Lorraine and the Grand-Duchy. The railways of Luxembourg thus formed part of a system which furnished Germany with three principal routes leading into the Paris basin. The first led westwards from Strasbourg through the Saverne gap; the second lay along the Moselle valley from Trier and Thionville; and the third, though it passed through Belgian territory, was the line from Aachen along the Meuse valley through Liège and Namur. The first two converged on the Moselle at Metz, but the vital line connecting them with the third was formed by the route joining Metz, Thionville, Luxembourg and Liège, of which more than one-third belonged to the *Guillaume-Luxembourg* company. Despite this ominous situation, from which it became clear that any future invasion of France even through Belgium would inevitably involve the Grand-Duchy, the German government by the Railway Convention of 1872 pledged itself not to use the Luxembourg railways for the transport of troops or munitions in time of war, an undertaking which was renewed in 1902. On the other hand, not until the remaining fortifications in Luxembourg were finally demolished in 1883 would Germany permit the construction of a direct line across the French frontier to Longwy.

Economic Development after 1870

Meanwhile, within the framework of the Customs Union, economic progress in the Grand-Duchy continued unhindered. Developments in the iron industry during the 'seventies and 'eighties provided the fundamental impetus to a general increase in prosperity. The introduction of the Thomas-Gilchrist basic process, which enabled the low-grade ore of Lorraine and Luxembourg to be used in the large-scale manufacture of steel, also served to emphasize the close relationship between these regions and the Rhineland, on account of the dependence of the former upon the coal and coke of the Ruhr. The use of basic slag, a by-product of the steelworks, was an important factor in the improvement of agriculture which included the advancement of viticulture along the Moselle valley. Industrial development in particular was accompanied by a substantial increase in population and in the growth of towns, the canton

of Esch, containing the mining and metallurgical district, and the capital itself, being the principal areas affected in this way.

Dynastic Independence, and the War of 1914-18

With the death of the King-Grand-Duke William III without a male heir in 1890, the personal link with the crown of Holland was finally severed. The Grand-Duchy then passed, in accordance with the Nassau Succession Agreement (1783) to Adolphus, Duke of Nassau-Weilburg. (The latter was a member of the older Walramian branch of the Nassau family, named after Walram its founder). He was succeeded in 1905 by his son, the Grand-Duke William IV. In 1912, following an Act of Succession promulgated a few years earlier, William's eldest daughter Marie Adelaide became Grand-Duchess. Two years later, at the outset of the war of 1914-18, the country was invaded by the Germans as part of their operations against France, regardless of the guarantees given under the Treaty of 1867. Through its railways Luxembourg was still of great strategic value, for it opened a way to outflank the defences of the Meuse valley at Verdun, besides serving as a pivot between the armies of Lorraine and those advancing through Belgium. Resistance to the invasion was impossible, since under the Treaty of 1867 the Grand-Duchy was prohibited from having a military force. Though public sentiment favoured the Allies, the government endeavoured to maintain a strictly neutral attitude throughout the occupation, which lasted until the Armistice of November 1918. This violation of its territory brought to an end another era of Luxembourg's history, a phase characterized by a close association with the modern Germany.

THE QUEST FOR SECURITY, 1919-40

The Plebiscite of 1919

The liberation of the Grand-Duchy which followed immediately upon the close of hostilities caused the question of its relations with neighbouring Powers to be raised anew. In order to leave no doubt as to its attitude the government denounced the Customs Union with Germany at the time of the Armistice and it was clear that some economic arrangement with either France or Belgium must be sought. Though not unexpected, the problem was complicated two months later by the abdication of the Grand-Duchess Marie Adelaide, who during the war had repeatedly manifested pro-German sym-

pathies, to the embarrassment of both people and government. The government, therefore, as soon as normal conditions were restored, arranged for a referendum to decide upon the political and economic future of the country. Now it is evident that for a time both France and Belgium had ambitions with regard to the Grand-Duchy. France hoped for economic control, while Belgium looked for a closer political connection—either direct incorporation or a personal union. At the request of the Powers then conferring in Paris (May 1919) the referendum was postponed, in order that the two countries might reach agreement concerning the future of the Grand-Duchy. Though they failed to do so, Belgium soon abandoned her political hopes, and France, while desirous of an economic union, would not permit this to prejudice her relations with Belgium, with whom she sought to conclude a military agreement. The referendum was accordingly taken in September 1919, and by an overwhelming majority the people elected to remain under the reigning dynasty (Charlotte, sister of Marie Adelaide, having already succeeded as Grand-Duchess) and to enter an economic union with France. The number of voters (consisting of men and women of twenty-one years of age and over) on the register was 127,775, of whom 90,984 actually voted. The voting on the political issue was as follows: for the reigning Grand-Duchess 66,811 (= 80%); for another Grand-Duchess of the same dynasty 1,286; for another dynasty 889; for a republic 16,885. On the economic issue: for an economic union with France 60,133; for a similar union with Belgium 22,242 (see p.251).

Since the second of these decisions was not acceptable to France an approach was alternatively made to Belgium and in December 1921 negotiations were at length concluded. The agreement provided for a single Belgo-Luxembourg customs unit and for the use of Belgian currency in the Grand-Duchy. It came into force on 1 May 1922, and was to last for fifty years (see p. 252).

The Policy of Neutrality, 1920-40

As early as December 1920, Luxembourg had been admitted to the League of Nations. In view of the special circumstances relating to its international status, the Grand-Duchy's policy was confined to one of neutrality. Thus in 1935, though she enforced economic sanctions against Italy, she would not distinguish between Italy and Abyssinia and prohibited the supply of arms to both. Again, at the

time of European tension ending in the Munich Agreement of September 1938, the Luxembourg delegate to the League Assembly declared: 'The government of Luxembourg has never ceased to affirm that the geographical situation of the country and the complete absence of means of defence oblige the government to maintain in the League its traditional policy of neutrality imposed upon the Grand-Duchy by the Treaty of London in the interests of European peace.'

By the Treaty of Versailles (Articles 40 and 41), Germany was obliged to renounce her former agreements with the Grand-Duchy in respect of the Customs Union and the management of the *Guillaume-Luxembourg* railways. The Grand-Duchy was not a signatory to the Treaty, but no issue affecting the position and status of the country was raised at the time by the Allied Powers. Yet there was subsequently considerable doubt among foreign governments as to whether the Treaty of 1867 was still operative. Some of the principal signatories at Versailles assumed its abrogation, though the Netherlands, Russia and the Grand-Duchy itself, as parties to the London settlement, had obviously not consented to its abrogation, since they were not among the signatories at Versailles. Thus in the quest for guarantees, many exchanges of views took place between the Grand-Duchy and the leading Powers during the post-war years. None of these proving satisfactory, Luxembourg continued to assume that the Treaty of 1867 was still in force, except as regards Germany. Broadly speaking, France was prepared to give a guarantee in case of renewed German aggression, and would readily have done so if Great Britain did likewise. Britain, however, regarded Luxembourg's neutrality as terminated, in particular by her entry to the League of Nations, and declined to acknowledge greater obligations to the Grand-Duchy than to any other member of the League. On the other hand, Britain was favourable to Luxembourg receiving guarantees from both France and Germany.

While the provisions of the London Treaty continued to serve as the basis of Luxembourg's sovereignty, her territorial integrity no longer had the unqualified support of the Powers. When, in 1925, the Locarno Pacts were signed, the guarantees of their frontiers entered into by France, Belgium and Germany made no mention of Luxembourg, though both France and Belgium might have been expected to insist on Luxembourg's inclusion. But by a rigid policy of neutrality she hoped to justify her claim to an international guarantee. In support of this, she was able to present a record of

scrupulous adherence to the conditions under which her existence had been assured by the Powers more than half a century before.

Apart from uncertainty in the matter of foreign affairs, the post-war period brought another re-orientation of Luxembourg's interests. In the economic sphere her interests now lay with Belgium, while her strong francophile tendencies determined a cultural outlook towards France. In any case, the strong democratic tradition caused the rise of National Socialism and the revival of military power in the Third Reich to be viewed with distaste and growing apprehension. Though from time to time German diplomatic representatives sought to bring pressure upon the Grand-Ducal government to force public opinion to observe what was called 'moral neutrality' towards Germany, no ground was yielded. The Press continued to denounce acts of aggression performed by the Nazis against neighbouring peoples, whilst sympathy with the victims was everywhere openly manifested.

The Outbreak of War, 1939

In August 1939, when war in Europe again appeared inevitable, and also immediately after hostilities had actually begun, declarations of strict neutrality were made by the Luxembourg government. The country, which in that year celebrated the centenary of its independence under the Treaty of 1839, had every reason, however, to fear the worst, for it lay directly between the Maginot and Siegfried defence systems (Fig. 64), while during the previous two years German fortifications were erected along the river-frontier of the Moselle and Sûre within view of the Luxembourg bank. In these unhopeful circumstances the responsibilities of both Sovereign and government were heavily increased and wider powers were inevitably sought in the interests of security. A law was passed in September 1938 empowering the government to take any steps necessary to preserve the safety of the state. Almost a year later, on the eve of the German invasion of Poland, the Chamber passed another measure extending indefinitely the time limit of the 1938 law. Both these measures, it should be observed, were passed unanimously by the Deputies without a single abstention. Thus on 10 May 1940, when the German offensive was launched in the west and the frontiers of Luxembourg again violated, the Grand-Duchess and her government withdrew before the Nazi columns to friendly territory, preserving a status which had been made constitutionally unimpeachable.

Since that day Luxembourg has been regarded by Great Britain as an ally and ranks as a member of the United Nations. The events of 1940-44 are described in Appendix I (pp. 303-9).

BIBLIOGRAPHICAL NOTE

1. Though an old work, the fullest authoritative historical account of the Grand Duchy is that of N. van Werweke, *Kurze Geschichte des luxemburger Landes* (Luxembourg, 1909).

2. An earlier work, still useful for reference, is that of Dr. Glaesener, *Le Grand-Duché de Luxembourg, historique et pittoresque* (Diekirch, 1885).

3. The most recent work is that of Professor P. J. Muller, *Tatsachen aus der Geschichte des luxemburger Landes* (Luxembourg, 1939). This scholarly and comprehensive treatment is a most reliable and indispensable guide.

4. Valuable contributions, including many papers of a research character, have appeared in the publications *Cahiers luxembourgeois* and *Ons Hemecht* (*Unser Heimat*), the latter being the organ of the *Verein für luxemburger Geschichte, Litteratur und Kunst*. Both are published periodically in Luxembourg.

5. For a full account of the relations between Belgium and the Grand-Duchy in the nineteenth century, reference should be made to the work of the great Belgian historian H. Pirenne, *Histoire de Belgique*, eight volumes (Brussels, 1902-3).

Chapter V

GOVERNMENT, ADMINISTRATION AND LAW

Official Status : The Constitution : Central Government : Local Government : Legal System: Police System : Note on the Administrative Districts : Table of Administrative Districts : Bibliographical Note

OFFICIAL STATUS

The Grand-Duchy is a constitutional monarchy under the authority of an hereditary head, the Grand-Duke or Grand-Duchess. The heir to the throne comes of age at eighteen. There are arrangements for a Regency should the succeeding Grand-Duke or -Duchess be a minor, and also should the reigning Sovereign be incapable of exercising his or her authority. Should the Sovereign die without legal issue, the Chamber of Deputies, sitting with double its usual numbers, has the responsibility of electing a successor. The sovereign power resides in the Nation, it being exercised by the monarch in conformity with the Constitution and with the laws of the country.

THE CONSTITUTION

The Constitution, which contains 121 articles written in the French language, was modelled on that of Belgium and proclaimed in October 1868. Important modifications were introduced in 1919, to the effect that the sovereign power resides in the Nation (Article 32), that all secret treaties were abolished (Article 37), and that candidates to the Chamber of Deputies were to be elected on the sole basis of universal suffrage, by the scrutiny of lists, and according to the rules of proportional representation (Article 52). The first two articles of the Constitution determine the international status of the country by guaranteeing the individuality, inalienability and perpetual neutrality of the State according to the provisions of the treaties of 1839 and 1867.

To citizens, the Constitution gives equality before the law, liberty of the individual and the inviolability of home and property; it grants cultural freedom and freedom of religious belief. Freedom of speech and of the Press are guaranteed, as well as the unrestricted use of both the German and French languages. Citizens have the

right of free association, and religious bodies need not be authorized by law unless they require legal status. Education is compulsory but may be pursued outside the country. The citizen has the right to obtain from State officials any information relating to matters of public interest. By the Constitution, too, the death penalty for political offenders was abolished.

These are among the principal constitutional rights of Luxembourg's citizens, testifying to the exemplary breadth of liberty which, as a free community, they enjoy.

CENTRAL GOVERNMENT

The essential division of powers within the political organism of the Grand-Duchy comprises the legislative, the executive and the judicial. By the constitution, the legislative power is shared by the Sovereign and a body of representatives called the Chamber of Deputies. The Sovereign exercises the executive power and the right to organize the Council of Government, which consists of a Minister-President, who is termed Minister of State, and at least three other ministers.

While both Sovereign and Chamber are thus empowered to initiate legislation, all laws must be passed by the Chamber, to which also the State budget must be submitted. In practice, though not in theory, the general support of the Chamber is required by the Government.

The Chamber of Deputies

According to the electoral law, candidates to the Chamber are elected by proportional representation on the basis of one member to 5,500 inhabitants ; a residue of 3,000 and over counts as one member. Before the present war, there were fifty-five members representing the thirteen cantons. Deputies hold office for six years, one-half of them retiring every three years. By grouping the cantons, the Grand-Duchy is divided into four electoral districts (Fig. 24), deputies of the first (South, consisting of the cantons of Esch and Capellen) and second (East—Grevenmacher, Remich and Echternach) districts retiring together, and those of the third (Centre—Luxembourg-Ville and -Campagne and Mersch) and fourth (North—Redange, Diekirch, Wiltz, Clervaux and Vianden) districts three years later. Decisions in the Chamber are taken on a majority vote and the debates are conducted in French. While the Sovereign can

prorogue, dissolve and summon extraordinary sittings of the Chamber, the normal session held each year is not dependent upon the royal summons.

The right to vote is extended to all citizens of either sex who enjoy civil and political rights, whether born in the Grand-Duchy or naturalized. They must be twenty-one years of age and resident in the country. To be eligible for candidature as Deputies the conditions are similar, except that the citizen must be twenty-five years of age. The electoral register is revised annually. Since 1919, women have had the same rights of suffrage and eligibility as males, but since that date only one woman has been elected to the Chamber.

The Council of Government

The Council of Government, which resembles a Cabinet, is composed of Ministers (*Directeurs-Généraux*), including the President (Minister of State), appointed by the Sovereign. They are responsible for the several departments, which are grouped under the various Ministers according to circumstances, the arrangement at the time of the German invasion in 1940 being as follows: 1. Minister of State and Finance; 2. Foreign Affairs and Home Affairs; 3. Justice, Transport and Public Works; 4. Social Welfare and Labour; and 5. Education, Commerce, Industry and Agriculture. Members of the Government occupy places in the Chamber, by which body, through the Supreme Court of Justice, they can be impeached.

At the head of each of these departments is a permanent official, the *Chef de bureau*.

The Council of State

In addition to the Government there is a Council of State consisting of not more than fifteen members appointed for life by the Sovereign; each must be at least thirty years of age. The Council deliberates on proposed legislation, dealing with possible amendments, and devotes consideration to any matter, such as an administrative issue referred to it by the Sovereign or by the Government. From among its members, a committee of seven (*comité du contentieux*) is elected every six years to serve as the final judicial court in all cases relating to the powers of the administration. The Council of State, which is specifically a Luxembourg institution, has steadily acquired a position of considerable influence upon political affairs in the Grand-Duchy.

Professional Chambers

Five professional chambers (*Chambres professionnelles*) were established by a law of 4 April 1924. These chambers were of Agriculture, Handicrafts, Commerce, Private Employees and Labour. No law affecting a particular profession must be enacted by the Chamber of Deputies until the views of the particular professional chamber have been taken into consideration. Members of the chambers, who must be over twenty-five years of age, are elected by individuals belonging to the particular profession, both men and women, who are over twenty-one years of age.

Political Parties

Popular interest in politics, though less lively than in Belgium, is most evident in the towns, especially in the mining district, where a strong socialist element exists. Conservative and clerical influences naturally predominate in the country districts, above all in the north, which is solidly Catholic. Before the invasion of 1940 the various parties were represented in the Chamber as follows: Catholics (Right) 25, Labour Party 18, Radical Liberals 6, Democrats 3, and Independents 3.

The Council of Government in 1937 was composed of representatives of the Catholic, Labour and Radical Liberal Parties, which were commonly known as the 'traditional parties' (*Partis traditionnels*). The Catholics held three portfolios, the Labour Party two and the Radical Liberals one; on the death of the last of these, no other was nominated, and in 1940 the Council contained three Catholics and two members of the Labour Party.

LOCAL GOVERNMENT

The Communes

The unit of local government in the Grand-Duchy is the commune, of which there were 130 in 1940 (Fig. 22, and see Tables pp. 92-4). Each is administered by a council, elected on a franchise similar to that for the Chamber of Deputies, together with a burgomaster and two *échevins* (aldermen). The size of the council varies with the population of the commune (see Tables pp. 92-4), as follows:

7 members for communes not exceeding 1,000 inhabitants			
9	"	"	of 1,000-3,000 inhabitants
11	"	"	" 3,000-10,000 "
13	"	"	" 10,000-15,000 "
15	"	"	" 15,000-20,000 "
17	"	"	" 20,000-30,000 "
25	"	"	exceeding 30,000 inhabitants

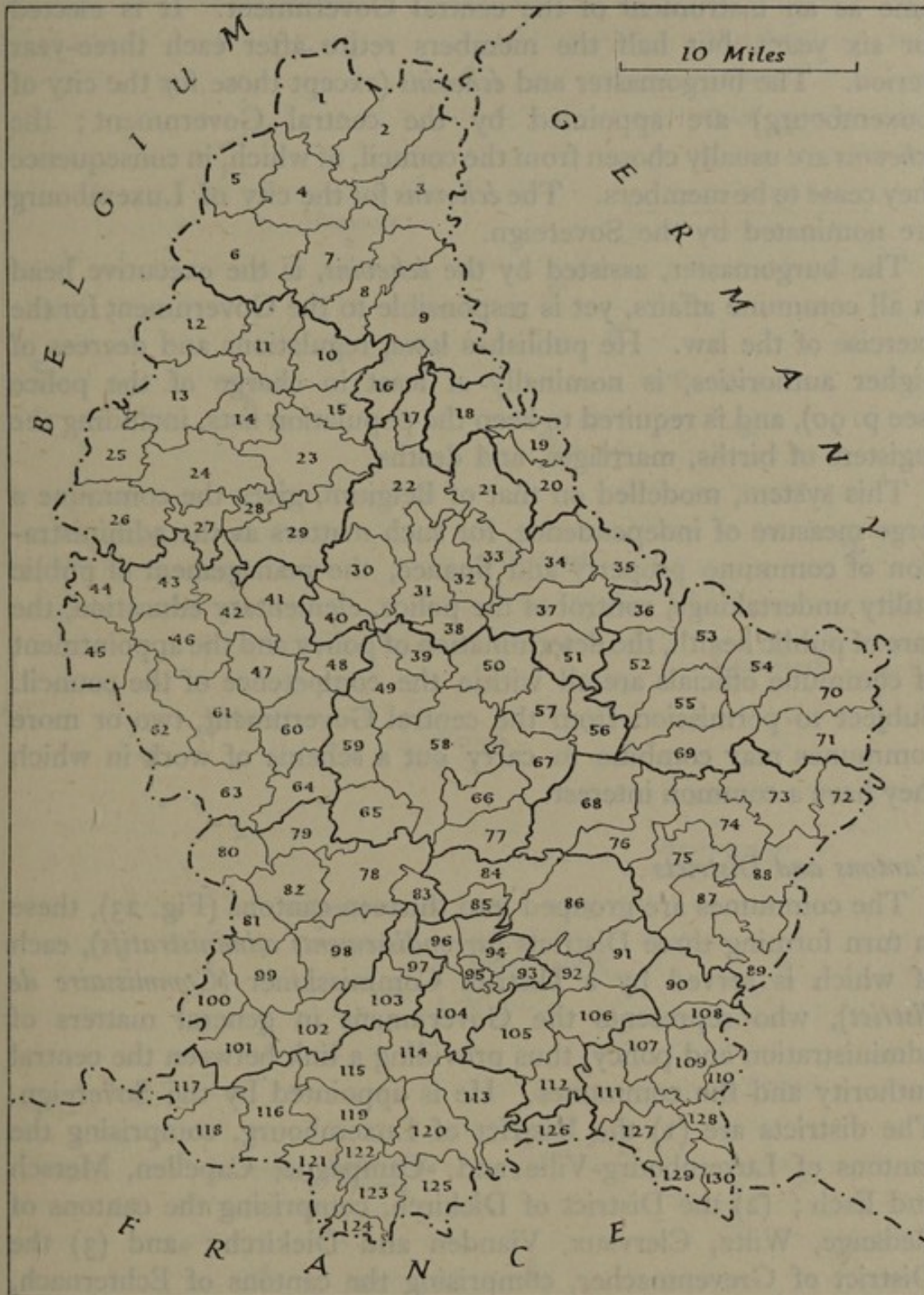


Fig. 22. Communes

Based on the 1 : 50,000 *Carte topographique du Grand-Duché de Luxembourg*, edited by J. Hansen (latest edition, 1928-34.)

The numbers refer to the tables on pp.92-4.

The council serves as a local administrative body and at the same time as an instrument of the central Government. It is elected for six years, but half the members retire after each three-year period. The burgomaster and *échevins* (except those for the city of Luxembourg) are appointed by the central Government; the *échevins* are usually chosen from the council, of which, in consequence they cease to be members. The *échevins* for the city of Luxembourg are nominated by the Sovereign.

The burgomaster, assisted by the *échevins*, is the executive head in all commune affairs, yet is responsible to the Government for the exercise of the law. He publishes laws, regulations and decrees of higher authorities, is nominally at least in charge of the police (see p. 90), and is required to keep the population lists, including the registers of births, marriages, and deaths.

This system, modelled on that of Belgium, gives the commune a large measure of independence, for such matters as the administration of commune property and finance, the management of public utility undertakings, control of the police, elementary education, the care of public health, the determination of policy and the appointment of commune officials are all within the competence of the council. Subject to permission from the central Government, two or more communes may combine to carry out a scheme of work in which they have a common interest.

Cantons and Districts

The communes are grouped into thirteen cantons (Fig. 23), these in turn forming three Districts (*arrondissements administratifs*), each of which is served by a District Commissioner (*Commissaire de district*), who represents the Government in general matters of administration and policy, thus providing a link between the central authority and the communes. He is appointed by the Sovereign. The districts are (1) the District of Luxembourg, comprising the cantons of Luxembourg-Ville and -Campagne, Capellen, Mersch and Esch; (2) the District of Diekirch, comprising the cantons of Redange, Wiltz, Clervaux, Vianden and Diekirch; and (3) the District of Grevenmacher, comprising the cantons of Echternach, Remich and Grevenmacher (see *Note*, p. 91).

LEGAL SYSTEM

The Luxembourg Constitution declares that judicial power is exercised by courts and tribunals whose decrees and judgments are

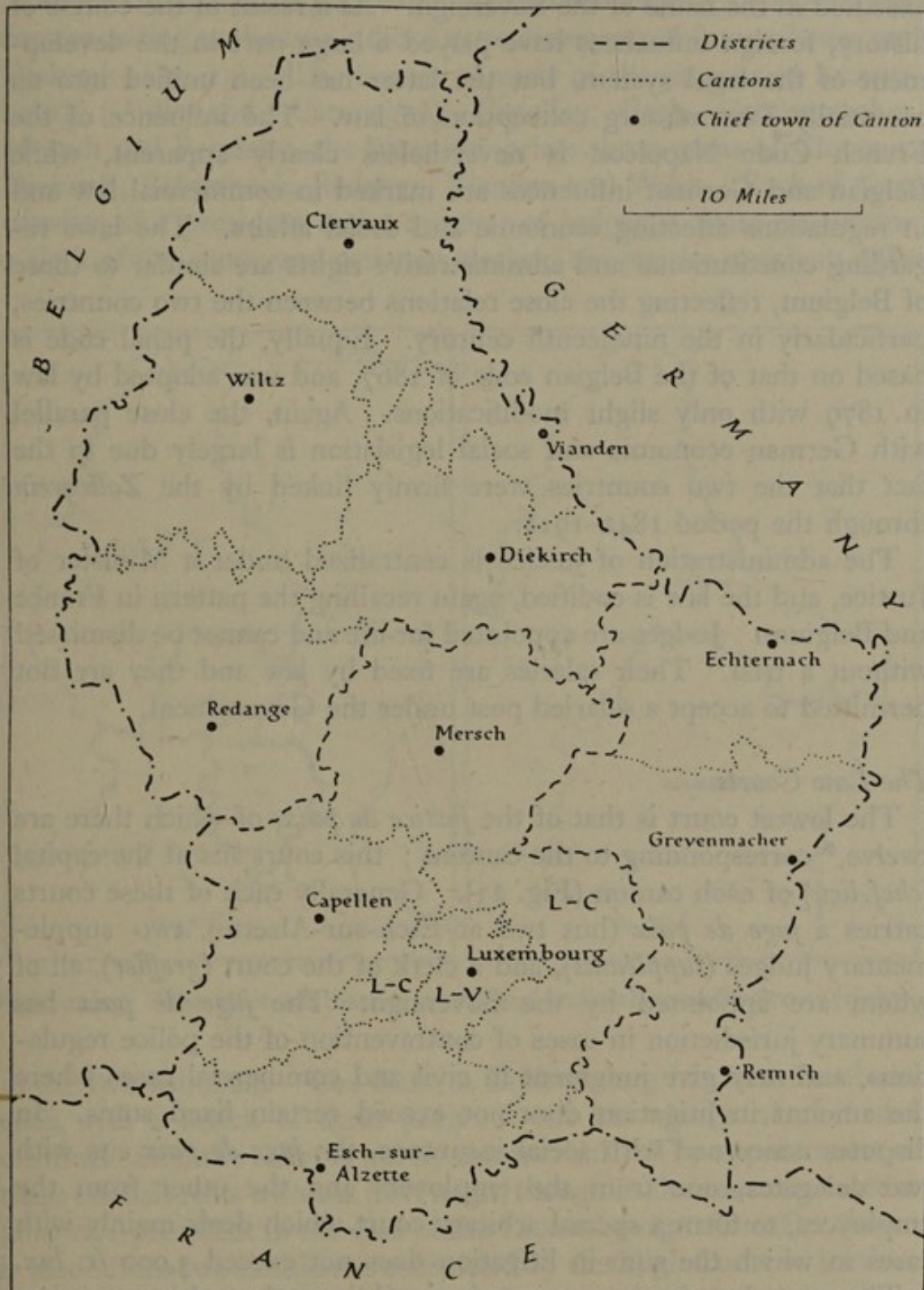


Fig. 23. Districts and cantons

Based on the 1 : 50,000 *Carte topographique du Grand-Duché de Luxembourg*, edited by J. Hansen (latest edition, 1928-34.)

The city of Luxembourg is the chief town in both the cantons of Luxembourg-Ville (L-V) and of Luxembourg-Campagne (L-C).

executed in the name of the Sovereign. As a result of the course of history, foreign influences have played a large part in the development of the legal system, but the latter has been unified into an essentially Luxembourg conception of law. The influence of the French Code Napoléon is nevertheless clearly apparent, while Belgian and German influences are marked in commercial law and in regulations affecting economic and social affairs. The laws regarding constitutional and administrative rights are similar to those of Belgium, reflecting the close relations between the two countries, particularly in the nineteenth century. Equally, the penal code is based on that of the Belgian code of 1867, and was adopted by law in 1879 with only slight modifications. Again, the close parallel with German economic and social legislation is largely due to the fact that the two countries were firmly linked by the *Zollverein* through the period 1842-1918.

The administration of justice is centralized under a Minister of Justice, and the law is codified, again recalling the pattern in France and Belgium. Judges are appointed for life and cannot be dismissed without a trial. Their salaries are fixed by law and they are not permitted to accept a salaried post under the Government.

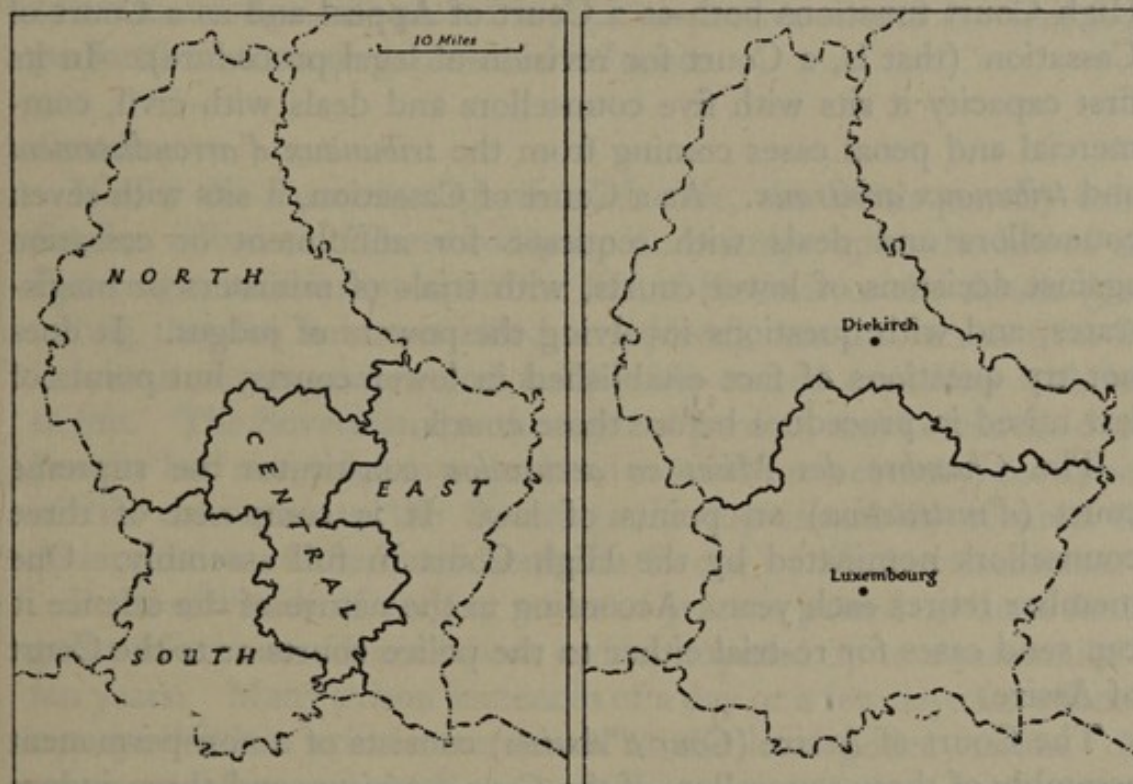
The Law Courts

The lowest court is that of the *justice de paix*, of which there are twelve,* corresponding to the cantons; this court sits at the capital (*chef-lieu*) of each canton (Fig. 23). Generally each of these courts carries a *juge de paix* (but two at Esch-sur-Alzette), two supplementary judges (*suppléants*), and a clerk of the court (*greffier*), all of whom are appointed by the Sovereign. The *juge de paix* has summary jurisdiction in cases of contravention of the police regulations, and may give judgment in civil and commercial cases where the amount in litigation does not exceed certain fixed sums. In disputes concerned with social insurance, the *juge de paix* sits with two delegates, one from the employers and the other from the employees, to form a special arbitary court which deals mainly with cases in which the sum in litigation does not exceed 3,000 *fr. lux.*

The procedure in these courts is simple, speedy and inexpensive, and there exists in consequence a strong tendency to stretch the competence of their jurisdiction. They have competence to impose fines up to 50 *fr. lux.* or sentences up to one week's imprisonment.

*The cantons of Luxembourg-Ville and -Campagne are combined for legal purposes.

Above the *justices de paix* come the two *tribunaux d'arrondissement*, corresponding to the two judicial *arrondissements* of Luxembourg and Diekirch (Fig. 25). The former consists of the cantons of Luxembourg (-Ville and -Campagne), Capellen, Esch, Grevenmacher, Mersch and Remich; the latter comprises the cantons of Clervaux, Diekirch, Echternach, Redange, Vianden and Wiltz. Each of these consists of a president and a number of judges, a State procurator, a clerk of the court, and assistant clerks; the precise numbers differ



Figs. 24,25. The electoral districts (left) and judicial *arrondissements* (right).

in the two tribunals. The court at Luxembourg has two chambers, each with a bench of three judges; one has charge of civil and criminal cases, the other is purely commercial. The appointment of these officials rests with the Sovereign, though in the case of president (and vice-president in the case of the Luxembourg tribunal) a choice is made from two candidates submitted by the High Court of Justice. The sessions are held in public, and every case is heard by three judges assisted by the State procurator and the clerk of the court. In civil and commercial matters, these courts deal as a court of first instance with all cases falling outside the competence of the *juges de paix*. The tribunals also serve as courts of appeal against verdicts from the *juges de paix*, except those of the arbitrary court (*tribunal*

arbitral), which are heard by the High Court. Their correctional jurisdiction covers various misdemeanours but excludes serious crime.

At the summit of the judicial hierarchy is the High Court of Justice (*Cour supérieure de Justice*), consisting of a president, a vice-president, a number of counsellors, the *Procureur Général de l'Etat*, an *Avocat-Général*, a clerk and an assistant. All are appointed by the Sovereign, who, in the cases of the president, the vice-president and the counsellors, chooses from candidates presented by the Court itself. The High Court functions both as a Court of Appeal and as a Court of Cassation (that is, a Court for revision of legal procedure). In its first capacity it sits with five counsellors and deals with civil, commercial and penal cases coming from the *tribunaux d'arrondissement* and *tribunaux arbitraux*. As a Court of Cassation, it sits with seven counsellors and deals with requests for annulment or cassation against decisions of lower courts, with trials of ministers or magistrates, and with questions involving the powers of judges. It does not try questions of fact established in lower courts, but points of law raised in procedure before those courts.

The *Chambre des Mises en accusation* constitutes the supreme court (*d'instruction*) on points of law. It is composed of three counsellors nominated by the High Court in full assembly. One member retires each year. According to the nature of the offence it can send cases for re-trial either to the police courts or to the Court of Assize.

The Court of Assize (*Cour d'Assises*) consists of a non-permanent assembly of three counsellors of the *Cour supérieure* and three judges from the *tribunaux d'arrondissement*, appointed every three months by the general assembly of the High Court. It functions as a central criminal court. A unique feature is that its six magistrates serve as jurors in deciding the question of guilt and as judges in imposing the sentence. The verdict is found by majority vote, though if the votes are equally distributed for and against, the accused is acquitted. In these courts, the Sovereign is represented by the *Procureur de l'Etat* and by the *Avocat-Général*.

Besides the judicial body proper, there exists an administrative jurisdiction exercised by the *Comité du Contentieux*, composed of seven members of the Council of State. Its competence extends only over such matters that have been assigned to it by law, and includes mainly questions of insurance, syndicates, dangerous or unhealthy trades, and general and communal elections.

The Ministère Public

The *Ministère Public*, or Office of the Public Prosecutor, consists of a group of officers appointed and dismissed by the Sovereign. Their chief duties are to supervise the maintenance of public order, to investigate criminal offences, and to act for the State in the establishment and punishment of offences. The *Ministère Public* is represented at the *Cour supérieure* by the *Procureur Général de l'Etat* or by his deputy the *Avocat Général*, and at the *tribunaux d'arrondissement* by a *Procureur de l'Etat*. It is part of their duty to see that judgments passed in their respective courts are free from personal motives or extraneous influence.

Sentences

Under the Luxembourg criminal code, the death penalty exists for five offences. These comprise an attempt upon the life of the Sovereign, an attempt upon the life of the heir to the throne (providing that the heir was killed or injured), murder, arson (if a life is lost in consequence), and maliciously caused explosion with loss of life. The Sovereign has the right of pardon, and in fact the death penalty had not, prior to 1940, been exacted for a century, the appeal of the convicted to the Sovereign having invariably secured the commutation of the death sentence to one of life-imprisonment.

Penal servitude of varying terms of years is passed on those found guilty of crimes. Hard labour can be imposed up to a maximum of ten years. Many prison sentences of a day or a few days for offences not specified as crimes are served at the local police station. All sentences of over a week are served at the prison at Luxembourg city (see p. 91).

Legal Language

French is the principal language used for all written judgments and for pleadings. Often, however, interrogations may be in the Luxembourg dialect, in French or in German, while verdicts are usually pronounced in German as well as in French in order that they may be fully understood.

The Luxembourg Bar

The Bar in the Grand-Duchy plays a highly important rôle in judicial affairs. The would-be advocate must pass three State examinations, each corresponding to a year of university study, preferably in a French university. Success in the final examination

brings with it the title of Doctor of Law, and, having taken his oath, the new lawyer is inscribed on the list of *avocats stagiaires*. Then follows a period of three years, called the *stage judiciaire*, during which the individual gains practical experience in the duties of a judge or public official and in exercising his own profession. Following this period, at the minimum age of twenty-five, he must pass a last practical examination, which gives him the full status of *avocat-avoué*. At the head of each of the two Bars of Luxembourg and Diekirch is a Council of Order, composed of seven and three members respectively.

POLICE SYSTEM

Prior to 1930, the Luxembourg police was a local communal force under the direct control of the burgomaster of each commune. By a law of July 1930 and by subsequent decrees of December 1930 and December 1933, the original communal police force became in practice a centralized State police force (*Police Locale Etatisée*). Instead of being wholly responsible for the financial maintenance of the police, the communes have to repay 40% of the cost to the State.

Central control of the service is vested in a Director-General (*Chef du Corps de la Police Locale Etatisée*), resident in the city of Luxembourg. Under him are three district commissioners, each responsible for one of the three police districts of Luxembourg (-*Ville et -Campagne*), Diekirch and Grevenmacher; the third of these, however, is a small unit and includes only the police post of the town of Echternach. Within the districts, and responsible to the district commissioners, are a number of local police commissioners (*commissaire de police*) for the local areas of Luxembourg, Esch-sur-Alzette, Differdange, Dudelange, Pétange, Bettembourg and Diekirch. The first five of these areas are under the commissioner for the district of Luxembourg. The subordinate police personnel, most of whom are concentrated in the district of Luxembourg, consist of senior brigadiers, each of whom is in charge of a police post (*poste de police*) in one of the large communes, first and second class constables (*agents de police de 1er et 2ème classe*), and a few rural policemen (*garde-champêtre*), who patrol the countryside to prevent poaching and damage to crops.

Under the law of 1930, an opportunity was afforded to communes to retain the old system if they so desired. In fact, none of them did so, largely because the State assumed responsibility for the finances and contributed 60% of the cost of maintenance. The introduction

of this optional clause, however, was due to recognition of the sense of communal individualism. To this factor may be attributed the retention of the nominal executive responsibility of the burgomaster, whereby the local police commissioners are still under his authority, and he is still nominally responsible for seeing that the laws and police regulations are carried out. In practice, however, the senior and supervising authority is the district commissioner.

Prisons

In 1939, there were two prisons in the Grand-Duchy, the main one at Luxembourg in the suburb of Grund and the other at Diekirch. As there is a High Court at Diekirch (see p.324), there has to be a prison, but it is used only for the serving of short prison sentences of less than a week. All other sentences are served in the Luxembourg prison. Both prisons are under the control of administrative commissions.

The Gendarmerie

Under the terms of the Treaty of 1867, the Grand-Duchy was demilitarized, and no armed forces were to be allowed other than those required for the maintenance of internal order, as a small militia performing garrison duty in the capital, and for ceremonial occasions. The force, under the command of a major, consists of two small companies, the *Compagnie des Gendarmes* and the *Compagnie des Volontaires*. Each is divided into three sections, one for each of the Districts of Luxembourg, Esch-sur-Alzette and Diekirch. The *Gendarmerie* numbered in 1939 four officers and 160 men, the *Volontaires* six officers and 170 men; the latter force could be raised to 225 in an emergency. Both form a source of recruitment for the *douanes* and other officials.

NOTE ON THE ADMINISTRATIVE DISTRICTS

While the grouping of the communes and cantons, together with the inception of the District Commissioners, dates from a law of 1843 (*loi communale*), historically the Districts are derived from three of the eight *quartiers* into which Luxembourg was divided at the beginning of the nineteenth century, previous to the cession of Belgian Luxembourg in 1839. Actually the old term *quartier* was superseded by the term District by a regulation of the Netherlands Government made in 1825. The other five *quartiers* were those of Bastogne, March, Neufchâteau, Virton and Arlon. Between 1830 and 1839, Luxembourg, with the exception of the capital which was granted a special administration, was governed as part of the Belgian Netherlands. The country was declared to be the ninth province of Belgium, and the seat of the administration was transferred to Arlon.

TABLE OF ADMINISTRATIVE DISTRICTS

The cantons are arranged in alphabetical order, as are the communes within each canton. Population figures refer to the numbers 'habitually resident' (see p. 137) at the census of 1935. The figures in the first column refer to Fig. 22. Statistics were taken from *Résultats du Recensement de la Population du 31 décembre 1935*, published by the *Office de Statistique* (Luxembourg, 1938).

I. CAPELLEN

(Area, 76.9 sq. miles, 199.2 sq. km.)

No. on Fig. 22	Commune	Popula- tion, 1935
101	Bascharage	2,202
100	Clemency	1,174
102	Dippach	1,366
99	Garnich	962
80	Hobscheid	2,174
78	Kehlen	1,681
82	Koerich	1,231
83	Kopstal	1,010
98	Mamer	2,073
79	Septfontaines	608
81	Steinfort	2,276
Total		16,757

II. CLERVAUX

(Area, 116.8 sq. miles, 302.3 sq. km.)

No. on Fig. 22	Commune	Popula- tion, 1935
4	Asselborn	1,275
6	Boevange	1,386
7	Clervaux	1,671
10	Consthum	461
5	Hachiville	674
3	Heinerscheid	1,391
9	Hosingen	1,636
8	Munshausen	929
1	Troisvierges	2,732
2	Weiswampach	1,430
Total		13,585

III. DIEKIRCH

(Area, 92.4 sq. miles, 239.4 sq. km.)

No. on Fig. 22	Commune	Popula- tion, 1935
21	Bastendorf	841
34	Bettendorf	1,681
22	Bourscheid	1,293
33	Diekirch	3,842
37	Ermsdorf	708
32	Erpeldange	607
31	Ettelbruck	4,606
30	Feulen	861
17	Hoscheid	488
51	Medernach	802
40	Mertzig	705
35	Reisdorf	598
38	Schieren	759
Total		17,791

IV. ECHTERNACH

(Area, 71.6 sq. miles, 185.5 sq. km.)

No. on Fig. 22	Commune	Popula- tion, 1935
36	Beaufort	1,202
69	Bech	961
53	Berdorf	890
55	Consdorf	1,205
54	Echternach	3,280
71	Mompach	976
70	Rosport	1,644
52	Waldbillig	994
Total		11,152

V. ESCH-SUR-ALZETTE

(Area, 93.7 sq. miles, 242.8 sq. km.)

No. on Fig. 22	Commune	Popula- tion, 1935
120	Bettembourg	5,231
118	Differdange	15,945
125	Dudelange	13,572
121	Esch-sur-Alzette	27,517
126	Frisange	1,221
123	Kayl	5,415
114	Leudelange	690
119	Mondercange	1,311
117	Pétange	10,525
115	Reckange-sur-Mess	754
113	Roeser	1,493
124	Rumelange	4,198
116	Sanem	4,700
122	Schifflange	5,371
Total		97,943

VI. GREVENMACHER

(Area, 81.5 sq. miles, 211.4 sq. km.)

No. on Fig. 22	Commune	Popula- tion, 1935
75	Betzdorf	1,366
74	Biwer	1,131
87	Flaxweiler	1,549
88	Grevenmacher	2,811
68	Junglinster	1,743
73	Manternach	1,166
72	Merttert	2,745
76	Rodenbourg	748
89	Wormeldange	2,154
Total		15,413

VII.

LUXEMBOURG-CAMPAGNE

(Area, 72.3 sq. miles, 187.2 sq. km.)

No. on Fig. 22	Commune	Popula- tion, 1935
103	Bertrange	1,362
106	Contern	1,153
105	Hesperange	3,037
86	Niederanven	1,616
92	Sandweiler	1,021
91	Schuttrange	1,006
84	Steinsel	1,429
97	Strassen	1,471
85	Walferdange	1,726
112	Weiler-la-Tour	660
Total		14,481

VIII. LUXEMBOURG-VILLE

(Area, 19.8 sq. miles, 51.3 sq. km.)

No. on Fig. 22	Commune	Popula- tion, 1935
95	<i>Ancien territoire</i>	20,710
94	Eich	8,454
93	Hamm	1,624
104	Hollerich	24,113
96	Rollingergrund	2,839
Total		57,740

IX. MERSCH

(Area, 86.5 sq. miles, 223.9 sq. km.)

No. on Fig. 22	Commune	Popula- tion, 1935
39	Berg	608
49	Bissen	1,144
59	Boevange-sur-Attert	948
67	Fischbach	518
56	Heffingen	722
57	Larochette	1,144
66	Lintgen	1,322
77	Lorentzweiler	1,450
58	Mersch	3,350
50	Nommern	707
65	Tuntange	801
Total		12,714

X. REDANGE

(Area, 103.1 sq. miles, 267.1 sq. km.)

No. on Fig. 22	Commune	Popula- tion, 1935
43	Arsdorf	541
63	Beckerich	1,815
47	Bettborn	899
44	Bigonville	483
62	Ell	780
46	Folschette	1,091
41	Grosbous	522
45	Perlé	1,247
61	Redange	1,744
64	Saeul	511
60	Useldange	1,078
48	Vichten	512
42	Wahl	801
Total		12,024

XI REMICH

(Area, 49.4 sq. miles, 127.9 sq. km.)

No. on Fig. 22	Commune	Popula- tion, 1935
109	Bous	916
129	Burmerange	567
111	Dalheim	1,216
90	Lenningen	956
127	Mondorf-les-Bains	1,732
130	Remerschen	1,271
110	Remich	1,770
108	Stadtbredimus	788
107	Waldbredimus	540
128	Wellenstein	1,245
Total		11,001

XII. VIANDEN

(Area, 21.2 sq. miles, 54.1 sq. km.)

No. on Fig. 22	Commune	Popula- tion, 1935
20	Fouhren	616
18	Putscheid	921
19	Vianden	1,195
Total		2,732

XIII. WILTZ

(Area, 113.6 sq. miles, 294.3 sq. km.)

No. on Fig. 22	Commune	Popula- tion, 1935
26	Boulaide	982
28	Esch-sur-Sûre	412
11	Eschweiler	610
23	Goesdorf	948
25	Harlange	893
29	Heiderscheid	1,236
15	Kautenbach	469
24	Mecher	880
27	Neunhausen	302
12	Oberwampach	1,023
14	Wiltz	4,184
16	Wilwerwiltz	728
13	Winseler	913
Total		13,580

BIBLIOGRAPHICAL NOTE

1. The Constitution of the Grand-Duchy is given in French in the *Annuaire Officiel*, published by the *Office de Statistique*, at Luxembourg. It was proclaimed on 17 October 1868, and modified by the laws of 15 May 1919, which affected four of the 121 articles.

2. A full treatment of the government and of the administrative and legal systems of the country is given in P. Ruppert, *Organisation politique, judiciaire et administrative du Grand-Duché de Luxembourg* (Luxembourg, 1878; second edition, 1885). A summary account is given in J. Anders, *Le Grand-Duché de Luxembourg, Historique, Politique, Economique et Social* (Brussels, 1919).

3. For the historical aspects of government and administration, P. Eyschen, *Staatsrecht des Grossherzogtums Luxemburg* (Luxembourg, 1890); and P. Ruppert, *Le Gouvernement, le Conseil d'Etat, et le Chambre legislatif du Grand-Duché de Luxembourg de 1831 à 1889* (Luxembourg, 1889), should be consulted.

Chapter VI

EDUCATION

Historical Background : The Educational System : Primary Education : Secondary Education : Technical Education : Special Schools : The Training of Teachers : The University Question : The Press : Public Libraries : Bibliographical Note

HISTORICAL BACKGROUND

Education from the ages of six to thirteen years, together with a further two years part-time schooling for all children not proceeding to secondary schools, has been compulsory in the Grand-Duchy since the establishment of the Constitution of 1868 (Article 23). Certain modifications are allowed; for example, the communes can extend the obligatory period for an eighth year or for the summer and winter terms of an eighth year, or can replace the seventh year by two consecutive winter terms. This is doubtless a concession to the importance of agricultural labour.

The present educational system in Luxembourg is the result of the interwoven threads of secular and religious influence. Since the eleventh century, when the Munster Abbatial School was the only one in Luxembourg, the Church has provided a powerful stimulus to education. One factor in particular was the profound influence exerted by the Jesuit Order on the spiritual life of the country, in spite of much opposition to their teaching, often expressed in threats of expulsion. The demands for books which resulted from Jesuit teaching led to the establishment in 1598 by Mathias Birthon of the first printing press in Luxembourg. Many attempts were made in the latter part of the sixteenth century to found a Jesuit College, but it was not until 1602, when Johann Benninck, President of the General Council, ignoring opposition from that body, gave to the Order the title deeds of Eltz House with its grounds, that the project could be realized. The College was opened in 1603 with two hundred students, and steadily expanded throughout the following century. One result of this institution was the attention paid to the theatre, which is said to have reached its highest point of development under Jesuit care. In 1773, the opposition to the Order succeeded in obtaining the suppression of the College by the Provincial Council (*Provinzialrat*) under Du Rieux, although it was afterwards reopened as the Royal College for the training of Belgian priests. In contrast to Jesuit policy, the theatre was forbidden to

students in 1785 so that it should not cause distraction from their studies. With the anti-religious influence of the French Revolution, the Royal College was transferred into an *Ecole Centrale* (1797), but this in turn gave way to a secondary or 'middle school' (1804), which was the forerunner of the present-day *Athénée*.

Many of the greatest scholars and teachers of Luxembourg, as of other countries, were churchmen; the Abbot Bertels of Echternach wrote the earliest history of Luxembourg, the first edition of which was printed in Cologne in 1605. As the number of schools increased so the Church supplied directors, principals and teachers. For example, it was not until 1916 that the training college for teachers had its first lay head, Professor Nikolaus Schlottert. The women's college, separated in the same year from the men's, still has a member of a religious order as *Directrice*. The establishment of kindergarten and schools for mental and physical defectives was largely inspired by the Church, which still provides the majority of teachers in these schools. Despite growing anti-clericalism in the nineteenth and twentieth centuries, religious or moral education still has its part in the syllabus of all schools, primary, secondary and advanced.

At the same time, the spread of education in Luxembourg owes much to the growing social consciousness of the community, as well as to the enterprise of public-spirited individuals and to the interest of the Government. As early as 1570, public opinion in the Duchy was sufficiently aroused to support a petition to the Duke of Alba for the 'erection of a good school in Luxembourg to teach the young, and by this means to drive away ignorance.' To-day it is largely in the part played by the representative communal authorities that this public interest finds expression. Some reference to the contributions of individuals is made in the sections dealing with the various schools.

The interest and participation of the State in educational matters long antedates the 1868 regulations. In 1753, an attempt was made by the *Provinzialrat* to enforce compulsory attendance at school, with penalties for parents who did not comply. Some forty years later the *Provinzialrat*, still concerned with the educational problem, complained not only of the lack but also of the poor quality of the teachers. After the fall of Napoleon, when Luxembourg became a Grand-Duchy in personal union with the kingdom of Holland (see p. 66), its intellectual life received a considerable impetus from the great interest in education which had been aroused in Holland during the early years of the nineteenth century, itself a result of the tremen-

dous burgeoning of philosophic thought that preceded and accompanied the French Revolution. In 1818, William II, the King-Grand-Duke, set up a commission to report on the schools of the country. The leader was Van den Erde, who had been responsible for the reorganization of the Dutch school system in 1806, which thus became a model for Luxembourg. His standards were high, for he appears to have been satisfied with only three of the existing schools, the boys' schools at Wiltz (under Bernard) and at Grevenmacher (under Clasen), and the girls' school at Grevenmacher (under Mlle Marie-Anne de Thierry). The Commission deplored the poor status and pay of teachers, and one result of its work was an improvement in this respect, together with an increase in the number of schools. Unfortunately, the wave of reaction that followed the Belgian Revolution of 1830 showed itself in a suppression of popular education, from which Luxembourg also suffered; the Commission itself was dissolved in 1831. The set-back was however only temporary, and 1843 saw the promulgation of a law relating to the organization of primary education. This was the first to deal with the schools of the Grand-Duchy alone, for the earlier reforms of the nineteenth century had applied equally to the territory ceded in 1839. A few years later, in 1848, came the organization of secondary and higher education, and the next step forward was taken in 1868 when by the Constitution education was made compulsory for all.

In the present century, discussion on educational reform has been coloured by growing anti-clericalism among the people. Religious instruction, always the basis of education, was customarily given not in the schools but in the churches by the clergy themselves. In 1912, an attempt to include amongst other educational changes the giving of religious instruction in the schools by the teachers provoked not only lively discussion in the Chamber, but also the fierce—and on this occasion successful—opposition of the clergy under the leadership of the Bishop, Mgr. Johannes Joseph Koppes. The matter was again brought forward in 1921 by an amendment promoted by M. Bech as Minister of Education. This time the Church, now represented by Bishop Nommesch, came to an agreement with the State. As a result, religious teaching takes place in the schools, but is in the hands of the clergy. In areas where there are not sufficient members of the clergy to undertake the work, it is performed by the teachers themselves, who receive additional remuneration from the Government.

THE EDUCATIONAL SYSTEM

The administration of the educational system is shared by two Government departments. Primary, secondary and higher education is under a permanent Director-General of Public Instruction (*Chef de Bureau d'Instruction Publique*), who is responsible to the Council of Government. Under him is a permanent committee, and a chief inspector of schools. The country is divided into eight districts (*ressorts d'inspection*), each in charge of an inspector who is responsible to the chief inspector. Responsibility for technical education lies with the department of Public Works (*Travaux Publics*). The central authority co-operates closely with the communal authorities. In each commune there is a local school commission (*commission scolaire locale*), consisting of the burgomaster, the *curé* of each parish in the case of Roman Catholic schools, and, in the case of communes with over 3,000 inhabitants, three lay members nominated by the communal council.

The finance of the educational system is met jointly by the State and the commune—in the case of the primary schools in the proportion of two-thirds by the State and one-third by the commune. No less than 15 per cent. of the country's total budget is devoted to education (see p. 265). It is not surprising that Luxembourg can claim that illiteracy has been unknown in the country for a hundred years.

The following table summarizes the number and different types of schools in the Grand-Duchy in 1939, together with the number of pupils on the rolls :

Type of School	Male	Female	Mixed	Total	No. of Pupils
<i>Ecoles gardiennes</i>	—	—	84	84	3,300
„ <i>primaires</i>	399	384	300	1,083	35,312
„ <i>primaires supérieures</i>	14	8	—	22	720
<i>Gymnases et Lycées</i>	5	2	—	7	1,024
<i>Ecoles industrielles et commerciales</i>	2	—	—	2	655
„ <i>normales</i>	1	1	—	2	181
„ <i>d'artisans</i>	1	—	—	1	392
„ <i>professionnelles</i>	1	—	—	1	568
„ <i>agricoles</i>	1	—	—	1	129

Source : *Aperçu Statistique*, 1940, pp. 82-84 (Luxembourg, 1940).

Encouragement to study is given by the various endowments and funds which are under the control of the Minister of State. An official is appointed to administer the monies subject to the approval of the Minister, to whom he must make an annual report. Students requiring help must make application to him, naming the particular endowment desired, and submitting a plan of proposed studies for approval.

PRIMARY EDUCATION

Primary education in the Grand-Duchy is essentially democratic in character, being based on the principle of the one school for all, compulsory, municipal and free, under State supervision and control. Increasing efforts are made to attend to the physical well-being of the children, especially in the industrial districts and in the capital. Free attention is given by doctors, dentists and nurses appointed by the councils for school services, and free school meals are available. There are about 1,200 elementary schools, attended by 38,000 pupils out of a total population of 300,000 inhabitants. The training of the teaching staff for primary schools is provided by two State colleges.

Administration

Primary education is controlled at the centre by the State, and locally by the commune. The State exercises authority through the Minister of State, who in turn controls a commission (*commission d'instruction*) and the inspectorate. The commission consists of three members nominated by the Government, the bishop or his delegate, the chief inspector, one inspector of primary schools appointed by the inspectorate, the head of the men's training college, and a delegate from the teachers. From these members the Government chooses a president and secretary. At the request of the Government, or when the committee thinks desirable, the head of the women's training college and other members of the inspectorate can be summoned to meetings. The latter take place as need arises. The main function of the commission is to advise the Government on questions of school organization, and to approve textbooks and books to be given as prizes. For the inspection of primary schools, the Grand-Duchy is divided into six districts, each with an inspector working under a chief inspector who is appointed by the Sovereign. The main duty of an inspector is the

supervision of the teaching staffs. In some communes women are appointed to inspect schools and courses for girls.

The authority of the commune is exerted through a schools' committee (*la commission scolaire*), which is composed of the burgo-master, who acts as chairman, a member of the clergy, and one member nominated by the commune council. At least twice a year, the schools committee calls to its meetings a member of the teaching staff chosen by all the teachers of the commune. Though without voting power, this member can share in the deliberations and present the point of view of the teachers. The commission is required to visit schools at least twice a year. The upkeep of premises and furniture, the supervision of school timetables and a watch on attendance are all part of its work. In addition, it assists with activities that supplement the work of the school, such as the provision of libraries, art-collections, school-gardens and school-meals. The teaching staff is appointed by the commune on the advice of the inspector, and is subject to government approval.

The elementary schools are, therefore, municipal establishments subject to state inspection. The State pays the teachers, though one-third of their salary is reimbursed to the Government by the local authority.

The primary schools include the kindergarten schools (*écoles gardiennes*), primary schools proper (*écoles primaires*), the higher grade schools (*écoles primaires supérieures*), and continuation schools (*cours post-scolaires*). Primary education may be given at home or in private schools, but these too are subject to inspection by the responsible authority.

Kindergarten

There has been a steady increase in the number of these schools in recent years. In 1939, 3,300 children were attending eighty-four kindergarten, with an average of nearly 39 children per school. Many of these schools owe their existence to the work of nuns, and over half the teachers are members of religious orders.

Primary Schools

In 1939, there were 1,083 schools of this type, of which 399 were for boys, 384 for girls and 300 mixed, attended by 35,312 children, 18,161 boys and 17,151 girls. In addition, over 300 children were attending school beyond the compulsory age, of whom three-quarters were boys. The small size of the Grand-Duchy is natur-

ally reflected in the smallness of its schools, the average number of pupils per school being only about 32. Most of the schools have between 20 and 50 pupils, but there are 171 schools with less than 20 children while there are none at all with more than 60. In 1939, 1,744 boys and 1,761 girls finished their primary education and received their certificates. The curriculum includes religious instruction, French, German, arithmetic, history, geography, natural history and elementary science, drawing, singing, gymnastics, needlework and domestic science. The practical course in house-keeping, including cooking, forms an essential part of elementary education for girls, and fully equipped schools are available for this purpose in many areas.

Higher Grade Schools (écoles primaires supérieures)

These provide a voluntary eighth and ninth year of schooling, following on the seven years' primary school. There are fourteen of these schools for boys and eight for girls. In 1939, they were attended by rather less than 3% of boys in the primary schools, and by 1% of the girls. The average number of pupils per school was 38 in the case of boys, and 23 in that of girls.

Continuation Courses (cours post-scolaires)

In 1912, attendance at these classes was made compulsory for those not receiving any other form of further education. The pupils attend in the evenings for two years. Courses are held in the industrial and commercial schools at Luxembourg and Esch-sur-Alzette, and in the industrial section attached to the *gymnases* at Diekirch and Echternach. These are intended to give vocational training to young pupils in industry and commerce. In addition, there are special courses for girls in commerce and domestic science, dressmaking, etc., at the fifteen vocational schools (*écoles professionnelles et ménagères*) which have been set up by the Government.

In 1939, there were 212 *cours post-scolaires* for boys and 224 for girls, attended by 2,229 boys and 2,878 girls respectively.

Schools for backward and defective children

These are mainly in the hands of religious orders, though the Department of State exercises supervision over them by means of a small committee of three members. The most important are the *Institut des Sourds-Muets* at Luxembourg, which provides training for deaf-mutes and is under the care of the Sisters of St. Francis of

Assisi, and the *Etablissement des Aveugles* at Berbourg, in charge of the Order of St. Elizabeth, which is also responsible for a school for backward children at Betzdorf. The latter is not supported by the State, though some control is exercised over it. There is also an open-air school at Dudelange run by the *Arbed-Terres Rouges* concern for the benefit of delicate children belonging to their employees.

SECONDARY EDUCATION

The secondary schools of the Grand-Duchy are supported by the State and the communes, while the teachers are State employees. For boys there are three classical schools (*gymnases*) at Luxembourg, Diekirch and Esch-sur-Alzette, which give a seven-year course, and two industrial and commercial schools at Luxembourg and Esch-sur-Alzette where the course lasts six years. There are no private secondary schools for boys. There are two high schools (*lycées*) for girls. Pupils enter these schools at the age of twelve, after having passed an entrance examination in French, German, arithmetic and religious knowledge. The organization of the curricula in these schools is supervised by the State through a commission of five trustees nominated by the Sovereign. The clergy and the *collegium* burgomasters and *échevins* (see p. 82) each have the right to propose one member of the commission, so that the communes have some share in the control of secondary education. The members of the commission serve for seven years and may be re-nominated for a further period.

Classical Schools (Gymnases)

As mentioned earlier in this chapter (p. 95), the oldest of these schools, the *Athénée* at Luxembourg, dates from the early years of the seventeenth century. It is by far the largest of this type, with 1,167 pupils in 1939 and a staff of over fifty. The school at Diekirch had its origin in the Middle School established in 1830 by the exertions of Burgomaster Vannerus and the Abbé Stehres, who became its first principal. In 1841, again largely due to the enterprise of the Abbé who, in order to further his schemes, even undertook a journey to William II at The Hague, the Middle School became a State *pro-gymnasium*, and at the same time a *pro-gymnasium* was established at Echternach, which had had a school since 1825. With the disbanding of the local garrisons in both towns in

accordance with the Constitution of 1868, the military barracks were handed over to the civil authorities and have since been used as schools. The school at Diekirch became a full *gymnasium* in 1891 and that at Echternach in 1900. The former had 389 pupils and a staff of twenty-five in 1938-9, and the latter 294 pupils and about twenty on the staff.

During the first two years, the course includes religious instruction, French, German, Latin, arithmetic, history, geography, natural science, art, music and gymnastics. Then, at the age of fourteen, further specialization takes place. For the remaining five years of the course, the school is divided into two sections, Greco-Latin and Latin. In the former, pupils are prepared for studies in theology, philology and law. The latter course includes the study of law, the mechanical and natural sciences, medicine, pharmacy, veterinary surgery, dental surgery and other professional subjects. At the end of the seven-year course, an examination gives the successful candidate the right to enter his chosen profession. At the Luxembourg *Athénée* there is also a one-year advanced course (*cours supérieur*), which is regarded as the equivalent of a year at a university. It provides an opportunity of specialized study of a high academic and scientific standard.

Industrial and Commercial Schools (Ecoles industrielles et commerciales)

In Luxembourg the industrial and commercial school formed part of the *Athénée* until its separation and reorganization under its first director, M. Gustav Zahn, in 1892. The school at Esch-sur-Alzette was founded in 1901. The courses aim at giving vocational training to those pupils who hope to enter industry or commerce. They are divided into two sections. In the lower division, comprising the first three years of the course, the curriculum is very similar to that of the *gymnasium*, except that English replaces Latin. The separation of the industrial and commercial sections comes in the third year. In the last three years less time is spent on languages, natural science is dropped altogether, and mathematics, chemistry, science and commercial subjects are added. The course is completed by an examination which permits the successful candidate to take up the career he has chosen. In the session 1938-9, there were 333 pupils at Luxembourg and 322 at Esch-sur-Alzette.

In addition to these schools, an industrial and commercial section is attached to the two classical schools at Diekirch and Echternach, with provision for a three-year course. The numbers of pupils

attending these, however, are small compared with those attending the main course.

Secondary education for girls (Lycées de jeunes filles)

In the first decade of the present century, the education of girls, hitherto rather neglected, began to receive greater attention. This was partly due to the foundation in 1909 of an association with the purpose of establishing a girls' high school in Luxembourg, which would give a classical education under lay teachers. The association was due largely to the inspiration of Mme Mayrisch de St Hubert, the wife of the founder of *Arbed* (see p. 220). Two years later, the State took over the school for girls in Luxembourg and a similar one at Esch-sur-Alzette. In the former the assistant director, Dr Marie Speyer, was notable as the first woman in the Grand-Duchy to obtain a university doctorate. In 1926, the *lycée* in Luxembourg was provided with new buildings.

The course of study is divided into two sections. The first three years are spent in the lower division, where the curriculum is very similar to that in the boys' schools. After this, the pupil specializes, choosing between a four-year course on either the classical or modern languages side, and a two-year course of vocational training, mainly in commercial subjects. The longer courses are ended by an examination before the pupil takes up her chosen career or continues with further study. In the session 1938-39, there were 444 pupils at the *lycée* in Luxembourg, and 301 at Esch-sur-Alzette.

Besides these two schools, there is also in Luxembourg a private school for girls—the *Ecole Moyenne de Sainte-Sophie*. Of the twenty-four pupils who obtained the *diplôme de maturité* at Luxembourg in 1939, eleven came from this private school, as did eighty-one out of the 139 who obtained the *diplôme de passage*.

Advanced Education

The only medium for advanced education within the Grand-Duchy is the *cours supérieur* of the *Athénée* at Luxembourg already mentioned. Luxembourg students are free to pursue their studies in any university, and in order to practise their profession within the country and to obtain a title to a degree, they must submit to an examination by a jury of Luxembourgers who are specialists in the subject concerned. Each jury is composed of five regular and three supplementary members, and is appointed for one year, although two-thirds of them are reappointed for the following year. In 1938,

148 men and eighteen women passed examinations held under this scheme.

TECHNICAL EDUCATION

The importance of industry, especially mining and metallurgy, in the economic and social life of Luxembourg is reflected in the great and increasing attention paid to technical education, both by the State and by industrial concerns, notably the *Arbed-Terres Rouges* combine (see p. 221). The agricultural school at Ettelbruck is evidence of the interest paid by the State to a fundamental occupation which still supports more than one-quarter of the population.

The Ecole d'Artisans

The *école d'artisans* in Luxembourg was founded in response to a law of 1896. It aims to give a pupil the theoretical background of his trade, as well as practical experience in the particular branch in which he has chosen his apprenticeship. At the end of the course the student should be sufficiently qualified to be employed as a skilled workman. The pupil enters the school at the age of thirteen, that is, at the end of the primary school course, after passing an entrance examination. The course lasts for three years, but a further voluntary year of study is possible. Besides some subjects usually studied in the primary schools, notably religion, ethics, German and French, courses are also given in drawing, technology, elements of mechanics, elementary principles of architecture and workshop practice. The school is divided into the following five sections: building, metal-work, mechanics, painting and decorating, and sculpture. In 1917, the Government added to the school a higher technical course (*cours technique supérieur*), aiming at the training of well-qualified technicians. The course lasts for three years and provides training of the same order as the *écoles nationales d'arts et métiers* of France and the German *Tekniks*. Those who are successful in the examination at the end of the course obtain a qualifying diploma. In the session 1938-9, there were 392 pupils at the school and the number has been rapidly increasing in recent years; in 1935-6, there were only 288. In addition, 357 pupils were attending evening classes. The teachers of advanced subjects in the school are appointed by the Sovereign and others by the Government. The school is supported by the State and is controlled by means of a commission of five members nominated by the

Sovereign for a term of five years. A yearly report is submitted to the Government on the administration of the school and on the instruction given. The president of the commission is the Engineer who is head of the Department of Public Works.

The Ecole professionnelle d'Etat

This school at Esch-sur-Alzette was founded by the State in 1924, and aims at completing the practical training of apprentices by a theoretical course intended to develop their intelligence and to initiate them into the general principles governing technical science. The pupils, who come from various factories, attend for twelve hours a week for three years, and comprise builders, mechanics, electricians, hairdressers, tailors and dressmakers, bakers and confectioners. Attendance at the school counts as work and is paid accordingly. For apprenticed mechanics and electricians, there is an advanced course of one year, which is attended by those who obtained their theoretical certificates before completing their apprenticeship. The school also provides evening and Sunday classes for workmen who wish to broaden and deepen their professional knowledge and technical skill. The teaching staff is appointed by the Sovereign and a commission supervises the school on behalf of the Government. The school is supported by the State, by the employers and by the commune of Esch-sur-Alzette, in the proportion of one-third each. In the session 1938-9, there were 568 pupils at the school, and ninety-nine of these were successful in the examination held at the end of the course.

There are also technical courses available at Differdange and Dudelange, where the classes are frequently held in the evenings or on Sundays.

Mining Schools

The importance of mining in the canton of Esch-sur-Alzette has given rise to the establishment of three preparatory mining schools at Rumelange, Pétange and Esch-sur-Alzette, as well as a more advanced school at Esch. The former are evening schools, the course embracing French, German, mathematics, mechanics, mining practice, physics and drawing. In the advanced mining school (*école des mines*), the students attend for two days a week. The course includes the study of subjects connected with mining theory and practice, such as geology, mineralogy and chemistry, together with mining legislation and the prevention of accidents.

The schools, which aim at training mines officials, are under the direction of the Engineer of Mines, the cost being shared by the State, by the commune, and by the mining companies, including *Arbed*, in the proportion of one-third each.

The Agricultural School (Ecole Agricole)

The first half of the nineteenth century saw the founding of an agricultural school, as a result of the attention paid by Peter Hermann, head of the Ettelbruck school, to agronomy. Out of this grew both the first higher grade school of the country (1885), and the State agricultural school founded in 1883. In 1892, short courses for adults were added to the syllabus. By 1927, the school had grown so much that new buildings were necessary, these being completed in 1932. Pupils enter the school at the age of twelve after an entrance examination, as in the case of the secondary schools. The three-year course includes French, German, ethics and religion, applied mathematics, natural science in its special application to agriculture, agronomy, animal breeding, rural economy and elements of rural law, book-keeping, writing and drawing, elementary geography and history, singing and physical training. An interesting feature is that specially qualified persons from outside the school may be invited to give short courses or hold conferences and discussions. Attached to the school is a laboratory for experimental agriculture and chemistry which is in charge of one of the full-time teachers. The laboratory also undertakes analyses for outside bodies. The staff is appointed by the Sovereign, with the exception of one member appointed by the Minister of State, in whose department the care of agricultural education falls. To encourage the children of Ettelbruck and the neighbourhood to attend the school, grants in aid are awarded by the Government. The number of pupils attending the school in 1938-9 was 129, and at the special winter courses held at Ettelbruck and Luxembourg the numbers were sixteen and twenty respectively.

Evening classes and short courses in agricultural subjects are also available at some of the *écoles professionnelles et ménagères*.

SPECIAL SCHOOLS

Emil Metz Institute

This Institute was founded at Dommeldange by Madame Emil Metz-Tesch, daughter of Victor Tesch (founder of the *Société August Metz*). Madame Metz-Tesch was deeply concerned with

the consequences, both to the individual and to society, of the rapid extension of specialized processes in industrial production. The aim of the school was, therefore, to give the young apprentice a fuller understanding of the industry in which he was employed. The first classes were held in November 1914. In 1922, important additions were made to the school as a result of benefactions which provided for the construction of a workshop for the practical training of apprentices. Secondly, a psycho-physiological laboratory was added. Here the apprentices are studied as individuals, so that each one may be employed in work best suited to his intelligence and capacities. Theoretical training is given during a three-year course in the school. In the first year the syllabus includes languages, elementary mathematics, physics and chemistry, geography and natural science. Specialized study begins in the second year and continues in greater degree in the third. Great attention is paid to the physical well-being of the boys, and swimming and physical training are compulsory throughout the three-year course. Approximately 140-150 apprentices attend the school.

Schools of Music

There are two State-supported schools of music in Luxembourg, the *Conservatoire de Musique* in the capital with about 500 pupils, and the *Ecole de Musique* at Esch-sur-Alzette with approximately 400 pupils. The first of these—though it came under State control in 1904—had its origin in a *Conservatoire* founded in 1822 by Heinrich Joseph Cornely. It is now a municipal rather than a State institution, its administration being in the hands of the city authority. The cost, however, is partly borne by a State grant which, according to the 1904 law, must not exceed 16,000 *fr. lux.*, though the Chamber can vote a supplementary grant and has in this way raised the amount to about 40,000 *fr. lux.* In return for support, the Government reserves the right to approve the appointment and dismissal of the Director and the curriculum and organization of the school. It has also the right of inspection and of appointing two of the five members of the supervisory committee, the other members being appointed by the commune. The school of music at Esch-sur-Alzette is also under the supervision of the municipality.

The State and commune authorities also help to support the musical societies that are to be found in many of the villages. These are fostered and encouraged by the two schools of music, and musical competitions and festivals are frequently held.

THE TRAINING OF TEACHERS

Training Colleges

There are two colleges, one for men and the other for women, for the training of primary school teachers. The earliest school for the training of teachers was the *Musterschule* (Model School) established in 1818, which aimed at providing teachers for the primary schools of the country. The school was attached to the *Athénée* in Luxembourg, whose professors also lectured to those in training. Since most children were needed to work on the land in the summer, teachers were then free to further their own education at courses held at the *Musterschule*. As the result of reactionary influences following the Belgian Revolution of 1830, the school was closed, but a teachers' training college (*école normale*) was opened in the great hall of the *Athénée* in 1845. Ten years later came the foundation of a training college for women teachers, with Sister Gonzague Forschler as principal, though under the direction of the head of the men's training college. In 1916, the women's college became a separate institution.

Both colleges provide a four-year course for which there are no fees. During the last year the students engage in teaching-practice in the schools. Candidates for admission to the colleges must be between fifteen and twenty years old and must pass an entrance examination. At the end of the course an examination is held for the provisional certificate (*brevet provisoire*), which allows the recipient to teach for five years. This is followed by a further examination for a diploma (*brevet d'aptitude pédagogique*), which completes the essential teaching qualifications. There are two further voluntary examinations which carry diplomas for teaching in the higher-grade schools and the post-school courses. There has been a steady increase in the number of students attending these colleges in recent years, particularly in the case of women. In 1938-9, there were 181 students of whom one hundred were men and eighty-one women, and in that session twenty-five men and twenty-two women obtained the teacher's certificate.

Teachers' Organizations

The earliest teachers' organization was the Teachers' Union (*Association Générale des Instituteurs et Institutrices luxembourgeois*), founded in 1900, largely through the work of Mathias Adam, a teacher in the higher-grade school at Pétange. It publishes its own organ, '*Die Lehrerzeitung*.' In 1909 was founded the Catholic

Teachers' Society (*Association des Instituteurs Catholiques*), whose organ is '*Der Schulfreund*.' A small group of schoolmasters also publish a three-monthly review, called '*Morgenglocke : Zeitschrift für kleine Leute*.'

The two societies in co-operation provide the authors or editors of all the books used in the schools of the Grand-Duchy. The instigation of this somewhat unusual task for such an organization was due to M. Joseph Bech when Minister of Education. Such collaboration has been not only of great value in smoothing out difficulties that might arise between the associations, but has proved financially profitable to both. On the one hand the schools have been supplied with textbooks of a high quality at low cost, and on the other hand association funds have benefited to such an extent that in 1939 plans were prepared for the building of a large house to accommodate teachers.

Conferences of teachers, which originated long before the formation of the association, the first one having taken place as far back as 1871, are held periodically.

THE UNIVERSITY QUESTION

There is no university in Luxembourg, a fact explained by the small size of the country. In so far as a university is a centre of research and a stimulus to intellectual and cultural activity, Luxembourg loses by this omission. On the other hand, there are important advantages. The young students of the country are free to pursue their studies in any foreign university. As a result, the Grand-Duchy benefits from having an educated section of the community trained in universities with a richly varied background of culture and tradition. This is a valuable antidote to the danger of a narrow parochial outlook that might result from an education confined within the borders of such a small State.

The connection of Luxembourg with foreign universities has its roots in the distant past, when the country formed part of a larger realm. For example, when the university of Prague—the oldest in central Europe—was founded in 1348 by the Holy Roman Emperor, two scholarships were awarded to Luxembourg students, and these remained in existence until shortly before the outbreak of the war of 1914-18. From the time of its foundation, the university of Trier attracted many Luxembourg students, especially of law and theology, while others were to be found in various universities of

Germany, France, Italy and the Netherlands. The university of Louvain was also much visited by law students from Luxembourg, especially in the sixteenth century.

In recent years, about five hundred Luxembourgers annually pursued university courses, chiefly in medicine, letters and law. Paris attracted a greater number of these students—more than a hundred annually—than any other university. Many others spent at least a short time studying in that city. Paris, Bonn, Munich, Berlin and Nancy were the universities generally chosen by those seeking careers in academic subjects. Medical students tended to favour France, especially Paris, Strasbourg or Marseilles. Mathematicians went to Göttingen, dentists to Bonn or Paris, engineers to Zürich, Aachen, Louvain or Paris, and those intending a career in commerce to Antwerp, Paris or Louvain.

The absence of intellectual stimulus provided by university life is partly remedied by the existence of two student associations. In 1910, the *Association Catholique des Etudiants luxembourgeois* was formed, which in 1939 represented the great majority of Luxembourg students. It publishes each term the '*Academia*,' which, besides giving information on association activities, includes serious articles on academic matters. The *Association Générale des Etudiants luxembourgeois* was founded in 1911 and is non-political and non-sectarian. Its publication is '*La Voix des Jeunes*.' The two bodies often worked in collaboration, especially in connection with the *Confédération internationale des Etudiants*.

Foreign degrees are not officially recognized as qualification for the liberal professions (medicine, law, etc.). Qualification for these is obtained through special examinations conducted by panels of examiners appointed annually by the Director-General of Public Instruction (see p. 104).

THE PRESS

The daily Press in particular plays an important part in the life of the Grand-Duchy. Thanks to an entire absence of illiteracy, and to the geographical position of the country which enforces an interest in affairs, the number of newspapers and periodicals is high in relation to the number of inhabitants. The Press, embodying the political and cultural aspirations of an educated public, reflects all shades of opinion. A Press reflecting the national attitude existed before Luxembourg secured its independence and served in no

small way to give expression to the claims for autonomy. Since 1839, and above all after 1868, the Press has given voice to the currents of thought which determine the political life of the country. This freedom is assured by the Constitution of 1868 (Article 24), which provides for complete liberty of expression, except for extravagances committed in exercising that liberty. The Constitution moreover does not permit a censor to be established.

The following were the daily newspapers published up to the time of the German invasion of May 1940 :

Title	Circulation (approx.)	Politics	Place of Publication	Date of foundation
<i>Luxemburger Wort</i>	48,000	Catholic	Luxembourg	1848
<i>Luxemburger Zeitung</i>	?	Radical- Liberal	Luxembourg	1868
<i>Luxemburger Volksblatt</i>	6,000	Independent	Luxembourg	1898*
<i>Escher Tageblatt</i>	12,000	Labour	Esch-sur- Alzette	1913
<i>Obermoselzeitung</i>	6,000	Independent	Greven- macher	1881
<i>Nationalzeitung und Landwirt</i>	?	Independent	Diekirch	1837†
<i>Luxembourg</i>	?	Non-political	Luxembourg	(1871) 1935

* The *Volksblatt* survived as one of a succession of independent newspapers published by a gifted family of journalists, Bourg-Bourger, whose first venture appeared at this date.

† This newspaper first appeared as the *Diekircher Wochenblatt*, and was for nearly a century in the hands of the well-known family of publishers, Schroell.

Source : H. Clement, 'La Presse luxembourgeoise,' in *Le Grand-Duché de Luxembourg* (Luxembourg, 1935).

The majority of the newspapers have always been published in German owing to the wider circulation obtained among a public whose own dialect is so closely related to that language. Since German is also the main language of the schools, the vast majority of Luxembourgers have, in any case, a greater facility for reading that language than French. A single article or notice in French is, however, a frequent feature of most newspapers. A few newspapers printed wholly in French have appeared from time to time, notably the two forerunners of the *Luxemburger Zeitung*—the *Journal de la Ville et du Grand-Duché de Luxembourg* (1826-44) and the *Courrier du Grand-Duché de Luxembourg* (1844-68). Both displayed definite liberal tendencies. More recently the only newspaper in French was *L'Indépendance luxembourgeoise*, which appeared regularly since 1871,

following *L'Avenir* and *L'Union*, which were established in 1860. Non-political and with a small circulation, chiefly among the middle class and the French colony in the Grand-Duchy, *L'Indépendance* was eventually replaced by *Luxembourg*.

The newspapers of the Left have naturally found the bulk of their support in the industrial district, and among the predecessors of the *Escher Tageblatt* were those produced under the long editorship (1896-1910) of the Socialist leader Dr Welter, such as the *Escher Volksblatt* and the *Neues Journal*. There were also published in the capital the radical-Socialist *Freie Presse*, the *Soziale Republik* and the *Arbeiterzeitung*, each of which was for a time the organ of the Labour Party. The *Escher Tageblatt* was first established by Paul Schroell in 1913 as a private concern, though it was a radical-Socialist paper. Its view swung more and more to the Left, until in 1928 it was acquired by the *Société Co-opérative d'Imprimerie* as the official organ of the Labour movement.

There exists, especially in the country, a number of weekly, bi-weekly and tri-weekly newspapers, most of them with a political bias. The *Fortschritt* (Diekirch) and *Ardenner Zeitung* (Wiltz) are Catholic organs, while the *Echternacher Anzeiger* (Echternach) and the *Tribune* are respectively independent and radical-independent. Further, most professional organizations issue a periodical, and in Luxembourg these are quite numerous, for many of the co-operative *syndicats* have their own publications. Among the most important, however, are the *Echo de l'Industrie*, organ of the Luxembourg Industries Federation, and *Die Mitteilungen*, of the farmers' associations. Other regular publications include a Pictorial Weekly *A-Z* (1935), and the *Cahiers luxembourgeois* (1923), a record of serious scholarship, embracing letters, arts and sciences.

In view of the excellence of railway communications, some of the foremost foreign newspapers—French, Belgian and German—are normally obtainable and are read regularly by people in the capital and in Esch-sur-Alzette.

PUBLIC LIBRARIES

The main library in the Grand-Duchy is the *Bibliothèque Nationale*, in the city of Luxembourg. Its contents total some 450,000 items, and include many manuscripts and early printed books.

The following list includes other important libraries in the city of Luxembourg :

- (1) The *Bibliothèque du Gouvernement*.
 - (2) The *Bibliothèque du Conseil d'Etat*.
 - (3) The *Bibliothèque Professionnelle, Technique et Commerciale*.
 - (4) The *Bibliothèque Piscatore*.
 - (5) The *Bibliothèque de la Chambre des Députés*.
 - (6) The Law Courts library.
 - (7) The *Bibliothèque de l'Institut Grand-Ducal*, which had Historical, Medical, Natural History, and Language and Folklore sections.
 - (8) The *Bibliothèque du Pensionnat Episcopal*, a library used by the 500 boarders at this institution.
 - (9) The library of the Redemptorist Monastery.
 - (10) The library maintained by the *Association pour l'Education Populaire*.
 - (11) The private library of H.R.H. the Grand-Duchess, at the Grand-Ducal Palace, which contains many valuable historical books.
- A number of libraries are situated in various other towns in the Grand-Duchy. The most important include :
- (1) The library of the Benedictine Abbey at Clervaux.
 - (2) The libraries at Esch-sur-Alzette and at Differdange of the *Association pour l'Education Populaire*.
 - (3) The Law Courts library at Diekirch.
 - (4) The library of the *Alliance Française* at Diekirch.
 - (5) The *Bibliothèque de la Ville* at Esch-sur-Alzette.
 - (6) The *Bibliothèques Scolaires*, aggregating some 200,000 volumes, which were attached to practically all the elementary schools of the country.
 - (7) The *Bibliothèques des Compagnons Catholiques* were attached to each of the nine secondary schools and to most of the eight technical and vocational schools.
 - (8) A branch of the *Bibliothèques de l'Association St. Borromée* was under the control of each parish priest for the use of his parishioners.

BIBLIOGRAPHICAL NOTE

1. Statistical summaries of the numbers of schools, scholars and teachers are contained in the *Aperçu Statistique* (Luxembourg, annually).
2. A useful summary of the development and character of the Press in Luxembourg is H. Clement's, 'La Presse luxembourgeoise,' in *Le Grand-Duché de Luxembourg*, published on the occasion of the Brussels International Exhibition (Brussels, 1935).

Chapter VII

PUBLIC HEALTH

Administration : Hospitals and Institutions : Vital Statistics : Causes of Death : Infectious Diseases : Social Insurance : Bibliographical Note

ADMINISTRATION

The conditions of public health in Luxembourg compare favourably with those in neighbouring countries, owing to a wide recognition of their importance on the part of the State and of the unofficial organizations. In so small a country a separate Ministry of Health is hardly to be expected, and health services, together with public assistance, are administered by the *Bureau d'Assistance Publique et Service Sanitaire*, responsible to the Department of the Interior. As a result of the close integration of State departments, social conditions in general are satisfactory, and there is a relatively high standard of living prevailing throughout the country. The national health has benefited from the numerous measures adopted in the interests of social welfare, such as the eight-hour working day, the prohibition of child labour and of the employment of women and children at night, and the abolition of slums. Holidays with pay were introduced earlier than in any other country. With an enlightened system of social insurance, extreme poverty is rare, and the contrast in the essential well-being of rich and poor relatively slight.

The *Bureau d'Assistance Publique* is assisted by a Medical Council (*Collège Médical*), which exercises both advisory and disciplinary powers. The local administration of health services is in the hands of cantonal medical inspectors. The supervision and control of medical personnel is carried out by the *Collège Médical* and by the Disciplinary and Higher Disciplinary Councils.

Mention must be made of the insurance organization (*Etablissement d'Assurance*), which operates the various insurance services—sickness, accident, old age and invalidity—on behalf of the Minister of Social Services (*Prévoyance Sociale*). In addition to its work of administering insurance, it co-operates generally with other bodies, such as the National Tuberculosis League (*La Ligue nationale de lutte contre la tuberculose*), in promoting the health and welfare of

the working community. The administration of social insurance is described on pp. 128-34.

The Medical Council (Collège Médical)

Founded in 1901, the functions of this Council are to supervise the health services of the Grand-Duchy, to study and inquire into all questions concerning medicine and public health which the Government may refer to it, and to exercise disciplinary power over all those qualified to practise medicine.

The council is made up of three types of member: executive, serving and consultative. Of the first group, five must be doctors, two pharmaceutical chemists, and one a veterinary surgeon; one of the doctors is required to live in the Diekirch district and two in the capital. The second group includes similar personnel without conditions of residence. All must be natives of the Grand-Duchy, aged thirty or over, qualified to practise within the country, and must have practised for at least five years. University work after the date of the final examination is accepted in lieu of practice. To assist these members, there are included a magistrate (the President of the Court of Justice of the Luxembourg *arrondissement*), an engineer, an architect, a chemist and the head of the Bacteriological Laboratory. The executive members are appointed by the Sovereign from a list submitted by doctors, dentists, veterinary surgeons and pharmaceutical chemists of at least three years' experience. Elections for candidature are held according to the regulations laid down in 1901. Office is held for six years in the first instance, retiring members being eligible for re-election.

The serving and consultative members are directly appointed by the Sovereign, except for the magistrate, who is appointed *ex officio*. The administrative functions of the Medical Council are fixed by Articles 20-23 of the law of 6 July 1901. There is also a special commission which deals with epidemics.

Medical Inspectors

Each canton has a Medical Inspector, except in cases where two closely adjoining cantons may be served by the same medical officer, or in cases where the importance of the canton necessitates two or more officers to deal with different kinds of work. Medical Inspectors are appointed by the Government on the advice of the Medical Council. Their term of office is six years in the first instance, but they can be reappointed on the expiration of this period. They

must be natives of Luxembourg, must be qualified in medicine, surgery and midwifery, and must be over thirty years of age, with at least five years' practical experience. Their duties, established by a decree of 24 August, 1902, cover the following :

(1) The study of public health and sanitary conditions in their area.

(2) The observance of laws and regulations concerning hygiene, public health and medical practice in their area.

(3) The reporting to the appropriate authority of deficiencies or shortcomings in their area, together with suggestions for improvements.

(4) Advice on all questions of hygiene and public health in their area which may be submitted by central or local government bodies.

(5) Advice on all decisions, rulings and orders which the local authorities wish to make concerning the improvement of sanitary conditions of dwellings and buildings, supplies of drinking water, drainage, measures against infectious diseases, sale of foodstuffs, medical services for the poor, and public health generally.

(6) Advice concerning public works undertaken by the local authorities, such as the building of schools, churches, slaughter-houses, canals, reservoirs, water-mains, springs, wells, drains, covered or open markets, cemeteries, etc.

(7) Supervision of services for the protection of children.

(8) Supervision of co-operative dairies.

Medical Personnel

The following table summarizes the number of medical practitioners and other personnel practising in 1935, the last year for which detailed statistics are available :

Doctors of Medicine, Surgery and Midwifery	..	182
Dentists .. .. .	..	59
Pharmaceutical chemists (a) with laboratory ..	..	50
(b) without laboratory ..	..	92
Druggists .. .. .	..	15
Veterinary Surgeons .. .. .	..	45
Midwives .. .. .	..	129

Source : *Annuaire officiel*, 1935 (Luxembourg, 1936).

All the personnel listed in the above table were Luxembourgers. A number of French and Belgian doctors, midwives and veterinary surgeons were permitted to practise in districts of the Grand-Duchy

adjoining France and Belgium, while a number of Luxembourgers were in practice in those countries, as shown in the following table :

	Doctors	Midwives	Veterinary Surgeons
Belgians permitted to practise in districts of the Grand-Duchy bordering on Belgium (according to the Convention of 1879)	12	12	2
French practitioners permitted to work in districts of the Grand-Duchy bordering on France	31	29	5
Luxembourgers permitted to practise in Belgium	9	15	2
Luxembourgers permitted to practise in France	54	37	8

Source : *Annuaire officiel*, 1935 (Luxembourg, 1936).

As there is no university in Luxembourg, medical students generally choose to take their course of study at Paris, although some enter the Faculty of Medicine at one of the Belgian universities. These foreign degrees are not officially recognized as qualification to practise until the candidate had passed a special examination conducted by a panel of examiners appointed annually by the Director-General of Public Instruction.

Medical personnel are under the general supervision of the *Collège Médical*. Specific disciplinary action is taken by the Disciplinary Council, which consists of four executive members who must be (a) all doctors, if the disciplinary action is directed against a doctor, a dentist or a midwife ; (b) two doctors and two pharmaceutical chemists if the action is directed against a chemist or druggist ; (c) three doctors and one veterinary surgeon in cases of action against a veterinary surgeon.

The President of the Court of Justice of the *arrondissement* of Luxembourg is *ex officio* the President of the Council, and the function of the Secretary is fulfilled by the Clerk of the same Court. Appeals against judgments of the Disciplinary Council are heard by the Higher Disciplinary Council which meets in the Palais de Justice in Luxembourg, and consists of a President and four Councillors nominated by the Sovereign ; the President and two of these members are chosen from the High Court of Justice, while the other two members are private doctors or medical officials.

The Bacteriological Laboratory and State Disinfection Services

The Bacteriological Laboratory (*Laboratoire Pratique de Bactériologie et Service de Désinfection*), with which is combined the laboratory for the inspection and analysis of foodstuffs, has in recent years virtually become a national institute of hygiene. The Laboratory personnel comprises a Director, a doctor of medicine, an assistant doctor, a chemist, laboratory staff and a number of disinfectors.

The Laboratory has a variety of functions, both State and private. These include :

(a) *Bacteriological* : The diagnosis of tuberculosis, diphtheria, typhoid fever and of other infectious diseases. The Laboratory serves as a dépôt for serums and vaccines, some of which, mainly smallpox vaccine, it manufactures for public use.

(b) *Hygienic and Analytical* : The Laboratory supervises the observance of measures prescribed by the authorities upon the outbreak of an epidemic. It undertakes the analysis of drinking water, and of home-produced and foreign foodstuffs and beverages, notably wine. Analyses are performed at fixed rates for private firms and individuals, varying with the nature of the work from 3-60 fr. lux. All investigations carried out for the State, for the local authorities, and on behalf of the poor, are exempt from charge, and the Director of the Laboratory has the power to waive charges when the work is in the public interest or of scientific importance. Government rulings are accepted both in the matter of defining the poor and of defining what are matters of general or scientific importance.

The inspection of all imported meat is made in the Bacteriological Laboratory by both a chemist and a veterinary surgeon. Home-killed meat, on the other hand, is inspected in communes with their own slaughter-houses by veterinary surgeons appointed by the local council. This is the case in the communes of Luxembourg, Rumelange, Wiltz, Remich, Ettelbruck, Grevenmacher, Echternach, Esch-sur-Alzette and Dudelange. In other localities, the inspection of home-killed meat is carried out by inspectors appointed by the Government. They must be veterinary surgeons, or individuals who have satisfied the authorities as to their qualifications for such work by passing a special examination.

The Laboratory controls the sale of medicines, patent-medicines and pharmaceutical products, and tests hygienic appliances.

(c) *Medical Diagnosis*. The Laboratory's work in this field is chiefly concerned with biochemistry and radioscopy.

(d) *Forensic Medicine.* The Laboratory carries out autopsies, the examination of hair, etc., the identification of human blood, and any other special work of this nature required by the Law.

The *Public Disinfection Service* was created by the Public Health law of 27 June, 1906. It is organized by the Director of the Bacteriological Laboratory, and has a central dépôt in Luxembourg and others in various parts of the country. Disinfection is carried out at the expense of the State in cases of typhoid, small-pox, scarlet-fever, diphtheria, cholera, plague, dysentery, tuberculosis, puerperal fever and meningitis; otherwise a charge is usually made.

Water Supply

In the Lower Lias (Luxembourg) Sandstone and in the Bunter sandstone formations (see p. 5-7), plentiful supplies of underground water are available. The Luxembourg Sandstone in particular with its extensive outcrop area holds enormous quantities, and most of the waterworks in the Grand-Duchy obtain supplies from this source. Generally, pumping-stations raise the water from deep wells, though sometimes copious springs are utilized, as in the Eisch valley. A reliable water supply was doubtless an important factor in the early development of the capital, and wells in the sandstone proved unfailing. There were the wells of the Bock itself (see p. 318) and others, 'les Puits Roux,' in the heart of the old town, the site of which can be seen at the eastern end of the Grand' Rue. Outside the citadel, the winding valleys of the Pétrusse and Alzette, which are deep enough to reach the water-table, give rise to springs of clear water like those in the Pfaffenthal and the historic spring at St Quirin's Chapel. Further to the north, in the valley of the Mühlenbach, are the springs known as Septfontaines. The principal modern supply for the capital comes from deep springs at Kopstal, where there is a modern pumping-station. To serve some of the new outlying parts, such as Gasperich, quantities are pumped to local water-towers.

Another important scheme is the Inter-Communal Supply, serving the populous districts of the south, which has its installations in the Eisch valley. In this case the floor of the valley consists of an impervious layer beneath the sandstone which forms the slopes on either side, so that abundant springs occur. A series of secondary pumping-stations serves to raise the water as far as the two main stations at Koerich and Dondelange. From these it is pumped to the Rehberg reservoirs (1,329 feet above sea level) near Garnich,

from which it is distributed by gravity feed to many parts of central and southern Luxembourg. It is estimated that about 150,000 inhabitants, or half the total population, are served by this scheme. The undertaking originated in 1911, when seventeen communes belonging to the cantons of Capellen and Esch-sur-Alzette co-operated to tap the supplies in the Eisch valley, but it has since been extended.

The towns of Diekirch, Ettelbruck, Echternach, Grevenmacher and Remich all have independent water-works deriving supplies from the Luxembourg Sandstone. With the exception of the capital and of these towns, the water supply for the whole country has in recent years been co-ordinated under two *syndicats*, a northern and a southern. Their programme of development was completed only a year or two before the outbreak of the present war, when it was claimed that hardly twenty inhabited places in the Grand-Duchy were without a regular supply.

At Useldange, water is obtained from the Bunter sandstone and pumped to reservoirs near Napoléonsgard and Eschdorf, situated at elevated points in the north, from which it is distributed over much of the Ardenne. Quantities are piped to local reservoirs, as at Wiltz, Clervaux and Hosingen.

HOSPITALS AND INSTITUTIONS

The Grand-Duchy is well provided with hospitals and other institutions. Three, the Hospice du Rham, the Ettelbruck Mental Asylum and the Home for the Blind at Berbourg, are maintained by the State, as is the Thermal Establishment at Mondorf-les-Bains. Others are maintained by the town or commune; these are at Differdange, Echternach, Esch-sur-Alzette, Ettelbruck, Grevenmacher and Wiltz. A further group are maintained by religious congregations of nuns; these are at Bettembourg, at Luxembourg (hospitals of Ste. Zithe, Ste. Elizabeth, St. Joseph and St. Francis, the last being for the deaf and dumb, at Mondorf (Cloître), at Redange, and at Remich (St. Joseph hospital and a children's nursing home). In some of the metallurgical towns, hospitals are maintained by the large firms for their employees; these comprise the hospitals at Dudelange (the Kreutzberg and the Usine, both owned by *Arbed*), at Esch-sur-Alzette (in conjunction with the commune), and at Rumelange. The State Social Insurance scheme maintains a hospital at Niederfeulen and a T.B. Sanatorium at Vianden. There

is also the endowed hospital at Eich, maintained by the *Fondation Emile Metz*.

1. *The Ettelbruck Asylum*

Legislation concerning the care of mental patients dates from 1880, and particular decrees concerning the organization of the asylum of Ettelbruck date from 1901. The institution has a medical doctor in charge, with appropriate staff. The advisory committee, consisting of a president and four members, is appointed by the State every three years. Orders for admission to the Asylum are made by three judges.

2. *The Hospice du Rham*

This Home provides refuge for the poor who are aged and incurable, and for poor patients sent for treatment by the local authorities because they are not eligible for benefit under any of the insurance schemes. A certain number of beds are provided for cases of infectious disease. Secondly, it provides a home for orphans and neglected children brought up under the Public Assistance Scheme created in 1884.

Children and adults who are financially solvent are only admitted to the Home when no alternative accommodation is available. In the case of children, when they have reached the necessary age, situations are found for them as domestic servants either in town or country districts, or as apprentices, preferably to artisans who are in a position to house and feed them.

The personnel of the Hospice includes a director, who is appointed by the Sovereign, a chief male nurse, and two other male nurses nominated by the Government. There are in addition a doctor, an almoner, four teachers, and an instructor in charge of gardening and manual courses for the boys. Some twenty nuns are attached to the various sections of the Hospice and orphanage, while the domestic arrangements including the catering are under the direction of a Mother Superior.

3. *Maternity Home and School of Midwifery*

The direction and administration of this institution are entrusted to an administrative committee, a director, a senior midwife and her assistant. The committee is nominated by the Sovereign on the advice of the Minister of the Council of Government whose duties include responsibility for the medical services. The President of

the Medical Council (*Collège Médical*) is an honorary member of the committee, and serves as its chairman.

4. *The Thermal and Hydropathic Station of Mondorf-les-Bains*

The spring at Mondorf-les-Bains was discovered by chance in 1841, during borings for rock-salt in the valley of the Altbach. At a depth of about 1,650 feet a warm spring containing mineral salts was encountered. A well was dug to 2,400 feet and regulated to tap the spring, which was named 'Kind,' after its discoverer. The output was some 600 litres a minute. A thermal station was established at Mondorf in 1848. The company concerned made considerable improvements in 1865 under the direction of Professor Fleury, who initiated modern hydropathics and made Mondorf a model spa. Twenty years later it was taken over by the Government, and a second spring, called the 'Marie-Adélaïde,' was tapped, which rose from a depth of 1,930 feet. It is this spring which supplies the present establishment. The present buildings, designed by the State architect, M. Paul Wigreux, date from 1925, when extensions and improvements were made and more modern equipment installed. The spring-water, which has a temperature of 76° F. (24° C.), contains chlorides, sulphates and alkaline earths; it is particularly rich in sodium-chloride and calcium (5 gm. per litre), is highly radioactive and rich in nitrogen. It is recommended for the treatment of intestinal, stomach, liver and arthritic complaints. Mondorf mineral-water is bottled for home use and is obtainable from chemists and drug-stores.

The administration of the spa is under the charge of a director and secretary. Free treatment is given in necessitous cases, but this concession is only made during the months of May, June and September, and applications accompanied by the appropriate medical certificates have to be made beforehand.

VITAL STATISTICS

The *Office de Statistique* in the city of Luxembourg is concerned with the compilation of nearly all statistics, including vital statistics. The records of marriages, births and deaths are kept by the burgomaster of each commune; he is registrar and is responsible for the upkeep of the various registers. The information contained in the registers is tabulated annually, certified by the burgomaster and forwarded to the registration officer, of whom there are twelve,

one for each canton (except Vianden) and two for Luxembourg city. The whole administration is under the *Office de Statistique*, which has a director in the capital, two inspectors in the capital and at Diekirch, and two auditors (*vérificateurs*) in the capital. The data is summarized and appears annually in the *Aperçu Statistique*.

Rates of Death, Infant Mortality and Births

The general death-rate, the infant mortality rate and the birth-rate in Luxembourg for each year from 1925 to 1938 are tabulated below. Corresponding rates for Belgium, England and Wales are inserted for comparison.

Year	Death rate per 1,000 inhabitants			Infant mortality. Death of Infants under 1 year per 1,000 live births			Birth-rate per 1,000 inhabitants		
	Luxembourg	Belgium	England and Wales	Luxembourg	Belgium	England and Wales	Luxembourg	Belgium	England and Wales
1925	14.1	13.1	12.2	116	94	75	20.9	19.8	18.3
1926	15.1	13.3	11.6	126	97	70	20.8	19.0	17.8
1927	13.7	13.5	12.3	99	92	70	20.6	18.3	16.6
1928	13.9	13.2	11.7	103	87	65	21.1	18.4	16.7
1929	15.4	15.0	13.4	121	104	74	21.1	18.1	16.3
1930	12.9	13.3	11.4	90	93	60	21.3	18.7	16.3
1931	13.2	13.2	12.3	85	82	66	19.9	18.2	15.8
1932	13.1	13.2	12.0	96	87	65	17.6	17.6	15.3
1933	12.3	13.1	12.3	90	85	64	16.2	16.5	14.4
1934	11.6	12.2	11.8	77	76	59	15.3	16.0	14.8
1935	12.6	12.8	11.7	77	77	57	15.2	15.4	14.7
1936	11.5	12.8	12.1	71	79	59	15.1	15.2	14.8
1937	11.8	13.1	12.4	67	74	58	15.0	15.3	14.9
1938	12.6	13.1	11.6	82	72	52	14.9	15.8	15.1

Source : The Luxembourg figures were derived from *Aperçu Statistique* for successive years (Luxembourg, annually).

The decline in the general death-rate during the inter-war years is noteworthy. From 1933 onwards, the rates have been comparable to those of England and Wales and appreciably lower than than those of either Belgium or France.

The infant mortality rates up to 1930 were, however, very high for a western European country, and were indicative of not very healthy conditions. Since then there has been marked improvement, but there is room for more. The figures compare unfavourably with those of Belgium, and England and Wales, while in the Netherlands the infant mortality rate was but 37 in 1938 and 1939.

The decline in birth-rate that has characterized nearly all western countries during the last two decades has been very well marked in Luxembourg.

The birth-rates and death-rates reported for Luxembourg city are both considerably higher than the corresponding rates for the

Grand-Duchy as a whole, whereas the infant mortality rates of the city are considerably lower :

Year	City of Luxembourg			Grand-Duchy of Luxembourg		
	Death-rate	Infant mortality rate	Birth-rate	Death-rate	Infant mortality rate	Birth-rate
1936	13.6	56	20.9	11.5	71	15.1
1937	14.1	51	21.7	11.8	67	15.0
1938	14.8	64	22.1	12.6	82	14.9

Source: *League of Nations: Annual Epidemiological Report for the year 1938* (Geneva, 1941).

CAUSES OF DEATH

The number of deaths ascribed each year to various diseases or groups of diseases indicates that the nosology of the country differs in no material respects from that of its neighbours. Defective notification and registration of causes of death, however, make attempts at comparison profitless and possibly misleading. As in France, and to a less extent in Belgium, the proportion of total deaths ascribed to senility and to 'causes not specified or ill-defined' is lamentably high. In France a somewhat exaggerated respect for professional secrecy is mainly responsible for uninformative death returns; but they are not an indication that any considerable number of patients lack skilled medical attention in their last illnesses. A somewhat similar state of affairs apparently pertains in Luxembourg. The table on p. 126 gives the number of deaths ascribed in Luxembourg to each of the forty-three causes of death, according to the abridged international nomenclature of 1929, during the years 1936 and 1937.

Deaths from all causes in 1936 and 1937 amounted to 1,152 and 1,182 per 100,000 respectively. Deaths from senility and ill-defined causes in 1937 accounted for 211 and 194 per 100,000. Corresponding ratios for England and Wales for these categories were 41.4 and 3.0. The proportion of deaths due to unspecified and ill-defined causes is thus 64 times greater in Luxembourg than in England and Wales, and of deaths due to senility nearly five times greater. Of specified causes of death, heart diseases head the list, as in most countries of western Europe. Cancer and pneumonia

Disease	Luxembourg				England and Wales
	1936		1937		Rate per 100,000
	Total deaths	Rate per 100,000	Total deaths	Rate per 100,000	
1. Typhoid and paratyphoid fever	4	1.3	6	2.0	0.5
2. Typhus fever	0	—	0	—	—
3. Smallpox	0	—	0	—	—
4. Measles	0	—	2	0.7	2.6
5. Scarlet fever	2	0.7	2	0.7	0.8
6. Whooping cough	10	3.4	5	1.7	4.3
7. Diphtheria	12	4.0	14	4.7	7.2
8. Influenza	35	11.7	58	19.3	45.4
9. Plague	0	—	0	—	—
10. Tuberculosis of the respiratory system	172	57.7	169	56.2	58.4
11. Other forms of tuberculosis	27	9.1	16	5.3	11.1
12. Syphilis	1	0.3	2	0.7	3.0
13. Malaria	0	—	0	—	—
14. Other infectious or parasitic diseases	34	11.4	36	12.0	7.9
15. Cancer and other malignant tumours	234	78.5	224	74.5	163.3
16. Tumours, non-malignant, or of which the nature is not specified	17	5.7	20	6.7	6.3
17. Chronic rheumatism and gout	4	1.3	4	1.3	9.1
18. Diabetes mellitus	42	14.1	53	17.6	17.8
19. Alcoholism (acute or chronic)	1	0.3	0	—	0.2
20. Other general diseases and chronic poisoning	26	8.7	18	6.0	20.5
21. Progressive locomotor ataxia and general paralysis of the insane	5	1.7	3	1.0	3.5
22. Cerebral hæmorrhage, cerebral embolism and thrombosis	118	39.6	129	42.9	66.5
23. Diseases of the nervous system and of organs of specific sense	111	37.2	135	44.9	27.2
24. Diseases of the heart	264	88.6	254	84.5	313.7
25. Circulatory system	80	26.8	94	31.3	69.5
26. Bronchitis	27	9.1	18	6.0	43.6
27. Pneumonias	253	84.9	301	100.1	72.0
28. Other diseases of the respiratory system (tuberculosis excepted)	86	28.9	115	38.2	11.8
29. Diarrhoea and enteritis	24	8.1	35	11.6	12.0
30. Appendicitis	19	6.4	33	6.0	6.9
31. Diseases of the liver and biliary passages	43	14.4	56	18.6	9.1
32. Other diseases of the digestive system	113	37.9	113	37.6	31.7
33. Nephritis	114	38.2	97	32.3	36.7
34. Other diseases of genito-urinary system	25	8.4	24	8.0	20.3
35. Puerperal septicæmia*	6	1.3	6	1.3	20.3
36. Other diseases of pregnancy, childbirth and the puerperal state	14	3.1	7	1.6	2.3
37. Diseases of the skin and cellular tissue, and of the bones and organs of locomotion	3	1.0	2	0.7	6.7
38. Congenital debility and malformations, premature birth and other diseases of early infancy	129	28.6	105	23.3	31.9
39. Senility	620	208.0	634	210.8	41.4
40. Suicide	51	17.1	43	14.3	12.6
41. Homicide	6	2.0	3	1.0	0.4
42. Violent and accidental deaths (suicide and homicide excepted)	127	42.6	152	50.5	42.5
43. Causes of death not specified or ill-defined	574	192.6	582	193.5	3.0
Total	3,433	1,151.8	3,555	1,182.1	1,241.9

* Rate per 1,000 live births.

Source: *League of Nations: Annual Epidemiological Report for the year 1938* (Geneva, 1941).

come next. The death-rates ascribed to tuberculosis in Luxembourg are very similar to the English rates, but it is safe to assume that there are many tuberculosis deaths in the 'unspecified' total. The same is probably true as regards cancer deaths; the reported cancer death-rate of Luxembourg is but half the English rate and about two-thirds of the Belgian rate. Pneumonia death-rates are somewhat higher in Luxembourg than in England; in part this again may be due to recording methods. Pneumonia is a common termination to a number of other infectious diseases, notably influenza. In England the primary cause is selected as the cause of death for statistical purposes. Reported influenza death-rates are higher in England than in Luxembourg.

Figures are also available for certain diseases during the years 1935 to 1938 in the city of Luxembourg. Without information about the age and sex constitutions of the total numbers who died from each particular disease, no very definite conclusions are warranted. There are no marked differences between the following figures for the city of Luxembourg and for the Grand-Duchy as a whole.

Luxembourg city

	Death-rates per 100,000 inhabitants			
	1935	1936	1937	1938
Measles	3.5	0.0	0.0	9.9
Scarlet fever	1.7	0.0	3.4	3.3
Whooping cough	0.0	1.7	0.0	1.7
Diphtheria	5.2	5.2	11.8	9.9
Influenza*	—	8.7	10.2	6.7
Tuberculosis of the respiratory system	60.3	65.3	62.5	69.6
Other forms of tuberculosis	13.8	15.5	23.7	23.2
Pneumonia and broncho-pneumonia*	—	88.3	95.5	179.0
Diarrhoea and enteritis	15	4	5	5
Puerperal septicæmia	2.9	2.5	0.0	0.0

Source : *League of Nations : Annual Epidemiological Report for the year 1938* (Geneva, 1941).

* The death rates of influenza, pneumonia and broncho-pneumonia are for the years 1 July 1935 to 30 June 1936, and 1 July 1936 to 30 June 1937, each period including one complete epidemic season. All others are for calendar years.

INFECTIOUS DISEASES

Most of the ordinary diseases of neighbouring countries occur in Luxembourg, but available records reveal no undue prevalence of any of them in recent years. There was no case of typhus fever reported during the inter-war period and the last case of smallpox was notified in 1926. The number of cases of, and deaths from, infectious diseases for the last three years for which records are available, are tabulated as follows :

	1936		1937		1938	
	Cases	Deaths	Cases	Deaths	Cases	Deaths
Typhoid fever	17	4	15	6	14	0
Paratyphoid fever†	7	—	3	—	1	—
Measles	1	0	153	2	270	5
Scarlet fever	239	2	150	2	209	2
Whooping cough*	—	10	—	5	—	20
Diphtheria	101	12	205	14	291	13
Influenza*	—	35	—	58	—	54
Acute poliomyelitis†	2	—	1	—	4	—
Cerebrospinal meningitis†	0	—	0	—	3	—
Acute rheumatism*	—	8	—	8	—	6
Puerperal fever*	—	6	—	6	—	6

Source : *League of Nations : Annual Epidemiological Report for the year 1938* (Geneva, 1941).

* The number of cases is not stated

† The number of deaths is not stated

SOCIAL INSURANCE

Luxembourg ranks among the countries in which social insurance has reached an advanced stage, for the rapid industrialization following the 'seventies, together with the growth of the Labour movement, has been accompanied by progressive improvements in the conditions of the working population. The responsibility of the State in such matters was recognized at an early stage, and legislation in support of social insurance dates from the opening of the present century. Contributory sickness insurance was introduced by law in 1901, while accident insurance was brought in during the following year and, in 1910, extended to include workers in agricultural occupations and in forestry. By a law of 1911, compulsory contributory insurance for old age and incapacity was introduced for all workers over sixteen years of age irrespective of sex or nationality.

A law of 1925 codified the principal forms of insurance into a single system, and at the same time the benefits were considerably increased. To be eligible to receive benefit through incapacity, the individual must have completed 1,350 working days as an insured person, or twice that number in the case of foreigners. There were some further amendments in 1927 and in 1933.

The central insurance organization (*Etablissement d'assurance*) co-operates with other bodies, official and unofficial, in promoting the health and welfare of the working community. In the campaign against tuberculosis, for example, it gives direct assistance to the national league (*la Ligue nationale de lutte contre la tuberculose*), and maintains two small sanatoria for sufferers. A home for aged people is also maintained at Bofferdange, where about eighty pensioners are cared for by members of a religious body, the Sisters of Ste. Elizabeth. The *Etablissement* operates under the direction of a committee presided over by an official appointed by the Government and composed of four members, two representing the employers and two the employees.

Insurance companies are governed by the law of 16 May 1891, which permits them to function only after the authorization of the Sovereign, on the advice of the Council of State. The authorization moreover is subject to withdrawal for reasons such as failure to observe regulations, insolvency, or failure to carry out obligations to clients.

Before commencing business, a company must furnish security, and in cases where the Government orders an increase in the original security, the company must pay the difference within two months of the date of notification. The security is worked out in proportion to the company's reserves, and is revised annually. Every insurance company must appoint a representative living in the Grand-Duchy to represent it in judicial and other matters. Other agents must also be resident in the Grand-Duchy and must be approved by the Government. In the first five days of every month, agents must present to the Government an account of policies taken out during the previous month. They must also present an annual account, and be prepared to give any necessary information to the Government on demand. The supervision of all insurance is in the hands of the Department of Finance, and the Government takes a proportional tax from insurance companies.

Insurance companies have the right to form unions to achieve certain clearly defined aims. Persons compulsorily insured are

automatically members of an association, and voluntary contributors become so by virtue of affiliation. Persons compulsorily insured lose their membership if they cease to be employed in an occupation covered by the scheme, unless they remain voluntary contributors.

The various schemes of insurance may be described under their three main heads as follows :

(1) sickness insurance ; (2) accident insurance ; and (3) old age and invalidity insurance.

(1) *Sickness Insurance*

The sickness insurance organization is under the ultimate control of a Minister of Social Services (*Prévoyance Sociale*), under whom is a central committee, consisting of a salaried chairman appointed by the Government, with six representatives both of employers and employees. Under this again is a General Assembly, which primarily supervises the operations of companies, in which employers hold one-third and employees two-thirds of the votes. The administration of the scheme is in the hands of either a district office (*caisse régionale*), the district usually coinciding with the canton, or of an employer. All insured persons must be affiliated to the district society, unless affiliated to one at their own place of work. Employers with 500 workers or more on their books can apply for their own insurance society (*Caisse de pension des employés privés*), permission being granted if the formation of such a society does not prejudice the operation of the district society.

The following are compulsorily insured against sickness : (1) workmen, helps, companions and apprentices ; (2) domestic servants and daily workers who are only in part-time occupation in commerce and industry but whose employment is nevertheless regular ; and (3) employees, clerical or otherwise, overseers, technicians, clerks, and apprentices in business. The insurance of these people, except in the case of apprentices, is dependent on the condition that they are employed for a wage, that this paid work constitutes their chief source of livelihood and, in the case of people in the third category above, on condition that their salary does not exceed 10,000 *fr. lux.* a year. Private domestic servants and agricultural and forestry workers are not covered by the scheme, and some further categories can be exempted from compulsory insurance if benefits equivalent to those provided by the law are guaranteed to them. On the other hand, people not subject to compulsory insurance (such as Civil Servants and members of the liberal pro-

fessions), can make voluntary contributions under certain conditions determined by the statutes, provided that their annual income does not exceed 12,500 *fr. lux.*

The object of the insurance is to provide help in cases of illness, confinement and death. Assistance in cases of illness includes medical treatment and the cost of drugs, as well as financial help in the case of temporary incapacity. The latter amounts to at least half the normal salary of the insured person. Benefit must be paid for at least twenty-six weeks in the case of total incapacity. Financial help for confinements is similar to that in cases of illness, and is given for a definite period covering a number of weeks before and after childbirth. Funeral expenses are paid at a rate of one-fifteenth of the annual wages, though minimum and maximum sums are fixed. Supplementary grants can be made within limits determined by law.

In 1938, there were fourteen district insurance offices (*caisses régionales*), and ten employers' insurance offices (*caisses patronales*). Altogether 55,407 persons were insured, of which 31,142 were members of *caisses régionales*. The expenditure comprised payments for 529,401 days of illness, 779 deaths and 1,850 births, the total expenditure being 29.3 million *fr. lux.*, compared with receipts of 27.6 million *fr. lux.* The principal disbursements were :

Million fr. lux.

Medical treatment	8.34
Medicines and drugs	6.06
Workers' disablement	8.12
Funeral expenses	0.41
Hospital treatment	3.66
Confinement expenses	1.70
Maternity benefits	0.80

Source: *Aperçu Statistique*, 1940, p. 85 (Luxembourg, 1940).

Under the special insurance schemes for private employees (*Caisse de pension des employés privés*) contribution rates are 10% of the total salary, half each paid by the employer and the employee. The lowest insurable income is 7,200 *fr. lux.*, the highest 40,000 *fr. lux.* The following table shows the number of workers in the main industries who were insured under the private employees' scheme in 1938 :

Industry	Male	Female	Total
Heavy industry	2,504	112	2,616
Light industry	675	112	787
Banks and insurance	631	186	817
Commerce and agriculture	1,790	1,318	3,108
Others	128	20	148
Total	5,728	1,748	7,476

Source : *Aperçu Statistique*, 1940, p. 89 (Luxembourg, 1940)

During 1938, contributions amounted to 24.1 million *fr. lux.* and payments to 4.0 millions, while the reserve fund totalled 138.5 millions.

Accident Insurance

Compulsory insurance of workmen against accidents (Workmen's Compensation) was introduced into the Grand-Duchy in April 1902, and was extended by a further law in 1904 to cover all workmen in trade and industry, whatever the number employed in each concern. By subsequent legislation (1908 and 1925), important improvements were introduced, and provision was made for more severe punishments for malingering. In 1905-6, international arrangements were made with Germany, Belgium and France; there also exists an understanding with Italy, giving Italians the same benefits as Luxembourg citizens, subject to certain conditions. The law of 1925 concerning social insurance introduced the principle of the separation of insurance against accidents from insurance against illness contracted at work. Under the old scheme, Health Insurance had to bear the expense of the first thirteen weeks following an accident. From 1 January 1926, the whole charges for treatment and subsequent indemnities were paid by the accident-insurance society. Finally, by a decree of 1928, benefits under accident-insurance are now payable in the case of certain occupational diseases, notably lead and mercury poisoning.

Business concerns covered by the scheme are grouped into an Accident Insurance Association, administered by a committee whose president was appointed by the Government. Since 1910, there have been separate branches for Industry and Agriculture (including Forestry). A special tribunal decides all legal cases arising from claims made by victims of accidents.

Accident insurance is compulsory for all workers in industry whose annual salary does not exceed 10,000 *fr. lux.*, while it is compulsory for an agricultural labourer if the joint income of himself and of his wife does not exceed a sum fixed annually by the Association, usually about 9,000 *fr. lux.* Premiums are paid by the employers, 5% of the total wage in industry and 3% in agriculture, while half each of the administration expenses are paid by the Association and by the State. In 1938, the Industrial Section held a guarantee fund of 70.55 million *fr. lux.*, the Agricultural Section of 5.53 million *fr. lux.* Apart from the reimbursement of material losses, compulsory accident-insurance has as its object compensation for the hardship incurred by injury or death. If the victim is disabled through accident, benefit includes free treatment, medicines and the furnishing of all possible means to ensure recovery. The pension for total incapacity following an accident is two-thirds of the annual wages.

The following table summarizes the operation of Accident Insurance in 1938 :

Industrial Section

Insured employers	5,250
Insured employees	40,209
No. of accidents declared	12,740
No. of accidents approved for payment	12,055
Deaths by accident of insured workers	30
Payments (million <i>fr. lux.</i>)	27.2

Agricultural Section

Insured employees	Not stated
No. of accidents declared	2,423
No. of accidents approved	2,135
Payments (million <i>fr. lux.</i>)	3.27

Source : *Aperçu Statistique*, 1940, pp. 86-7, (Luxembourg, 1940).

(3) *Old Age and Invalidity Insurance*

Introduced into the Grand-Duchy in 1911, this form of insurance has as its aim the provision of a pension at the age of sixty-five, and financial help or curative treatment to younger persons unfit for work. The widow of an insured man, moreover, if herself an invalid or over fifty-five years old, or with three children under eighteen years of age, can claim half of the income of her late husband. This insurance is compulsory for all wage-earners of sixteen years or over, in industry and commerce. Insurance is optional, however,

for agricultural and forestry workers, and for domestic servants. Clerical workers either come within the general scheme or in the special Private Employees' Insurance Scheme. The scheme is organized under a Commission of employers and employees, the administration being in the hands of a small committee under a president appointed by the Government. Contributions, amounting to 6% of the wages or salary, are shared equally between employer and employee. Half the administrative expenses of the fund are paid by the State. In addition to the sums paid out to widows and orphans through the organization, the State also pays a further annual subsidy up to 500 *fr. lux.* to a widow and 120 *fr. lux.* to an orphan.

The following table summarizes the operation of Old Age and Invalidity Insurance in 1938 :

<i>Old Age Pensions</i>		<i>Invalidity Pensions</i>	
Applications	255	Applications	1,285
Rejections	69	Rejections	227
Annual pensions allocated	602,769 <i>fr. lux.</i>	Annual pensions allocated	3,276,794 <i>fr. lux.</i>

Source : *Aperçu Statistique*, 1940, pp. 87-8 (Luxembourg, 1940).

BIBLIOGRAPHICAL NOTE

Most of the statistical information contained in this chapter was obtained either from the *Aperçu Statistique* (Luxembourg, annually), or from the *Annual Epidemiological Report* for the year 1938, published by the Health Organization of the League of Nations (Geneva, 1941). A section in the *Annuaire Officiel* deals with the organization of health services in the Grand-Duchy.

Chapter VIII

THE GROWTH AND DISTRIBUTION OF POPULATION

General Features: Distribution of Population: The Growth of Population: Urban Population: Rural Settlement: Foreign Population: Bibliographical Note

GENERAL FEATURES

The population of Luxembourg according to the census of 31 December, 1935, was 296,913, and was officially estimated at the end of 1938 to be 301,367; the latter gives an average density for the whole country of 116 per sq. km., or just over 300 per sq. mile. The following table shows how this compares with neighbouring countries:

Estimates of Population, 31 December 1938

Country	Population (thousands)	Area (1,000 sq. km.)	Density (per sq. km.)	Density (per sq. mile)
France	41,980	551	76	197
United Kingdom	47,600	244	195	505
Germany*	67,500	470	144	373
Netherlands	8,727	33	264	684
Belgium	8,387	31	275	712
Luxembourg	301	2.6	116	300

* 1937 frontiers (i.e. including the Saar territory); the date of the estimate is June 1938.

Source: *Statistical Year-book of the League of Nations*, 1938-39, p. 18 (Geneva, 1939) and *ibid.*, 1939-40, p. 17 (Geneva, 1940).

The average density for the Grand-Duchy, though somewhat low, is nevertheless intermediate between the high figures for Belgium and the Netherlands and the low figure for France, though of course the vastly greater area of the latter must be borne in mind.

This is largely accounted for by the fact that the country is still largely agricultural in character, and the farming, moreover, is seldom intensive.

Occupational censuses have been made for the Grand-Duchy on two occasions, in 1907 and in 1935. Certain significant changes are revealed in a comparison of the two. The total population directly or indirectly dependent upon agriculture in 1907 was 89,576 (35.9% of the total population), but in 1935 the same category had fallen to 61,052 (26% of the total). This decline is emphasized by the fact that the total population rose some 18% in the same period. The industrial population, on the other hand, rose both absolutely and proportionally from 104,271 (41.7%) in 1907 to 128,156 (43.2%) in 1935 (see p. 203). It must be remembered, however, that the distinction between an urban industrial population and a rural agricultural population is now far from being a sharp one, and occupational groupings cannot be regarded as clear-cut categories. Many industrial workmen cultivate small plots of land with the aid of their families. However, it is abundantly clear that the balance between agricultural and industrial employment has been changing, to the advantage of the industrial element.

These figures refer to the population as a whole, including not only 'effective workers,' but also their dependants. The 'effective workers' include all those who are employed, either directly for a wage or as members of a family working for an enterprise run by the head of the household. According to the occupational census of 1935, some 45% of the total population was classified as 'effective workers,' as shown in the following table :

Category	Total	% of total population
Gainfully employed workers	107,639	36.2
Members of families working for head of household	27,208	9.2
Members of families not gainfully employed	144,220	48.6
Unemployed and without profession	17,846	6.0
Total	296,913	100

Source : *Résultats du Recensement de la Population* (1935), Vol. III, p.3, (Luxembourg, 1940).

The occupational distribution of the 'effective workers' was as follows :

Category	Male	Female	Total
Agriculture	24,216	16,550	40,766
Industry	47,451	4,288	51,739
Commerce & Transport	17,594	7,876	25,470
Public Services	6,795	3,944	10,739
Domestic Service	265	5,868	6,133
Total	96,321	38,526	134,847

Source : *Résultats du Recensement de la Population* (1935), Vol. III, p. 7 (Luxembourg, 1940).

DISTRIBUTION OF POPULATION

The average figure of 300 people per square mile for the whole of Luxembourg is misleading, for the density of population varies considerably between the various cantons, as shown in the table on p. 139, which gives the official estimates of the habitually resident population* for 31 December 1938.†

The detailed distribution of population by communes for 1935 is shown on Fig. 26, and listed in the tables on pp. 92-4.

The contrasts exhibited between the Ardenne and Bon Pays as regards physical conditions and economic prosperity are reflected

* The population statistics of Luxembourg are stated in three distinct ways : (1) *population de fait ou présente*, that is, the people actually present on the night of 31 December—1 January ; (2) *population de résidence habituelle*, that is, the people permanently domiciled, temporary absence or presence not being included ; (3) *population politique ou légalement domiciliée*, that is, an assessment of numbers for electoral purposes. The three figures differ slightly ; in 1935, they totalled 296,913, 296,776 and 297,328 respectively. Unless otherwise stated, the 'habitually resident' population figures are used ; these returns, however, do not exist prior to 1922, as they were instituted for the purposes of the Customs Union with Belgium.

† Summary population figures for cantons only are available for 1938 ; these have been computed by the *Office de Statistique* from the census returns of 1935, together with the subsequent annual returns of births, deaths, and the balance between immigration and emigration. All other detailed population figures are available only for 1935 from the *Résultats du Recensement de la Population* (Luxembourg, 1938).

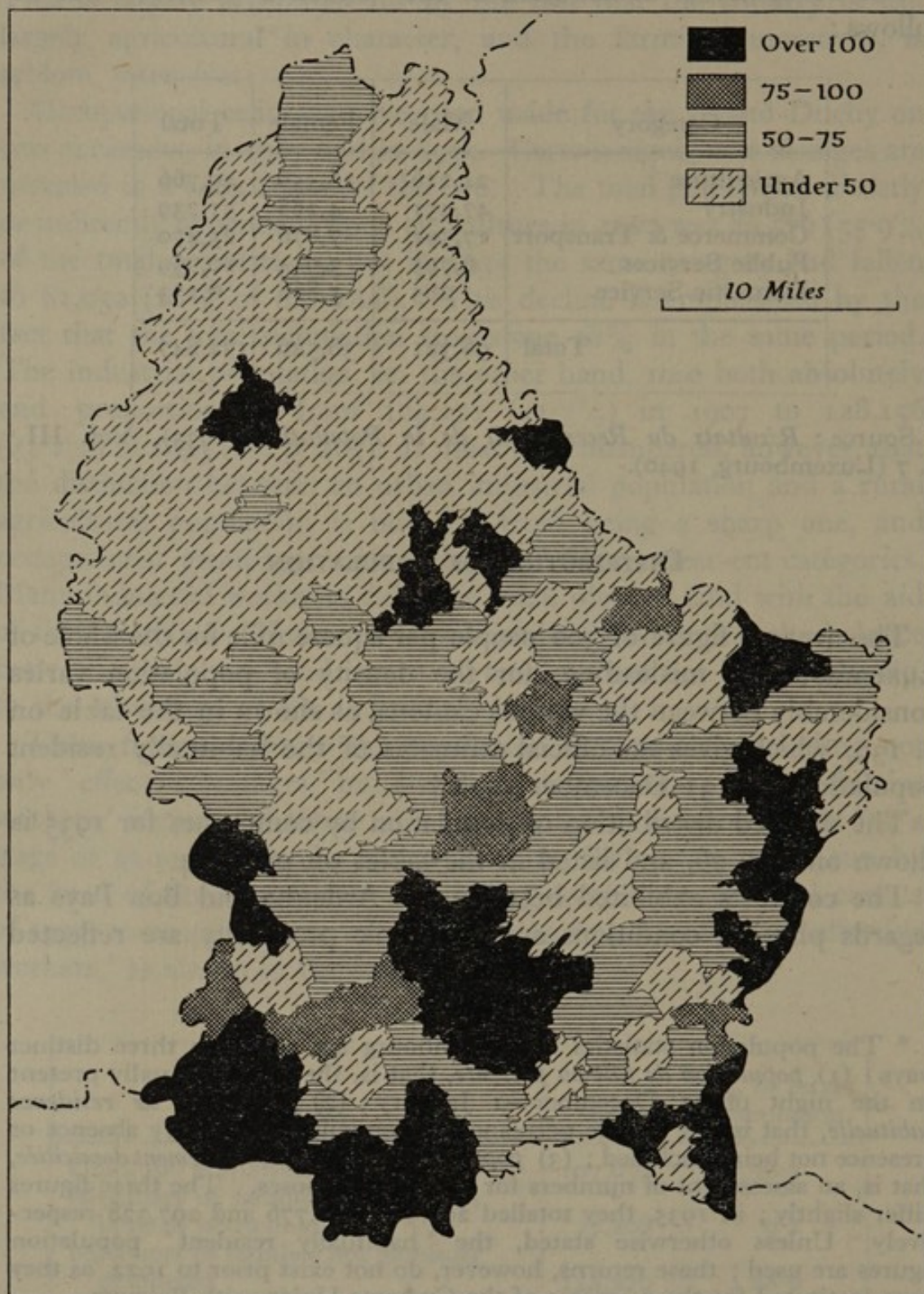


Fig. 26. Distribution of population by communes, 1935

Based on statistics from the *Résultats du Recensement de la Population, 1935* (Luxembourg, 1937.)

The figures refer to the number of people per square kilometre, by communes.

Canton	Area in sq. km.	Total population	Per sq. mile	Per sq. km.
Capellen	199.20	16,720	84	32
Clervaux	302.34	13,224	44	17
Diekirch	239.37	17,774	74	29
Echternach	185.54	11,040	60	23
Esch-sur-Alzette	242.77	100,476	414	160
Grevenmacher	211.37	15,147	72	28
Luxembourg-Campagne	187.17	14,795	80	31
Luxembourg-Ville	51.29	60,980	1,189	459
Mersch	223.90	12,672	57	22
Redange	267.14	11,853	44	17
Remich	127.87	10,664	83	32
Vianden	54.08	2,669	49	19
Wiltz	294.32	13,353	47	18
Grand-Duchy	2,586.36	301,376	300	116

Source : *Aperçu Statistique*, 1940, p. 7 (Luxembourg, 1940).

in the distribution of population. The Ardenne, forming nearly one-third of the country, supports only 14% of the inhabitants, with an average density of 122 per sq. mile, while the Bon Pays with over 85% of the population shows a density of 381 per sq. mile. Of course, the latter figures are mainly due to the fact that the Bon Pays division includes both the capital and the industrial district. The following table summarizes population statistics for 1935 for the two areas :

Region	Area in sq. km.	Population	Per sq. km.	Per sq. mile
Ardenne	828.24	38,847	47	122
Bon Pays	1,758.12	258,066	147	381
Grand-Duchy	2,586.36	296,913	116	301

Source : Based on *Aperçu Statistique*, p. 1, 1940 (Luxembourg, 1940). These figures are of 'population de fait ou présente.'

Even though the Bon Pays includes both the capital and the industrial region, the density of population in the primarily rural cantons of the Bon Pays is substantially greater than in the primarily rural cantons of the Ardenne, as shown in the following table :

Density of Population in Rural Cantons

Ardenne			Bon Pays		
Canton	Per sq. km.	Per sq. mile	Canton	Per sq. km.	Per sq. mile
Clervaux	45	117	Capellen	83	215
Wiltz	45	117	Mersch	57	148
Vianden	52	135	Echternach	61	158
			Remich	84	218
			Grevenmacher	71	184

Source : Calculated from statistics in *Résultats du Recensement de la Population* (1935) (Luxembourg, 1938).

THE GROWTH OF POPULATION

There are no reliable census figures of the population of Luxembourg prior to 1861. In the seventy-four years between that date and the last census in 1935, the population showed an increase of over 50%. If, however, the total of Luxembourgers only is considered, it will be seen that the increase was by no means so striking ; in fact, the first two decades after 1875 showed a small decrease, largely due to emigration to neighbouring countries. The total increase has been due to the foreign elements in the population ; their numbers increased tenfold between 1875 and 1930, although they declined considerably after that date owing to the general economic depression. The growth of total population is shown in the following table :

	Luxembourgers	Foreigners	Total
1861	—	—	196,492
1871	—	—	197,528
1875	199,263	5,895	205,158
1880	197,027	12,543	209,570
1885	197,134	16,149	213,283
1890	193,098	17,990	211,088
1895	197,557	20,026	217,583
1900	206,596	28,998	235,594
1905	214,116	32,339	246,455
1910	220,168	39,723	259,891
1922	227,331	33,436	260,767
1927	237,191	48,333	285,524
1930	244,162	55,831	299,993
1935	258,544	38,369	296,913

NOTE.—This table is given in terms of 'population de fait ou présente' up to 1922, as the figure for the 'population de résidence habituelle' is available only after 1922.

Source : *Aperçu Statistique* for successive years (Luxembourg, annually).

By 1935, the total 'présente' population of the Grand-Duchy was made up as follows:

Males	149,429
Females	147,484
	<hr/>
Total	296,913

That is to say, for every 1,000 males there were 987 females; in Belgium, on the other hand, in 1938 there were 1,025 females for every 1,000 males.

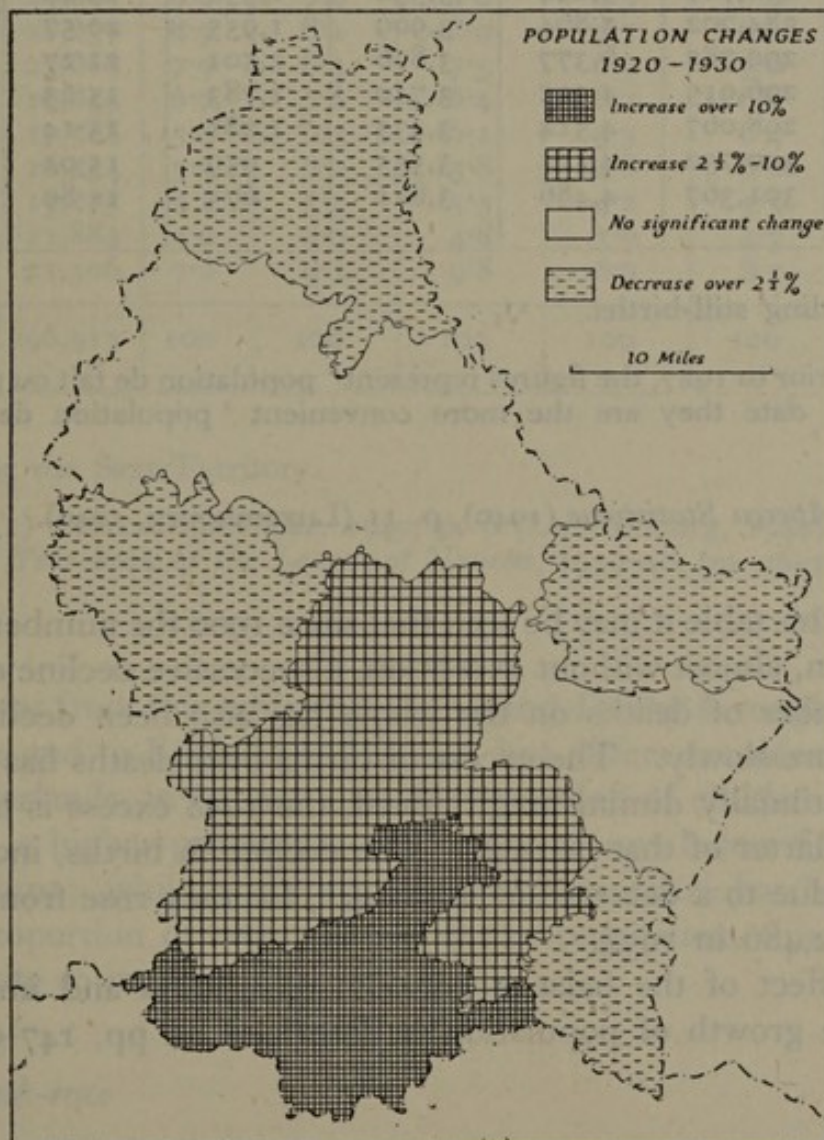


Fig. 27. Population changes by cantons, 1920-30

Based on statistics from the *Résultats du Recensement de la Population, 1935* (Luxembourg, 1937.)

The Balance of Births and Deaths

More detailed figures are available of the movements of the population since 1895, as shown in the following table :

	Popula- tion (31 Dec.)	Live births	Deaths*	Excess of births	Rate per 1,000 inhabitants	
					Births	Deaths
1895	217,583	6,272	4,192	2,080	28.54	19.08
1900	235,594	7,037	5,109	1,928	29.50	21.42
1905	246,455	7,431	4,851	2,580	30.10	19.65
1910	259,891	7,264	4,752	2,512	28.27	18.50
1922	260,767	5,094	3,538	1,556	19.47	13.52
1927	284,702	5,864	3,909	1,955	20.57	13.71
1930	299,782	6,377	3,876	2,501	21.27	12.93
1935	296,913	4,523	3,740	1,783	15.23	12.60
1936	298,067	4,514	3,433	1,081	15.14	11.52
1937	300,732	4,514	3,555	959	15.01	11.82
1938	301,367	4,486	3,811	675	14.89	12.65

* Excluding still-births.

NOTE.—Prior to 1927, the figures represent 'population de fait ou présente' ; from that date they are the more convenient 'population de résidence habituelle'.

Source : *Aperçu Statistique* (1940), p. 11 (Luxembourg, 1940).

From this table it may be seen that since 1900 the number of births has shown, almost without exception, a successive decline each year. The number of deaths on the whole has also been declining, but much more slowly. The excess of births over deaths has therefore been continually diminishing, indeed, the 1938 excess is little more than a quarter of that in 1930. The decline in births, incidentally, was not due to a decrease in marriages, for they rose from 1,813 in 1900 to 2,486 in 1934.

The effect of the balance between emigration and immigration upon the growth of population is described on pp. 147-9.

Age Groups

The age composition of a population is the product of its past and has a vital bearing upon its future. The following table gives the population of Luxembourg in quinquennial age-groups for 1935 ;

the percentage of each group is added for comparison with respective figures for neighbouring countries :

Age Group	Luxembourg (1935)		Belgium (1938)	France (1936)	Netherlands (1937)	England & Wales (1937)	Germany * (1937)
	Total	%					
0-4	22,289	7.5	6.8	8.2	9.5	6.8	8.1
5-9	25,742	8.7	7.5	8.4	9.6	7.2	7.2
10-14	24,892	8.4	7.8	8.6	9.5	7.8	8.0
15-19	20,248	6.9	8.3	5.6	9.2	8.1	7.8
20-24	24,569	8.3	5.5	7.3	8.3	7.9	6.9
25-29	26,886	9.0	7.9	8.0	8.3	8.4	9.1
30-34	26,637	8.9	8.2	8.0	7.7	8.2	8.9
35-39	23,664	7.9	8.3	7.5	6.9	7.6	8.3
40-44	19,859	6.7	7.6	6.4	6.2	6.8	6.9
45-49	17,588	5.9	6.5	6.1	5.3	6.4	6.1
50-54	16,234	5.5	6.0	5.8	4.8	6.0	5.6
55-59	15,115	5.1	5.5	5.5	4.2	5.5	5.0
60-64	11,884	4.0	4.9	4.8	3.6	4.7	4.5
65+	21,306	7.2	9.3	9.8	6.7	8.5	7.6
Total	296,913	100	100	100	100	100	100

* Including the Saar Territory.

Source : (1) *Aperçu Statistique*, 1940, p. 6 (Luxembourg, 1940) ; and (2) *Statistical Year-book of the League of Nations*, 1939-40, pp. 26-30 (Geneva, 1940).

It is clear from this table that the Grand-Duchy is roughly similar to France and to England and Wales, but differs considerably from the Netherlands, in having a small proportion of children. It has, however, a higher proportion in the age groups below fifteen than has Belgium ; while, therefore, like Belgium, there has been a rise in the proportion of older people in the population, this tendency is not quite so marked.

The Death-rate

With improvements in medical science and in hygiene the death-rate in Luxembourg, as in neighbouring countries, has been declining, although there has been a slight increase in recent years. A comparison with conditions in other west European countries is as follows:

Rate per 1,000 Inhabitants

	1911-13	1921-25	1926-30	1931-35	1936	1937	1938
Luxembourg	17.5	13.4	14.2	12.7	11.5	11.9	12.6
Belgium	15.3	13.4	13.7	12.9	12.8	13.1	13.0
France	19.0	17.2	16.8	15.7	15.3	15.0	15.4
Germany *	14.8†	13.3	11.8	11.2	11.8	11.7	11.7
Netherlands	13.1	10.4	9.9	8.9	8.7	8.8	8.5
United Kingdom	14.2	12.4	12.3	12.2	12.3	12.6	11.8

* 1937 frontiers (i.e., including the Saar territory).

† For 1913 only.

Source: *Statistical Yearbook of the League of Nations*, 1939-40, p. 8 (Geneva, 1940).

For a discussion of the various causes of death, see pp. 125-8.

Roughly speaking, Luxembourg has a lower-death rate than Belgium and France, but a considerably higher one than the Netherlands.

The following table analyses the mortality in the Grand-Duchy by age and sex, for the period 1935-6:

<i>Age Group</i>	<i>Male</i>	<i>Female</i>	<i>Age Group</i>	<i>Male</i>	<i>Female</i>	<i>Age Group</i>	<i>Male</i>	<i>Female</i>
0-1	841	630	25-29	41	32	55-59	203	150
1-4	47	43	30-34	36	32	50-64	276	254
5-9	18	14	35-39	52	41	65-69	460	369
10-14	15	15	40-44	66	40	70-74	723	634
15-19	28	22	45-49	105	69	Over 74	1,498	1,338
20-24	32	30	50-54	143	86			

Source: *Statistical Yearbook of the League of Nations*, 1939-40, p. 62 (Geneva, 1940).

The rates are calculated per 10,000 of each age group, except that the rates for infants under 1 year are based on 10,000 living births.

Birth-rate, Fertility and Reproduction Rates

While the death-rate in Luxembourg and other countries has been and can be further reduced, it is clear that this process cannot be continued indefinitely. It is the number and rate of births which are more important factors in deciding the future population.

The Birth-rate. In Luxembourg, as in other countries of western Europe, the birth-rate has fallen steadily during the present century. Only France has a lower birth-rate, as shown in the following table:

Birth-rates, 1911-39 (per 1,000 inhabitants)

	1911-13	1931-25	1926-30	1931-35	1936	1937	1938
Luxembourg	26.8	20.4	21.0	17.0	15.2	15.1	14.9
Belgium	22.7	20.4	18.6	16.8	15.2	15.3	15.6
France	18.1	19.3	18.2	16.5	15.0	14.7	14.6
Germany*	27.0†	22.1	18.4	16.6	19.0	18.8	19.7
Netherlands	28.1	25.7	23.2	21.2	20.2	19.8	20.6
United Kingdom	24.3	20.4	17.2	15.5	15.3	15.3	15.5

* 1937 frontier (i.e., including the Saar territory).

† For 1913 only.

Somewhat surprisingly, perhaps, at first glance, the more rural cantons on the whole exhibit the lowest birth-rates, largely because industry and commerce draw the younger people to the towns of the metallurgical district and to the capital. Thus the largely industrial canton of Esch, which had the highest birth-rate in 1891, was still among the highest in 1936, while Clervaux was the only rural canton in 1936 to retain the relatively high position that it occupied in this respect in 1891. These facts are demonstrated in the following table :

Birth-rate in the Cantons

1891		1936	
<i>Above the national average (29.3) :</i>		<i>Above the national average (15.1) :</i>	
Esch-sur-Alzette	36.8	Luxembourg-Ville	16.7
Clervaux	31.9	Clervaux	16.1
Vianden	31.2	Esch-sur-Alzette	15.7
Luxembourg-Campagne	29.4	Wiltz	15.7
Capellen	29.4		
<i>Below the national average (29.3) :</i>		<i>Below the national average (15.1) :</i>	
Grevenmacher	28.1	Redange	14.5
Luxembourg-Ville	27.8	Grevenmacher	14.1
Wiltz	26.8	Diekirch	13.9
Diekirch	26.5	Vianden	13.9
Redange	26.4	Mersch	13.9
Mersch	26.3	Luxembourg-Campagne	13.4
Echternach	26.2	Echternach	12.9
Remich	24.6	Capellen	12.5
		Remich	10.8

Source : League of Nations : Monograph No. 24, *Luxembourg* (European Conference on Rural Life, Geneva, August 1939).

The fact that the rural districts of the country have declined so considerably in population and therefore to a large extent have ceased to serve as a storehouse of vitality to the community, is becoming a matter of apprehension to those concerned in the future welfare of the Grand-Duchy.

Fertility and Gross Reproduction Rate. The crude birth-rate merely expresses the number of births per thousand of the total population, and provides only a very rough idea of the trend of population growth. Neither this rate nor the balance between it and the death-rate is a true measure of the capacity of a population for further increase. This capacity depends upon its fertility and its mortality in the various age-groups. The 'total fertility' of the population is a figure obtained by calculating the number of children born in every year to every thousand women up to the age of 50, assuming that no women died before reaching that age and that the current fertility of women at different ages remained unchanged. The total fertility of the Luxembourg people has shown a marked decline in the last twenty years, especially since 1921-3, when it was higher than for any other west European country. The following table compares the annual rates with those of other countries as follows :

Luxembourg	(1921-3)	2,694
"	(1930-2)	2,396
"	(1935-6)	1,841
Belgium	(1939)	2,097
France	(1935)	2,045
"	(1936)	2,045
Germany	(1934)	2,032
"	(1936)	2,212
England and Wales	(1931)	1,920
Netherlands	(1936)	2,591
"	(1937)	2,543
"	(1938)	2,633
"	(1939)	2,641

Source : *Statistical Yearbook of the League of Nations*, 1940-41, pp. 46-7 (Geneva, 1941).

The figure for Luxembourg means that according to fertility rates in 1935-6, a thousand women would give birth each year to 1,841 children, assuming that none of the women die before they are fifty years old, and that current rates of fertility at all ages remained unchanged. But as this total fertility figure includes both boys and girls, it is not a measure of the extent to which the population is equipping itself for further reproduction. This is expressed by reducing the figures of total fertility in the same proportion as the

ratio between females born and total births ; the result is called the 'gross reproduction rate,' and is usually expressed not per thousand but per unit. The gross reproduction rate for Luxembourg in 1921-3 was 1.304, in 1930-2 it was 1.156, and in 1935-6 it was 0.889. The last figure means that the average number of girls (potential mothers) born to 1,000 women during their reproductive period, always assuming that no woman dies before she is fifty years old, is only 889, and that therefore the current population is not replacing itself. The following table compares this figure with those of neighbouring countries :

<i>Gross Reproduction Rate</i>		
Luxembourg	(1935-6)	0.889
Belgium	(1939)	1.025
England & Wales	(1931)	0.937
France	(1936)	1.004
Germany	(1936)	1.072
Netherlands	(1937)	1.236

Source : *Statistical Yearbook of the League of Nations*, 1938-9, pp. 60-1, (Geneva, 1939).

It will be seen that Luxembourg compares unfavourably with the other countries. In fact, only Austria (1933-4), Norway (1936), Sweden (1936), and Switzerland (1938) had rates lower in Europe than that of the Grand-Duchy.

A further adjustment is usually made to allow for the proportion of women who will not attain the age of fifty ; that is, to convert the gross reproduction rate into a 'net reproduction rate.' Unfortunately, such figures are not available for Luxembourg. However, by analogy with neighbouring countries it is likely that the net reproduction rate will be approximately 0.750, that is, every thousand women are being replaced by only 750, and the present population is not replacing itself. In this, Luxembourg is by no means alone in Europe. While this figure is merely an indication of the general trend, and may be upset by migration or by changes in the rates of fertility and mortality, it seems that a marked decline in the population of Luxembourg is imminent.

Emigration

The growth of the population of a country is materially affected by the balance between the emigration of a number of the native population and the immigration of foreigners. The small size of the country provides very restricted scope for careers, and the comparatively difficult conditions prevailing in the Ardenne have

prompted many Luxembourgers in the past to find a livelihood abroad. Many went into the neighbouring countries, others overseas. The following table summarizes the number of Luxembourgers resident in other countries at the time of their most recent censuses :

Country	Date of census	Number of Luxembourgers
France	1931	21,286
Belgium	1930	9,587
U.S.A.	1930	9,048
Germany	1933	2,410
Saar	1935	421
Switzerland	1930	333
Belgian Congo	1930	222
Netherlands	1930	169
Italy	1931	78

Source : *Aperçu Statistique*, 1940, p. 9 (Luxembourg, 1940).

In the first decade of this century, large numbers ventured overseas, chiefly to the New World. The latter settled in the great cities of New York and Chicago, or worked in the mines of Pittsburgh. A few were attracted to the Belgian Congo, mainly as engineers and mine-workers, the object in most cases being to return after a period of years to the homeland. This stream of overseas emigration has steadily diminished, as shown in the following table :

Average Annual Overseas Emigration from Luxembourg

Period	No. of Emigrants
1904-09	702
1909-13	613
1920-25	295
1925-30	129
1930-35	26
1935-38	44

Source : *Aperçu Statistique*, 1940, p. 7 (Luxembourg, 1940).

Large numbers of Luxembourgers have continued to seek their fortune in the neighbouring countries, above all in France and Belgium, where there has been scope for industrial labour, in particular during the period between the two wars. In 1931, the French census included no fewer than 21,286 Luxembourgers, the

majority of whom were domiciled in two areas : (a) Paris and its environs, and (b) the industrial districts of Lorraine, the returns according to the *départements* being as follows :

<i>Luxembourgers</i>	
Seine (Paris and Suburbs)	5,196
Moselle	8,895
Meurthe-et-Moselle	2,215

Source : *Aperçu Statistique*, 1940, p. 9 (Luxembourg, 1940).

The number of Luxembourgers in Belgium has remained remarkably consistent since the late nineteenth century at some 9,000 to 10,000, the majority being found in the provinces of Brabant, Liège and Luxembourg. In 1938, the numbers in the more important provinces were as follows :

<i>Luxembourgers</i>	
Brabant	4,771
Luxembourg	2,839
Liège	1,877
Namur	494
Anvers	478
Hainaut	413

Source : *Aperçu Statistique*, 1940, p. 8 (Luxembourg, 1940).

Statistical details of the part played by emigration and immigration in the growth of the population for a few recent years are as follows :

	Increase		Decrease		Population (31 Dec.)	Change
	Immigration	Births	Emigration	Deaths		
1934	22,226	4,665	21,072	3,535	304,880	—
1936	23,540	4,514	23,446	3,434	298,067	-6,813
1937	26,803	4,514	25,097	3,555	300,732	+2,665
1938	24,108	4,486	24,148	3,811	301,367	+ 635

Source : *Aperçu Statistique*, 1940, p. 7 (Luxembourg, 1940).

The above figures do not include the people who crossed the frontier each day to work, particularly in the neighbourhood of Esch-sur-Alzette. It is evident that in recent years the balance between immigration and emigration has had little influence on the population total.

URBAN POPULATION (Fig. 28)

Until the middle of the last century, or even later, a rural economy provided almost the sole basis of existence in the Grand-Duchy

and the country shared neither in the early town-building movement of Flanders and the Netherlands nor in the municipal tradition of Germany. Even the capital owed its significance largely to its military function as a stronghold, and remained until the beginning of the nineteenth century a small centre of scarcely 8,000 inhabitants. Luxembourg is, therefore, a country lacking a strong tradition of urban life and only in a few places, such as Echternach, can the mediæval pattern of township be recognized.

Urbanization, being a recent process, has had only a limited effect upon the population of the Grand-Duchy. The remarkable growth of towns in the 'minette' zone has occurred since 1870, while in the same period railways have promoted the growth of centres elsewhere, like Ettelbruck, Bettembourg and Wasserbillig. These are important junctions, at which industrial and commercial activity have been fostered. Again, the discovery in 1845 of the thermal springs at Mondorf led to the rise of a popular spa (see p. 329), which, though small, exhibits many of the features associated with a modern town. These and other instances, however, have not occurred on such a scale, except in the industrial area, as to affect the general subordination of the urban by the rural life.

The process of urbanization which has occurred since 1870 is shown by the following table :

Year	Population	Percentage of population	
		Living in places of over 5,000 inhabitants	Living in places of under 5,000 inhabitants
1871	197,328	10.0	90.0
1900	235,954	27.5	72.5
1910	259,819	36.4	63.6
1922	260,676	38.0	62.0
1927	285,524	45.0	55.0
1930	299,782	49.5	50.5
1935	296,913	47.6	52.4

Source : League of Nations, Monograph No. 24, *Luxembourg* (European Conference on Rural Life, Geneva, August, 1939).

This table is given in terms of 'population de fait ou présente.'

It will be noted that the latest figures indicate a small reversal of the process, but this can only be regarded as temporary, for it resulted from the severe economic depression of the early 'thirties and was largely caused by the repatriation of foreign industrial workers. Thus the population of the town of Esch-sur-Alzette

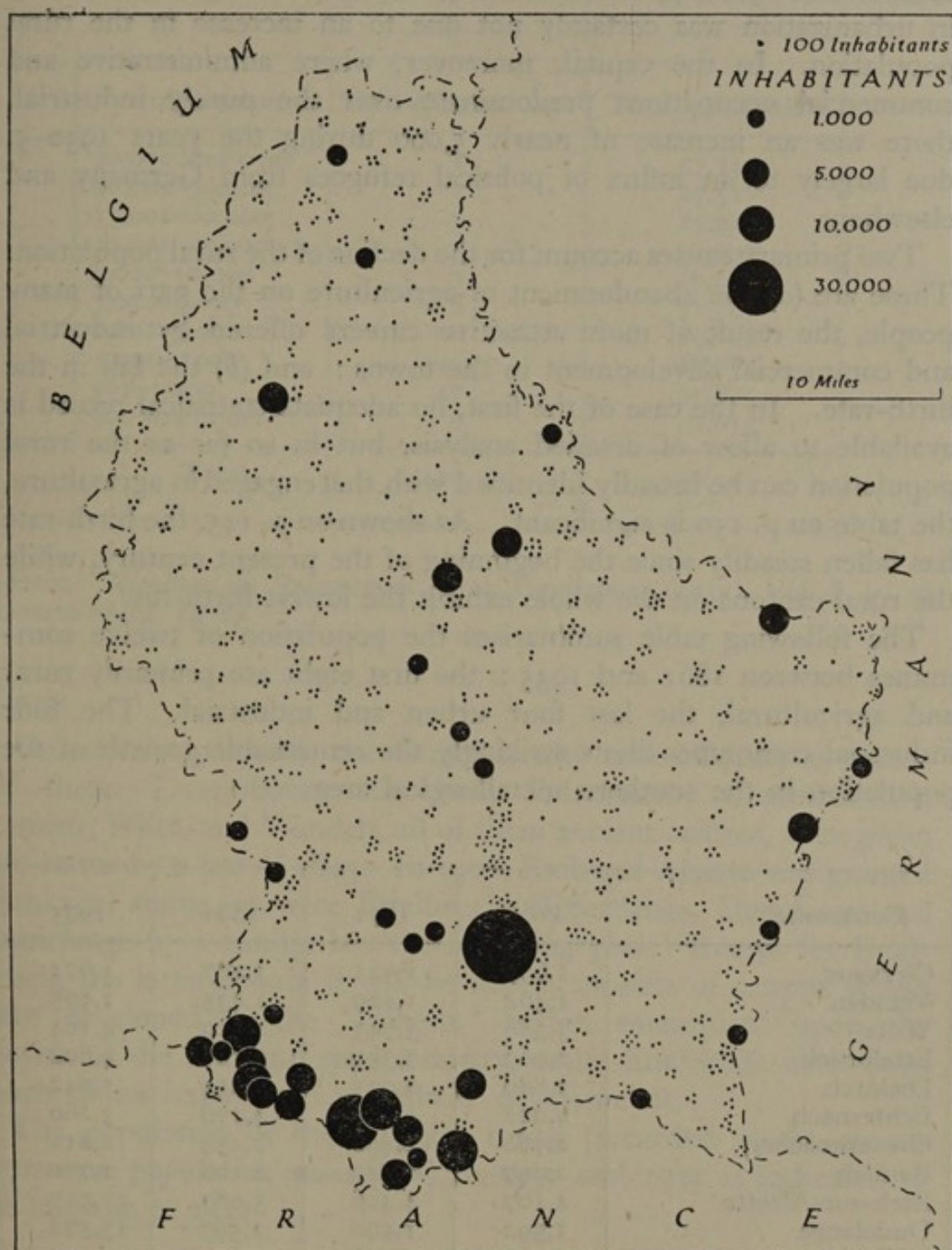


Fig. 28. Distribution of population, 1935, showing towns, villages and inhabited places

Based on statistics from the *Résultats du Recensement de la Population, 1935* (Luxembourg, 1937.)

fell from 29,429 in 1930 to 27,517 in 1935, while that of the canton of Esch fell by 6,244 in the same period. This slight diminution in urbanization was certainly not due to an increase in the rural population. In the capital, moreover, where administrative and commercial occupations predominate over the purely industrial, there was an increase of nearly 5,000 during the years 1930-5, due largely to an influx of political refugees from Germany and elsewhere.

Two primary causes account for the decline of the rural population. These are (a) the abandonment of agriculture on the part of many people, the result of more attractive careers offered by industrial and commercial development in the towns; and (b) the fall in the birth-rate. In the case of the first, no adequate statistical record is available to allow of detailed analysis, but in so far as the rural population can be broadly identified with that engaged in agriculture, the table on p. 150 is significant. As shown on p. 145, the birth-rate has fallen steadily since the beginning of the present century, while the rural cantons on the whole exhibit the lowest birth-rate.

The following table summarises the population of twelve communes between 1861 and 1935; the first eight are primarily rural and agricultural, the last four urban and industrial. The four industrial communes show strikingly the remarkable growth of the population in the southern metallurgical area.

Commune	1861	1871	1881	1935
Clervaux	1,697	1,521	1,497	1,671
Vianden	1,462	1,429	1,435	1,195
Wiltz	3,388	3,743	4,020	4,184
Ettelbruck	2,969	3,359	3,789	4,606
Diekirch	2,880	2,931	3,254	3,842
Echternach	4,022	3,385	4,179	3,280
Grevenmacher	2,780	2,498	2,454	2,811
Remich	2,297	2,212	2,208	1,770
Esch-sur-Alzette	2,107	4,406	5,087	27,517
Dudelange	1,592	1,590	1,593	13,572
Differdange	2,065	2,076	2,624	15,945
Pétange	1,041	1,269	2,619	10,525

Source : Based on statistics obtained from the *Office de Statistique*, Luxembourg.

At the time of the 1935 census, only eight of the 126 communes* had populations exceeding 5,000, as shown in the following table :

Size of Commune	No. of Communes	Total population
30,000 and over	1	57,740
20,001-30,000	1	27,517
15,001-20,000	1	15,945
10,001-15,000	2	24,097
5,001-10,000	3	16,017
3,001-5,000	8	31,197
2,001-3,000	8	19,167
1,001-2,000	49	66,763
501-1,000	47	35,855
500 and under	6	2,615
Total	126	296,913

Source : *Résultats du Recensement de la Population* (1935), Vol. I, p. 16 (Luxembourg, 1938).

Towns

Only twelve places in the Grand-Duchy rank officially as towns. Of these, Luxembourg, Diekirch, Echternach, Grevenmacher, Remich, Wiltz, and Vianden, all of them ancient centres, were given this status by a law of 1843. In 1906, Esch-sur-Alzette was granted municipal status, as were Ettelbruck, Differdange, Dudelange and Rumelange by a similar law the following year. Except for Ettelbruck, the latter group, it will be noted, consists of centres which have developed in the 'minette' region consequent upon the growth of the iron and steel industry, while Ettelbruck itself owes much of its importance to railway development.

The population of these twelve towns (recorded in the census returns as *population municipale*) in 1930 and 1935 is indicated in the table on p. 154.

* The five communes of Luxembourg-Ville are usually grouped together for administrative purposes.

Town	1930	1935
Luxembourg	53,791	57,740
Esch-sur-Alzette	29,429	27,517
Dudelange	13,782	12,814
Differdange	9,197	8,111
Rumelange	5,209	4,198
Ettelbruck	4,221	4,322
Diekirch	3,820	3,798
Echternach	2,889	3,066
Grevenmacher	2,753	2,738
Remich	1,783	1,770
Wiltz*	1,526	3,594
Vianden	1,086	1,111

Source : *Résultats du Recensement de la Population* (1930, 1935) (Luxembourg 1932, 1938).

* The marked increase is due to the inclusion of Niederwiltz in the *population municipale* for 1935.

These towns are described in detail in Appendix III, pp. 18-32.

It should be noted that, in addition to these twelve places with the official status of a town, there are a number of 'urban agglomerations,' some of a size exceeding several of the 'towns.' In all, another twenty-five localities have populations exceeding a thousand, and nine exceed two thousand. The last category comprises the following :

Town	1930	1935
Pétange	5,493	5,496
Schifflange	5,394	5,312
Bettembourg	4,759	4,584
Rodange	4,356	3,975
Niederkorn	3,902	3,682
Oberkorn	3,475	3,583
Kayl	3,113	2,985
Belvaux	2,778	2,818
Tétange	2,430	2,688

Source : *Résultats du Recensement de la Population* (1930, 1935) (Luxembourg, 1932, 1938).

RURAL SETTLEMENT

An important element in the landscape of a region is the way in which people have come to live in it—whether in large villages or in hamlets

or in scattered dwellings. Rural settlement may take the form either of agglomeration, that is, the clustering of houses into compact nucleated villages, or of *dispersion*, the scattering of houses over the countryside.

The form of settlement primarily found in both the Ardenne and the Bon Pays is agglomerated (Fig. 29). The characteristic unit is the large compact village, though the hamlet is also common, but the dispersed population is generally negligible in quantity. As a rule, the villages support upwards of 400 inhabitants, in some cases more

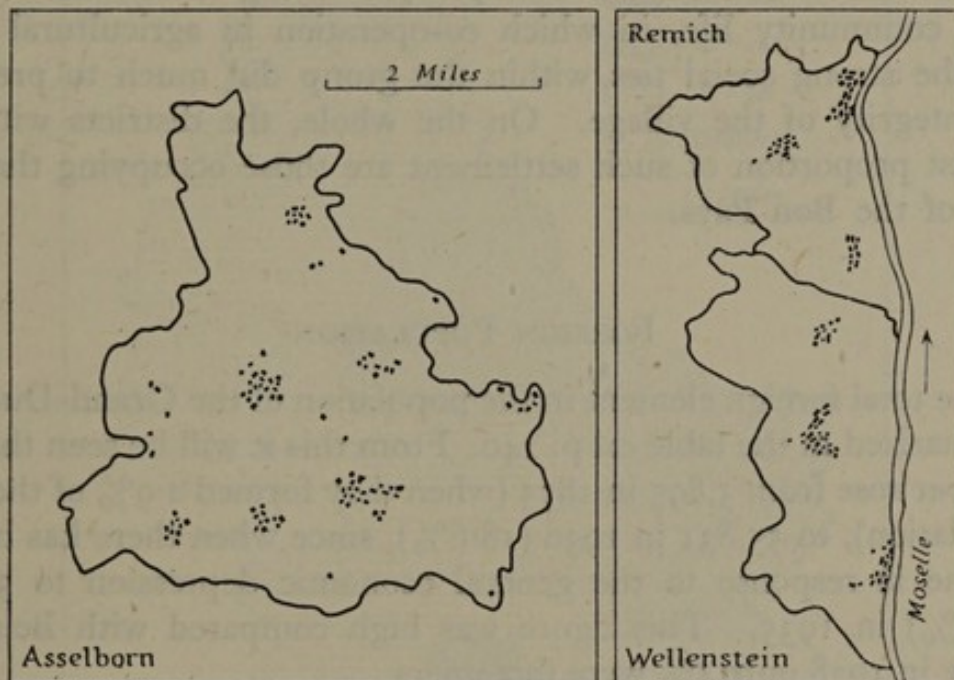


Fig. 29. The concentration of settlement in rural communes

Based on various sheets of the 1 : 50,000 *Carte topographique du Grand-Duché de Luxembourg*, edited by J. Hansen (latest edition, 1928-34.)

These examples show that in both the Ardenne and in the Bon Pays the typical rural settlement within a commune consists of one or more compact villages, with an extremely small proportion of dispersed dwellings.

than 1,000, while the hamlets contain from 200 to 500 people. The great majority of these communities consist of peasants who, if somewhat conservative, are nevertheless skilful farmers, taking a deep pride in their land.

The dispersed population, if taken to include groups of less than twenty persons, constitutes about 1.2% of the total. This small fraction is not uniformly distributed, but varies from one district to another and frequently from one commune to another, though on the whole it is greatest in the east-central parts (notably the cantons

of Echternach and Mersch) and in the north. The maximum of 4.7 % is found in the canton of Echternach (where the communes of Consdorf and Berdorf exhibit a noticeable dispersion). On the other hand, some of the cantons which border the Moselle, such as Remerschen and Wellenstein in the south-east, are entirely without dispersed settlement, while isolated cases of the same kind occur in other parts. The dispersed population is often made up of the occupants of such scattered units as a château, a mill on the bank of a stream, or the houses attached to a railway halt. To some extent dispersion is a modern tendency representing a break from the older community life, in which co-operation in agricultural work and the strong social ties within the group did much to preserve the integrity of the village. On the whole, the districts with the highest proportion of such settlement are those occupying the best land of the Bon Pays.

FOREIGN POPULATION

The total foreign element in the population of the Grand-Duchy is summarized in the table on p. 140. From this it will be seen that the number rose from 5,895 in 1875 (when they formed 2.9% of the total population), to 55,831 in 1930 (18.6%), since when there has been a decline in response to the general economic depression to 38,369 (12.9%) in 1935. This figure was high compared with Belgium, where in 1938 only 4% were foreigners.

The increase of the foreign population in the Grand-Duchy prior to 1930 was due in the main to the inadequacy of indigenous labour to supply the rapidly expanding metallurgical industry. First, in the 'eighties of last century, came Germans, then from 1892 onwards contingents of Italians, followed later by considerable numbers from France, Belgium and other countries. As the number of foreigners grew—nearly 10,000 by 1900 and over 12,000 by 1913 in the canton of Esch alone—so the population of the industrial district became highly cosmopolitan. According to the census of 1926, one person out of every four in the canton of Esch was a foreigner, compared with one out of every fifteen in the rest of the country. By nationality, the Italians and Germans formed the two largest foreign elements, though they presented marked contrasts as to employment, character and social existence. Invariably the Italians were extremely poor and worked largely as miners and as unskilled or semi-skilled labourers. They knew no language but their own and had

little dealings with the Luxembourg people or with other nationals. Like Italian emigrés in other regions, they were content to live humbly in order to save, and their aim was eventually to return home. They lived in their own colonies, such as the La Frontière quarter of Esch-sur-Alzette and the district known as L'Italie at Dudelange, pursuing as far as possible the mode of life of their native land. The

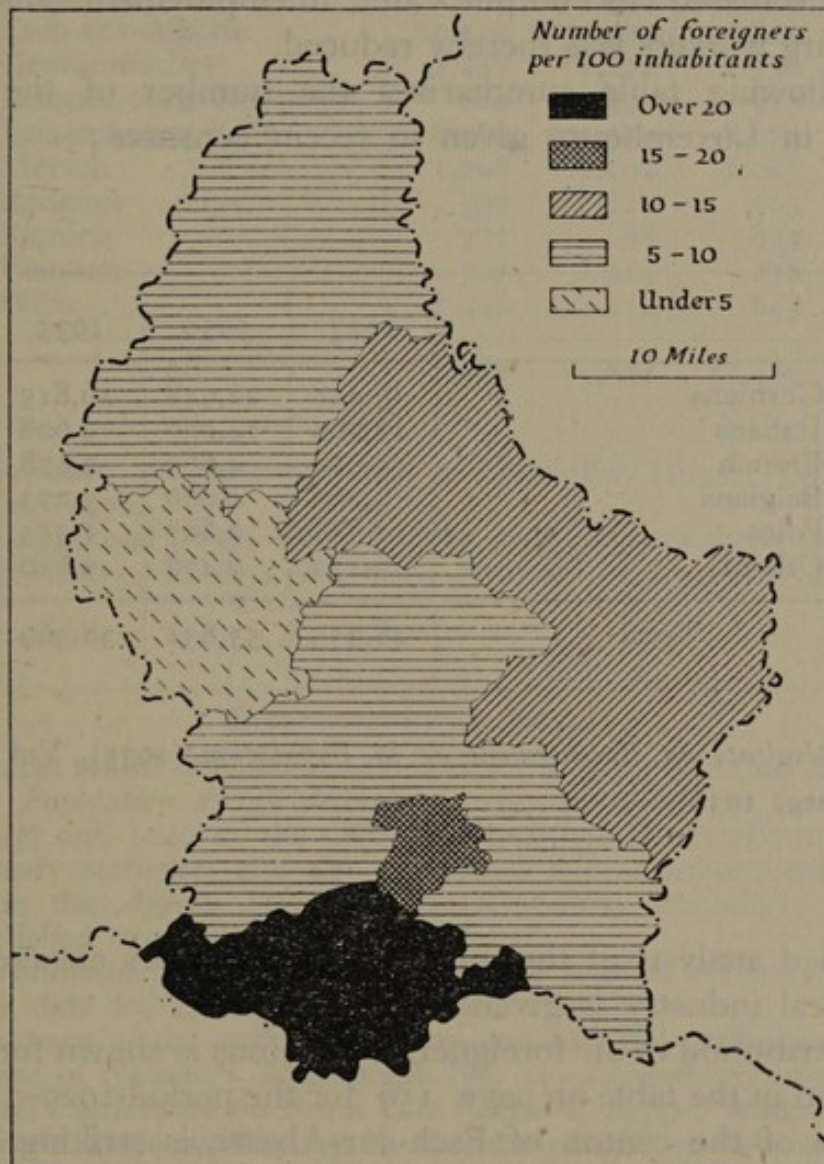


Fig. 30. Distribution of foreign population by cantons, 1935

Based on statistics from the *Résultats du Recensement de la Population, 1935* (Luxembourg, 1937.)

The concentration in the iron and steel area is striking.

Germans, on the other hand, served generally as skilled workers and technicians. Owing to the similarity of their language to the Luxembourg dialect (see p. 43), and to a kindred mode of life, their acceptance into the community was facilitated. Many found

permanent careers in industry and some became naturalized subjects of the Grand-Duchy.

The peak number of foreigners in Luxembourg was reached in 1929-30, the most prosperous years for industry. The decline between 1930 and 1935 was due to the economic depression. Much of the foreign labour was gradually withdrawn as the iron and steel industry decreased its output, and unemployment among the Luxembourg workers was thereby reduced.

The following table summarizes the number of the various foreigners in Luxembourg given in recent censuses :

	1927	1930	1935
Germans	19,428	22,948	16,815
Italians	12,704	14,050	9,628
French	4,919	4,669	3,478
Belgians	4,266	4,080	3,273
Poles	1,886	2,607	1,555
Others	5,130	7,477	3,620
Total	48,333	55,831	38,369

Source : *Résultats du Recensement de la Population* (1935), Vol. I, p. 76 (Luxembourg, 1938).

A detailed analysis of the numbers of foreigners engaged in the metallurgical industry is given on pp. 217-18.

The distribution of all foreigners by cantons is shown for 1935 on Fig. 30, and in the table on page 159 for the period 1927-35. The dominance of the canton of Esch-sur-Alzette is striking, while in 1935 over 8,000 foreigners, more than half of whom were Germans, lived in the capital.

During recent years a number of Germans sought refuge in Luxembourg. No estimates have been made, however, of the probable numbers, and it is likely that many of them passed through the Grand-Duchy into Belgium and France. After the Saar plebiscite of 1935, many people who had voted either for the *status quo* or for France left the territory ; it is estimated that 184 families went into Luxembourg.

Foreigners in Luxembourg

Canton	1927	1930	1935
Capellen	1,007	1,111	946
Clervaux	1,158	1,123	1,040
Diekirch	1,742	2,004	1,474
Echternach	1,153	1,266	1,119
Esch-sur-Alzette	29,114	34,094	19,810
Grevenmacher	1,442	1,772	1,330
Luxembourg-Campagne	610	974	915
Luxembourg-Ville	8,268	9,370	8,174
Mersch	1,098	1,194	1,043
Redange	597	629	563
Remich	777	868	832
Vianden	301	314	278
Wiltz	1,048	112	845
Total	48,333	55,831	38,369

Source : *Résultats du Recensement de la Population* (1935), Vol. I, p. 75 (Luxembourg, 1938).

Note : In 1927 and 1930, the numbers of foreigners were returned as *population présente* ; in 1935 they were returned as *population de résidence habituelle*.

BIBLIOGRAPHICAL NOTE

1. The most recent detailed census is that for 1935, *Résultats du Recensement de la Population du 31 décembre, 1935*, published in four volumes between 1937 and 1940 by the *Office de Statistique* (Luxembourg).

2. Summary statistics, and also calculated figures subsequent to 1935, are given in the *Aperçu Statistique* (Luxembourg, annually) ; the most recent, published in 1940, refers to 1938.

3. The *Statistical Yearbook of the League of Nations* (Geneva) provides comparative data for Luxembourg and other countries.

4. A summary of the rural population and of rural settlement is given in the League of Nations : Monograph No. 24—*Luxembourg*, produced by the European Conference on Rural Life (Geneva, 1939) ; while urban and rural settlement are compared by K. C. Edwards, 'The Relation between Urban and Rural Settlement in the Grand-Duchy of Luxembourg,' in *Comptes Rendus du Congrès Internationale de Géographie* (Amsterdam, 1938), published at Leyden (1938).

5. A detailed study of population changes in the Grand-Duchy is given by K. C. Edwards, *La Répartition de la Population dans le Grand-Duché de Luxembourg en 1861 et en 1930* (*Ligue internationale du Coin de Terre et des Jardins Ouvriers—Congrès Internationale*, Diekirch, 1939), published at Esch-sur-Alzette (1939).

Chapter IX

AGRICULTURE AND FORESTRY

Government Agricultural Organization and Policy : Agricultural Regions : Arable Farming : Viticulture : Rose Cultivation : Livestock : Agricultural Workers and Holdings : Co-operative Methods : Forestry : Bibliographical Note

GOVERNMENT AGRICULTURAL ORGANIZATION AND POLICY

The government department in charge of agriculture is the Office of Agriculture (*Service Agricole*), which has an agricultural engineer (*Ingénieur Agricole*) as director, five subordinate *Conducteurs Agricole* and five *Conducteurs Auxiliares*. There are a number of permanent committees, such as that charged with the supervision of viticulture. One of the chief policies of the *Service Agricole* is to encourage and assist, both by loans and by expert advice, the formation of local syndical associations and co-operatives. It is also in charge of agricultural education and research.

For a number of reasons, the framing of a general policy for agriculture in the Grand-Duchy is a difficult matter. In the first place, there are considerable differences between the Ardenne and the Bon Pays ; conditions of climate, soils and configuration produce significant contrasts in the productivity of the two regions. The relatively low crop yields compared with those of the neighbouring countries give cause for concern, as does the small size and the inordinate dispersal of holdings. The smallness of the country, moreover, provides an inadequate market for some of the crops which by tradition form part of the accepted farming system. But the chief problems arise from the Customs Union with Belgium, a free-trade country in which low tariffs give insufficient protection to Luxembourg agriculture. In contrast to the period 1842-1918, during which the *Zollverein*, by its resolute protectionist policy, provided a wide market, the economic union with Belgium placed the Grand-Duchy in competition with a neighbour whose agriculture served a low-price market. Belgian agriculture even thrived on keen competition from abroad, as in the case of Dutch and Danish dairy products or of North American wheat.

The special position of agriculture in Luxembourg was recognized however at the time of concluding the Union, for Article 13 of the

Convention provided that a portion of the customs receipts should be paid to the Government of the Grand-Duchy in compensation for the lack of tariff protection for bread cereals. A law of 13 May 1926, established the procedure for dividing the sum among farmers in proportion to the amount of land sown with grain. However, while this measure is of real importance, it does not assist agriculture

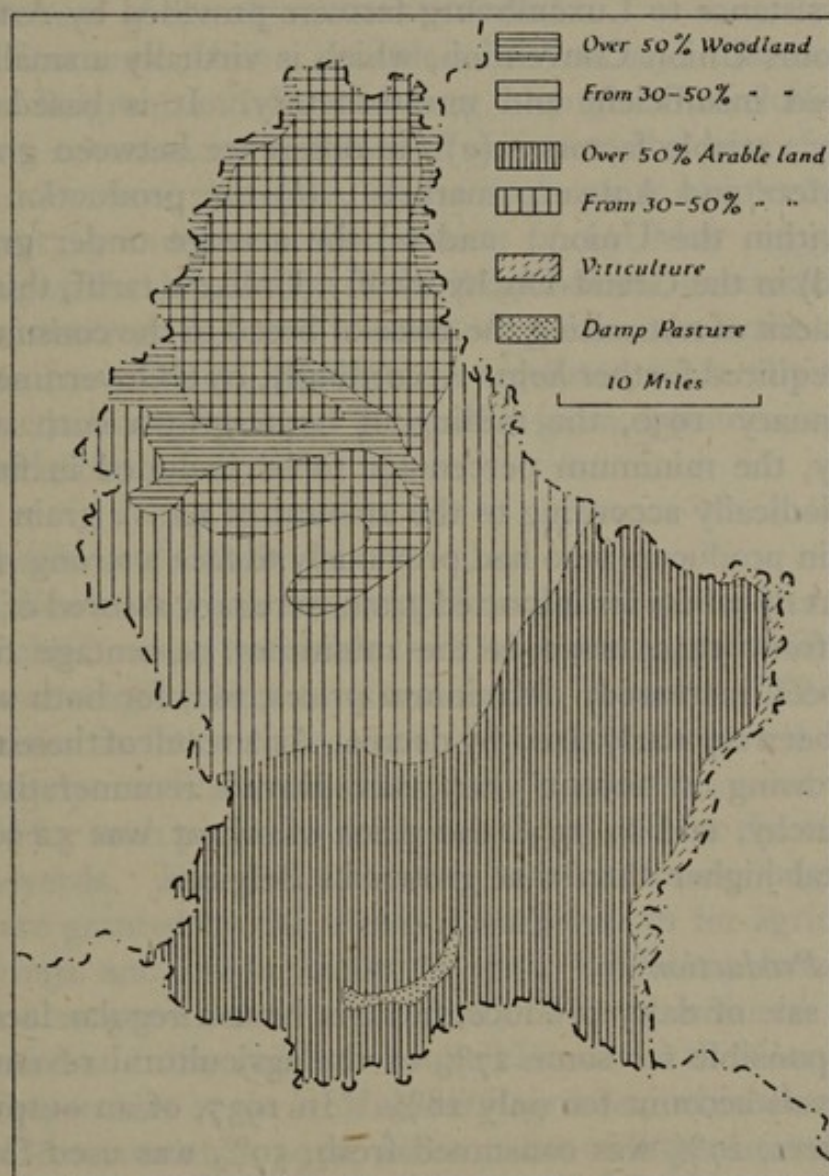


Fig. 31. Broad features of land utilization

Based on the *Atlas des Deutschen Lebensraumes*, sheet 17 (Leipzig, 1939)

as a whole, and in consequence various internal measures have been adopted to supplement it. Since 1930, Government policy has sought to maintain prices at a remunerative level by direct intervention in the market, and this has been attempted through measures of valorization, together with steps taken to promote rationalization

and technical improvement. These may be summarized as (1) measures relating to grain production; (2) measures relating to milk production; (3) protection of the agricultural market; (4) subsidies and credits; and (5) control of production.

(1) *Grain Production*

The assistance to Luxembourg farmers provided by Article 13 of the Customs Union Convention, which is virtually a small subsidy, has proved insufficient and unsatisfactory. It is based on three essentially variable factors: (a) the difference between grain prices on the Metz and Antwerp markets; (b) the production of bread cereals within the Union; and (c) the acreage under grain crops (for bread) in the Grand-Duchy itself. Unlike a tariff, this measure had the merit of not raising the price of bread to the consumer. Yet farmers required further help. Accordingly, by a Government decree of 31 January 1930, the milling of home-grown corn was made obligatory, the minimum percentage to be included in flour being fixed periodically according to the amount of native grain available. Thus grain producers who had previously to face a strong preference on the part of bakers for imported grain were now assured of a market. In fact, from 1930 onwards the minimum percentage figure has steadily been increased. Minimum prices, too, for both wheat and rye have been regularly fixed by decree. As a result of these measures, wheat growing in recent years has proved remunerative in the Grand-Duchy, and in 1938 the price of wheat was 52.90 *fr. lux.* per quintal higher than that grown in Belgium.

(2) *Milk Production*

By the sale of dairy produce, farmers have a regular income, this being responsible for some 27% of the agricultural revenue, while bread cereals account for only 18%. In 1937, of an output of 137 million litres, 27% was consumed fresh, 59% was used for making butter and 14% used for feeding stock. Milk and butter prices are fixed by the Government after taking into account (a) the cost to the producer; (b) the excess amount produced in the country; (c) the consumers' purchasing power; and (d) the relation between the price of milk for manufacturing purposes and that of fresh milk. The cost price is carefully calculated by the Economic and Statistical Service of the Office of Agriculture and used as a basis for fixing minimum selling prices. Since 1935, the milk market has been virtually immune from foreign competition but production exceeds

requirements, the surplus being utilized for butter exports. Producers undertake to finance these exports, for they are essential to the maintenance of internal prices. The Government is therefore not called upon to give assistance and the home market is protected from imported butter.

(3) *Protection of the Agricultural Market*

The Economic Union provided for free and unrestricted trade between Belgium and Luxembourg, though it precluded the pursuit of an autonomous commercial policy on the part of the Grand-Duchy. In view, therefore, of the inadequacy of internal measures to protect agriculture, a Convention of 23 May 1935, following closely upon the devaluation of the Belgian franc, instituted a common basis for the regulation of imports, exports and transit trade, while giving to Luxembourg the right to regulate unilaterally the imports of certain main agricultural products—grain, potatoes, apples, eggs, pigs, pork, cattle and beef.

(4) *Subsidies and Credits*

Subsidies of various kinds and credits at low rates of interest are the chief means by which the Government of the Grand-Duchy compensates agriculture for the absence of tariffs. The numerous co-operative societies of farmers and vine-growers owe their existence very largely to State subsidies, while grants to individuals are awarded for such purposes as corn-growing and for the restoration of old vineyards. For the establishment of societies, long-term loans at 2% are granted by the *Fonds d'améliorations* for agriculture, and the savings and credit banks (*Caisses Raiffeisen*) found in some villages also grant loans (see p. 268). The agricultural associations are advised and directed by a council known as the *Conseil supérieur de la Coopération et de la Mutualité agricoles*, which was instituted by the Government in 1930, and consists of fifteen members chosen from the directors of the co-operative movement.

(5) *Control of Production*

The Government seldom interferes directly with production and concerns itself with the improvement of quality rather than with the limitation of output. Thus, by a regulation dated 1 January 1939, participation in butter-making competitions, with a view to qualifying for the national mark, was made compulsory for all dairies. Support of the co-operative societies has brought further good

results, especially in dairying and viticulture. There is but a single example so far of direct intervention. This concerned the reduction of vineyards, a decree of 15 April 1936 prohibiting the planting of vines on 'fallow or uncultivated land, arable or forage fields, meadows or orchards.'

Technical Progress and Improved Services

Largely as a result of good communications, particularly by means of improved roads and an extension of telephone services, technical progress on the farms made considerable strides after the war of 1914-18. As noted elsewhere (see p. 168), the increased availability of lime and phosphate in the form of basic slag fertilizer has proved an important factor, especially on the poor soils of the Ardenne. Farms are steadily being equipped with machinery, a process which is encouraged by the scarcity of labour, while the larger and medium-sized holdings, instead of borrowing from the agricultural societies, have been buying their own machines. This, however, may be inadvisable, in view of the limited time each year during which they can be put to use.

Water-supply and electricity are two services upon which success in farming and the welfare of rural life in general increasingly depend. There exist in the Grand-Duchy two water-supply syndicates serving the rural areas, one for the north and the other for the south, and by 1940 very few places were without a proper and adequate supply. Similarly, a plan for electrification was completed for the country a year or so earlier. The current is supplied by the metallurgical concerns under a Government contract, the Grand-Ducal Electricity Company (*Compagnie grand-ducale d'électricité du Luxembourg*) being responsible for the distribution, a function which it has performed since 1927. Electricity is now used widely on the farms and contributes much to the well-being of the rural population.

The curriculum of the village schools takes no account of the needs of farming, though continuation classes in many districts devote a few hours each week to agriculture and to viticulture in the areas concerned. The State Agricultural School at Ettelbruck (see p. 107), founded in 1883, provides full technical and cultural courses, and gives specialized instruction. Winter courses are also a useful feature of its work.

AGRICULTURAL REGIONS

The Grand-Duchy may be readily divided, on the basis of relief, soil, and climate, into two main regions. In the south is the Bon Pays (*Gutland*), in the north the Ardenne (*Oesling*). The former is a region of light fertile soils and with a genial climate, the latter a less hospitable plateau country, with usually poor soils, wooded in part, and a more severe climate. These physical differences are reflected in the productiveness of the two areas.

The Bon Pays (Plate 17)

In the Bon Pays the farmhouses are closely concentrated into villages and hamlets (Fig. 29) with the fields lying at varying distances away, those of an individual farmer being as a rule widely scattered. The compact form of these settlements is typical not only of the Bon Pays of Luxembourg, but of all Lorraine, and also over much of the Ardenne. In many cases it appears to be related to the occurrence of water-supply, though that is doubtless only one of a group of interrelated factors. The occasional solitary or outlying farmstead may be explained in either of two ways. Either it combines the functions of a country villa and a farm for a well-to-do citizen who spends part of the summer and the winter shooting-season in the country, or it may be a large old house surviving as a reminder of an earlier system of agriculture (Plate 18).

On most of the farms there is a fairly even distribution of land devoted to the three principal types of crop—grain (wheat, oats, rye and barley); roots (fodder-beet and potatoes); and green fodder (clover, lucerne and permanent meadow grass). Apart from dairy produce and pigs, which are the principal 'cash' items, all the products play a part in a system which is essentially a subsistence economy. Wheat, rye and potatoes are the chief crops for human consumption, though rye is of declining importance, while oats, barley, roots, clover and lucerne provide the bulk of the animal fodder. Most of these crops are consumed at home, and even the grain may be milled locally, small electrically-driven mills being found in some of the larger villages. Attached to each house in the village is a small patch of garden, chiefly devoted to vegetables and small fruit. Since the peasants can obtain fruit from the trees which border the main roads—much of it, especially apples for cider-making, is auctioned locally by the commune in autumn—orchards are comparatively uncommon.

The arable lands lie scattered at distances up to a half or three-quarters of a mile from the village, generally occupying the more elevated parts and the slopes, which provide on the whole the best drained land. Very little land is allowed to lie fallow, although regular rotations are followed and the soil is made to produce as much as possible. Heavy manuring is a necessity and a feature of the village street is the succession of manure heaps, one near the door of every farmhouse. Considerable use is also made of artificial manures, especially of basic slag obtained at special rates from the steel-works.

Low-lying ground is often devoted to permanent grass, used not so much for grazing as for hay production, since the cattle are mainly stall-fed. Quantities of manure, moreover, are required every year, for the farm economy is based on the need for producing sufficient food for man and beast through the winter. Hay is not stacked in the fields, but as soon as the grass is dried it is carted to the village and stored in the loft of the large barn which is a feature of every farmstead. This practice is clearly related to the distance between the fields and the farm buildings, an important factor in winter, as well as to the small size of the plots, which yield only one or two cartloads of hay from each cutting. Several cuttings are made in a year, so the hay is short and light.

Though subsistence mixed-farming is pursued over most of the Bon Pays, differences of emphasis occur from part to part as the result of soil or economic conditions. Thus in the east, towards Echternach, the mosaic of cultivated strips reaches perhaps its fullest development. In this district, gentle well-drained slopes furnish loamy soils (derived from the thin limestone capping the Luxembourg Sandstone), which encourage a high proportion of arable land with good yields. In consequence, dairy produce, pigs and poultry are especially profitable, making villages like Consdorf, Scheidgen and Berdorf among the most prosperous in the Grand-Duchy. Falling rather short of this in richness is the belt of heavier land (Keuper Marls) to the south. Here Osweiler is an important centre of cultivation, from which produce is sent into Echternach, but the string of villages, Bech, Zittig, Hemsthal and Rippig, situated near the foot of the sandstone escarpment, utilize their stiff reddish marls for permanent grazing, sending quantities of milk to the capital by road or on the Echternach railway. Again, the Vale of Roeser (Fig. 11) provides another area of permanent grazing, based



Plate 17. THE AGRICULTURAL LANDSCAPE

This view near Berdorf shows strip cultivation and orchards on the more gentle slopes, with small patches of meadow cut for hay on steeper ground. This landscape is typical of much of the Bon Pays.



Plate 18. FARM-BUILDINGS, CONSDORF

Most of the farm-houses in Luxembourg confront the village street, isolated farmsteads being comparatively rare. The large doorway on the left gives access to a yard and stables ; alongside is the house, often built of stone, giving an impression of prosperity.



Plate 19. VINEYARDS NEAR REMICH

The south-facing slopes above the Moselle are clad with vineyards; Remich is one of the chief wine-producing centres of the Grand-Duchy. See also Plate 8.



Plate 20. OX TRANSPORT IN CLERVAUX

Oxen are still used to draw farm wagons in parts of the Ardenne. Roads paved with small setts are common in the smaller towns.

on the damp pastures of the Alzette and within a short distance of the capital.

Under existing conditions, to gain a livelihood makes heavy demands upon the labour of the peasants. The work, done largely by hand, requires long hours on the part of all the members of a family. Women and children play their part in the round of activities. In summer, women are to be seen using the pitchfork and hoe, while school holidays are arranged so that children may help in harvesting. Reaping and binding machines are not especially common, and fields are cut by small groups of men using scythes, followed by women who tie the corn into bundles. Root crops, too, are raised chiefly by hand, largely by women and children. Since the scattered holdings are unsuited to an extensive use of machinery, work is somewhat slow, yet the ground is covered methodically and thoroughly. Unhappily, the size of most farms limits the number of beasts which can be kept, and in some places there are hardly enough draught animals, even dairy cattle at times being used for ploughing and haulage. On the other hand, mutual help among farmers in such matters, leading to further combined efforts, has provided a basis for the successful co-operative movement.

The Ardenne

Considerable parts of the Ardenne are forested (Fig. 48), while much of the plateau surface is bleak and open, with a thin and rather sour soil. The proportion of farmland is considerably less than in the Bon Pays. In spite of the bleakness of the plateau areas, most of the arable land occurs there, rather than on the valley slopes, which are steep and heavily wooded, while the valley floors are narrow, and the small alluvial flats that do occur are devoted to damp permanent pasture (Plate 2).

On most of the farms the main crops are oats and potatoes, hardier varieties being grown there than in the Bon Pays. As a result, there is, in addition to these subsistence crops, a considerable cultivation of seed potatoes, which are sent in large quantities to the Bon Pays.

There has been some increase and improvement in pastoral farming in recent years. Even the very small farms keep a few animals to provide manure for the poor soils which are commonly found. Livestock consists mainly of cattle and pigs; sheep are rarely found, and, while horses are sometimes kept for draught purposes, oxen are used in many places. Better types of cattle have

been produced, both by the organization of *syndicats d'élevage* and by the improvement of pastures, made possible by the introduction of better types of fodder grasses and by the application of basic slag obtained cheaply from the metallurgical works in the south. The valley flats are generally devoted to hay cultivation, many water-meadows being irrigated.

As in the Bon Pays, most of the farmhouses are situated in compact villages, with arable lands scattered at varying distances from the village centres. Isolated outlying farmsteads are rare. A striking feature in many places is the *chaume*, or farmhouse roof covered with growing plants.

ARABLE FARMING

Area under Crops, 1939

			<i>Acres</i>
Cereals :	Wheat	42,139	
	Rye	19,393	
	Mixed (wheat and rye)	2,728	
	Barley	7,997	
	Oats	67,360	
	Buckwheat	541	
Total ..			140,158
Legume crops :	Peas	398	
	Beans	1,142	
	Lentils	40	
	Lupins, vetches, etc.	247	
	Total ..	1,827	
Root crops :	Potatoes	42,860	
	Turnips and swedes	28,472	
	Carrots	77	
	Kohl Rabi	546	
	Other roots.. ..	27	
	Total ..	71,982	
Fodder grasses :	Red clover	13,258	
	White clover	601	
	Other clovers	2,570	
	Lucerne	11,421	
	Grasses for seed	16,685	
	Other grasses	3,947	
	Grassland for hay	67,049	
Permanent pasture			45,303

Source : *Statistik der Landwirtschaft im Jahre 1939* (Luxembourg, 1940)

Wheat (Fig. 32)

Wheat, though it is the chief bread grain, ranks second to oats in the Grand-Duchy, both in acreage and in value of production. In view of the measures adopted to assist the grower, the total acreage sown with wheat has increased in recent years (by 70% between 1930 and 1939), until in 1938 it reached an abnormally high figure, to be followed the next year by the lowest since 1935 :

Area under wheat in acres

1930	1932	1934	1936	1938	1939
24,765	29,766	39,767	44,618	56,946	42,139

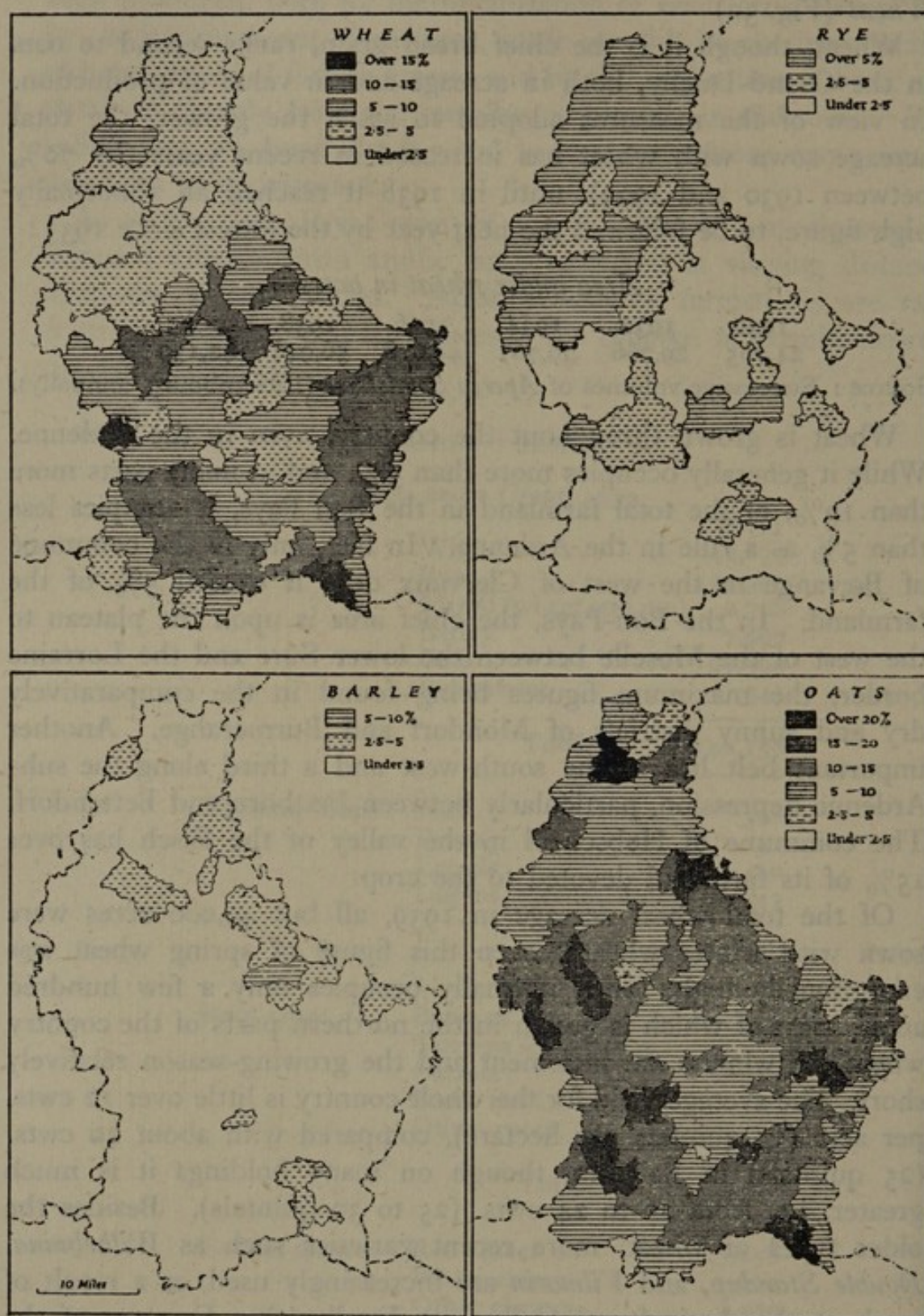
Source : Successive volumes of *Aperçu Statistique* (Luxembourg, annually).

Wheat is grown throughout the country, even in the Ardenne. While it generally occupies more than 5%, and in many parts more than 10%, of the total farmland in the Bon Pays, it occupies less than 5% as a rule in the Ardenne. In fact, only in the commune of Bœvange to the west of Clervaux does it exceed 5% of the farmland. In the Bon-Pays, the chief area is upon the plateau to the west of the Moselle between the lower Sûre and the Lorraine border, the maximum figures being found in the comparatively dry and sunny districts of Mondorf and Burmerange. Another important belt lies in the south-west and a third along the sub-Ardenne depression, particularly between Bettborn and Bettendorf. The commune of Hobscheid in the valley of the Eisch has over 15% of its farmland devoted to the crop.

Of the total wheat acreage in 1939, all but 40,000 acres were sown with winter wheat; even this figure of spring wheat was exceptionally high, for it normally occupies only a few hundred acres, most of which is grown in the northern parts of the country where the winters are inclement and the growing-season relatively short. The average yield for the whole country is little over 12 cwts. per acre (15 quintals per hectare), compared with about 20 cwts. (25 quintals) in Belgium, though on many holdings it is much greater, i.e. from 20 to 24 cwts. (25 to 30 quintals). Besides the older types of wheat, more recent varieties such as *Wilhelmina*, *Double Standup*, and *Vilmorin* are increasingly used, as a result of work at the Agricultural College at Ettelbruck. Farmers of the Bon Pays obtain part of their seed from crops grown in the north.

Rye (Fig. 33)

Rye is principally the crop of the Ardenne, where it generally occupies over 5% of the farmland; over the greater part of the



Figs. 32-35. Distribution of wheat, rye, barley and oats, 1939

Based on statistics from *Statistik der Landwirtschaft*, 1939 (Luxembourg' 1940.)

The percentages are of the total area of farm land.

Bon Pays under $2\frac{1}{2}\%$ is devoted to it. In a few scattered districts, such as the middle Alzette valley (Lintgen and Lorentzweiler), and near Junglinster and Hobscheid, it attains to greater importance. Like wheat, the bulk of the crop is sown in the autumn, but in the north, especially in the Clervaux and Wiltz districts, spring-sown rye is common enough. The variety called *Petkus* is almost the only kind grown in Luxembourg, the yields averaging rather more than 12 cwts. per acre (15 quintals per hectare), though locally they attain 20 cwts. (25 quintals). The average yield is therefore poor compared with that of Belgium (18 cwts. per acre or 22 quintals per hectare), which is the highest among European countries. This cereal is no longer used in bread, except perhaps in a few of the remote upland farmsteads, and is chiefly consumed by livestock. Some is used for the preparation of alcohol. For some years past the area under rye in the Grand-Duchy has remained around 17-20,000 acres annually without marked fluctuations; in 1939, it totalled 19,393 acres (7,848 hectares).

Mixed Grain

The practice of growing mixed grain, i.e. seed containing at least 50% of either wheat or rye, is steadily declining, though it survives among individual farmers in all parts of the country, notably in the west around Redange. The area under cultivation decreased from over 12,000 acres in 1930 to about 2,700 acres in 1939.

Barley (Fig. 34)

The distribution of barley is remarkably uniform over the Grand-Duchy, though the area devoted to it is small and slowly declining. In general, less than $2\frac{1}{2}\%$ of the farmland is sown with barley. A few districts in the east, from Hosingen to Echternach, have a greater proportion, the highest being over 5% in the commune of Ermsdorf. Barley is normally spring-sown and the yields vary from under 12 cwts. to 20-24 cwts. per acre (15 to 25-30 quintals per hectare). The area sown with barley in 1939 was 7,997 acres (3,236 hectares), rather greater than usual. The output is consumed mainly on the farms as fodder for livestock, only small quantities being absorbed by the brewing industry, which is primarily dependent on imports.

Oats (Fig. 35)

Oats cover nearly half the area devoted to grain crops and are grown universally, especially in the Ardenne, where the yields

(13–20 cwts. per acre, or 16–25 quintals per hectare) are also highest. The percentage of farmland occupied by oats is extremely variable in both divisions of the country. The highest figures occur at the extremities, Asselborn in the north and Burmerange in the south, both with over 20%. In parts of the central Bon Pays, in the communes along the Moselle valley, and even in some districts of the Ardenne, the crop is of little significance. Swedish seed from the famous station at Svalof is generally used. The crop is mainly consumed as fodder, especially for horses and young cattle. Since 1930, the amount of land devoted annually to oats has remained fairly stable between 60,000 and 75,000 acres, the 67,360 acres (27,259 hectares) in 1939 being typical of the period.

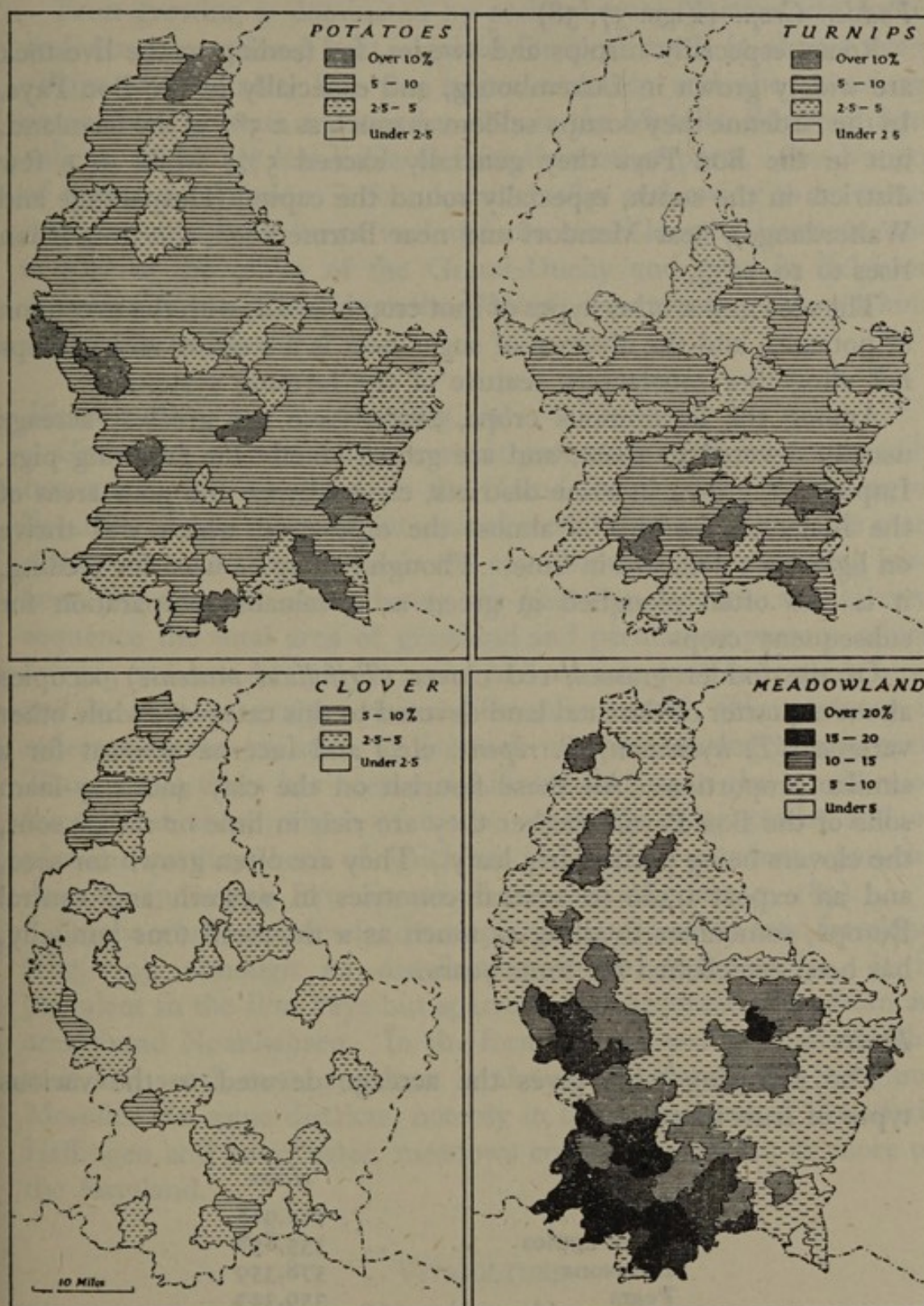
Buckwheat

A little buckwheat (*Sarrasin*) is still grown in parts of the Ardenne where it tolerates the sour land, but as the crop gives only poor or moderate returns it has all but disappeared as a serious item in farming.

Potatoes (Fig. 36)

Formerly potatoes ranked next to oats in acreage, but in recent years they have been superseded by wheat in this respect. The crop is raised almost exclusively for human consumption, and only in the event of a large surplus are they fed to stock. There is generally a slight surplus, however, and small quantities are sent into Belgium. The distribution of potatoes is fairly uniform and in most parts they occupy between 5 and 10% of the farmland. The areas in which they are of less importance are chiefly the Moselle vine-growing district and a small belt in the Ardenne stretching southwards from Clervaux. As a hardy crop they form with oats a staple item in the upland cultivation, but are most successful on the light soils of the Bon Pays. In scattered communes of this region, e.g. Perlé, Redange, Kœrich, Lorentzweiler and Dudelange, and in the Mondorf district, the crop occupies well over 10% of the farmland.

Until recent years only a few varieties were raised, and in most parts *Magnum Bonum* was grown almost exclusively. Following a noticeable deterioration in this type, others were introduced, and through the efforts of the Agricultural College at Ettelbruck the potato crop has been improved. British varieties such as *King Edward* are increasingly used in the north, from which, in turn, the south obtains much of its seed.



Figs. 36-39. Distribution of potatoes, turnips, clover and meadowland, 1939

Based on statistics from *Statistik der Landwirtschaft*, 1939 (Luxembourg, 1940.)

The percentages are of the total area of farm land.

Fodder Crops (Figs. 37, 38)

Roots, especially turnips and swedes, for feeding to the livestock are widely grown in Luxembourg, and especially in the Bon Pays. In the Ardenne they occupy seldom as much as 2.5% of the farmland, but in the Bon Pays they generally exceed 5%, while in a few districts in the south, especially round the capital (Hesperange and Walferdange), near Mondorf and near Burmerange, the proportion rises to 10-15%.

The area under other types of root crop is small, with the exception of potatoes, and the absence of sugar-beet is a striking and perhaps not altogether satisfactory feature of the farming system.

Among the leguminous crops, beans have the greatest acreage usually devoted to them, and are grown chiefly for fattening pigs. Lupins are grown in some districts, especially on the poor areas of the Ardenne, for this is almost the only crop which will thrive on light soils deficient in lime. Though it may be used for feeding, it is also often ploughed in green as a valuable preparation for subsequent crops.

Of the fodder grasses, red clover (*Trifolium pratense*) occupies about a quarter of the total land devoted to this category, while other varieties (*T. hybridum*, *T. repens*, etc.) and lucerne account for a similar proportion. All these flourish on the clay and clay-loam soils of the Bon Pays, whether they are rich in lime or rather sour, the clovers being particularly leafy. They are often grown for seed, and an export trade to several countries in western and central Europe, sometimes totalling as much as a thousand tons annually, has been established for some years.

Fruit

The following table gives the acreage devoted to the various types of fruit in 1939 :

	<i>Acres</i>		
Apples	711,918
Cider apples	335,858
Damsons	578,359
Pears	359,323
Plums	100,053
Mirabelles	29,887
Cherries	78,302
Apricots	8,501
Strawberries	133

Source : *Statistik der Landwirtschaft im Jahre 1939* (Luxembourg, 1940).

Fruit-growing is dominated by orchard trees, particularly apples and damsons. Some fruit is raised for local needs in almost every village and hamlet, but the larger orchards and the occasional commercial growers are found mainly in the Moselle, Sûre and Syre valleys, which are less liable to frost than other parts. One variety of apple, the *Rambou*, is found universally, and owing to its somewhat tough skin, it keeps well and can stand lengthy journeys, and is sold in the towns of the Grand-Duchy and even in Belgium. A variety of plum, known as the *Quetsch*, is grown to produce a kind of brandy or liqueur.

Meadow Grass and Pasture (Fig. 39)

Grassland for hay and permanent pasture for grazing are steadily becoming more important in the Grand-Duchy, for the keeping of livestock is now the main interest of most farmers. The fields most distant from the farmhouse in the case of nearly every holding have been put down to grass during the past few decades, and in consequence the total area of grassland and permanent pasture, which in 1913 amounted to 71,391 acres, had risen in 1927 to 103,440 acres and in 1939 to 112,352 acres. To some extent, this tendency is reflected in the variation in livestock numbers during recent years. Thus, while there has been a significant decline in the numbers of horses and sheep, those of cattle, especially dairy cattle, and of pigs and poultry (both of which are indirectly dependent upon the dairying industry), have increased considerably (see p. 189).

On the whole, meadowland occupies some 5% of the total farmland (Fig. 39), although its distribution varies considerably. It is prevalent in the Bon Pays but sparse in the Ardenne, apart from an area round Neunhausen. In the former it is most extensive in the west and south-west, and least in the east bordering the Sûre and Moselle. In some districts, notably in the communes of Consdorf, Heffingen and Junglinster, meadows comprise one-fifth or more of the farmland.

VITICULTURE

Viticulture is an important aspect of Luxembourg agriculture, for it furnishes some contribution towards the country's export trade. No other branch of agriculture, however, is subject to such sharp annual fluctuations in both acreage and output, this being due to a variety of causes such as weather conditions (mainly severe late frosts

and rainy summers—see p. 35), plant diseases (vine grub and phylloxera), and marketing difficulties.

Physical Features (Plates 8, 19)

The hill-slopes along the Luxembourg side of the Moselle valley offer a number of favourable advantages to the vine growers. These slopes are formed of Keuper and Muschelkalk rocks (see p. 17), which provide the calcareous soils preferred by the vine. The hillsides, which have generally a south-easterly aspect, descend steeply to the river, and are thus sheltered and sunny. In places, faults have formed several huge steps on the valley sides, thus increasing the area available for planting. Locally, the bends in the deeply eroded valley add materially to the amount of slope facing directly south (Fig. 40). In most cases, the valley sides are so steep that artificial terracing is essential, and the Muschelkalk Limestone serves as material for building dry retaining walls along the terrace margins. In many places, too, caves for wine storage have been artificially excavated in the limestone near the main road along the valley.

The following table summarizes the soil conditions and type of vine grown in the three main producing areas :

<i>District</i>	<i>Terrain</i>	<i>Variety of vine</i>
Lower Sûre valley	Muschelkalk, except for for gypsiferous marl near Rosport	<i>Elbling</i>
Moselle valley below Ehnen	Muschelkalk, except for some Keuper Marl at at Machtum	Mainly <i>Elbling</i> , with some <i>Riesling</i> at Ehnen, Wormeldange and Ahn (Palmberg) and some <i>Sylvaner</i> at Greven- macher
Moselle valley above Ehnen	Keuper Marl, except for some Muschelkalk at Greiveldange and Canach, and some mixed soil (Keuper and Muschelkalk sandy loams) at Stadtbredimus and Schengen	<i>Elbling</i>

Production

The vineyards extend more or less continuously along the slopes of the Moselle valley for 25 miles and less continuously along the lower Sûre (Fig. 40). Before the war of 1914-18, vineyards were also found in the Our valley around Vianden, and at some places in

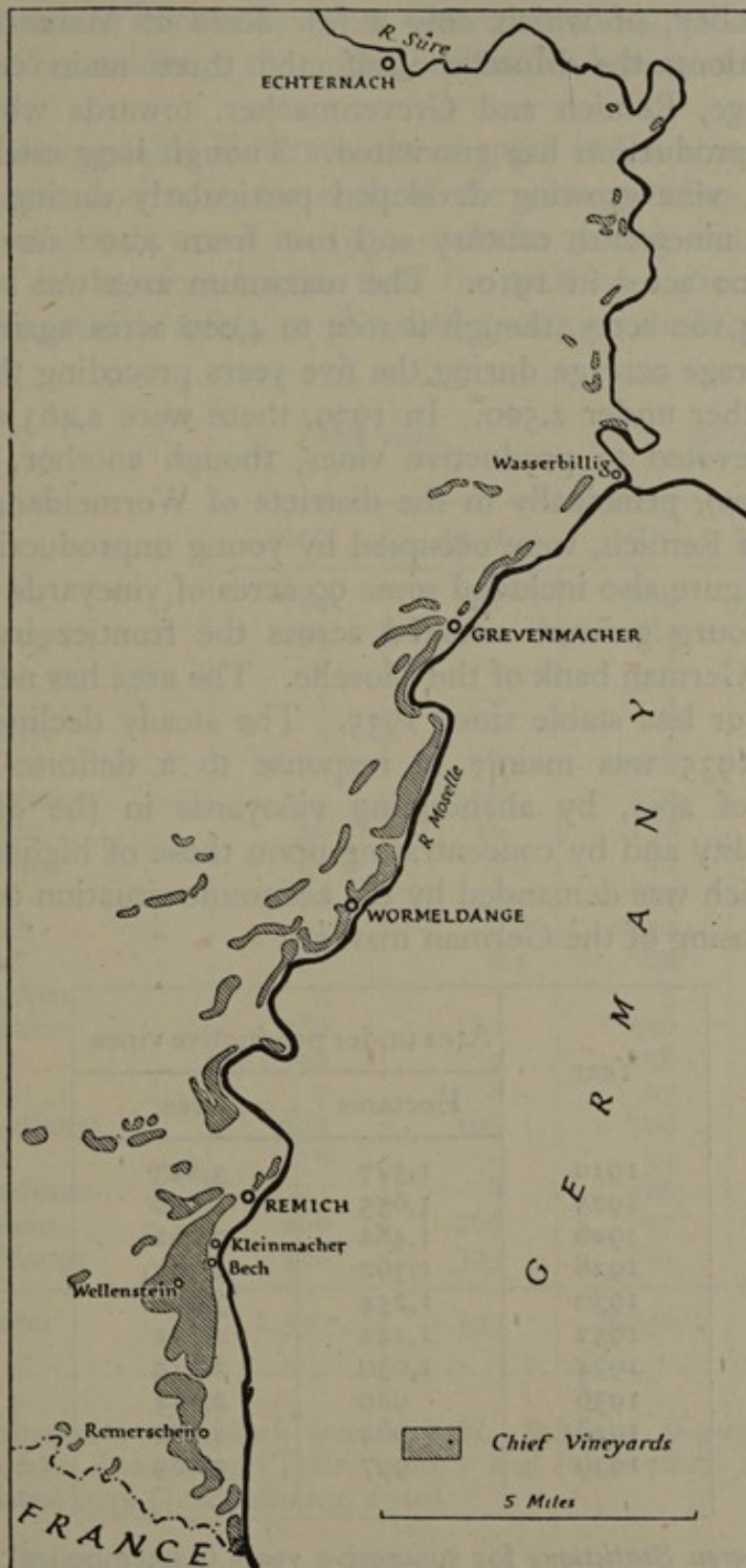


Fig. 40. Viticulture in the Sûre and Moselle valleys

Based on data from *Statistik der Landwirtschaft*, 1939, p. 15 (Luxembourg, 1940.)

Vine growing is concentrated on the southward-facing valley slopes see also Plates 8, 19).

the Syre valley, of which only a few acres at Manternach now survive. Along the Moselle itself, the three main centres are Wormeldange, Remich and Grevenmacher, towards which large-scale wine production has gravitated. Though long established in this region, vine growing developed particularly during the latter part of the nineteenth century and rose from 2,200 acres in 1880 to over 3,700 acres in 1910. The maximum area was reached in 1917 with 4,100 acres, though it rose to 4,000 acres again in 1925, but the average acreage during the five years preceding the present war was rather under 2,500. In 1939, there were 2,463 acres (997 hectares) devoted to productive vines, though another 500 acres (200 hectares), principally in the districts of Wormeldange and to the south of Remich, were occupied by young unproductive plants. This total figure also included some 90 acres of vineyards belonging to Luxembourg growers situated across the frontier in Lorraine and on the German bank of the Moselle. The area has nevertheless been more or less stable since 1935. The steady decline between 1925 and 1935 was mainly in response to a definite policy of restriction of area, by abandoning vineyards in the districts of inferior quality and by concentrating upon those of highest quality, a policy which was demanded by the economic situation consequent upon the closing of the German market.

Year	Area under productive vines	
	Hectares	Acres
1910	1,547	3,823
1925	1,655	4,090
1926	1,482	3,662
1928	1,362	3,365
1930	1,254	3,098
1932	1,122	2,772
1934	1,030	2,545
1936	989	2,444
1938	964	2,382
1939	997	2,463

Source : *Aperçu Statistique* for successive years (Luxembourg).

Though the reduction in acreage has affected most districts, it has been most severe around Remich, while production in the Vianden area, for many years slight, has ceased altogether; the same is true of Echternach in the Sûre valley. There has been a

slight increase at Flaxweiler (near Grevenmacher), while at Wellenstein and Wormeldange the area under vines has more or less held its own.

The following table illustrates the changes in the area under vines between 1910 and 1939 for each of the vine-growing communes ; the total of 2,948 acres in 1939 includes young non-productive plants and is therefore higher than the total of 2,463 acres in the table above, which refers to the area under productive vines.

	Hectares		Acres	
	1910	1939	1910	1939
Bous	84	41	206	101
Burmerange	34	12	84	30
Contern	2	—	5	—
Dalheim	1	—	3	—
Echternach	2	—	5	—
Flaxweiler	72	78	178	192
Grevenmacher	93	78	230	192
Lenningen	56	29	138	72
Manternach	19	4.5	47	11
Merttert	75	33	185	81
Mompach	13	9	32	22
Mondorf	28	6.5	69	16
Niederanven	2	—	5	—
Remerschen	182	162	450	400
Remich	104	35	256	86
Rospert	7	8	17	20
Stadtbredimus	125	102	309	251
Vianden	18	—	44	—
Waldbredimus	43	8	106	20
Wellenstein	266	266	657	657
Wormeldange	324	323	802	797
Total	1,550	1,193	3,830	2,948

Source : Statistics compiled from (1) H. Schliep, *Weinbau-Karte des Grossherzogtums Luxemburg* (Trier, 1910) ; and (2) *Statistik der Landwirtschaft im Jahre 1939* (Luxembourg, 1940).

The total output of grape-juice (must) and the yield per hectare both fluctuate considerably, due mainly to weather conditions, notably the amount of rainfall during summer and the presence or absence of frosts (see p. 32). These fluctuations are shown in the following table :

Year	Area devoted to productive vines hectares	Vine juice	
		Yield in hl. per ha.	Output in hectolitres
1934	1030.3	136	140,000
1935	996	71	70,880
1936	989	70	69,320
1937	934	62	57,760
1938	964	85	81,500
1939	997	100	100,000

Source : *Aperçu Statistique* for successive years (Luxembourg).

Since the Belgian Customs Union, the growers have had to face competition with better wines, thus forcing attention upon improved methods and upon making the most of the conditions of soil and climate. This policy was endorsed by the Government in 1925 by the establishment of a research station (*Station viticole*) at Remich to deal with scientific problems, such as resistance to phylloxera—this disease made its appearance in the Grand-Duchy in 1907—improvement of varieties, and more scientific processing. Within ten years, 600 acres of vines had been established at the station, and some 200 grafters were trained to manage them. As a result of their work, wines of much higher quality are now produced. As in other branches of agriculture, the Government has devoted much attention to the problem of vine-growing. No less than 1,000 acres of inferior or derelict plants have been removed; bonuses for replanting have been awarded, together with indemnities against 'black frosts' in spring (as in 1928), and assistance in obtaining fungicides is granted. The most valuable measures, however, have been the encouragement given to syndicate groups for the improvement of the vineyards, and the construction of large co-operative cellars by means of loans with low-interest rates.

Some firms, chiefly at Grevenmacher and Remich, began to make sparkling Moselle, adopting the same methods of preparation as for the champagnes of the Marne, thus promoting an important branch of the trade. The concern known as *Caves St. Martin*, founded at Remich in 1919, which uses vast cellars hewn in the Muschelkalk Limestone along the banks of the Moselle, provides a good instance of this development. The caves, together with the *Bernard Massard* cellars at Grevenmacher, are the largest in the Grand-Duchy.

The laws governing the production of both still and sparkling wines are strict, only pure grape-juice being permitted, though in view of the variable climate the scientific mixing of wines to reduce the effects of bad years is customary.

Consumption and Trade

Prior to 1929, only a small percentage of native wine was consumed within the Grand-Duchy, but succeeding years saw a steady reduction in imported wines and a corresponding rise in the proportion of the local Moselle produce, amounting in most years to more than half the total output, and generally to over three quarters of the total consumption.

(1,000 hectolitres)

Year	Total output of vine juice	Consumption in Luxembourg		Total consumption
		Native wine	Imported wine	
1929	111	15	11	26
1930	38	20	11	31
1931	86	31	8	39
1932	39	47	5	52
1933	57	42	4	46
1934	140	48	4	52
1935	71	59	5	64
1936	96	63	7	70
1937	58	52	17	69
1938	82	46	20	66
1939	100	40	13	53

Source : *Aperçu Statistique* for successive years (Luxembourg).

The absence of earthy taste and the high content of tartaric acid made the must specially suitable for the production of sparkling Moselle, and, prior to 1914, the greater part of the Luxembourg vintage was sent to Germany for this purpose. After a period of five years following the war of 1914-18, during which Germany, by the provisions of the Versailles Treaty, admitted a certain quantity of wine duty free, the vine-growers were faced with the problem of finding new markets, for after 1925 the German tariffs proved insurmountable. With the formation of the Customs Union with Belgium, competition with better wines had to be faced. However, up to 1930 Belgium took an annual total of some 40,000 hectolitres, but with the onset of the world depression this amount fell substantially—in 1933 Belgium took only a quarter of her 1930 total. During the period between the recovery from the world

depression and the outbreak of the present war, the export trade continued to reflect the fluctuations due to variable output and uncertain markets. This is clearly shown by the following table, though in addition the trends with regard to certain specific markets should be noted. For example, exports to both the Netherlands and Poland continued to rise, while there is some indication of a developing market in Britain. Though Belgium furnished the principal outlet for the trade, Germany—except for an unusually large quantity in 1938—was superseded by the Netherlands as second customer.

Exports of wine (hectolitres) to various countries

Year	Belgium	Nether-lands	Poland and Danzig	Germany	England	France	Switzer-land	Others	Total
1930	41,713	—	—	4,000	—	—	—	—	45,713
1931	24,920	283	797	1,919	70	—	28	11	28,028
1932	34,370	298	618	2,072	47	—	47	16	37,648
1933	10,560	186	196	1,533	74	—	5	118	12,672
1934	21,483	722	627	2,473	129	31	56	383	25,904
1935	30,729	1,000	661	594	154	43	4	33	33,218
1936	34,280	1,284	850	592	72	26	—	57	37,161
1937	22,850	1,016	735	496	26	65	—	21	25,209
1938	17,777	1,400	1,170	12,456	486	4	7	204	33,504

*NOTE.—The German figures include the Saar Territory ; they also include the import of must from Luxembourg to make Moselle wines.

Source : *Aperçu Statistique* for successive years (Luxembourg).

ROSE CULTIVATION

Luxembourg is famous for its rose trees, and their cultivation ranks as an important subsidiary branch of agriculture. The trees are grown primarily for export to many parts of the world, though the largest section of the market is found in neighbouring countries. Large-scale cultivation dates from the 'seventies of last century, when the development of railways provided a means of exporting the trees. Prior to 1850, there had been some cultivation among fruit-growers as a side-line, but by 1855 rose-growing had become a special occupation for a few. After 1870, Germany in particular became a valuable market, for horticulture in that country was slow to develop, while at the same time the *Zollverein* favoured the Luxembourg growers. Further customers were found in Austria, France, Russia and even in America, and by the outbreak of the war in 1914 there were at least forty growers working exclusively for the foreign market. Their nurseries, giving employment to

1,000 skilled cultivators, covered 500 acres and with a yield of about 30,000 trees per acre the total production reached several million trees a year.

During the war of 1914-18, the *rosiéristes* lost their best customers, but new markets were subsequently found and the trade was restored to a position of greater importance than before. In 1928, before the general trade depression, the number of growers had increased to nearly 80 and the production reached eight million trees a year. Since then, as the accompanying table shows, there has been a sharp decline in the industry, some of the markets being held only at the cost of heavy sacrifices to the cultivators.

Production of rose trees (in thousands)

1928	..	..	8,000
1930	..	..	2,321
1931	..	..	1,594
1932	..	..	2,542
1933	..	..	2,014
1934	..	..	1,395
1936	..	..	1,326
1937	..	..	1,082
1938	..	..	767

Source : *Aperçu Statistique* for successive years (Luxembourg, annually).
Figures for 1929 and 1935 are not available.

In 1938, exports amounted to only 38,300 trees, a record low figure since the revival of cultivation following the war of 1914-18. Of this total, 28,500 were sent to France, 4,100 to Italy, 2,500 to Switzerland, and smaller quantities to the Netherlands and to South American countries. The trees are bought in quantity by horticulturalists, nurserymen, landscape-gardeners, and other retailers in large European centres.

The distribution of nurseries (Fig. 41) indicates a close relationship between a clay soil, upon which roses thrive best, a sheltered situation, though this may in fact be only a secondary consideration, and railway communications. The stiff soils of the Keuper Marl appear most favourable to rose-growing, and over half the acreage is to be found along the Alzette valley north of the capital, where these soils occur.

Some producers grow many varieties, while others favour a restricted number of the more popular varieties, which because of the constant and wide demand, are grown on a very extensive scale. The bush and dwarf plants are all budded, calling for high skill from those employed. The only stock used is the common wild

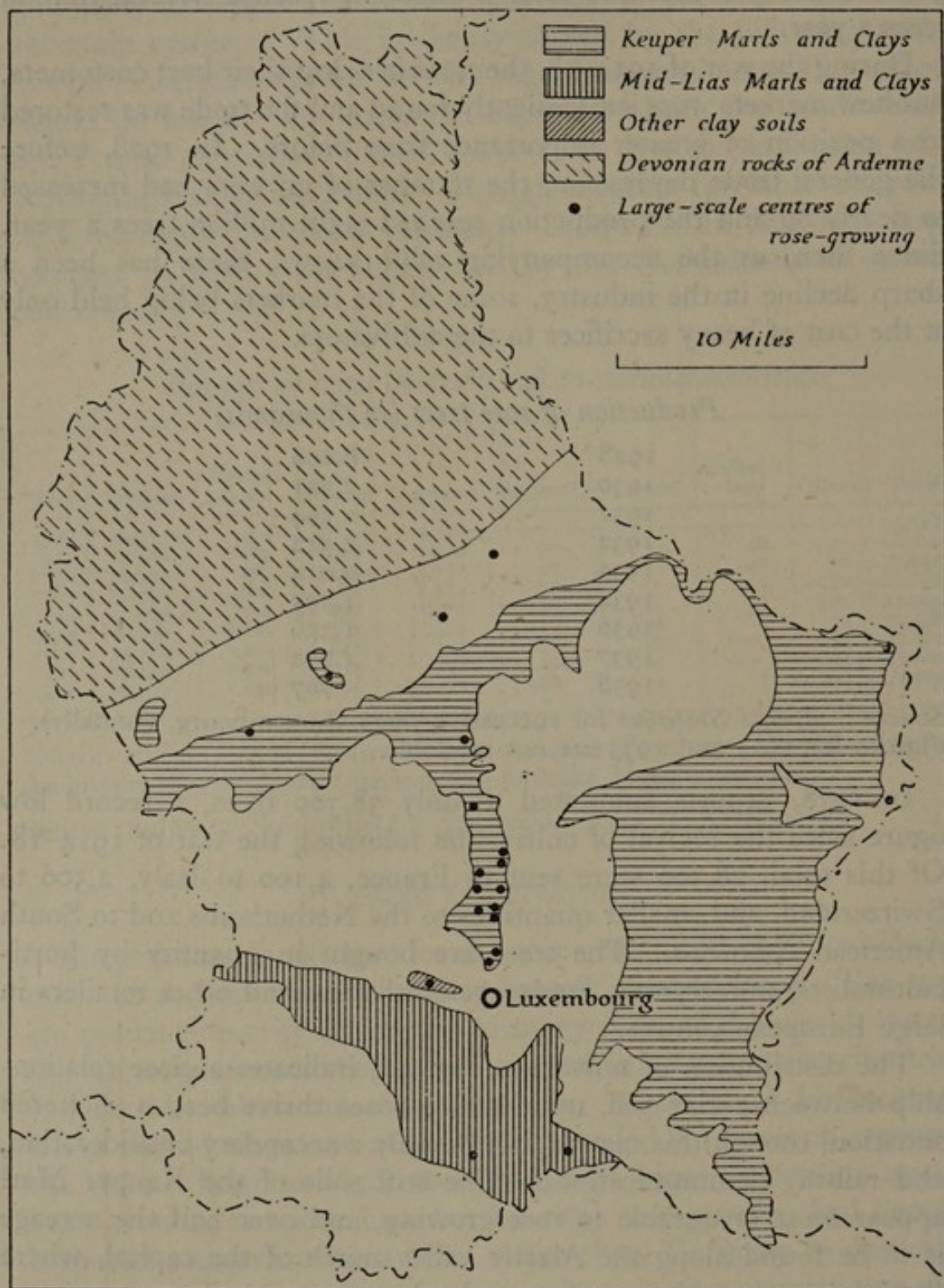


Fig. 41. Rose cultivation in Luxembourg

Based on data from *Aperçu Statistique*, 1939, p. 24 (Luxembourg, 1939).

rose (*Rosa canina*), which is obtained from the countryside in both Luxembourg and Belgium. Its hardiness makes it suitable for different kinds of cultivation and also able to withstand changes of soil and climate. Standard roses are raised at most of the establishments, while some growers produce new roses from seedlings, the seeds being obtained by artificial fertilization. Of this kind, however, only a small proportion are sold, for the product is liable to speedy degeneration. Not only are skill and experience required in rose cultivation, but suitable plots of land and considerable equipment. Thus standards are prepared a year in advance in small pots and are re-potted before grafting. Propagation is done under glass during winter and requires roomy accommodation. Many young trees are transplanted before mid-November to avoid frost. They are removed to long earth-cellars covered with 2-3 feet of soil, with windows for ventilation and light. Though unheated, these conditions give a uniform temperature low enough for the plants to remain in a state of latent growth until late spring, thus making the grower independent of climatic difficulties and enabling him to dispatch orders at any time during the winter. Further, in order to avoid the spread of disease, it is seldom that two successive plantings are made on the same ground, and this partly explains the necessity for large plots.

The success of the Luxembourg rose cultivation and its export trade is primarily due to the hardy character of the trees, resulting from local conditions. The clay soils are only of moderate fertility and the climate is somewhat rigorous; consequently plants raised under such conditions allow of successful transplanting and vigorous revival in a new environment, however distant. In order not to weaken this hardiness, the use of chemical manures is forbidden among the cultivators.

LIVESTOCK

Cattle (Fig. 42)

The raising of livestock, especially cattle, has become the principal branch of agriculture in Luxembourg, a development which has been accompanied by a substantial increase in the amount of land devoted to grass and fodder crops (Figs. 38, 39). So predominant is the place occupied by cattle that more than once during the past twenty years the danger of over-production of fat stock at least has arisen. The number of beasts, on the other hand, has increased but slowly since the beginning of the century, for there were 108,512

head in 1937 compared with 92,000 in 1901. While their main purpose formerly was to work in the fields and to keep the land in condition, their function to-day is to supply milk and meat, and in consequence quality is a matter of great importance; only 2,539 were kept primarily for draught purposes, compared with 12,267 in 1916. In this connection, farmers have concentrated upon two types, the 'red-and-white' (*pie-rouge*) in the Ardenne and Frisians (*pie-noir*) in the Bon Pays, both of Dutch or North German origin. From time to time beasts for breeding purposes have been imported from the Netherlands by the Government in order to improve the quality of the stock. In comparatively recent years a number of co-operative societies (*syndicats d'élevage*), grouped under the *Société du Herdbook luxembourgeois*, have contributed materially towards raising the standard of both beef and dairy cattle.

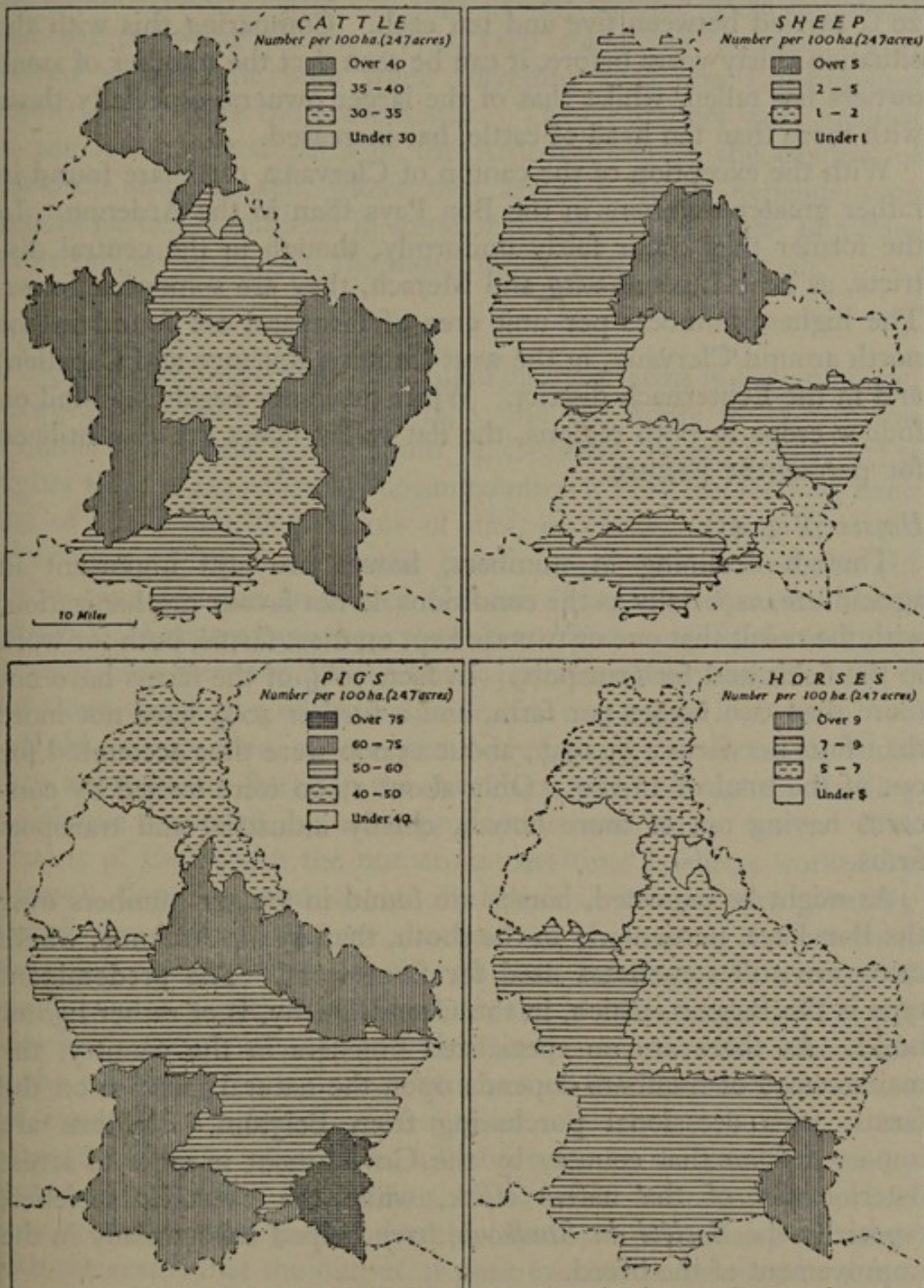
Two economic factors affect the composition of the herds. In the first place, the large demand for veal, particularly in the towns, provides a market for calves, of which considerable numbers are slaughtered in the course of a year. Secondly, the development of dairying (see p. 193) has resulted in a significant increase in the proportion of milk cows, the ratio now fluctuating from year to year between 51% and 57%. Thus in 1937 there were 57,026 milk cows, representing almost 54% of the total number of cattle.

From the following table it will be seen that the vast majority of holdings support a very small number of cattle each :

Cattle in Luxembourg, 1937

No. of head	No. of farms	Percentage of total no. of farms	Corresponding per- centage for 1904
1	2,477	15.6	23.5
2	2,461	15.5	20.9
3	1,870	11.8	14.4
4	1,394	8.8	10.0
5	1,152	7.3	7.0
5-10	3,309	20.8	15.7
10-15	1,575	9.9	5.2
15-20	799	5.0	1.9
20-30	596	3.7	1.1
30-40	153	1.0	0.2
over 40	92	0.6	0.1
Total	15,878	100	100

Source : *Der Viehstand des Grossherzogtums*, 1937 (Luxembourg, 1939).



Figs. 42-5. Distribution of cattle, sheep, pigs and horses, 1939

Based on statistics from *Der Viehstand des Grossherzogtums Luxemburg, 1939* (Luxembourg, 1940.)

Thus in 1937, one-third of the farms kept either one or two head of cattle each ; on over 60% there were only five or less, and another 20% carried between five and ten each. Comparing this with the situation thirty years before, it can be seen that the number of small owners has fallen, whilst that of the larger owners, especially those with more than ten head of cattle, has increased.

With the exception of the canton of Clervaux, cattle are found in rather greater numbers in the Bon Pays than in the Ardenne. In the former they occur fairly uniformly, though in the central districts, as near Luxembourg and Mersch, they are somewhat fewer. The highest numbers per unit area of farmland are found in the north around Clervaux, in the west (cantons Redange and Capellen) and in the Echternach district. While cattle are largely stall-fed on fodder crops in both regions, the flat valley floors are also utilized for permanent pasture.

Horses (Fig. 45)

Though declining in numbers, horses are still important in agriculture, especially as the conditions do not favour mechanization, with the result that one or two are kept on most farms, both for work in the fields and for transport. In fact, 70% of the farms have not more than two horses per farm, and a further 20% have not more than four per farm ; in 1937, about 15,000 were thus accounted for out of the total of 17,300. Only about 1,000 were owned by concerns having ten or more horses, chiefly industrial and transport firms.

As might be expected, horses are found in greater numbers over the Bon Pays, particularly in the south, than in the Ardenne, where cattle are still sometimes used for farm work. The predominant type is the Belgian, which, in the Grand-Duchy, is of rather lighter build. As there are no specialized breeders in the country, the maintenance of numbers depends upon the natural increase on the farms, with occasional purchasing from Belgium. Stallions are imported from that country by the Government in order to arrest deterioration of the native stock, while the livestock societies, especially the *Société du Studbook*, have helped substantially in the improvement of the breed.

Sheep (Fig. 43)

As in France and Belgium, there has been a continuous decline in the number of sheep over the past century. In 1937, there were 6,955, whereas in 1870 there were eleven times as many. This

fact reflects an important change in the animal husbandry of the Grand-Duchy, cattle and pigs having become more important and sheep having declined to a very subsidiary position. Few indeed were to be seen when travelling over the Luxembourg countryside before the present war. Their numbers were greatest in the less elevated parts of the Ardenne and in the cantons of Diekirch and Vianden, where they are still largely dependent on upland pastures, and least in some of the best lands of the Bon Pays and strangely enough in the most rugged parts of the north.

Pigs (Fig. 44)

Pigs form an important 'cash' item on most farms in Luxembourg, above all on the smallest holdings, and the figure of 58 per 100 hectares of farmland (cf. Belgium 34, Germany 31 and France 13) is higher than in any other European country. Pork has for long been one of the principal elements of diet, especially among the rural population. The characteristic breed is a cross between the old native type and the Improved German (*Veredeltes deutsches Landschwein*). A century ago there were about 28,000 pigs in the country, by 1900 there were 100,000, and in 1934 the number reached 163,337, but there was then a considerable decline to 147,366 in 1937.

Unlike sheep, there are comparatively few pigs in the north, while large numbers are found in the Bon Pays, with the superior feeding conditions provided by root production and dairy waste. The cantons of Esch (with the numerous part-time holdings worked by miners), Capellen, and above all Remich, with its exceptionally high figure of nearly 89 per 100 hectares, are among the principal areas for pig-keeping. On the smallest holdings, the raising of young pigs is particularly important, the animals being sold at the fairs held each month at convenient centres such as the *chefs-lieux* of the cantons. Sucking-pigs, too, are sold at remunerative prices for export to neighbouring countries, while everywhere pigs are fattened for pork, either to be killed for use by the family or to be sent to the town for slaughtering. The increase in attention to this form of stock is closely related to the expansion of the dairy industry, with the result that the output of pork exceeds home requirements. The surplus—mainly in the form of live fat pigs—is exported to Belgium and Germany.

Of the total number of pigs in 1937, some 45% consisted of young pigs from eight weeks to six months old, 22% were under eight weeks and a similar proportion from six months to one year old.

Poultry

Among the smaller farms, poultry and egg-production afford a useful source of revenue, and for family needs fowls are kept on every farm. Leghorns are found almost universally, since in the matter of egg-laying they are reliable and give little trouble. In 1934, the number of poultry exceeded half a million, but their value to agriculture was not so great proportionately as, for example, in Belgium. Nevertheless, it is a striking fact that their value was more than double that of sheep in the Grand-Duchy.

AGRICULTURAL WORKERS AND HOLDINGS

The occupational census of 1935 gave a total of 61,052 people dependent on agriculture, that is, 26% of the total population. The decline in both the absolute total and the proportion has already been commented on (see p. 136). Of this total dependent on agriculture, 50,766 were described as being actively employed; the balance represents the young children and very old people of the farmers' families, and it is probable that many of them would contribute a certain amount of part-time work at such times as the harvest. The following table analyses the number of agricultural workers according to certain categories :

	Male	Female	Total
Proprietors	11,407	1,151	12,558
Members of family actively working for proprietor	7,682	14,512	22,194
Public officials	83	—	83
Paid workers	5,044	887	5,931
Total	24,216	16,550	40,766

Source : *Résultats du Recensement de la Population* (1935), Vol. III, p. 6 (Luxembourg, 1940).

There are several significant features of these returns : the large contribution made to the total by the working owners or tenants and by the members of their families who assist them ; the consequent relative unimportance of hired workers, less than one-seventh of the total ; and the large numbers of female workers, two-fifths of the total.

These figures do not include the considerable numbers of industrial workers who cultivate small plots of land with the aid of their families. In fact, the family character of agriculture is of fundamental importance, for at the present time the majority of holdings of less than five acres, and especially those of less than 1.25 acres, are subsidiary undertakings consisting of orchards, gardens and little plots worked by those not primarily engaged in agriculture. According to the census of 1907, there were nearly 15,000 of these plots, or 62% of the total number of holdings; there has been no further detailed census of the size of holdings, but in general this situation has not changed much.

In 1937, a survey representative of current conditions was made of 125 farms of various sizes situated in different parts of the Grand-Duchy. These covered more than 7,000 acres and employed a total of 661 persons, of whom only 97 were paid workers not belonging to the holders' families.

Finally, although no detailed statistics exist, tenant farming is seldom found; it has been estimated that between 80 and 90% of the farmers of all sizes are owned by the people who cultivate them.

Land Tenure

The system of land tenure prevailing in Luxembourg is derived from the reforms following the French Revolution and is governed by the law of succession embodied in the Code Napoléon. Article No. 745 in the Luxembourg Civil Code provides that children shall succeed their parents without distinction of sex or primogeniture, while the Code elsewhere restricts a father's power to give preference by will to the son or daughter who shows most interest in the perpetuation of the family holding. The law thus divides property in equal portions among the children of a family, and further requires that each portion of an inheritance must contain an equal amount of property of the same kind. This has led in consequence to the prevalence of small holdings or 'parcels' and to an excessive division of the land, conditions which seriously impair the efficient conduct of agriculture. The progressive division of farm holdings tends to reduce them to an unremunerative size, while buildings in particular become out of all proportion to the amount of land they serve. Other disadvantages include loss of time in reaching scattered plots, difficulty of supervising labour, the restricted use of machinery and the multiplication of boundary furrows. Among the advantages of the system are the maintenance of small properties,

valuable from a social point of view, and the recognition of equality among members of the same family.

The excessive division of the land is often avoided in practice by arrangement between the co-heirs. Thus one kin may acquire the whole farm at less than the market value and compensate the others with money. The essential difficulty is to find the capital for compensation, and in any case, the burden of interest payments may continue for many years. The problem of succession is therefore primarily a problem of credit, and a partial solution at least has been found by the Government in allocating 10 millions francs out of 25 millions belonging to the Agricultural Improvements Fund for credits to heirs of farmers at low rates of interest. A feature of the revenue system in the Grand-Duchy, moreover, is the absence of death duties on the succession of property to heirs, and this too tends to facilitate the passing of a holding from father to son.

Though no legislation exists to control the continual subdivision of land, the question of consolidation is repeatedly raised. Despite the lack of recent statistics, it is generally agreed that the average size of the family holding in Luxembourg is now well below that which would give the highest return, so that large-scale consolidation would doubtless be of the utmost value to agricultural production. Yet the individualism and conservatism of the peasants weaken opinion in favour of consolidation, whilst the lack of a legal basis for reform is a further handicap to progress. At the same time, there exists a law dating from 1883 concerned with syndical associations for the purpose of undertaking drainage and other works, which could be interpreted as affording a basis for consolidation. For under Article 1 of this law, syndical associations of owners may have as their object any improvements in methods of cultivation of advantage to the community. It has been pointed out that, on a liberal interpretation, consolidation may be regarded as such an improvement, and in fact a small amount has been carried out under this provision, but always in conjunction with improvements of a technical nature, such as drainage, irrigation or road-making.

CO-OPERATIVE METHODS

The growth of co-operative organizations has played a significant part in the development of agriculture. Since approximately nine-tenths of the farm produce is absorbed by the home market, it is obvious that both buying and selling facilities are of importance to

the farmer. Assistance along many other lines is now widely given on a co-operative basis, and in almost every district there exists one or more societies or syndical associations. These are formed whenever a group of farmers or vine-growers by common consent agree to carry out some project for the improvement of their business, including material improvement such as land drainage or the reconstruction of vineyards. Thus during little more than a decade previous to the present war, some eighty syndicates were created and federated under the Stud Book and Herd Book. As a result of agricultural exhibitions arranged by these societies and the holding of public sales of breeding-animals, much has been done towards the improvement of livestock.

The local society (*la société locale agricole*) in particular has given a much needed solidarity to farming in many districts. The earliest of these societies, of which there are now 420, were founded in 1875, and they developed especially after 1900. They are recognized by law, and a few years ago claimed 20,000 members, mostly in the larger villages. Each society is normally concerned with a single village and serves the peasant mainly through facilities in buying equipment, feeding-stuffs and fertilizers, as well as in the provision of libraries and agricultural literature, and in the promotion of occasional meetings. As long ago as 1909, these societies were grouped into a federation.

Of special importance are the dairy co-operatives (*laiteries co-opératives*). Founded in 1893, there are now 261, with a membership exceeding 12,000, and represent the principal means of co-operative selling. These, too, serve mainly local interests, and are concerned with butter-making; they return skimmed milk to the farmers, who use it to feed pigs, or to make an inferior type of cheese. They are particularly valuable to the small milk-producer with only a few cows, into which category falls the majority of Luxembourg farmers. At present many of the *laiteries* are simply small dairies which provide cream for the central butter-making establishments at Ettelbruck, Hosingen and Saeul. By 1934, a milk-selling scheme devised some years earlier had proved successful in the north, and shortly before the present war, was being extended to the rest of the country, though the headquarters of the agency (*le Syndicat de Vente des Laiteries de Luxembourg*, or S.V.L.) remained at Ettelbruck. The first seventy-two *laiteries* brought into the scheme were by design nearly all situated in the north, since the benefits to be derived from it were most needed in that part of the country. With

about thirty in the area between Hosingen and Ettelbruck and a considerable number around the latter, this town became the principal butter-making centre in Luxembourg (Fig. 46). Much of the output is despatched daily by the Syndicate's fleet of lorries to retailers in different parts, and in the summer months (May-August) production reaches 1,200 kg. (2,600 lbs.) daily. In 1933,

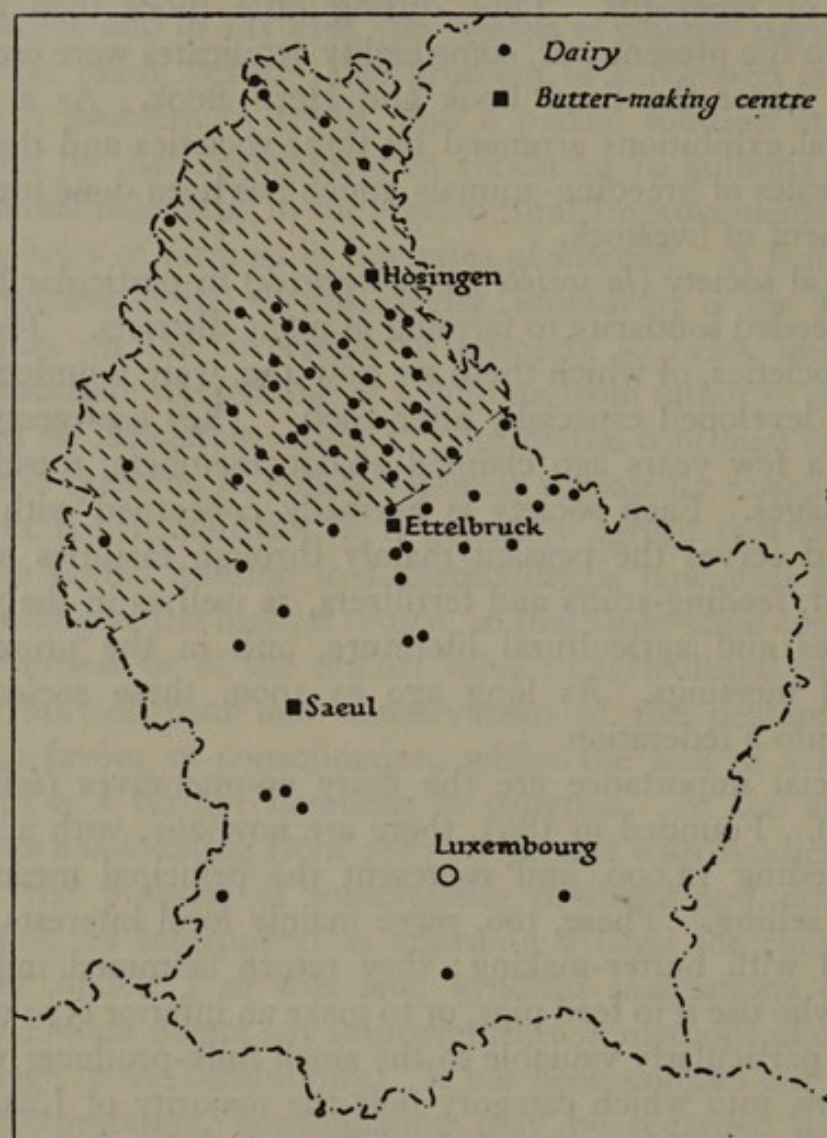


Fig. 46. Distribution of co-operative dairies, 1934

Based on data obtained from the *Verkaufgenossenschaft Luxemburger Molkeerein* at Ettelbruck.

The scheme for the establishment of co-operative dairies was introduced first into the Ardenne region to assist farmers in that area, and was later extended to the Bon Pays. The map shows progress in the development of the scheme since its inception in 1927.

the S.V.L. disposed of 762,360 kg. (about 1.68 million lbs.) of butter, of which half was consumed in the Grand-Duchy and the rest exported to Belgium and France.

For some years past, an important co-operative for the sale of milk called 'Celula' (*Centrale luxembourgeois des laiteries*) has existed at Bettembourg in the south. This establishment, though in a country area amid a comparatively clear atmosphere, is situated close to the industrial district and at an important communication centre. It deals with about 4,000 gallons of milk per day.

In some areas co-operatives for cattle-breeding (*sociétés d'élevage de bétail*) are found. There are now nearly fifty of these grouped in a federation, devoting attention largely to the two officially recognized breeds of cattle, the type *pie-noir* of the Bon Pays, and the type *pie-rouge* of the Ardenne (see p. 186). There exists too a similar number of societies for mutual help against cattle mortality.

Other examples of co-operative organizations are those for the sale of fruit (*Société nationale d'arboriculture*), for the sale of potatoes ('Colupo'), the association of distilleries ('Adal') established at Ettelbruck for the rectification of alcohol, and the recently formed corn-threshing associations.

Since 1926, savings and credit-banks called *Caisses Raiffeisen* have been founded in several villages (see p. 268). These collect the farmers' available capital and, under favourable conditions, offer short or medium-term loans. The multitude of organizations, however, has not grown without encouragement from the State. Numerous subsidies have been awarded, and long-term loans at 2% have been regularly granted by the *Fonds d'améliorations* for agriculture.

FORESTRY

Little more than two centuries ago, Luxembourg was almost entirely covered with forest, mainly of oak and beech. In 1811, when, as the *Département des Forêts*, the country formed part of France, nearly three-quarters of the total extent was forested. This proportion has steadily diminished, the process being markedly accelerated to meet German requirements during the war of 1914-18. However, the country remains abundantly wooded with some 320 sq. miles, i.e. rather less than one-third of the entire area, under forest (Fig. 47). Apart from cultivated land, the areas least covered by woods include flat alluvial stretches, such as the Vales of Roeser and Mersch and the Sûre valley below Diekirch, together with some of the heights overlooking the Moselle.

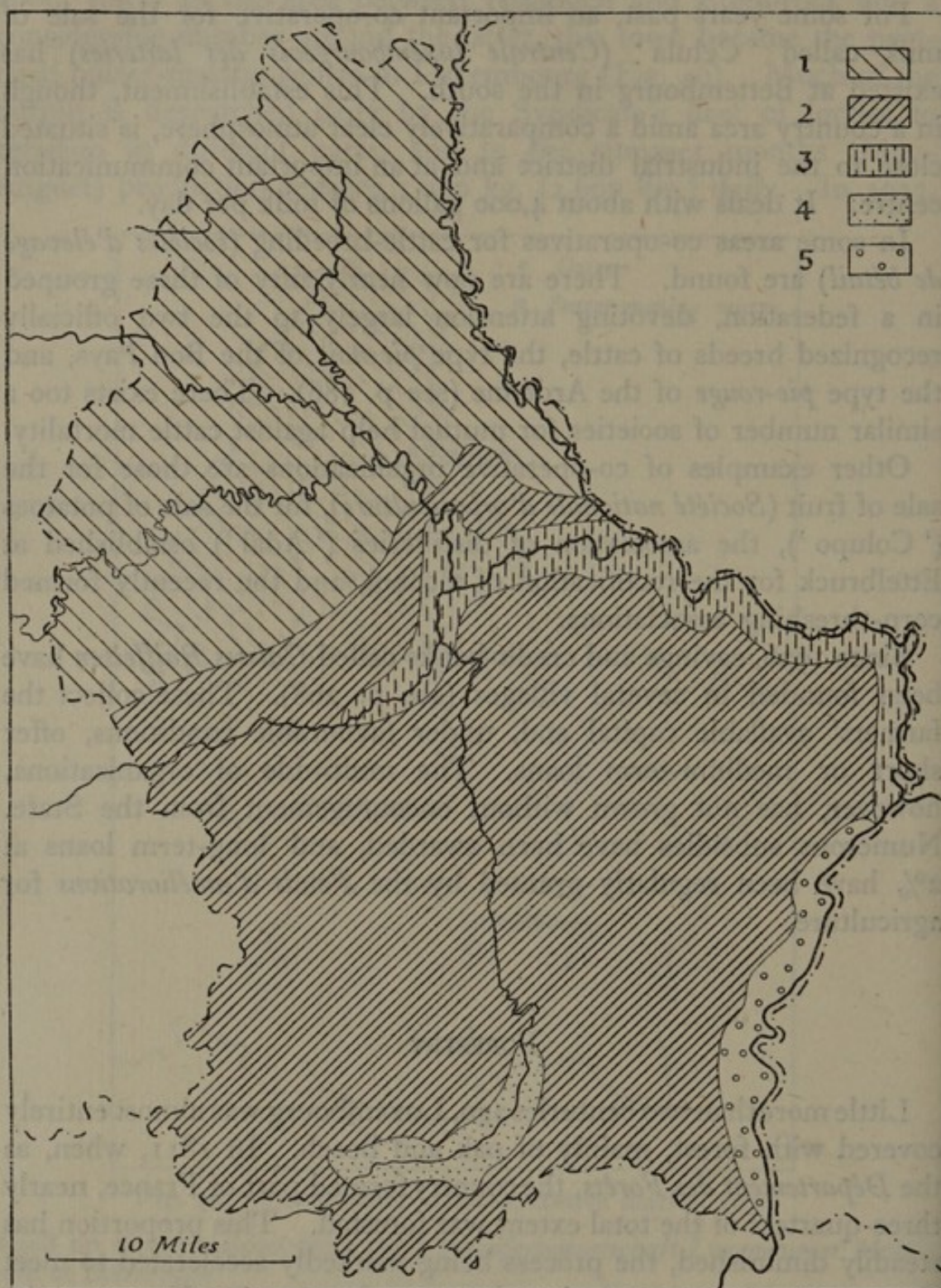


Fig. 47. The natural vegetation regions

1. Beech woods on acid soils.
2. Beech woods on less acid soils, with much cultivation.
3. Mixed woodland on water-meadows.
4. Marsh vegetation (liable to flood).
5. Steppe-heath and woodland.

Source: K. Hueck, 'Die natürliche Vegetation,' in *Atlas des Deutschen Lebensraumes*, edited by N. Krebs (Leipzig, 1937).

Distribution of the Forests

The Bon Pays. Fig. 48 shows a fairly uniform occurrence of woodland, with little distinction in this respect between the Ardenne and the Bon Pays. If in the former a slightly greater proportion of the surface is devoted to forest, this is made up for in the latter by the existence of several individual woods of vast extent such as the famous Grönewald, north-east of the capital, the Baumbusch on the city's northern outskirts, and the Marscherwald, which spreads eastward from the valley of the Ernz Noire between Junglinster and Consdorf. All these examples occur on the Luxembourg Sandstone, which is one of the geological formations most favourable to forest development. With its frequent capping of limestone, the sandstone area of the Bon Pays, normally well drained, is particularly suited to the growth of oak and beech, which, with smaller quantities of coniferous timber, constitute the principal trees found in the woodlands. The beech-woods of the Petite Suisse district (Müllerthal) and those of the Eisch valley both contain magnificent trees. On the more sterile exposures of the sandstone, however, birches and conifers frequently predominate.

Further north, the outcrop of the Bunter sandstone is also well timbered, partly because it gives rise to highly featured country in which the steep slopes are left under woodland, and partly because it provides agricultural land of only moderate quality. On the clay lands of the south (Keuper Marl and Middle Lias Clays and Marls) damper conditions prevail, but there is little difference in the amount of woodland. One considerable area between Bettembourg and Nœrtzange in the upper Alzette valley, however, has long been cleared of its tree-cover, and, being rather poorly drained, is largely devoted to permanent grass.

Though many areas were depleted in the eighteenth and early nineteenth centuries to provide charcoal for the iron industry, most of the inroads upon the forest have been made by clearing for cultivation. Even to-day most of the villages appear to stand in the midst of what are really huge clearings, while the abrupt limits and frequent re-entrant boundaries of some of the larger woods indicate the details of this conquest. There is still no doubt that the forest is the dominant feature of the natural vegetation. In the Bon Pays the oldest woods are of oak and beech. Where the former is dominant, an undergrowth thicket of hazel, wild raspberry and hawthorn is common. Beeches are more confined to hollows in the deep valleys of the Luxembourg Sandstone, such as the Müllerthal,

where they often reach a considerable height before branching and thus provide useful timber. A younger woodland composed either of beeches or conifers may be distinguished in many parts. The area of softwood trees is being extended widely, both by colonization and by afforestation, and is gradually replacing the older woods. Thus firs and larches now form a dense cover in the gorges of the Müllerthal, around Echternach and along the valleys of the west, such as those of the rivers Attert and Mamer.



Fig. 48. Distribution of woodland

Based on 1 : 250,000 G.S.G.S. Series 4042, Army/Air edition, sheets 6, 9 (1940).

The map shows (i) the wide distribution of woodland ; (2) the particularly heavy concentration in the western and central Ardennes, and the large individual woods in the neighbourhood of the capital ; and (3) the considerable clearings for agriculture and the damp river valleys less favourable to forest growth.

The Ardenne. In this part of the country, where cool humid conditions and sour soils prevail, forest occurs either in scattered patches upon the plateau surfaces or as continuous belts following the deep valleys. The oak is predominant, with birch and conifers quite common, but the beech is less tolerant of the non-calcareous soil. On the gentler slopes, tall rather slender oaks growing closely together, with their bark stripped for tanning, were formerly a characteristic feature but are rarely seen to-day. More typical here than in the Bon Pays perhaps is the sombre coniferous plantation, usually of *Picea* or *Pinus sylvestris*. On the higher parts, damp flattish areas similar to the *fagnes* of Belgium support heath (*calluna*), grass such as *Nardus stricta* and groups of willows. Bordering the streams at the bottom of the deep valleys are rich meadows lined with alders.

Maintenance of Forests

Replacement of the forest is effected partly by natural regeneration and partly by reafforestation. Rapid depletion in recent years, especially during the war of 1914-18, led to the necessity of State protection. The Forestry Service (*Administration des Eaux et Forêts*) has established nurseries at Wiltz, Hosingen, Haut-Feulen, Diekirch, Beaufort, Consdorf, Kopstal and Baumbusch, while plantations in many parts now come under the supervision of its wardens. Many of the plantations are coniferous, largely of *Pinus sylvestris*, although softwoods still constitute less than ten per cent of the forest cover, i.e. about 30 square miles. The nature and extent of woodlands coming under the surveillance of the Forestry Service may be seen from the following table :

Type of woodland	Acres	
	State owned	Commune or publicly owned
Mature deciduous ..	1,560	24,301
Oak (for tanning bark) ..	—	1,443
Coniferous	641	3,583
Total ..	2,201	29,327

Source : *Statistique de l'Administration des Eaux et Forêts*, 1937-38 (Luxembourg, 1939).

While a proportion of the forests is owned by the State, by the Church and in private estates, the bulk of it is owned by the communes and is used to meet domestic requirements in fuel and timber. The neat pile of cut wood standing in front of the farmhouses is a feature of every Luxembourg village. Log-sawing, plank-cutting and joinery provide permanent employment for a small amount of skilled and semi-skilled labour, while from places situated on a railway there is an occasional export of pit-props to Belgium. There is, however, no export of timber on a considerable scale.

The Forestry Service (*Administration des Eaux et Forêts*) is organized under a Director and Secretary assisted by a Council, responsible to the Ministry of Public Works. The country is divided into the five forest areas (*cantonnements forestiers*) of Luxembourg, Diekirch, Grevenmacher, Mersch, and Wiltz, with an Inspector (*garde-général*) in charge of each. The forest wardens (*gardes-forestiers*) work under the instructions of a small number of *brigadiers*, who are themselves responsible to the Inspector. There are about twenty *brigadiers*, while wardens number well over fifty. The service is also responsible for the administration of the conditions and formalities affecting hunting and fishing in the Grand-Duchy.

The *Administration des Eaux et Forêts* is also responsible for the maintenance of the *Etablissement piscicole de l'Etat* at Ettelbruck. This is primarily concerned with the breeding, hatching and supplying of game fish (salmon, river trout and rainbow trout) to the preserved rivers.

BIBLIOGRAPHICAL NOTE

1. Detailed official statistics are contained in the following Government publications :

(a) *Statistik der Landwirtschaft: Anbauflächen, Ernteertrag und Erntewert* (Luxembourg, annually, latest edition refers to 1939).

(b) *Der Viehstand des Grossherzogtums*, which appears at intervals (Luxembourg, latest edition refers to 1937).

(c) *Ergebnisse der Mostuntersuchungen* (Grevenmacher, annually), compiled by the *Station viticole (Weinbaustation)* at Remich.

2. More summary statistics appear in :

(a) *Rapport sur la Situation de l'Industrie et du Commerce* published annually by the *Chambre de Commerce de Luxembourg*.

(b) *Aperçu Statistique* (Luxembourg, annually).

3. The annual prospectus and other publications of *L'Ecole Agricole de l'Etat* at Ettelbruck contain much valuable information.

4. Details of the forestry service are given in the *Statistique de l'Administration des Eaux et Forêts* (Luxembourg, biennially), and in a more summary form in the *Aperçu Statistique* (Luxembourg, annually).

5. Some special aspects of viticulture are treated in P. Medinger and F. Mersch, *La Viticulture de la Moselle luxembourgeoise : étude sur les grands vins de 1921* (Grevenmacher, 1923).

Chapter X

MINING AND INDUSTRY

General Features : Industrial Employment : The Iron and Steel Industry
Non-ferrous Mines : Quarries : Miscellaneous Industries : Power : The
Tourist Industry : Bibliographical Note

GENERAL FEATURES

Industrial activity in the Grand-Duchy is dominated by mining and metallurgy to such a degree that iron and steel form the pivot of the economic life of the country and provide the main basis of its prosperity. For many years Luxembourg maintained fifth place among the world's iron-ore producing countries and sixth place in the production of pig-iron and raw steel ; the position dropped to sixth and seventh respectively in 1937 since the rapid industrial expansion of the U.S.S.R., as shown in the following table :

Million tons

Country	Iron ore, estimated iron content	Pig iron and ferro-alloys	Steel ingots and castings
U.S.A. ..	37·3	37·1	51·4
Germany ..	2·7	16·0	19·4
U.S.S.R. ..	— *	14·5	17·8
Great Britain	4·3	8·6	13·2
France ..	11·5	7·9	7·9
Belgium ..	0·1	3·8	3·9
Luxembourg	2·2	2·5	2·5

Source : *Statistical Year book of the League of Nations*, 1938-9, pp. 145-7 (Geneva, 1939).

* Details not available

The importance of the metallurgical industry is shown by the fact that in 1939 there were nearly 20,000 metallurgical workers out of a total of 32,000 engaged in industry. It is a notable fact that the *Arbed* works are the second largest metallurgical concern in western Europe.

The secondary industries can be divided into two groups, one operating primarily for the home market, and the other producing goods for export. In the first group are included the production of building materials and quarried stone, brewing, and the manufacture of foodstuffs, tobacco, clothing and general consumer goods. In the second group are certain specialized forms of engineering (such as the making of hydraulic presses, wine presses and electric equipment) and the manufacture of pottery, brushes, leatherware and gloves.

INDUSTRIAL EMPLOYMENT

On 1 January 1940, the total of paid workers employed in industry was 30,703, consisting of 29,611 men, 909 women, and 183 persons under sixteen years old. Of the total, 26,750 were Luxembourg subjects and 3,953 foreigners, among whom the principal elements were 1,205 Italians, 1,031 Belgians, 910 Germans and 235 French. The fluctuation in the aggregate numbers engaged in industry and the varying extent to which the latter has been dependent on foreign labour are shown in the following table :

	1913	1926	1929	1933	1935	1939	1940
No. engaged in industry	31,786	37,747	43,944	28,483	29,334	32,666	30,703
Luxembourgers	16,764	26,241	28,476	22,423	23,659	27,502	26,750
Foreigners	15,022	11,506	14,468	6,060	5,675	5,164	3,953

Source : Based on statistics from various *Aperçu Statistique* (Luxembourg, annually).

It will be seen that before the onset of the general economic depression in the early 'thirties, industrial employment had risen far above the 1913 level, the peak being reached in 1929. Although a considerable recovery from the depression had been achieved by 1937-38, the deterioration of the international political situation checked further progress. At the outbreak of the present war the number employed in industry was very similar to the corresponding figure at the beginning of the war of 1914-18, but during the intervening period the proportion of Luxembourg workers rose from 52% to 80%.

In 1935, an occupational census was made in connection with the usual quinquennial population census. According to this, 128,156 people (or 43.2% of the total population) were dependent on industry.* This figure, however, included not only paid workers, but employers, members of the family engaged in the same industry as the head of the household, and dependent members of the family. Excluding the non-working dependants, 51,739 people (of which 47,451 were men and 4,288 women) were actively engaged; of these 29,334 were working for a direct wage, while the remainder were assisting the head of the household in small-scale industries.

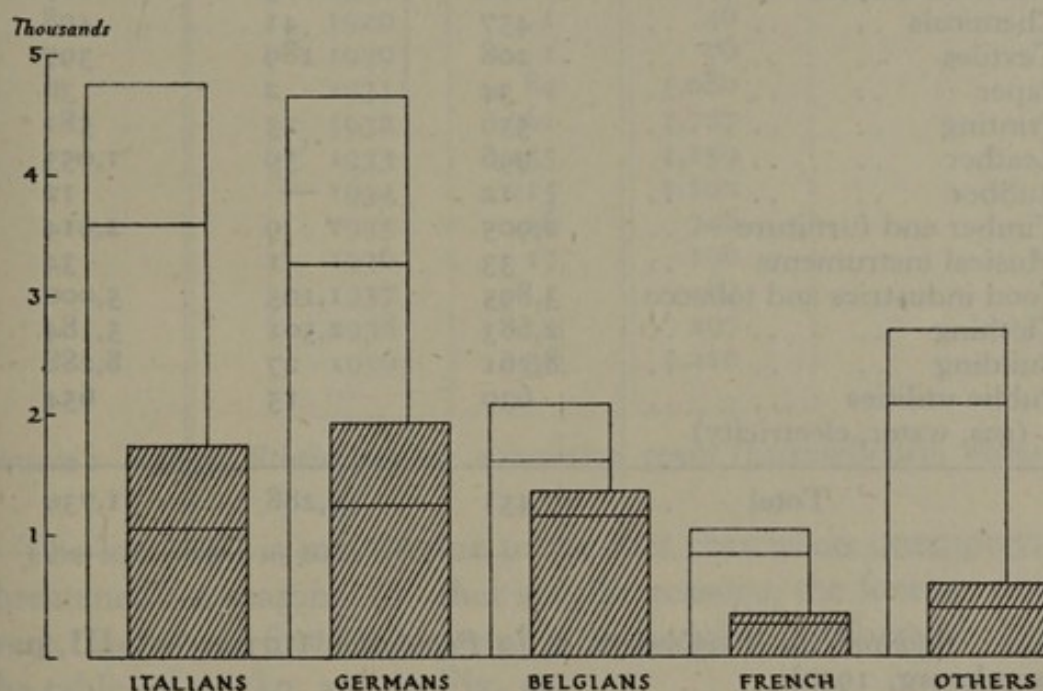


Fig. 49. Foreign labour in Luxembourg industry, 1929 and 1938

Based on statistics from *Rapport sur la Situation de l'Industrie et du Commerce* (Luxembourg, 1939.)

The blank and shaded columns indicate the numbers of foreigners employed in Luxembourg industry in 1929 and 1938 respectively. The lower portion of each column refers to the numbers employed in the metallurgical industry alone.

*In comparing these statistics with those of other countries, it should be noted that the general category of 'Industries et métiers' does not include those engaged in Transport, as is the case for Belgium and France.

The following table analyses the numbers of people actively engaged in each of the following branches of industry :

Industry	Male	Female	Total
Mining	4,195	7	4,202
Quarries, brickworks, etc.	2,225	108	2,333
Iron and steel works ..	16,295	134	16,429
Metallurgical work ..	2,105	46	2,151
Machinery construction ..	1,158	7	1,165
Electrical engineering ..	592	7	599
Precision articles	202	5	207
Chemicals	457	41	498
Textiles	208	189	397
Paper	34	2	36
Printing	556	25	581
Leather	996	59	1,055
Rubber	12	—	12
Timber and furniture ..	2,905	9	2,914
Musical instruments ..	33	1	34
Food industries and tobacco	3,895	1,105	5,000
Clothing	2,683	2,501	5,184
Building	8,261	27	8,288
Public utilities (gas, water, electricity)	639	15	654
Total ..	47,451	4,288	51,739

Source : *Résultats du Recensement de la Population* (1935), Vol. III, p. 14 (Luxembourg, 1940).

The industrial workers engaged in the iron and steel industry are described in detail on pp. 216-18.

Unemployment

The number of unemployed workers has never been very high ; the maximum reached was in 1933, when just over 2,000, or about one-fourteenth of the total workers, were unemployed. However, the minimum employment during the same year was only 455, showing that there was no 'hard core' of permanently unemployed people for any considerable length of time. The following table summarizes the number of the native population unemployed in the Grand-Duchy for each year during the period 1920-39 :

Year	Number employed	
	Minimum	Maximum
1920	100	780
1921	93	1,658
1922	1	137
1923	1	46
1924	1	15
1925	—	—
1926	1	4
1927	1	3
1928	1	3
1929	1	46
1930	1	76
1931	84	1,080
1932	761	1,727
1933	455	2,159
1934	215	1,202
1935	46	748
1936	17	196
1937	1	83
1938	4	297
1939	38	1,210

Source : *Aperçu Statistique* for successive years (Luxembourg, annually).

The low total is mainly due to the fact that when unemployment threatened for seasonal or other specific reasons, the foreign workers were discharged first, as shown by the varying numbers of these in the table on p. 140, and in Fig. 49.

THE IRON AND STEEL INDUSTRY

HISTORICAL BACKGROUND

The modern phase of the iron and steel industry was built up within the economic structure of the German *Zollverein*, mainly during the last quarter of the nineteenth century, but was derived from an earlier phase dating from the beginning of that century when the country was under French rule. This phase can be traced in turn to iron-workings which date from the early seventeenth century. Thus the large-scale exploitation of the 'minette' ore, which began little more than seventy years ago, really revolutionized an industry which was already established. It originated in the

working of local ore at several primitive furnaces in central and southern Luxembourg. The earliest of these was erected at Dommeldange on the edge of the Gr nwald forest in 1605 or soon afterwards, while records show that there were forges at La Sauvage in 1625, a furnace at Septfontaines with forges at Ansembourg in 1630, and others at Bissen and Colmar-Berg a little later. The iron (hydrated oxide), in the form of oolitic and pisolitic grains, was found in alluvial deposits located near some of the rivers, such as the Alzette and its western tributaries the Mamer, Attert and Eisch. These deposits were laid down by large streams in Quaternary

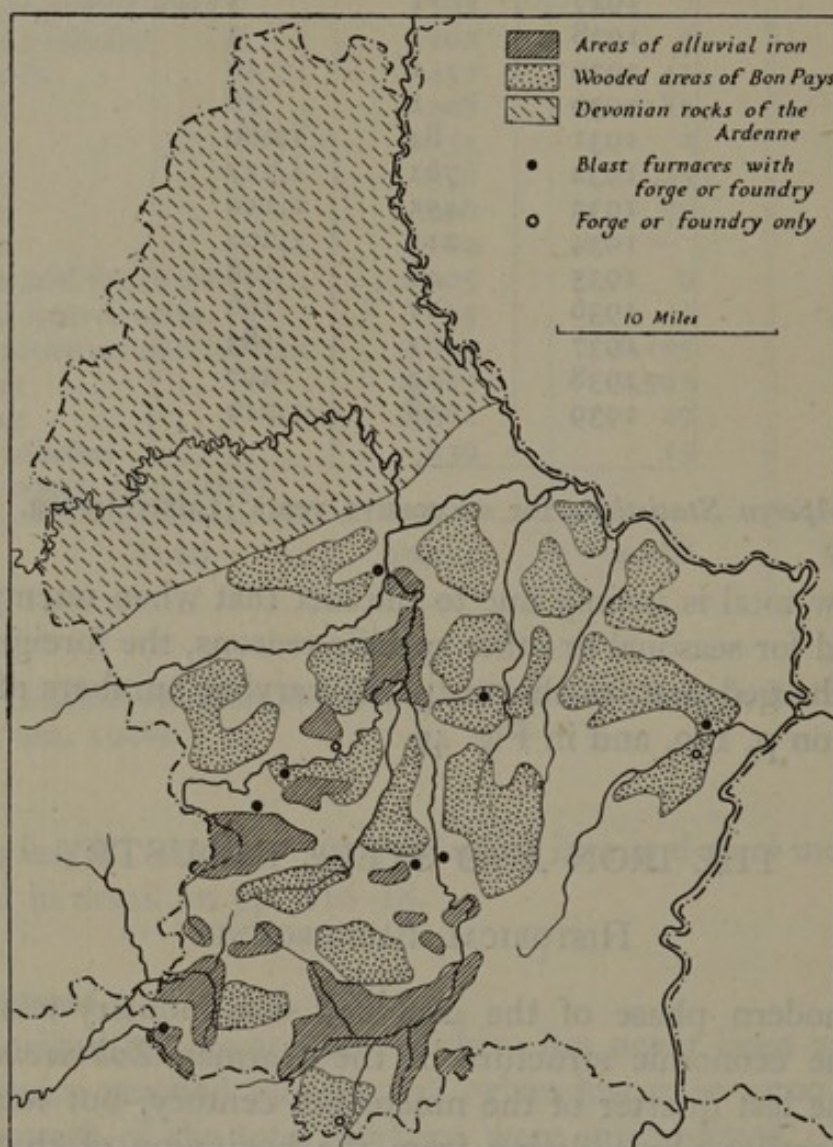


Fig. 50. The iron industry of Luxembourg before 1870

Based on data from J. Wagner, *La Sid rurgie luxembourgeoise avant la d couverte du gisements des minettes* (Diekirch, 1921.)

The map shows how the early industry was based on the juxtaposition of alluvial iron, of charcoal and of water-power. The extensive woodlands of the Ardenne are not indicated.

times, and the present drainage largely follows the same valleys. In many places the alluvial iron was accessible at the surface and obtainable in quantity. It is recorded that as late as 1810 more than 500 tons were gained from the Septfontaines district alone.

The distribution of the tracts of alluvial iron is shown in Fig. 50. Since the streams in which the deposits were originally laid flowed from south-south-west to north-north-east, the heavier or better grade mineral was found nearer the source, and the lighter or inferior grade downstream. An early distinction arose therefore between the better quality iron (*le fer fort*) found especially upon the high ground near the Lorraine frontier, and the inferior kind (*le fer tendre*), which was relatively soft and brittle and found in the lower parts of the valleys. At La Sauvage the mineral contained 40% iron and a little phosphorus, in the upper Alzette valley it contained 30-35% iron and rather more phosphorus, while at Mersch lower down the same valley the iron content seldom reached 30%. Smelting was dependent upon wood fuel from the forests of the Bon Pays, though eventually the provision of charcoal became a profitable business on its own. Large quantities were produced for local consumption and also sent annually into Lorraine; the Ardenne too was exploited for the purpose. The forges likewise demanded fuel, but in addition they required the motive power of the streams, particularly for driving hammers, and in consequence treatment of the metal took place in the neighbourhood of the streams and not necessarily at the furnaces. In time, however, it proved expedient to combine all the processes at the same centre, as at Bissen, Colmar-Berg and Fischbach. A statistical report for the year 1811 shows that some 500 men were engaged in gaining alluvial iron and a further 400 employed at the furnaces and forges. For more than a century, the industry provided Luxembourg and parts of France and Belgium with tools, agricultural implements, arms and shot.

In 1845, August Metz, who had been *maître de forge* at Fischbach, established an ironworks at Eich in the valley of the Mühlenbach on the northern outskirts of the capital. This centre was the first to utilize the 'minette' ore from the south. The earliest discovery of the 'minette' appears to date from the beginning of the century, near Esch-sur-Alzette and at La Sauvage. In 1837, Metz secured the first concession to work these deposits at Tetingerheydt in the commune of Kayl, and in 1845 the first experimental load of the ore was smelted at Eich. A little later these works became the first in Luxembourg to use coke fuel.

Important changes resulted from the development of railways, the lines from Liège to Luxembourg (1862) and from Esch-sur-Alzette to the capital (1859) in particular creating a vast improvement in the supplies of coke and ore respectively. At the same time the old scattered works were placed at a disadvantage, and gradually fell out of activity. For a period therefore the industry became concentrated near the capital, with the erection of large coke-consuming furnaces at Eich, Dommeldange and Hollerich. Those at Colmar-Berg were converted for coke, and others were set up at Steinfort on the frontier near the railway to Arlon and Brussels. Most centres continued to rely on the alluvial ore, while some used the 'minette,' though so far little development had occurred in the south.

In 1867, however, following the Treaty of London, the Government decided to grant mining concessions in the 'minette' region, subject to the ore raised being smelted within the Grand-Duchy. The response was swift, and large-scale exploitation began, especially around Esch-sur-Alzette. In 1871, the *Forges d'Eich* company, of which August Metz was the head, joined with another concern to

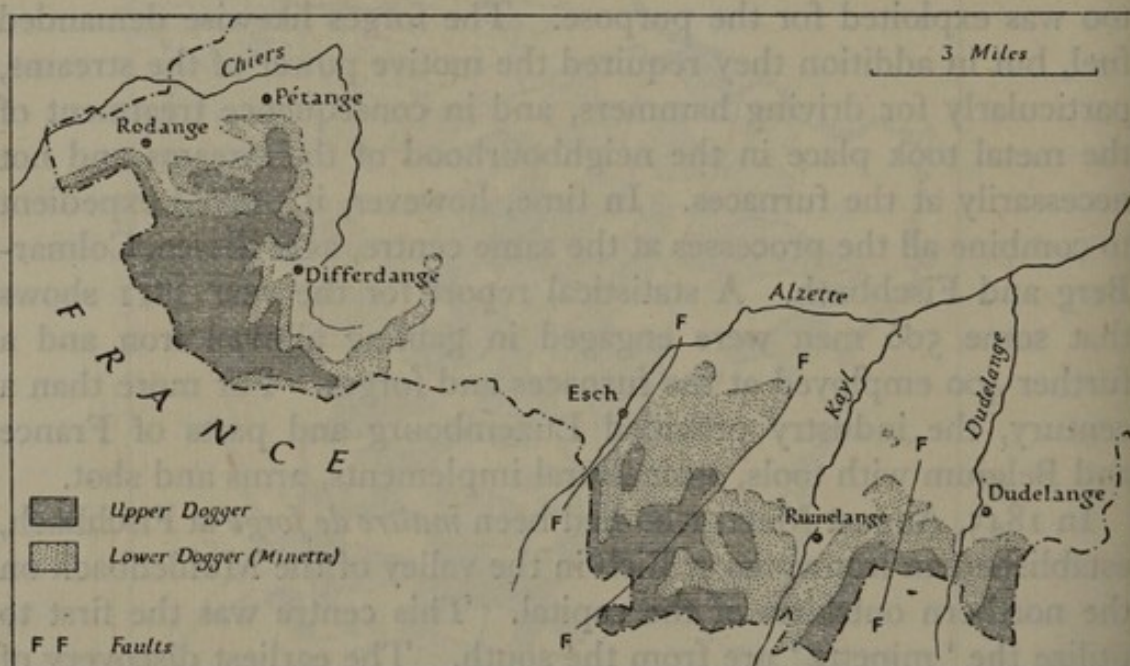


Fig. 51. The 'Minette' Region

Based on the 1 : 200,000 *Geologische Übersichtskarte des Luxemburger Landes*, edited by J. Robert (Luxembourg, n.d.)

The two distinct basins into which the 'minette' region is divided are clearly shown. The more easterly or Esch basin is broken by a number of parallel faults.

establish the first blast furnaces at Esch. This was the real beginning of the modern era in the metallurgical industry, but progress would have been even more phenomenal if a satisfactory means had existed for the production of steel from the 'minette.' This problem was solved by the Thomas-Gilchrist basic process, discovered in 1876 and introduced into Luxembourg and Lorraine a

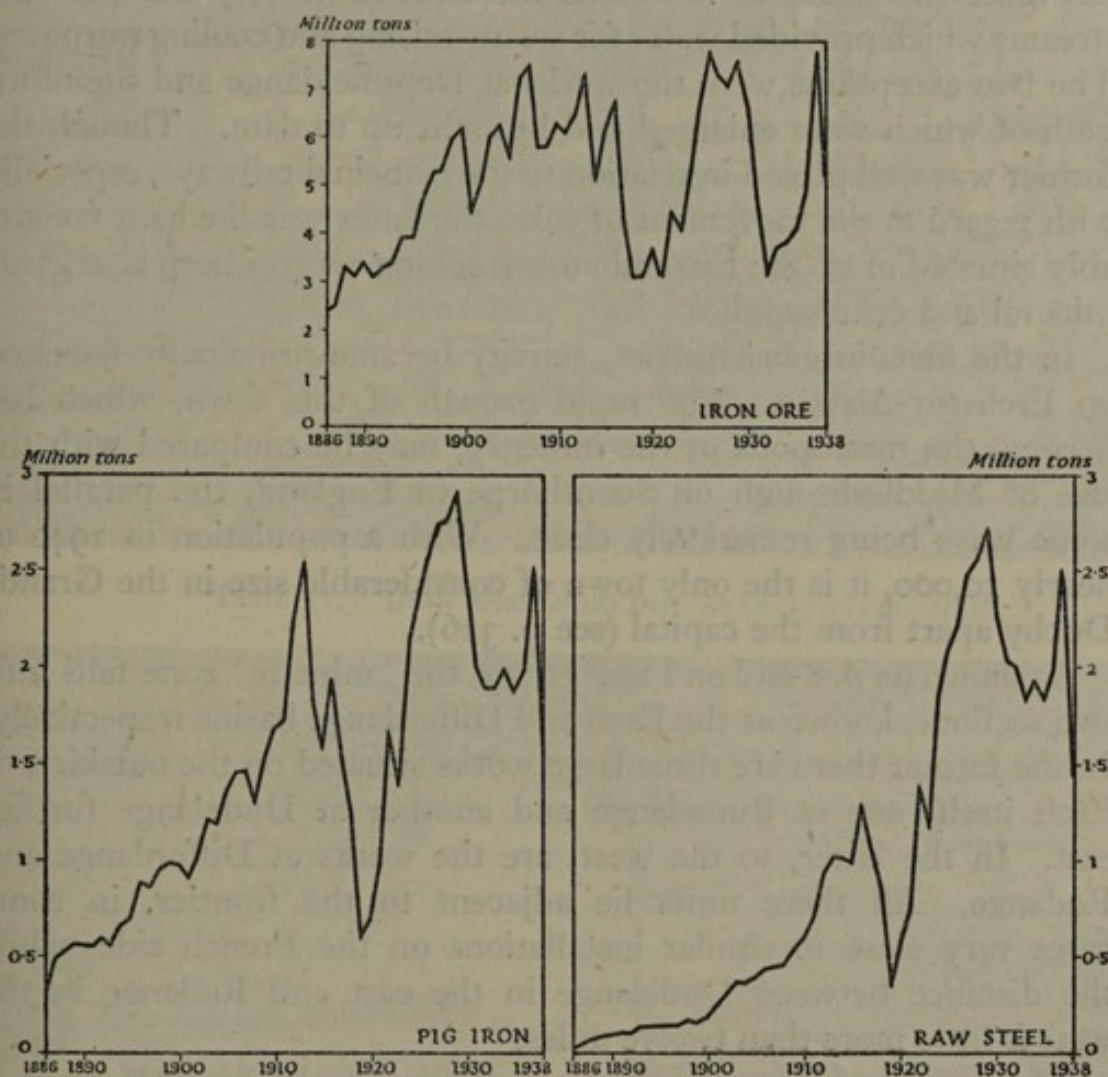


Fig. 52. The production of iron ore, pig-iron and steel in Luxembourg, 1868-1938

Based on statistics from *Rapport sur la Situation de l'Industrie et du Commerce* 1938 (Luxembourg, 1939.)

The fluctuations of production in the heavy industry serve as a 'barometer' to the economic prosperity of the country as a whole. The graph shows clearly (1) the steady rise in output to a peak in 1913; (2) the subsidiary peaks in 1916, due to German war-time exploitation; (3) the post-war depression and subsequent rapid recovery, reaching a maximum in 1929; (4) the effects of the world economic depression; (5) partial recovery; and (6) the depressing effect of disturbed political conditions prior to the outbreak of the present war.

few years later. The first modern blast-furnaces and the first Thomas steel converter in Luxembourg were installed at Dudelange in 1884. From this time the 'minette' region was rapidly transformed into a district of mines, steelworks and rolling-mills, with an accompanying development of railways and townships. The sites chosen for the erection of plant were, with two exceptions, close to the mines, in order to minimize the haulage of ore, and near the streams which provided water for steam-raising and cooling purposes. The two exceptions were the works at Dommeldange and Steinfort, both of which were enlarged and brought up to date. Though the former was well placed in relation to the principal railways, especially with regard to the movement of coke, the latter was the least favourably situated of all the Luxembourg smelting centres both as regards mineral and coke supplies.

In the metallurgical district, activity became principally focussed on Esch-sur-Alzette. The rapid growth of this town, which has become the metropolis of the industry, may be compared with the rise of Middlesbrough or Scunthorpe in England, the parallel in some ways being remarkably close. With a population in 1940 of nearly 30,000, it is the only town of considerable size in the Grand-Duchy apart from the capital (see p. 326).

As shown on p. 8 and on Figs. 51, 53, the 'minette' zone falls into two sections, known as the Esch and Differdange basins respectively. In the former there are three large works situated on the outskirts of Esch itself, one at Rumelange and another at Dudelange further east. In the latter, to the west, are the works at Differdange and Rodange. All these units lie adjacent to the frontier, in some cases very close to similar installations on the French side, while the distance between Dudelange in the east and Rodange in the west is little more than twelve miles.

The output of iron ore, pig-iron and raw steel from 1886 to 1938 is represented graphically on Fig. 52.

IRON ORE MINING

The 'minette' region of the Grand-Duchy, some 9,000 acres in extent, is a continuation of the Lorraine iron-ore basin, but constitutes only a minute fraction of the whole (Fig. 53). The ore-bearing formation at first increases in thickness from east to west, but after reaching a maximum near Esch, diminishes again. The ore-beds themselves vary considerably in thickness and in quality from one



Plate 21. IRON ORE WORKING NEAR DIFFERDANGE



Plate 22. THE ARBED IRON AND STEEL WORKS, ESCH-SUR-ALZETTE

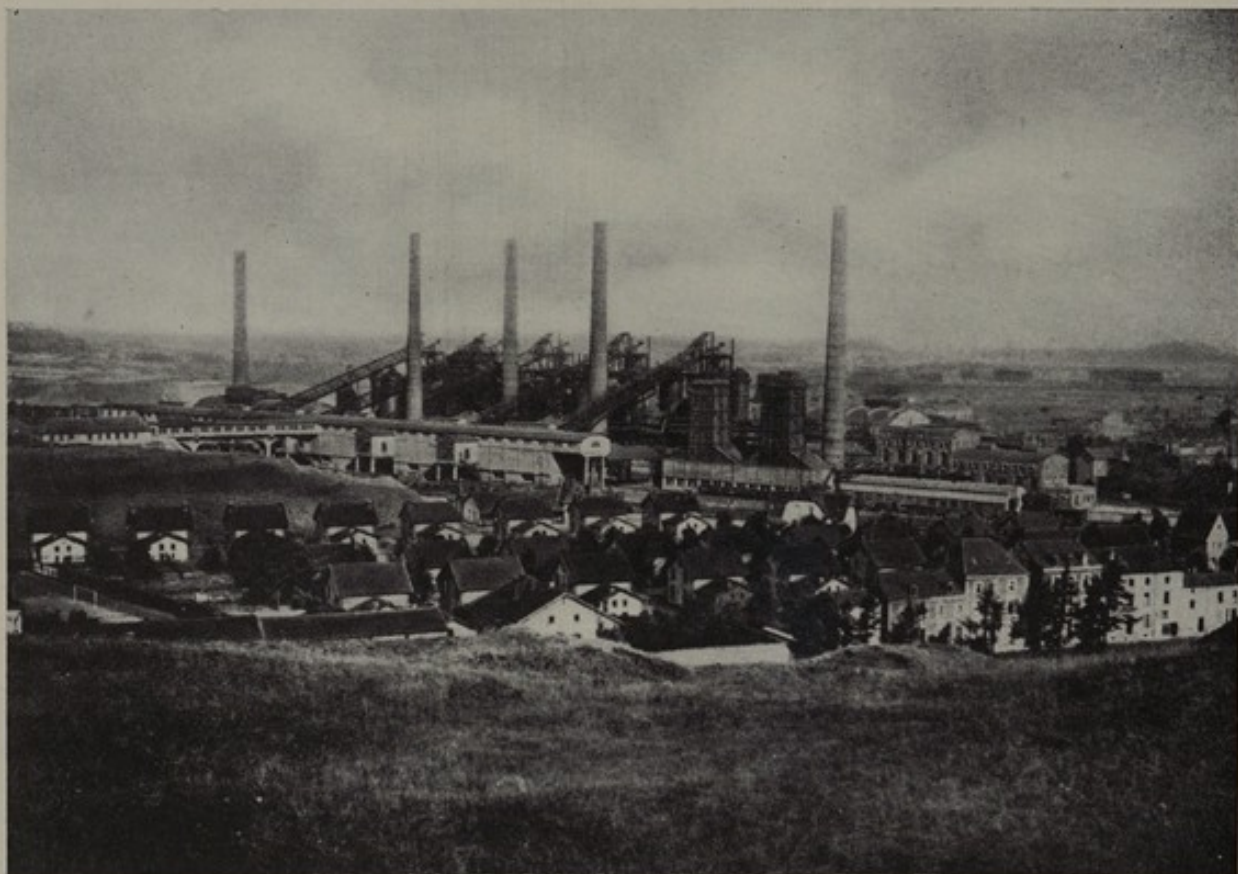


Plate 23. THE TERRES ROUGES IRON AND STEEL WORKS AT ESCH-SUR-ALZETTE

district to another, and only the so-called 'grey' bed is consistently present. Whereas in the western or Differdange section the mineral is predominantly siliceous, in the Esch section it is both siliceous and calcareous. As may be expected, the beds are separated by varying thicknesses of sterile material. At Esch the exploitable 'minette' beds have a mean aggregate thickness of 52 feet, and at Differdange of 42 feet. The general character of the various beds in order of depth from the surface may be summarized as follows :

(1) The 'siliceous red' bed is found only in the Esch basin, and is particularly rich in silica and in quartz grains.

(2) Of the two 'calcareous red' beds, the upper is found in both the eastern and western sections, but more especially in the latter, and takes the form of a ferruginous limestone ; the lower, known as the Esch 'red' bed, is the more important, owing to its considerable development in that neighbourhood and on account of its relative richness, the iron content reaching to 40% in places.

(3) The 'yellow' bed, also rich in iron, is well developed around Dudelange and extends to Rumelange and Esch, but is not present in the western section.

(4) The 'grey' bed, which is calcareous east of the Alzette and siliceous to the west, is the most important of all, because its composition is particularly favourable to blast furnace treatment. Its thickness, moreover, in the neighbourhood of Esch attains to a maximum of 20 feet.

(5) The 'brown' bed, which is siliceous and of a high mineral content, is restricted to the Esch district, where it extends southward to the French frontier.

(6) The 'black' bed, also siliceous, occurs in the western section and again at Esch, but is absent further east.

(7) A 'green' bed, siliceous and pyritous, from 3 feet to 9 feet in thickness and yielding from 32-33% iron, occurs at Esch-Hoehl and continues southward into Lorraine.

The iron content of 'minette' varies from 25% to 40%, lime from 2% to 25%, silica from 6% to 20%, magnesium from 0.4% to 1.6% and phosphorus about 0.65%. The average iron content of the ore exploited is about 30.5%, the figure for the Esch basin (about 29%) being rather below that for the Differdange basin (about 33%). The relative abundance of phosphorus causes the Thomas-Gilchrist process to be universally adopted, and under existing conditions the exploitation of the 'minette' on an economic scale is only undertaken if (a) the iron content closely approaches 30% ; (b) it does

not contain more than about 20% silica; and (c) the bed has a minimum thickness of 3 feet.

Though the Luxembourg ore compares unfavourably with that of Lorraine in its percentage of iron content, it enjoys several advantages in compensation. The existence, side by side of calcareous and siliceous ores, which from the point of view of smelting are complementary, provides an important economic advantage in dispensing with limestone for flux and in requiring a smaller consumption of coke. Further, the low cost of extraction, often by open-cast workings, allows the Luxembourg ore to compete with that beyond the frontier.

Three methods are now used in extracting the 'minette'—open-workings, underground galleries and shafts. The first method is exploited wherever the beds lie within a few yards of the surface, the operations resembling vast shallow quarries, with broad ledges or platforms to indicate the working of more than one bed. Since the surface occurrences of the 'minette' were naturally the earliest to be attacked, many of these workings have long since been exhausted. The driving of underground galleries is the method most widely employed. At different levels along the 'minette' escarpment and on the slopes of the valleys cut by the streams, numerous tunnel-openings are to be seen. These mark the entrances to systems of galleries which are planned to follow the various ore beds. Some are roughly hewn, while others, especially the large ones, are more elaborate. Passing into these tunnels and disappearing into the darkness can be seen a railway track, a footpath and overhead cables for power and light. Where possible, two or more beds are worked in the same gallery, and as a rule a roof two or three yards in thickness is adequate to ensure the safety of the miners. The ore is first dislodged by an explosive charge and then broken up by the miners with pneumatic drills and hammers. Serious accidents are infrequent, though they do occur. In January 1933, for instance, six miners were buried by the collapse of a roof in the Fond de Gras mine. Shaft-mining is found at only two places in Luxembourg, at Ellergrund and Hoehl (Plate 21).

The total number of workings is about eighty, of which fifty are in the Esch basin and the remainder in the Differdange basin. Of the total, thirty-one are exclusively open-cast workings and twenty-one exclusively underground. The following table summarizes the output of ore in 1934 for the centres of Esch-sur-Alzette

and Rumelange (eastern section of the field) and of Pétange (western section):

Centre	Number of miners	Output, tons	% of iron content
Esch ..	605	759,406	30.91
Rumelange ..	710	1,021,982	28.04
Pétange ..	1,311	2,032,459	31.80
Total ..	2,626	3,833,847	30.62

Source: *Rapport sur la Situation de l'Industrie et du Commerce, 1934*, p. 28, published by the *Chambre de Commerce du Grand-Duché de Luxembourg* (1935).

The subject of future reserves of ore has engaged the attention of metallurgists in the Grand-Duchy for many years past, and various estimates have been made from time to time. Among these the following may be regarded as being within reasonable limits of probability:

Authority	Date of estimate	Estimated reserves of 'minette' (million metric tons)
Bailly	1903	300
Limpach	1908	267
Kohlmann	1911	250
J. Wagner	1920	273

If Wagner's figure, based on more reliable data than those of his predecessors, be accepted provisionally and deduction made for the extraction of ore made since 1920, the existing reserves may be put at little more than 180 million tons.

The supply of ore to the Luxembourg furnaces is governed both by metallurgical practice and by the distribution of 'minette'-workings owned by the various industrial concerns. Thus only part of the output from the Grand-Duchy is consumed in the country, much being sent to Belgium and Germany, while the

deficiency is supplied mainly from Lorraine, as shown in the following table for 1934 :

Tons

Centre	Ore produced and consumed Grand-Duchy	Luxembourg ore exported to				Imports of ore from France
		Germany and Saar	France	Belgium	Total	
Esch	567,024	} 369,606	—	191,673	192,343	2,284,278
Rumelange	881,872		—	89,352	147,385	595,159
Pétange	1,251,449		198,389	321,931	831,223	800,871
Total	2,701,345	369,606	198,389	602,956	1,170,951	3,680,308

Source: *Rapport sur la Situation de l'Industrie et du Commerce*, 1934 p. 29, published by the *Chambre de Commerce du Grand-Duché de Luxembourg*, (1935).

Some years before the outbreak of the present war, the *Arbed* combine, operating workings across the French frontier, were known to possess concessions which, with their existing properties, amounted to over 18,000 acres in addition to their 3,000 acres in Luxembourg. This probably represents a reserve of not less than 300 million tons of ore. Works belonging to the *Arbed-Terres Rouges* group are supplied with a considerable amount of 'minette' from Lorraine by overhead cable or by mineral lines with electric traction. The following table summarizes the total import of iron ore from Lorraine into Luxembourg for the years 1925-34 :

Year	Tons	Year	Tons
1925	3,021,262	1930	5,035,351
1926	3,480,852	1931	3,694,338
1927	4,399,788	1932	3,569,158
1928	5,057,430	1933	3,723,595
1929	5,125,497	1934	3,680,308

Source : Successive volumes of the *Rapport sur la Situation de l'Industrie et du Commerce*, published by the *Chambre de Commerce du Grand-Duché de Luxembourg* (annually).

Small quantities of high-grade iron ore, as well as of alloy materials, are imported annually for the enrichment and specialized treatment of steel. Some 50,000 tons of hematite iron are obtained each year from Sweden and Spain, while about 150,000 tons of manganese are imported from India, Brazil and the U.S.S.R.

CONDITIONS OF IRON AND STEEL PRODUCTION

Coal and Coke

Luxembourg is without any local coal supplies of her own, and both coal and coke are imported, chiefly from Germany (the Westphalian and Saar fields), Belgium and the Netherlands (Fig. 53). Before the war of 1914-18, largely as a result of Luxembourg's position in the *Zollverein*, almost the entire requirements were supplied by Germany. Though in the years immediately following 1919 considerably more than half the total was obtained from other countries, in time Germany regained her position as the principal source, and by 1926 provided 60% of the 3 million tons of coke imported into the Grand-Duchy. In subsequent years

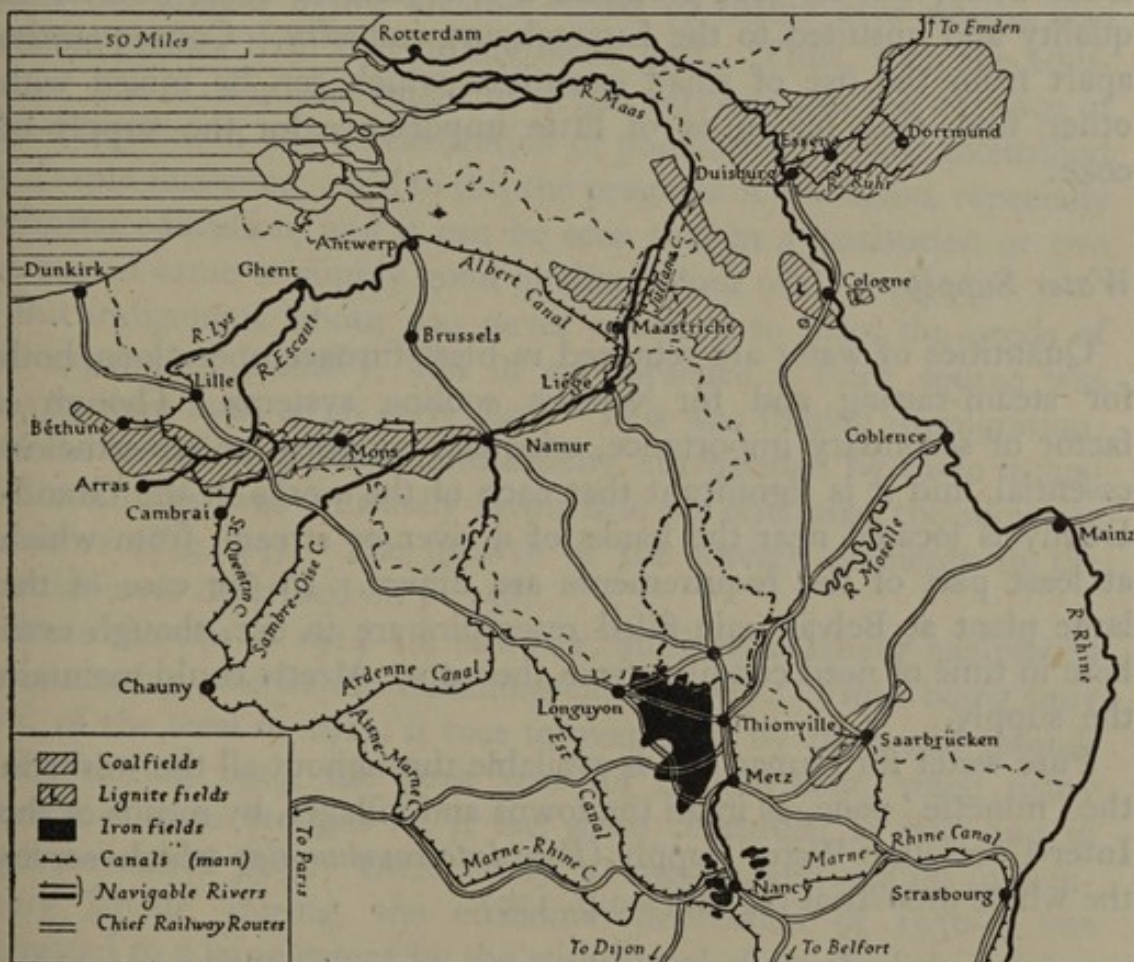


Fig. 53. Luxembourg in relation to industrial resources and communications
Compiled from various sources.

The most striking features are (1) Luxembourg's favourable position with regard to the great 'minette' field; (2) its relative remoteness from adequate resources of coking coal; and (3) its distance from the seaboard. A well-developed system of communications allows raw materials to be assembled and finished products to be exported.

this percentage rose still higher. Much of the coke comes from the Eschweiler district near Aachen, where the *Arbed* combine owns mines and coke-ovens, while further quantities are obtained from the Ruhr. Despite its higher cost and freight charges, Rhineland coke is definitely preferred by Luxembourg metallurgists on account of its superior quality, for only by the production of steel of an assured quality are they able to compete in a world market.

The rest of the coal and coke is obtained almost entirely from Belgium, chiefly from the Mons, Liège and Belgian Campine (Kempenland) districts, while small quantities come from the Dutch Campine and from Britain. It should be noted that the nearest coalfield to the Grand-Duchy is that of the Saar, only sixty miles away, but its coal produces a low yield of coke, inferior in quality and unsuited to the Luxembourg industry. Consequently, apart from the use of small quantities which can be mixed with other fuel, this region is of little importance for the supply of coke.

Water Supply

Quantities of water are required in blast-furnace operations, both for steam-raising and for various cooling systems. Though a factor of secondary importance, adequate supplies are nevertheless essential, and it is significant that each of the works in the Grand-Duchy is located near the banks of a river or stream, from which at least part of the requirements are drawn. In the case of the large plant at Belval, rain-filled reservoirs are in use, though even here in time of need conduits from the upper Alzette could maintain the supply.

Pure water for human use is available throughout all the works in the 'minette' zone, as in all the towns and villages, by means of the Inter-Commune Water Supply (*Eau Intercommunale*) which serves the whole industrial region (see p. 120).

Labour

During the sixty years of development, the labour requirements of the metallurgical industry have been met from three sources. First, there has been a movement from other parts of the Grand-Duchy towards the mining zone, the usual attractions of industrial employment and urban life having resulted in a phenomenal concentration

of population within the canton of Esch. Happily, the agricultural life of the country was not seriously impaired by these changes, though particularly in the earlier stages the recruitment of labour for the mines and works depended mainly on the drift from the rural areas.

Secondly, in the course of time the industrial zone itself became a reservoir of man-power. The concentration of population, together with the 'mushroom growth' of towns, had important effects. These were largely, though not exclusively, confined to the canton of Esch, and can readily be measured by reference to the vital statistics for that area. These show that during the present century the birth-rate in the canton rose to be the highest in the country, while the annual figure for the excess of births over deaths also became greater than that in any other part. Thus, with the additional effects of improvement in health services and the advance of social legislation, the concentration of population became intensified by a rapid increase. Add to this the progress of education, especially technical education, and it can be seen that in a generation or two the region came to supply good quality labour of its own.

But indigenous labour was never adequate to meet the needs of the expanding industry, and in consequence a third source was drawn upon even at an early date. This was foreign immigration, and the situation of the Grand-Duchy, surrounded by three industrial countries, was unusually favourable for obtaining the requisite numbers (Fig. 49). The growth of the foreign elements in the population is described on p. 156.

Since the war of 1914-18, however, indigenous labour has played an increasing rôle in the metallurgical industry. From being only 40% of the total in 1913, it rose to over 60% by 1926, and though it fell during 1929, the peak year for employment, when many foreigners were brought in, it has since continued to rise, and in 1938 it reached 79%. Incidentally, unemployment among Luxembourg labour during the economic depression of 1930-2 was mitigated to a large extent by the withdrawal of much of the foreign element. By 1938, due presumably to political causes in the main, a change had also occurred in the relative strength of the different nationals. Of the 4,279 foreigners engaged in the iron and steel industry, Germans with 1,284 formed the largest group, a distinction hitherto falling to the Italians; Belgians ranked next with 1,167, and Italians third with 1,098; there were also 328 French and 402 of other nationalities.

Nationality of workers in the metallurgical industry, 1913-39

Total	Total	Luxembourgers	Foreigners	Italians	Germans	Belgians	French	Others
1913	19,168	7,707	11,461	5,565	3,886	1,185	517	308
1926	25,433	16,264	9,169	3,464	2,766	1,426	698	815
1929	28,938	17,390	11,548	3,624	3,267	1,662	869	2,126
1939	19,599	15,853	3,746	983	1,038	1,018	295	412

Source : *Aperçu Statistique* for successive years (Luxembourg, annually).

An important factor affecting labour supply in industry was the introduction by Government decree of the eight-hour working day at the end of 1918. In the steel works the organization of three shifts daily raised anew the problem of man-power. Not only were more workers required, but many left the industry rather than have their earning capacity restricted by the specified working hours. For a time too output suffered as the result of reduced hours of work. Eventually, however, improvement set in and whether or not related to the general post-war recovery, the problem was overcome and in time the benefits of the reform became apparent to employees.

In 1938, the distribution of workers among the principal sections of the metallurgical industry was as follows :

	Numbers employed
Mines	4,032
Blast Furnaces	3,315
Steel production	2,038
Rolling Mills	6,475
Other branches	4,557*
Total	20,417

*Of this number rather less than 1,000 are normally employed in the foundries associated with the ironworks.

Source : *Rapport sur la Situation de l'Industrie et du Commerce*, 1938 (Luxembourg, *Chambre de Commerce*, 1939).

While many employees live at a considerable distance from the mines or works, preferring to travel daily by cycle, bus or train, and spending the rest of their leisure time on a little holding in the country, the vast majority live in the towns or in housing estates on the outskirts. The metallurgical concerns have promoted the development of these *cités ouvrières* which are found at Esch, Schifflange, Dudelange, Differdange, Oberkorn, Rodange and Steinfort.

Transport

The broader aspects of transport as it affects the iron and steel industry are described on pp. 292 and 295. Although only two of the

units, Dommeldange and Rodange, are sited directly on main lines, the one on the Luxembourg-Liège line and the other on the Luxembourg-Paris line, railway distances in the Grand-Duchy are short, and location upon the branch lines serving the 'minette' region is not a serious disadvantage. What is important, however, is the distance of the plant from its source of coke, in view of the cost of haulage (Fig. 53). Thus the freight charge from the Ruhr to Luxembourg represents about 50% of the cost of the coke. Since railway rates between German and Belgian railways and between the *Guillaume-Luxembourg* and *Prince Henri* systems are not strictly uniform, this factor in terms of annual tonnage becomes significant.

Between the mines and the blast furnaces there exists a network of mineral lines to ensure expeditious movement of the ore, while from the steelworks and rolling mills other lines of normal gauge lead to sidings, which in turn connect with the ordinary railways. The lay-out of these two systems of internal communications affects to a large degree the efficient working of a metallurgical plant, and most of the Luxembourg units are sufficiently up to date to be well planned in this respect.

Industrial Electric Power

In Luxembourg, as in Lorraine, smelting is undertaken on the ore-field, and an exceptionally close relationship exists between the mines which provide the raw material and the blast-furnaces which transform it into iron. The modern technique of using gases to make electrical energy intensifies the relationship by furnishing another link between the mine and the plant. The latter supplies the mine with electric power, which is applied in several ways. Consequently most of the installations produce electricity, much of which is consumed in their own mines, while any surplus is disposed of outside the industry, e.g. for public consumption (see p. 242). This form of energy is used in the 'minette' workings for driving the pneumatic drills, for lighting and traction, for pumping water and for mine ventilation. Elsewhere too it provides power for the manufacture of explosives used in the mines.

Thus, with up-to-date technique, electricity is an important factor in the production of iron, and with its use the more or less complete interdependence of mine and blast-furnace is established. But both within the industry and outside, important implications arise from this situation; for in times of depression a stoppage of the

smelting plant would hinder if not prevent the operation of the mines, while the supply of electricity to outside consumers would be curtailed.

ORGANIZATION

In 1880, shortly before the application of the Thomas-Gilchrist process to steel production in the Grand-Duchy, the *Zollverein* revived its protectionist system and a Lorraine-Luxembourg pig-iron syndicate was formed, thus terminating profitless competition between the works of the two regions. At this time, too, German firms acquired large interests in the Luxembourg industry, such as the *Gelsenkirchener Bergwerks A.G.* at Esch, and the *Deutsch-Luxemburgische A.G.* at Differdange. Gradually, as the various units were absorbed by or affiliated to German syndicates, the influence of that country became predominant and industrial policy was increasingly directed from Düsseldorf. In economic terms, this community of interests was represented by the regular exchange of Luxembourg 'minette' for Ruhr coke, the quantities of each being carefully regulated, and by the policy, greatly to Germany's benefit, of bringing the metallurgical centres of the Grand-Duchy to the highest degree of efficiency.

Following the collapse of the German economic system at the end of the war of 1914-18, the control of the industry reverted to Luxembourg, either by the transfer of capital or by the formation of new companies, while some works were merged with French and Belgian concerns. By far the two largest companies in the Grand-Duchy are those known as *Arbed* (*Société Anonyme des Aciéries Réunies de Burbach, Eich et Dudelange*), and *Terres Rouges* (*Société Métallurgique des Terres Rouges*). The first was established in 1911 by the merging of three firms under the direction of Emil Mayrisch, the *Forges d'Eich*, founded in 1847 by August Metz, the *S.A. des Mines du Luxembourg et Forges de Sarrebruck* founded at Burbach in the Saar in 1856, and the *S.A. des Hauts-Fourneaux de Dudelange* established in 1882. It possesses four works in Luxembourg situated at Esch-sur-Alzette, Dudelange, Dommeldange and Eich. On the basis of its total steel output, *Arbed* ranked second in Europe to the *Vereinigte Stahlwerke* of Germany.

The *Terres Rouges* company was formed in 1919 to take over the mining concessions and the works at Esch and Belval belonging to the German *Gelsenkirchen*, *Rothe Erde* (Aachen) and *Eschweiler*

concerns. It is chiefly associated with the *Société Minière des Terres Rouges*, which acquired the Gelsenkirchen property in Lorraine.

The *Arbed* and *Terres Rouges* companies entered into an agreement in 1926, under which, while preserving their legal autonomy and the ownership of their respective properties, they combined their industrial activities under a single management. They have subsequently been known as the *Arbed-Terres Rouges* group. Even before the conclusion of this working arrangement, the two concerns had jointly set up a sales organization known as *Columeta* (*S.A. Comptoir Métallurgique luxembourgeois*), having a monopoly for the disposal of products from all the associated works. This measure proved highly successful, and *Columeta* rapidly extended its activities to every important market in the world.

The third metallurgical concern is known as *Hadir* (*S.A. des Hauts-Fournaux et Aciéries de Differdange, St. Ingbert et Rumelange*) and was founded in 1920. It owns the works at Differdange and Rumelange, together with others in Lorraine and the Saar, all formerly belonging to the *Deutsch-Luxemburg* company. For its export business *Hadir* has a sales organization called *Sogeco* (*Société Générale pour le Commerce des Produits Industriels*), which also undertakes the purchase of raw materials for the industry. Another concern is the *S.A. d'Ougrée-Marihaye* of Belgium, founded in 1872, which operates the works at Rodange. The latter utilizes the Ougrée agency *Socobelge* (*Société Commerciale de Belgique*) for the disposal of its products. Finally, there are the works at Steinfort, one of the earliest of the modern smelting centres in the Grand-Duchy. After several changes in financial control both before and after the last war, the *Société des Hauts-Fourneaux et Aciéries de Steinfort* was absorbed in 1921 by the *S.A. d'Athus-Grivegnée*, which six years later became the *S.A. Angleur-Athus*, an important metallurgical group in the Liège district.

The iron and steel industry of Luxembourg is thus dominated by a few great organizations, the ramifications of which extend throughout a vast range of industrial activity. The *Arbed-Terres Rouges* group alone produces over half the annual output of steel and possesses more than a quarter of the 'minette'-working area. Even where smaller companies exist, like the *Société de Steinfort*, they are generally subsidiaries of larger combines. The latter exhibit the normal features of vertical integration, with their constituent properties often situated in several countries. The *Ougrée-Marihaye* concern, for example, obtains ore for the steel plants at

Ougrée and Rodange from its own workings in the Grand-Duchy and from Lorraine, where it also possesses reserves, while it owns coal mines and coke ovens in the Ougrée district and at Bray. Similarly, Steinfort is assured of its supplies of coke through part-ownership of a Belgo-Dutch company operating mines and coke-ovens near Maastricht. But it is the *Arbed-Terres Rouges* group, of course, which exhibits integration, both vertical and horizontal, on the greatest scale. With the possession of coal, ore, refractory minerals, blast-furnaces, rolling-mills and foundries, it controls all stages of manufacture and at the same time owns more than one group of similar combines. Geographically, *Arbed-Terres Rouges* embraces three somewhat concentric spheres of operations. First comes the primary concentration within the Grand-Duchy, the principal concern in the combine being mainly dependent on Luxembourg capital and directive personnel. In any case, six of the iron and steel works are in that country. Next are the properties of *Arbed* and the associated firms located in neighbouring parts of the surrounding countries. These include blast-furnace installations in Lorraine, the Rhineland and the Saar; mines of the *Eschweiler Bergwerksverein*, important producers of coal and coke; a large cable works at Cologne; a large nail- and wire-works at Gentbrugge; and various coal mines in Belgium and the Netherlands. Thirdly, there are the growing overseas interests, for the company now owns mines and metallurgical units in Brazil and Argentina and in 1928 acquired control over a South African firm manufacturing wire-fencing. This sphere of activity may be exploited to a much further degree in the future, for two of the principal factors concerned in this development are likely to continue in operation. First there is the problem of the future supply of ore. The Luxembourg 'minette,' if worked at the pre-war rate, may not last longer than another thirty or forty years, and although reserves in Lorraine are much greater, prudence demands looking far ahead. The second factor arose from the re-orientation of economic policy after the last war. The *Zollverein*, to which the Grand-Duchy had been attached for three-quarters of a century and under the protection of which the metallurgical industry had been built up, was denounced, and new markets and connections had to be sought. The Economic Union with Belgium, taking effect in 1922, proved of little advantage to the iron and steel industry. No material expansion took place in the home market while prohibitive duties prevented exports to neighbouring countries. In

these circumstances, industrialists were forced to enter the more distant markets, and several firms besides *Arbed* accordingly strengthened their sales organizations and widened the scope of their activities abroad. Their efforts in this direction have produced important results, not the least of which is the laying of foundations for long-term developments.

Despite the closing of the German market, recovery was satisfactory, and by 1926 the production of pig iron reached the 1913 level, while the output of steel was much greater than the pre-war quantity. In the same year too, the production of 'minette' ore exceeded the 1913 figure for the first time, though it fell somewhat in subsequent years, and even with the boom preceding the present war never rose to the 1926 figure. It must be remembered, moreover, that production was abnormally high that year, for Luxembourg, like other countries, benefited from the industrial stoppage in Britain caused by the General Strike (Fig. 52).

INSTALLATIONS AND OUTPUT

The large productive capacity of the Luxembourg metallurgical industry is shown by the table on p. 224, which summarizes the number of installations in the various branches of the industry, together with the output of the various products for the peak year 1929, a slump year 1933, the year of maximum recovery 1937, and the renewed depression year 1938, due mainly to the unsettled political state of Europe.

The table refers only to units involved in the fundamental operations and not to the vast amount of equipment and specialized plant for the manufacture of finished and semi-finished goods, nor to the machinery for accessory industries. These are best summarized in the description of the individual centres given below and on Fig. 54. By 1938, the number of blast-furnaces had diminished to thirty-five, largely as the result of rationalization measures, while the number in blast, thirty-eight in 1929, had dropped to half that figure. With the onset of the depression in 1931, all three of the furnaces at Steinfort were closed, bringing operations to a standstill and work was not resumed there for several years. That this unit was the first to succumb may to some extent reflect its relatively less favourable location.

The seven individual steel plants included twenty-four Thomas converters, each of twenty to thirty tons capacity, three Siemens-

	1929	1933	1937	1938
<i>Pig-iron</i>				
Number of furnaces	47	38	35	35
" " (in blast)	38	21	22	19
" " workers	7,463	3,086	3,523	3,315
Consumption of ore (local)	6,065,399	2,639,055	4,301,749	2,037,919
tons (foreign)	4,546,383	3,693,209	4,736,238	3,449,259
Consumption of coke (tons)	3,663,930	2,039,209	2,955,627	1,820,728
Production of pig-iron (tons)	2,859,250	1,882,753	2,483,505	1,526,787
" " cast iron (tons)	42,638	4,785	14,495	11,958
<i>Raw steel</i>				
Number of steel-works	7	7	7	7
" " workers	3,182	1,881	2,221	2,038
Consumption of pig-iron (tons)	2,922,650	1,889,270	2,539,747	1,494,255
" " scrap (tons)	124,223	160,025	237,505	91,977
Production of "Thomas" steel (basic Bessemer) (tons)	2,669,759	1,837,085	2,491,981	1,389,354
Production of steel castings (tons)	22,536	1,235	9,106	354
Production of steel by electric furnace (tons)	9,962	6,511	9,147	46,798
<i>Semi-finished and finished steel</i>				
Number of rolling mills	6	6	6	6
" " workers	8,524	6,498	6,720	6,475
Consumption of ingots (tons)	2,858,503	1,832,198	2,484,711	505,304
Production of semi-finished steel (tons)	216,878	220,170	364,765	158,692
Production of finished steel (tons)	2,323,059	1,598,348	2,094,512	1,260,115
<i>Foundry pig-iron</i>				
Number of foundries	11	13	13	13
" " workers	879	637	760	836
Production of foundry iron (tons)	53,226	26,208	33,819	25,879

Source : Successive volumes of *Rapport sur la Situation de l'Industrie et du Commerce*, published by the *Chambre de Commerce du Grand-Duché* (Luxembourg, annually).

Martin furnaces of fifteen to thirty tons, and six electric furnaces of three and one-half to six tons. The technique of the industry resembles that of France and Belgium, the two other countries which mainly use Lorraine ore. Here the Thomas converter (or basic Bessemer) is employed almost exclusively; furnaces lined with basic material, usually dolomite, are necessary because of the phosphoric nature of the ore (see p. 211), and this type of converter is a quicker method of producing steel; further, it uses practically no fuel. The open hearth (Siemens-Martin) furnace, which is usually fired by producer gas, and is used commonly in Germany

and Great Britain, is found only at two places in Luxembourg, at the *Arbed* works at Dudelange, and at the *Angleur-Athus* works at Steinfort, using mainly scrap iron.

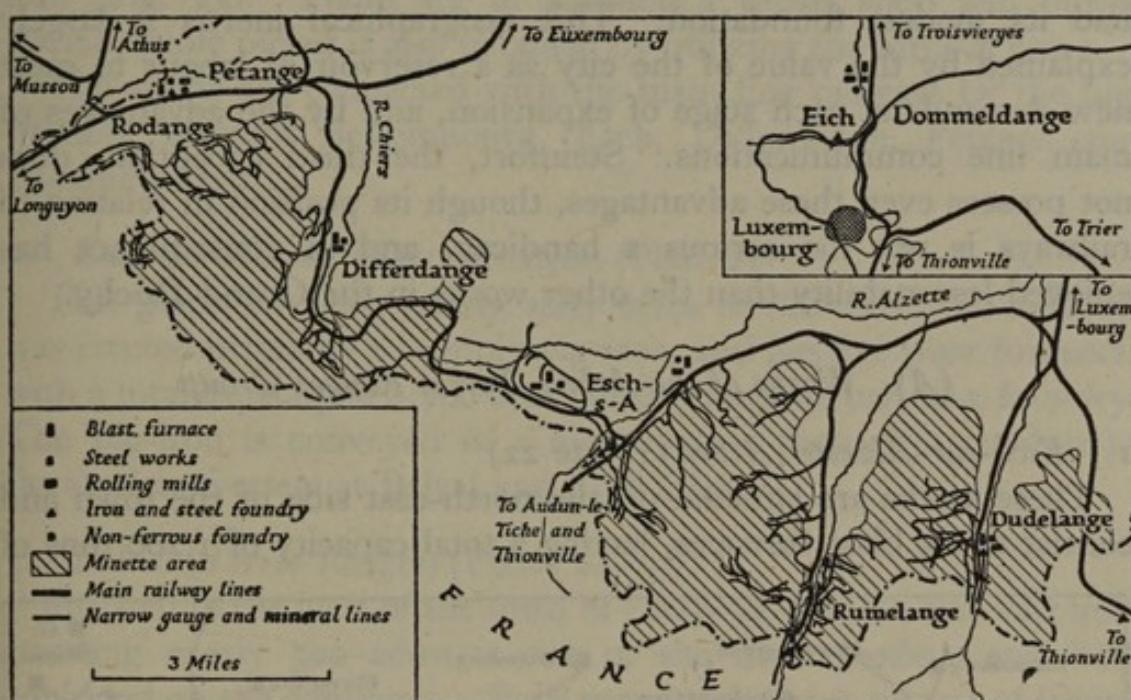


Fig. 54. The iron and steel works of Luxembourg

Based on the 1 : 50,000 *Carte topographique du Grand-Duché de Luxembourg*, sheets 11, 13, 14, edited by J. Hansen (latest edition, 1928-34), with details of the metallurgical installations compiled from various sources.

The 'minette' region of course extends into France, but is shown here only for Luxembourg. The works at Steinfort lie outside the area covered by this map.

The individual works, of which a short description is given, are arranged according to ownership and include the following :

- (A) Works of the *Arbed-Terres Rouges* group.
 - (1) Esch-sur-Alzette (*Arbed*).
 - (2) Esch-sur-Alzette (*Terres Rouges*).
 - (3) Belval (*Terres Rouges*).
 - (4) Dudelange (*Arbed*).
 - (5) Dommeldange (*Arbed*).
 - (6) Eich (*Arbed*).
- (B) Works of the *Hadir* group.
 - (1) Differdange.
 - (2) Rumelange.
- (C) Works of the *Ougrée-Marihaye* group.
 - Rodange.
- (D) Works of the *Angleur-Athus* group.
 - Steinfort.

All but three of the works are located in the 'minette' region. Of these exceptions, the *Arbed* units at Eich and Dommeldange have been successfully maintained on the northern outskirts of the capital in the district where, in the early 'sixties, the great combine had its modest foundation. This geographical inertia is largely explained by the value of the city as a reservoir of labour to meet new demands at each stage of expansion, and by the advantages of main line communications. Steinfort, the third exception, does not possess even these advantages, though its position in relation to railways is not too serious a handicap, and in consequence has enjoyed less stability than the other works in the Grand-Duchy.

(A) *Works of the Arbed-Terres Rouges Group*

1. *Esch-sur-Alzette (Arbed) (Plate 22)*

These works are situated on the north-east side of the town and consist of six blast furnaces, having a total capacity of 1,200 tons of

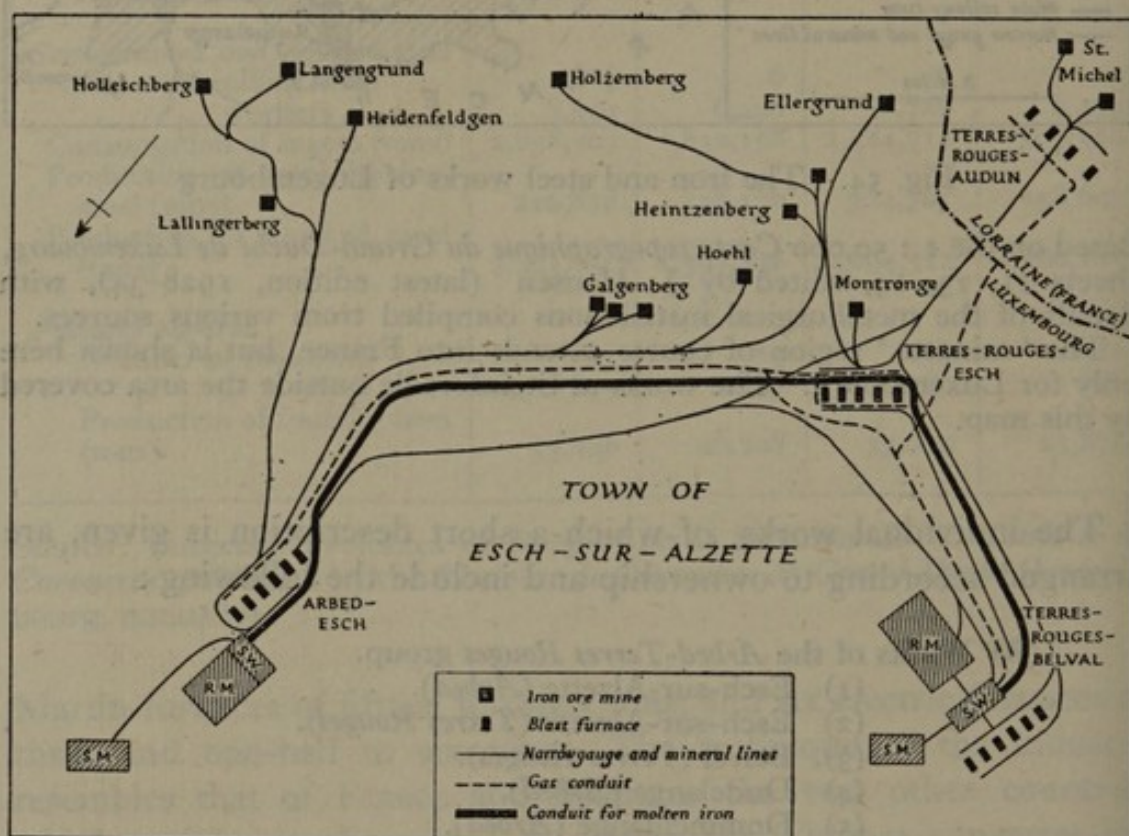


Fig. 55. Diagram of the iron and steel works at Esch-sur-Alzette

Based on M. E. Faber, *La Métallurgie du Luxembourg ; étude de géographie physique, sociale, et économique* (Luxembourg, 1927.)

The diagram shows the complex inter-relations between the ore-fields and the works, and the different stages of production in the works themselves.

S.W. = Steel works ; R.M. = Rolling mill ; and S.M. = Slag mill.

pig-iron per day ; one basic steel works with six converters of 24 tons capacity each ; one rolling mill, with six trains of rolls for bars, light rails, structural sections and wire rods ; and one basic slag mill (Fig. 55). There are in addition a repair shop and power station, while power is also obtained by utilizing the furnace gases.

The works are connected with the main line railways by the line running through Bettembourg, Esch, Differdange, Pétange and Kleinbettingen.

2. *Esch-sur-Alzette (Terres Rouges)* (Plate 23)

This plant, covering nearly sixty acres to the south of the town, was erected primarily to supply pig-iron, and has five blast furnaces, with a total capacity of 1,700 tons per day and one cast iron foundry. The pig-iron is conveyed in a molten state through a conduit to the steel converters at Belval and Esch (*Arbed*).

3. *Belval (Terres Rouges)* (Plates 24-25)

Situated to the west of the town of Esch-sur-Alzette, this vast unit covering nearly 500 acres is one of the most modern and best equipped on the continent. Both space and design permit of future extension. There are six blast-furnaces, having a capacity of 1,600 tons per day ; one basic steel works with six converters of 24 tons each ; one rolling mill with eight trains of rolls for semi-finished products, heavy structural pieces, sheet pilings, railway material, merchant bars and wire rods ; and one basic slag mill. There is also a large power-station.

4. *Dudelange (Arbed)*

Situated near the eastern extremity of the 'minette' zone and a little to the south of the town of Dudelange, these works comprise six blast-furnaces with an output of 1,200 tons per day ; one basic steel works with four converters of 23 tons each ; one Martin (open hearth) steel works, with two furnaces of 25 tons each ; one rolling mill with seven trains of rolls for semi-finished products, joists, channels, railway material, hoops and thin sheet ; one cold rolling mill for strips ; one foundry for castings up to 50 tons (specializing in cast iron moulds) ; one structural steel workshop ; and one basic slag mill.

The ore for this plant is brought from local workings within a mile of the blast-furnaces and by overhead ropeway or electric tramway from the Ottange district in Lorraine. Siliceous ore is obtained from the Differdange area.

The works are connected with the main lines at Bettembourg, the important junction a short distance to the north.

5. *Dommeldange (Arbed)*

Standing on the main line to Liège and the Ruhr on the northern outskirts of the capital, this plant includes three blast-furnaces producing 325 tons of pig-iron daily; one Martin (open-hearth) steelworks with two furnaces of 15 and 30 tons respectively; one electric steel works with three furnaces; one rolling mill with two trains for billets, hoops, bars and strips; one steel foundry; and one bronze foundry. In addition there are shops for general engineering and for the construction of crushing plant. The electric power station furnishes current for the tramways and public lighting in Luxembourg city and is linked with the Belval station eleven miles away by an overhead high-tension cable (35,000 volts).

The works obtain ore from the neighbourhood of Tétange and also from Redange across the frontier in Lorraine.

6. *Eich (Arbed)*

These works are also located on the northern outskirts of the capital, barely three-quarters of a mile from the Dommeldange plant, and are connected with the main line to Liège. They comprise one foundry specializing in armatures for blast-furnaces and cowper apparatus; one cast iron foundry producing central heating radiators and other heating equipment; and one structural engineering department.

An interesting product of the works is the reproduction of ornamental fire-backs (*taques*), modelled on those contained in a remarkable collection of originals (*collection Edouard Metz*) belonging to the firm.

(B) *Works of the Hadir Group*

1. *Differdange*

Situated to the north-east of the town of Differdange, these works contain ten blast-furnaces having a daily capacity of 2,000 tons; one basic steel works with five converters of 20 tons each; one rolling mill with six trains of rolls (specializing in the output of Grey girders); and one basic slag mill. Much of the power consumed is obtained from furnace gas. The Grey girders, for which Differdange is renowned, are characterized by the great width of their flanges, and the elimination of the inclined inner surfaces. Thus the

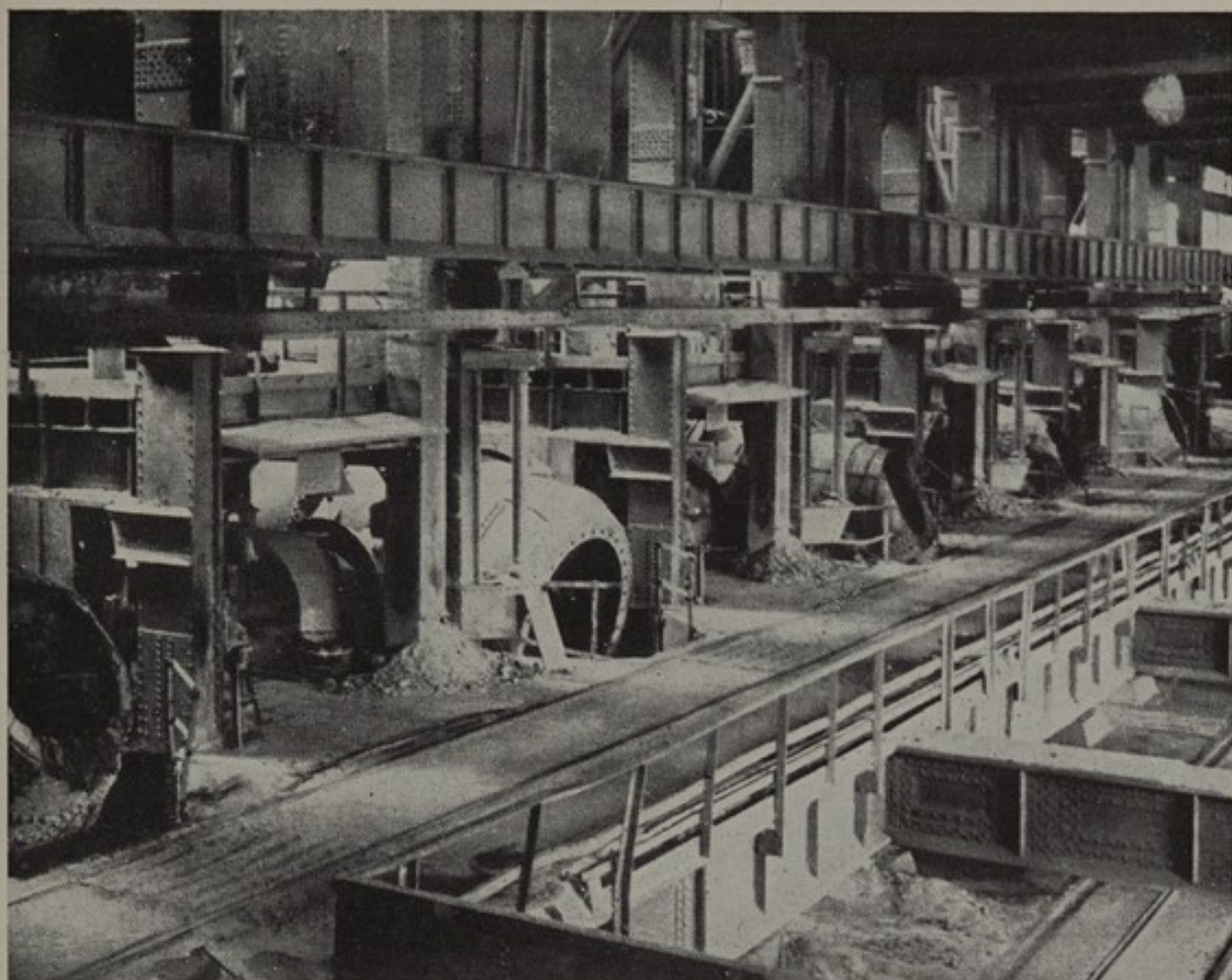


Plate 24. THOMAS STEEL CONVERTERS AT THE TERRES ROUGES WORKS, BELVAL



Plate 25. STEEL PRODUCTS FOR EXPORT AT BELVAL

This view conveys some impression of the immense output of finished and semi-finished steel awaiting export.

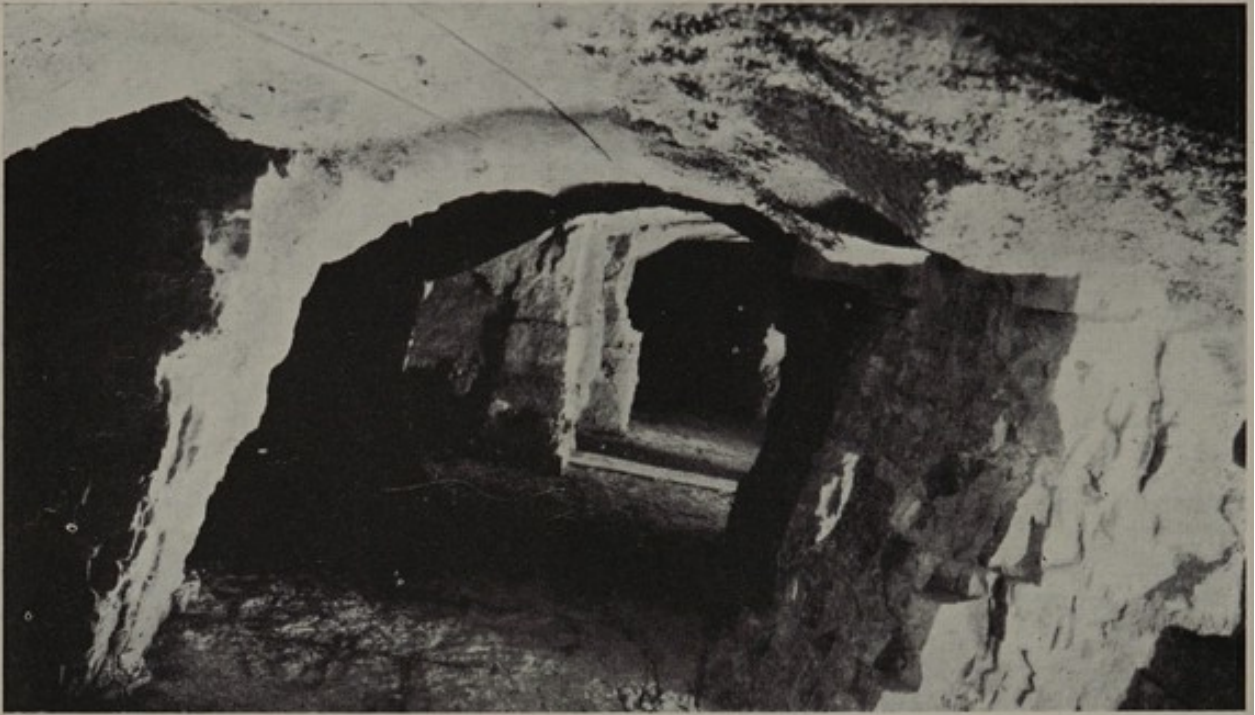


Plate 26. DOLOMITE QUARRY NEAR WASSERBILLIG

Dolomite limestone is quarried for use in lining the basic steel converters.

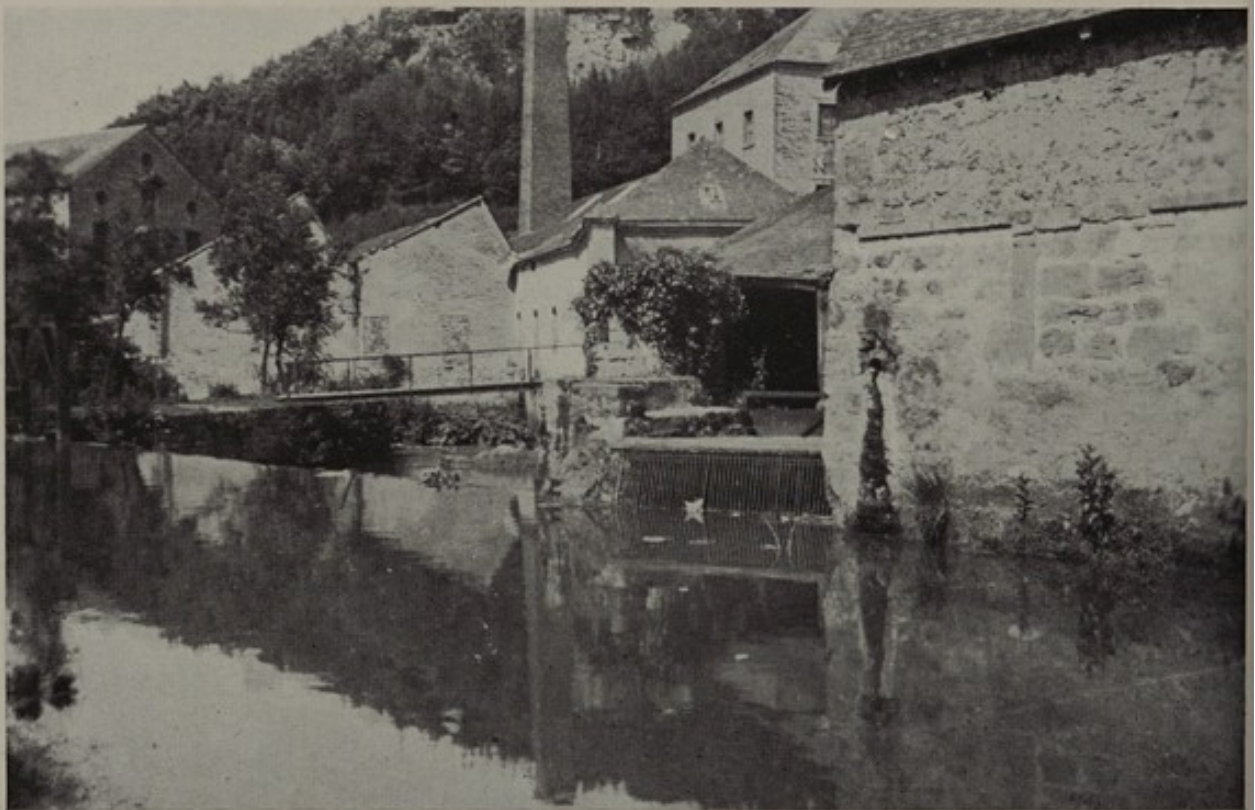


Plate 27. OLD TANNERIES AND CLOTH-MILLS AT LAROCLETTE

A number of local industries, some of which still survive, were located in the small towns of the Grand-Duchy.

flanges are of uniform thickness and strictly parallel throughout their length. It is claimed that such girders possess the advantages of greater transverse rigidity and greater facility in erection and fastening.

The ore for the blast-furnaces is obtained locally. As this is mainly siliceous, calcareous 'minette' is brought by funicular rail from Ottange (Lorraine), eight miles distant.

Like the works around Esch, main line connections are made at the junctions of Bettembourg, Pétange and Kleinbettingen.

2. *Rumelange*

Lying between Esch-sur-Alzette and Dudelange, this plant is situated almost on the frontier and comprises three blast-furnaces with a total capacity of 150 tons of pig-iron. This unit, however, has remained disused since 1919.

(C) *Works of the Ougrée-Marihaye Group*

Rodange

First erected in 1872, this unit marks the western extremity of the 'minette' zone in the Grand-Duchy, though close at hand the works at Athus (Belgium) and Mont-St. Martin (France) indicate the continuation of the ironfield beyond the frontier. The Rodange plant has been modernized and now comprises five blast-furnaces, of which one erected in 1929 has the exceptional capacity of 450 tons daily; one basic steel works with four converters handling the entire output of pig-iron; one rolling mill with trains for semi-finished products, rails and pilings; one basic slag mill; one bronze foundry turning out bronze bearings for rolls and housings for rolling mills; and one iron foundry producing large quantities of moulds. There are in addition several engineering and repair shops.

Rodange specializes in the manufacture of rails and pilings and is fully equipped for the finishing of rails and fishplates. In some years the output of rails has exceeded 50,000 tons.

Supplies of 'minette' are obtained from the eastern basin (calcareous), especially from Kayl and Rumelange, and from Lorraine (siliceous) by means of a funicular line. The works are conveniently placed on the main line from Luxembourg via Pétange to Paris.

*(D) Works of the Angleur-Athus Group**Steinfort*

The position of these works has already been mentioned (see p. 210). Though they lie just off the main route to Brussels via Arlon, the *Prince Henri* railway provides access to it at Kleinbettingen and to the northern (or Liège) line at Ettelbruck. The equipment consists of three blast-furnaces (one of 120 tons and two of 45 tons), giving a daily output of 180–200 tons; one Martin steel furnace of 18 tons and one electric furnace of 6 tons. About 90–100 tons of special steel are produced daily.

The ore is brought largely from the Esch-sur-Alzette district, with smaller quantities from workings in Lorraine.

NON-FERROUS MINES (Fig. 56)

There are occasional occurrences of antimony, copper and lead ores in the ancient rocks of the Ardenne, but none of them is at present worked. Antimony was found at Goesdorf near Esch-sur-Sûre on a property covering some 1,850 acres. Its discovery and early exploitation are lost in obscurity, but it is said to have been worked at intervals until 1745; an attempt to revive activity was made in 1847, but this lasted only a few years. At Stolzembourg, overlooking the Our valley north-west of Vianden, there exists a copper mine which has been worked from time to time since the seventeenth century. For a brief period (1768–72), the concession was held by Antoine Pescatore, while later on in 1818 it passed to the Luxembourg Government and the workings were extended. A contemporary report claimed that the ore contained 25–28% pure metal. Though no longer exploited, the property embraces more than 5,000 acres. Lead is found on the Belgian frontier between Allernborn and Oberwampach over an area of 5,000 acres, extending further for some 2,500 acres to Longvilly on the Belgian side. It is said that the ore in the form of lead sulphide was discovered in 1787 by a farmer digging to make a pond. The Government granted the concession to a company in 1826 and when the geologists, N. Wies and P. M. Siegen, visited the mine nearly forty years later it was still in production and employed some thirty to forty men. It has not been worked, however, for many years.

In addition, the rocks of the Ardenne contain many minerals too widely scattered and in insufficient quantity to be commercially

valuable. Thus iron pyrites occurs commonly, while in the Vianden district barytes is found (e.g. at Stolzembourg, Bivels and Brandenburg), but only in the case of a few rich veins has it ever been exploited.



Fig. 56. Distribution of non-ferrous mines and quarries

Based on *Übersichtskarte der Naturprodukte*, p. 31, in *Luxemburger Geographie* (Luxembourg, 1926).

The following abbreviations are used on the map :

Cl = clay (for tiles, bricks and pottery) ; Cu = copper ; G = Gypsum ; L = Limestone (for lime) ; Pb. = lead ; Q = Quartzite ; Sl = Slate ; St = Building stone.

Neither the lead nor copper mine is now worked.

QUARRIES (Fig. 56)

Owing to its varied geology, the small territory of the Grand-Duchy produces a wide diversity of building and road-making materials. These consist chiefly of slates; several grades of sandstone and limestone; gypsum for plaster and cement; and sand and gravel. The first comes from the Ardenne and the rest mainly from the Mesozoic rocks of the Bon Pays (Fig. 56).

In all, there are about three hundred stone quarries, employing 1,400 workers, but the great majority are not only very small, but serve purely local needs, often those of a single commune, and are worked simply as occasion demands. The larger quarries are worked continuously, some of them furnishing stone of good quality for export. Naturally the increasing use of alternative and cheaper building materials, such as bricks, in recent years has resulted in a decline both in the number of local quarries and their output.

Stone quarries

	1929	1933	1938
Large quarries	191	180	149
Local quarries	291	218	159
Total	482	398	308
No. employed	1,634	1,412	1,410

Source : Based on *Aperçu Statistique* (Luxembourg, annually).

The slate quarries in addition give employment to some 200-250 workers. Though there were four such workings in 1929, only two remained working throughout the decade 1930-40; thus the yearly output of slates was subject to marked fluctuations, as shown in the following table :

	1929	1933	1938
Output of slates (in thousands)	12,879	7,480	11,200
No. employed	436	170	245

Source : Based on *Aperçu Statistique* (Luxembourg, annually)

The location of the principal quarries may be most conveniently described in relation to the respective geological formations in which they occur. In the ancient rocks of the Ardenne are quarried slates and road metal. The *slates* occur in the Troisvierges or Kautenbach Series (see p. 3), and are worked near the Belgian border at Asselborn and Haut-Martelange, the latter being part of a considerable exploitation near Martelange on the Belgian side. The workings at Asselborn are not served by a railway, though good roads lead to the main line at Troisvierges and Clervaux and also to Wiltz. Those at Haut-Martelange, which are more extensive, are served by the narrow-gauge line which runs from Martelange to the *Prince Henri* railway, at Noerdange. Much of the output is sent into Germany, largely as the result of a tradition established during the period of the *Zollverein*; of the total production of 11,217 slates in 1938, over 8,800 were exported to the Reich.

Road metal from the phyllites and grits, which contain much quartz (see p. 3), is obtained from quarries around Merkholtz between Wiltz and Kautenbach; this has in recent years superseded the use of local material in most parts of the country. Even the roads maintained by the communes are increasingly surfaced with the Ardenne 'Hasselstein', as it is called. Loose material consisting of the same rocks in the form of pebbles is obtained from the Pleistocene deposits along the southern margin of the upland, as at Buschrodt where, as at Merkholtz, it is crushed and graded for road metal.

The chief *building stones* of the Grand-Duchy are obtained from the Mesozoic rocks. The Bunter sandstone is quarried at Mertzig from the slopes of the Wark valley, but it has only a limited value in building. Vastly superior is the dolomite sandstone (Upper Muschelkalk), worked at the well-known quarries at Gilsdorf just east of Diekirch and also at Reisdorf. This fine durable stone was used for the Pont Adolphe which spans the Pétrusse in Luxembourg city (Plate 40), as well as for many other buildings in the capital, and was also used in the construction of the former *Reichstag* building in Berlin. It is, however, the Luxembourg Sandstone (Lower Lias) which furnishes the most commonly used building stone in the country, for this formation provides a durable freestone at a great number of accessible points. Most of the quarries are found around the edge of the main outcrop, though innumerable workings, many of them long disused, are scattered over the surface. The edge of the outcrop, which often assumes the form of an escarpment, and the steep slopes of the main valleys which dissect the sandstone,

present ideal conditions for quarrying. Along the north side of the outcrop (see p. 7), the principal workings occur at Beckerich, Mersch (Rollingen), Ernzen and Beaufort-Dillingen; on the east side at Senningen; on the south side at Steinfort (Schwarzenhof), Koerich, Kehlen, Mamer, and Hesperange (Hohlwald); and in the extreme south at Aspelt. Those at Ernzen rank among the most important quarries in recent years, and are served by the narrow-gauge railway from Cruchten to Larochette, which was extended in 1930 as far as the Ernzen workings. Most of these quarries have access to a railway and appear to owe their location to this fact, and this in turn explains the widespread use of the stone throughout the Bon Pays and in the larger centres of the Ardenne.

The dolomitic limestone (Muschelkalk) is quarried at places along the Moselle, notably at Wasserbillig, Grevenmacher and Stadtbredimus, and is used both in the furnaces of the metallurgical district as a flux and for the production of lime. Gypsum, occurring in the Middle Keuper Series (see p. 6), is worked principally for plaster and cement in the Alzette valley at Heisdorf and Walferdange, a little to the north of the capital, and in the Moselle valley at Remich.

Finally, the working of sand and gravel, either from the Pleistocene deposits along the Moselle valley, e.g. at Wasserbillig, or from material dredged from the river bed (Moselle and Sûre) is a growing activity.

MISCELLANEOUS INDUSTRIES

ENGINEERING

The leading engineering firm in the Grand-Duchy is that of *Paul Wurth (S.A. des Anciens Etablissements Paul Wurth)*, whose works are situated at Hollerich, an industrial district of the capital. The concern began in 1870 with a small boiler shop near the Luxembourg railway station, but the present company was organized after the war of 1914-18. In 1923, it took over the steel foundry at Hollerich which had been established at the beginning of the present century. The share capital of 9 million francs was subscribed mainly by the *Arbed-Terres Rouges* group, the *Banque Internationale à Luxembourg* and the *Banque de Bruxelles*. Since that time, the works, which are connected by private sidings with the main line railway, have been considerably extended. The plant has its own power station.

The firm is engaged in three distinct branches of constructional engineering—(a) bridge and other construction; (b) crane building and (c) steel foundry work.

The first of these departments specializes in the manufacture and erection of bridges, for which numerous contracts are obtained from abroad, and of blast-furnace installations, steel works and rolling mill appliances, for which an important market exists within the country, in Belgium and in Lorraine. The crane-building section has grown in importance in recent years and enjoys a large export trade; it specializes in electric travelling cranes, elaborate travelling gantries, cantilever cranes, pulley blocks and winches. Here an important feature is the department with milling machines for gear cutting. The steel foundry turns out 500 to 600 tons per month, and supplies steel castings up to 10 tons in weight for general engineering purposes. With its large number of modern casting machines, a certain amount of railway material, both rolling and stationary, is also made.

The manufacture of agricultural machinery, tools and wine-presses is carried on by the well-known firm of *Duchscher* at Wecker near Wasserbillig in the east of the country. The works, founded in 1873, are situated in the Syre valley a few miles from the frontier and are built alongside the Luxembourg-Trier railway. The position in the heart of a rich farming district close to the vine growing areas of the Moselle and Sûre, and at the same time with access to metal and fuel by the main line railway, are factors which have favoured a specialization in rather exceptional products, in addition to the usual agricultural machinery. As with other manufactures in the Grand-Duchy, the restricted home market has shaped the policy of the firm by encouraging the manufacture of machinery for export. From the simple wine- and cider-presses, therefore, have developed all kinds of hydraulic presses, pharmaceutical presses, and machines for the extraction of vegetable oil and for the treatment of fibres. In addition, some blast-furnace accessories are produced.

The works, which were modernized and re-equipped soon after the war of 1914-18, normally employ some 200 men. The firm of *Duchscher* is also known for its enlightened social policy towards employees. As early as 1880, the latter were encouraged and often assisted to purchase their own cottages; since 1885, the firm has insured them against accidents at work, while a sickness benefit scheme was introduced in 1892.

A number of lesser engineering and related industries are located at places on the main railway from Luxembourg to Liège, most of them only a few miles from the capital. They include tool-making (especially files) and enamel ware at Lintgen; mining tools and equipment at Hünsdorf; domestic articles, agricultural implements and machinery at Mersch; ovens and bakery equipment at Berchem; organ-building at Lintgen, which supplied many of the restored churches in Belgium after the war of 1914-18; non-ferrous metal-work, particularly of nickel and aluminium, at Bonnevoie; metal furniture, particularly for offices, in the city of Luxembourg itself; rolling stock parts at Tétange and Kayl; tools at Keispelt near Mersch; and small general engineering work at Weilerbach.

Apart from the foundries belonging to the large iron and steel works (see p. 224), there are nearly forty other small-scale local foundries, employing altogether some 2-3,000 workers. Many of them are in the capital, where they do both ferrous and non-ferrous metallurgical work, and at Kayl, Bissen and Lintgen. At Bissen, in the Attert valley, there is a foundry established in 1910, now absorbed by the *Clouterie et Tréfilerie de Flandres* of Gentbrugge and owned by *Arbed*. The works stand near the site of the old forge which was one of the pioneer centres of the early iron industry (see p. 207).

TEXTILES

The textile industries of the Grand-Duchy, which formerly enjoyed a much greater relative importance, are now represented only by a few rather small factories making cloth, knitted goods and clothing, and give employment to not more than a thousand operatives.

The early basis of the industry lay in the home and semi-domestic clothmaking from wool and flax which dated back to the Middle Ages. This was particularly widespread in the Ardenne. Later on, during the period of Austrian rule (1714-95), there was considerable development, and particular stimulus was given to cloth production in 1741 when permission was granted by Maria Theresa for the establishment of a clothworks at Martelange. Before the end of the eighteenth century, there were seventy *draperies* in Wiltz and Esch-sur-Sûre, while others existed at Clervaux, Vianden, Dasbourg (on the east side of the Our), and Larochette. Several of these centres made military cloth, and the eventual withdrawal of Austrian troops dealt a severe blow to the trade. The nineteenth century brought the machine age and with it the concentration of

cloth-weaving into places favourably situated for water supply, water-power and transport. Thus Luxembourg and Ettelbruck, the former in particular, became the principal centres of production, although a few of the older ones such as Esch-sur-Sûre and Larochette survived.

The only large textile concern today is the *S.A. Draperies de Schleifmühl*, founded in 1828, which has three branches, two in the capital at Schleifmühl and Pulvermühl, and the third at Ettelbruck. All produce cloth of different kinds and quality, while the Pulvermühl works also manufactures hosiery and knitted goods. Weaving, chiefly of wool, and the making of piece goods and clothing are carried on by smaller enterprises at Ettelbruck, Esch-sur-Sûre and Larochette. At the last-named place, where the industry has survived from the days of domestic spinning and weaving, two small factories specialize in the production of cheap suitings (*confection* or *vêtements d'ouvrier*), which find a market in both Luxembourg and Belgium.

Though the industry serves the home market, an export trade in knitted goods, profiting by the Customs Union, was slowly developing before 1939. Thus, in 1938 only 50% of the output in this section was disposed of at home, 33% went to Belgium and the rest to other countries. On the other hand, as war approached, depression threatened the industry, and in 1939 it was feared that the works at Schleifmühl, the largest in the Grand-Duchy, would have to close.

TANNING AND LEATHER

From early times Luxembourg has been well known for its leather tanned with oak bark, a trade which was based on the production of bark from the extensive forests, particularly in the Ardenne. One of the most important of a multitude of small centres was Wiltz, and here, despite the drawbacks of its remote situation, the leather industry still flourishes. The introduction of quebracho and other tanning materials towards the end of the last century seriously affected the trade, but it was successfully revived during the war of 1914-18. Several tanneries have since been modernized. For some purposes sole leather tanned with oak bark is still produced in the old-fashioned way and was even exported until a few years ago. A small amount of oak bark is sent annually to Germany and to other neighbouring countries (Plate 27).

In 1929, a prosperous year, the leather trade gave employment to about 1,500 people, and in all some 70-75,000 hides were treated. The depression which followed had a serious effect, although some redress was obtained by working skins and furs. In any case, labour difficulties have confronted the firms for many years, people no longer being attracted to the work. A small export to Belgium is maintained. Surprisingly enough, however, with business transactions amounting to between two and three million francs annually, the manufacture of leather ranks as the second most valuable industry of the Grand-Duchy.

The principal centre of manufacture is at Wiltz, where there are several works; the chief firm is the *Ideal Tannerie de Wiltz S.A.*, which produces box calf and chrome tanned goods. In both Luxembourg and Larochette, as elsewhere, tanning is now of little importance, most of the premises being put to other industrial uses. Shoemaking is still carried on in a small way at Larochette, and another factory making boots and shoes is located at Tétange in the populous mining district.

Gloves

Glovemaking on a small scale was carried on by hand methods in the early nineteenth century at several places, such as Luxembourg and Vianden, and this appears to be the humble origin of a more important industry which developed in the capital later on. In the latter half of the nineteenth century, several factories prospered, though at times they were subject to great fluctuations in fortune due to caprices of fashion and to changes in trade policy. Some fifty years ago, for example, the industry was virtually ruined as a result of the closing of the American market by the McKinley tariffs.

Before the war of 1914-18, a considerable export of high-class gloves took place to both Britain and America. In 1911, some three million goatskins were treated and 75,000 dozen pairs of gloves, mostly kid gloves, produced. The industry at that time gave employment to about 2,200 workers. After the war of 1914-18, the disappearance of the long-sleeved glove, which had been a Luxembourg speciality, together with the difficulty of obtaining skins (the export of which was prohibited by Germany and Austria) brought about another crisis. Still later, British import duties and competition from Czechoslovakia further aggravated the position, and even in the few favourable years preceding the world depression

the output averaged well under 50,000 dozen pairs. The year 1938 proved the most disastrous in the history of the industry and the number employed fell to fewer than 150.

The principal enterprise surviving all these vicissitudes is that of *Albert Reinhard*, founded in 1882, with its factory along the banks of the Alzette near the Luxembourg citadel. It is the only establishment which still combines the dressing, dyeing and manufacturing processes, and turns out kid gloves of all qualities, the finest having a world reputation, as well as nappa and suède types.

TOBACCO

Among the industries concerned with consumer goods, the preparation of tobacco is of some importance, and in 1935 gave employment to nearly 300 people. It is equipped with up-to-date machinery capable of a large and rapid output. Cigarette-making is the principal branch of the industry, while other branches are declining in importance year by year. Cigars are now obtained mainly from Belgium. Production reached a maximum of 973 tons of tobacco in 1930, but with the onset of the depression—which resulted in many workers leaving the country as well as a reduction in exports—the output dropped and in recent years has not exceeded 750 tons. The home market consumes the bulk of the production. Ettelbruck, where the industry was founded in 1866, and Luxembourg are the two chief centres of manufacture.

BREWING AND DISTILLING

Brewing is an old-established industry which enjoyed a considerable expansion following the war of 1914–18, including the development of some export to Belgium. Both light beer of the Pilsen kind and dark beer are made, several of the breweries being of considerable size. These are located in the capital at Clausen (two), Eich, Grund and Neudorf, at Diekirch, Esch-sur-Alzette, Dudelange, Bascharage and Wiltz. The ten breweries in all employ some 5–600 men.

Numerous small distilleries, although mostly only on a domestic scale, are found scattered about the Grand-Duchy; the chief commercial producers are at Ettelbruck and at Hollerich. The various spirits are made chiefly from fruit. A late ripening variety of plum known as the *Quetsch* is grown in considerable quantities for the distillation of a spirit known locally and in Lorraine by the name of the fruit. Other spirits are distilled from *mirabelle* plums,

greengages and cherries. *Cassis*, a liqueur made from blackcurrants, is produced at Beaufort, and has a high reputation among both Luxembourgers and tourists.

POTTERY AND BRICKS

The ceramic industries with one historic exception are not important in Luxembourg. In 1765, however, a modest works was founded at Septfontaines in the valley of the Mühlenbach about two miles north of the capital. The proximity of the city, local deposits of clay, supplies of water from nearby springs (whence the name Sept-fontaines), and fuel from the forests were all doubtless advantageous factors. But in a few years, Boch, the founder who had come from Lorraine, received certain privileges from the Empress Maria Theresa, among them the use of the Imperial eagle as a crest on the ware produced by him. The industry soon became widely known and by 1811 it is recorded that 150 workers were employed. The materials were brought from far—pipe-clay from Coblenz, chalk from the Champagne, soda from Belgium, and lead oxide from England.

The works are still in operation and owned by the original firm of *Villeroy-Boch*, whose principal establishments however are in the Saar district, Belgium and France. Artistic ware, as well as commonplace goods, are produced, and about 300 people are normally employed. Septfontaines holds a special place in the history of ceramics, for it was the birthplace on the continent of platinum-decorated ware similar to the Leeds and Sheffield products of that type, while nearly a century ago the first floor tiles were made (called *Mettlacher Platten* in Germany since they were eventually produced on a large scale by the same firm at Mettlach on the Saar).

Another works, mainly concerned with tiles, exists at Wasserbillig, where sands and clays are worked from the valley deposits of the Moselle, and good railway communications assist in the transport of other materials. There is also a mosaic works at Wasserbillig, a small tile-works at Echternach, and brickworks at Bettembourg, Esch-sur-Alzette and Schouweiler near Dippach. In 1938, the ceramic and allied industries in all gave employment to 600 people.

CHEMICAL INDUSTRY

The chemical industry, though not of much importance in Luxembourg, is represented by the manufacture of (1) lime, at Colmar,

Contern, Strassen, and Grevenmacher (*Chaudolux*), the last-named also using dolomite as a raw material; (2) of carbonic acid at Lintgen; and (3) of explosives, for use in the quarries and iron workings, at Kockelscheuer, between Luxembourg and Bettembourg. A small factory for making stained glass is situated at Mondorf-les-Bains.

CEMENT

Several works manufacture cement from blast-furnace slag, which is used for making cement bricks. Esch-sur-Alzette, which also produces Portland cement, and Dommeldange, are the chief centres. Normally each of these employs over 200 workers, but owing to the falling off in trade in the period before the present war, the numbers had decreased to about 100 and 75 respectively in 1939.

BRUSH MAKING

The making of brushes is carried on at Larochette. This industry was started after the war of 1914-18 in a disused tannery. It developed rapidly in the small town, in which there was a reserve of labour owing to the decline of certain local industries such as tanning and cloth making. Eventually, all types of brushes were produced, from brooms to nail brushes, and besides serving almost all the home market there was a considerable export to Belgium and some even to Britain. By 1938, the factory employed over 200 workers.

SAW-MILLING AND TIMBER WORKING

There are numerous sawmills in the Grand-Duchy, most of them being small local concerns treating local timber for village needs. A few are larger and are generally located near a railway by which logs can be brought from a distance, as at Bettembourg, Bertrange, Echternach, Grevenmacher, Junglinster, Larochette, Mersch, Roodt-sur-Syre and Vianden. The largest of all are at Diekirch and in the capital; in both these towns the manufacture of furniture is also carried on in association with sawmilling. There is a small paper mill at Manternach.

POWER

ELECTRICITY

The bulk of the electric power consumed domestically in Luxembourg is derived from the power stations at the large metallurgical works (see p. 219). As a result of the small size of the country, transmission distances are short, and so current is readily distributed to all parts, including even to isolated homesteads. Of course, in the Ardenne, where distances from the southern producing units are greatest, where consuming centres are smaller, and more scattered, and where the demand is necessarily more fluctuating, distribution costs and therefore consumer costs are necessarily higher. However, on the whole, the cost of current is relatively low, as is usually the case when the energy is produced by industrial firms from waste blast-furnace gases.

Prior to 1927, the supply and distribution of power was in no way centralized or integrated. In that year, a contract was made between the Government and the principal industrial producers, establishing a joint supply system between them; this ensured not only the maintenance of a constant base load but the accommodation of peak loads at any time or place. The main producers who joined this contract were *Arbed-Terres Rouges*, *Paul Wurth*, *Hadir* and *Ougrée-Marihay* (Rodange) in Luxembourg, and *La Houve* (Creutzwald), the *Compagnie d'Electricité d'Alsace-Lorraine* (Strasbourg) and the *Société-électrique de la Sidérurgie lorraine* (Nancy) outside the Grand-Duchy. Distribution was undertaken by a central agency, the *Compagnie grand-ducale d'électricité du Luxembourg*, known as *Cegedel*. Apart from the principal electric power stations situated in the metallurgical centres and in Luxembourg city, a number of smaller power stations, some of them municipal enterprises, furnish a useful contribution to the national supply scheme. These are located at Beckerich, Bissen, Cap (near Capellen), Cruchten, Diekirch, Echternach, Ettelbruck, Grevenmacher, Mamer and Mondorf-les-Bains. It will be observed that almost all these centres of production are situated in the Bon Pays, although thanks to the scheme for general electrification applied through the agency of *Cegedel*, power is now distributed to the remotest parts of the Ardenne.

The State gave further support to the scheme for the general electrification of the country by a grant of 25 million *fr. lux.*, which was used largely to extend the system of high- and low-tension

wires. By 1935, the essential framework of distribution was complete; high-tension transmission lines totalled some 625 miles and low-tension lines 500 miles. Apart from industrial consumption, power was supplied to over 90% of the total households, that is, to about 270,000 of the population. In 1938, the total domestic consumption was 40 million kilowatt-hours, of which 15 millions were used by the capital and 3 millions by Esch-sur-Alzette.

DOMESTIC COAL AND COKE

Coal and coke for general use are imported into the Grand-Duchy from Germany and Belgium, coming chiefly from the Aachen-Eschweiler and Liège districts and the Saar. Transport is entirely by rail and distribution organized either directly through the producing concerns (e.g. *Eschweiler Bergwerks Verein*) and selling agencies (e.g. *Comptoir luxembourgeois des Charbonnages d'Eschweiler S.A.*), or through numerous retailers.

GAS

Apart from the capital, gasworks exist in a number of the smaller towns: Diekirch, Differdange, Dudelange, Grevenmacher, Kayl (also serving Bettembourg), Pétange and Remich.

OIL

Oil supplies, too, must be imported and are obtained mainly from the port of Antwerp. Storage dépôts, including small refineries, are located along the railways near the capital, occupying land which, though relatively cheap, is free from building. Examples are found at Bertrange (*Shell*) on the Brussels-Arlon railway, with access to the main Arlon-Luxembourg road, at Cessange (*Purfinia*, *Texaco* and *Standard Oil* dépôts), at Leudange and at Dippach (*Petro-Gulf*), all on the Longwy-Paris railway, and at Walferdange, north of the capital on the Liège line.

THE TOURIST INDUSTRY

The development of the tourist industry in the Grand-Duchy of Luxembourg has been stimulated by a number of favourable factors. These include a wide diversity of natural scenery, ranging from the rugged forested wildness of the Ardenne to the peaceful Moselle valley with its vineyards, and a wealth of abbeys, châteaux and other

places of historic interest. Further advantages are a central position in western Europe and comparative accessibility from the North Sea coast, a good system of internal communications, and in recent years a favourable rate of exchange. To all these tangible factors must be added the inherent interest of a small independent state, peace-loving and prosperous, surviving between its powerful neighbours.

In recent years, the Government has not been backward in exploiting the natural advantages in order to expand the tourist industry. This shared in the post-1919 development of the country, and became a profitable source of revenue, while in the years following 1929 it was encouraged as a means of offsetting the general effects of the economic depression. With the creation of the *Office du Tourisme de l'Union belgo-luxembourgeoise*, a systematic Government campaign was prosecuted by means of the publication of official guides, by articles and photographs in the Luxembourg and foreign Press, by the installation of tourist bureaux at foreign exhibitions and in European centres, by the production of feature films, and by the radio. Some two million *fr. lux.* per annum have been spent by the Government in recent years on direct and indirect advertising. Systematic improvement of the roads has encouraged the motorist-tourist. Official contacts have been made with foreign tourist agencies and with railway companies. Special shooting and fishing licences are available in the State forests; in 1938, 1,707 annual game-licenses and 143 for a period of five years, together with 4,608 fishing permits, were granted.

Government support has been given to a number of organizations established within the Grand-Duchy to promote the tourist trade. The *Union des Villes et Centres Touristiques du Grand-Duché* produces an annual list of hotels. The *Touring-Club luxembourgeoise* is an organization which encourages visitors, especially motorists, to visit the Grand-Duchy, and assists with routine matters such as the provision of *triptyques*, and advice concerning garages, accommodation, etc. The *Nouvel Automobile-Club du Grand-Duché* publishes an attractive *Annuaire*, containing a wide range of illustrated articles and advertisements. Many of the larger towns have their own *Syndicat d'Initiative et Embellissement*, which advertise widely, and frequently publish their own descriptive pamphlets and maps.

As nearly every part of the Grand-Duchy is readily accessible by road or rail, most of the hotels (totalling some 130) are grouped in

or near a few centres. The capital itself is of course most important, both because of its own inherent historical interest and attractive surroundings, and because of the facility with which other parts of the country may be reached from it. The wooded heights and ravines of the Petite Suisse (Müllerthal) in the Sûre valley (see p. 16) have resulted in a large group of hotels in the neighbourhood of Echternach, and others at Berdorf and at Consdorf. A number of hotels at Vianden, Diekirch and Ettelbruck serve the needs of tourists who are attracted by the rugged scenery of the Ardenne. A few small hotels in this region cater for people whose main interest is fishing, as at Esch-sur-Sûre and Goebelsmühle. The Moselle valley is popular for its boating, bathing and fishing with both foreign visitors and the Luxembourgers themselves; the chief centres are at Remich, Wormeldange and Ehnen. A few scattered hotels cater for visitors at smaller centres, such as Clervaux, Wiltz, Capellen and Grevenmacher.

A considerable tourist centre is Mondorf-les-Bains, near the French frontier, where there are some famous thermal springs (see p. 123). However, apart from its value as a spa, Mondorf les-Bains became increasingly popular as a tourist centre after the war of 1914-18. Its park and gardens, covering 75 acres, with pavilion, orchestra and bathing facilities, came to attract vastly greater numbers of casual visitors compared with those seeking benefit from the waters. Thus in the year 1936 there were 132,500 visitors, of whom only 8,200 came for treatment from the *établissement thermal* (see p. 329). Of the latter, French and Belgians made up the greater part of the total, as the following figures for two years indicate :

No. of Patrons	1937	1938
French	2,805	923
Belgians	2,253	1,719
Luxembourgers	1,176	990
Others	659	764
Total	6,993	4,396

Source : *Aperçu Statistique* for respective years (Luxembourg).

By 1938, the effects of the disturbed political situation were manifest and in 1939 the numbers visiting Mondorf were much reduced, i.e. to 60,870 in all, of whom only 3,099 attended the *établissement* for medical reasons.

Youth Hostels

As a rather special branch of the tourist industry, mention should be made of the youth hostel movement, which enjoyed a vigorous development in Luxembourg during the years preceding the war. The first hostel was opened at Steinfort near the Belgian frontier in 1933, and the following year saw the formation of a national league (*Ligue Nationale luxembourgeoise pour les Auberges de la Jeunesse*) under royal patronage and with State support. Other hostels were soon opened and in the next five years the total number was raised to fourteen. Most of them contain at least thirty beds, sometimes many more, and are situated in different parts of the country about a day's walk from each other. Several are placed close to the frontier making contact with walking routes from Belgium and Germany, for one of the chief aims in establishing a system of hostels was to foster the international aspect of the movement. Almost from the beginning, the accommodation was used to a far greater extent by foreigners than by the youth of Luxembourg. In the year ending October 1935, of 4,286 persons who stayed at the hostels only 333 were Luxembourgers. Similarly, the records for the year ending October 1939 show that out of 12,981 visits (made by 9,123 males and 3,858 females) only 610 were made by natives of the country.

Numbers staying at Youth Hostels

Nationality	1935	1939
Luxembourgers	333	610
Belgians	1,158	4,649
Dutch	1,800	4,670
German	339	493
French	188	589
British	278	1,445
Danes	—	267
Others	190	258
Total	4,286	12,981

Source : *Aperçu Statistique* for respective years (Luxembourg).

In 1939, the most visited hostels were those at Luxembourg (two), Vianden, Mersch and Clervaux. All of them are closed in October and November, while from December to March they are patronized only by a few ; from April onwards numbers increase rapidly, until in the holiday months of July and August the demand

for accommodation is naturally at its heaviest. Out of the 12,891 visits recorded in 1939, no fewer than 11,060 were made in these two months.

BIBLIOGRAPHICAL NOTE

In view of the complex political and economic relations between France, Germany and Luxembourg affecting the Lorraine-Luxembourg iron field, particularly since 1870, an extensive literature exists concerning the metallurgical industry. Many works by writers from all three countries, bearing on the physical, technical, politico-economic and social aspects of the subject, have been published, especially since the war of 1914-18. The industry moreover is so important in the Grand-Duchy alone that many journals and periodicals, technical and commercial, published in other countries regularly devote attention to it. Only a selection of the more important works, therefore, can be given here.

1. *The 'Minette' Deposits*

L. van Werweke, *Die lothringisch-luxemburgischen Minetteablagerungen* (Bonn, 1910), is a standard account of the geological and physical aspects of the iron ore. Three valuable contributions appear in Vols. 1 and 2 of *The Iron Ore Resources of the World* (XIth International Geological Congress, Stockholm, 1910): (i) V. Dondelinger, *Die Minette im Gross-Herzogtum Luxemburg* (Vol. 1); (ii) P. Nicou, *Les minerais de fer oolithiques de Lorraine* (Vol. 1); and (iii) G. Einecke and W. Köhler, *Das Minettegebiet von Lothringen und Luxemburg* (Vol. 2). A general survey of the 'minette' resources is found in Max Roesler, *The Iron Ore Resources of Europe* (U.S.A. Geological Survey, Washington, 1921). Earlier studies include those of L. Blum, 'Zur Genesis du lothringisch-luxemburgischen Minette' (in *Stahl und Eisen*, Düsseldorf, 1901); H. Ansel, 'Die oolithische Eisenerzformation Deutsch-Lothringens,' in *Zeitschrift für praktische Geologie*, 1901; F. Reuter, *Les Minettes au minerais de fer en roches du Grand-Duché de Luxembourg* (Luxembourg, 1887) and M. Dondelinger, *Les Concessions Minières dans la Grand-Duché de Luxembourg* (Luxembourg, 1912). The work of the French geologist, F. Villain, on the origin of the 'minette' ore can be consulted in two contributions dealing with Lorraine: *Sur la genèse des minerais de fer de la région lorraine* (Paris, 1899) and *Le gisement de minerais de fer oolithique de la Lorraine* (Paris, 1902). Finally an important paper embodying the results of recent technical research by J. P. Arend, a director of the *Arbed-Terres Rouges* group, should be noted: 'Les Particularités Génétiques du bassin de Briey et leurs rapports avec la répartition, la constitution et les propriétés métallurgiques des minerais oolithiques' in *Revue de Métallurgie* (Paris, 1933).

2. *History of the Industry*

Historically, the iron industry of the Grand-Duchy falls into two main phases, i.e. before and after the discovery and exploitation of the 'minette.' For the earlier period, J. Wagner, *La Sidérurgie luxembourgeoise avant la découverte du gisement des minettes* (Diekirch, 1921) is the best account, while for the development during the past century, especially since 1870, M. Ungeheuer, *Entwicklungsgeschichte der luxemburgischen Eisenindustrie im XIX Jahrhundert* (Luxembourg, 1910) is a standard work.

3. *The Organization of the Industry*

An excellent general account of the industry is provided by M. E. Faber, *La Métallurgie du Luxembourg: étude de géographie physique, sociale et économique* (Luxembourg, 1927). Other contemporary works are R. Dounay de Casteau, *La Sidérurgie dans la Grand-Duché de Luxembourg* (Antwerp, 1925); A. de Muyser, *L'Industrie sidérurgique luxembourgeoise* (Brussels, 1926) and P. Bergenkopf, *Die Entwicklung und die Lage der lothringisch-luxemburgischen Grosseisenindustrie seit dem Weltkriege* (Jena, 1925). The 'Luxembourg' number of the *Völkermagazin* (Berlin, 1929-30) contains useful articles on the different metallurgical concerns, their plant, operations and organization.

For the geographical and economic relations between the Luxembourg industry and those of Lorraine and Germany, the following should be consulted: J. Levainville, *L'Industrie du fer en France* (Paris, 1922); H. Lauffenburger, *L'Industrie sidérurgique de la Lorraine désannexée et la France* (Paris, 1924); and E. Heubner, *Die deutsche Eisenindustrie* (Leipzig, 1913).

4. *Economic and Politico-Economic aspects*

The overwhelming importance of the iron and steel industry as a factor in the economic policy of the Grand-Duchy and its political relations with other countries is reflected in the considerable literature on this aspect of the subject. The following general works are useful: A. Calmès, *Der Zollanschluss des Grossherzogtums Luxemburg an Deutschland 1842-1918* (Luxembourg, 1919); and E. Majerus, *Das Wirtschaftsbündnis des Grossherzogtums Luxemburg mit Belgien* (Luxembourg, 1928). A more specific treatment of the industry's economic problem is furnished by C. Wagner, *La Sidérurgie luxembourgeoise sous les Régimes du Zollverein et de l'Union Economique belgo-luxembourgeoise* (Luxembourg, 1931).

In 1919, a Commission was appointed by the Grand-Duchy to examine the problem of the future economic policy of the country. Its report, which contained a useful fully-documented section dealing with the metallurgical industry, prepared by A. Widung, was published under the title, *Orientation Economique de Grand-Duché de Luxembourg* (Luxembourg, 1919).

5. Among the numerous journals, periodicals and reports which devote attention to the industry, either regularly or from time to time, the following should be mentioned: *Bulletin de la Chambre de Commerce belgo-luxembourgeoise*; *Rapport sur la Situation de l'Industrie et du Commerce* (Chambre de Commerce du Grand-Duché de Luxembourg); 'Bulletin Quotidum' (*Columeta*, Luxembourg); 'Echo de l'Industrie' (Luxembourg); 'Escher Tageblatt'; 'Iron and Coal Trade Review'; 'Moniteur des Intérêts belgo-luxembourgeois'; 'Neptune' (Antwerp); 'Rapports sur les Assemblées Générales des Sociétés Métallurgiques luxembourgeoises'; *Revue Technique luxembourgeoise*; 'Stahl und Eisen' (Düsseldorf); 'Statistiques du Commerce belgo-luxembourgeoise.' In addition many brochures and articles have been issued by the principal concerns, especially *Arbed-Terres Rouges* (or through *Columeta*), or have appeared in general publications dealing with the Grand-Duchy.

6. Material on other aspects of Luxembourg industry is obtained from the *Aperçu Statistique* (Luxembourg, annually), and from the *Rapport sur la Situation de l'Industrie et du Commerce*, published annually by the *Chambre de Commerce du Grand-Duché de Luxembourg*.

7. The weekly organ of the *Fédération des Industriels luxembourgeois*, namely *L'Echo de l'Industrie*, gives various views and reports on the current industrial and commercial situation.

8. *Khiat's Annuaire du Grand-Duché de Luxembourg* is a comprehensive 'Who's Who?' of commercial and industrial concerns, both in the capital and place by place throughout the country.

9. From the historical point of view, a valuable survey of industry during the Napoleonic period is given in A. Funck, *L'Industrie au Département des Forêts: une statistique d'il y a cent ans* (Diekirch, 1913). The basis of this account is an enquiry into the industrial situation made by the prefect of the *département*, A. J. Jourdan, for the Emperor in 1812.

The publication of the Luxembourg Chamber of Commerce, *Statistique historique: la Situation du Commerce et de l'Industrie de 1839 à 1899* (Luxembourg, 1900), provides an analysis of conditions during the first sixty years of the Grand-Duchy's independence.

10. Information relating to the tourist industry in the Grand-Duchy is published in the *Bulletin du Touring Club luxembourgeois* (Luxembourg, monthly), and in the occasional publications of the *Nouvel Automobile Club du Grand-Duché de Luxembourg*, such as the special *Annuaire 1933-34*. An hotel list (*Guide des Hôtels*) is published annually by the *Union des Villes et Centres Touristiques du Grand-Duché de Luxembourg*.

Chapter XI

COMMERCE AND FINANCE

The Belgo-Luxembourg Customs Union : Commercial Policy : Foreign Trade : Finance : Bibliographical Note

THE BELGO-LUXEMBOURG CUSTOMS UNION

Historical Background

During the years 1842-1918, Luxembourg was a member of the German Customs Union (*Zollverein*) ; her membership was renewed periodically, the last time in 1902 for an unfulfilled period of fifty-seven years. Under the customs convention, Luxembourg had control of a portion of the external frontier of the *Zollverein*, but both the director and controller of the Luxembourg Customs were Prussian officials appointed by the Prussian Minister of Finance. The Grand-Duchy had the right of appointing only lesser officials, and on all questions of administration reference had to be made to Prussia. On each renewal of the convention, Luxembourg tried in vain to obtain representation either on the ' Customs Congress ' or after 1871 in the ' Economic Parliament ' of the *Zollverein*, and equally in vain to renounce the obligation to accept a Prussian as the customs director. On the renewal of the customs treaty in 1872, a railway convention was attached (see p. 285).

In spite of these disabilities, Luxembourg derived considerable economic benefit from the *Zollverein*, especially during the period of industrial expansion under the protection of German tariffs established in 1879. Her metallurgical industry, supplied with coal and coke from the Ruhr and the Saar, developed along with that of Westphalia ; of the five large concerns in Luxembourg, three were owned by German companies, one by a Belgian and one by a joint Belgian-Luxembourg firm. Luxembourg's agriculture found extensive markets in the area round Trier and in Lorraine, while the vineyards supplied must and raw alcohol to the wine-producing firms and distilleries of the lower Moselle and the Palatinate. It is quite certain that an economic union with Germany was the most convenient connection for Luxembourg as long as the neighbouring territory of Alsace-Lorraine was under German sovereignty.

As a result of the German invasion of the Grand-Duchy in 1914 and of the restoration of Alsace-Lorraine to France in 1919, it was inevitable that Luxembourg should secede from the German Customs

Union. By Article 40 of the Treaty of Versailles, Germany renounced all agreements by which Luxembourg had been placed under her economic control. From 1 January 1919, Luxembourg became an autonomous customs territory, and by Articles 41 and 268 of the Treaty of Versailles was given the right to export duty free to Germany for five years goods equivalent in quantity to an average pre-war export to Germany.

Yet it was clear that Luxembourg, with its important metallurgical industry depending on local iron ore and on imported coal, had to avoid economic isolation. The choice before the Grand-Duchy was a new customs union, either with France or with Belgium. In either case, certain branches of its economic life were bound to suffer. Thus farming could not compete with the intensively developed Belgian agriculture, while Luxembourg wine was inferior to that of France (where over-production was already a problem). Further, Luxembourg iron ore was inferior to that of France, who, with the return of Lorraine, had more than enough for her own needs. France, moreover, had little coking coal to spare for the Luxembourg iron and steel industry. Belgium had little ore and therefore would welcome supplies from Luxembourg, but her coal resources, which supplied some 86% of her own requirements, would meet only 73% of their joint needs. Further, the coking quality of Belgian coal was much inferior to that produced in the Ruhr, on which the Luxembourg industry prior to 1914 had wholly depended. Other Luxembourg industries manufacturing for export would profit by a union with Belgium, which was a considerable exporting country, although in some cases competing with similar Belgian industries; while, on the other hand, Luxembourg goods produced primarily for home consumption would profit by the protection afforded by French tariffs.

A plebiscite was held in September 1919, to decide both the dynastic future of Luxembourg (see p. 75) and the question of economic affiliation. In the second respect, 60,133 votes were cast for a customs union with France and 22,242 for Belgium. Although France had made efforts after the Armistice to attract Luxembourg into her economic sphere, she had not declared the terms of a proposed customs union. The Luxembourg Government stated officially that the vote was contingent upon the offer of acceptable French terms. Belgium, however, was offended by this clear preference shown for France, and even withdrew her Minister from Luxembourg and for a time suspended diplomatic relations.

Up to this point the issue had lain in the hands of the Luxembourgers themselves, but ultimately the problem was settled by questions of wider importance. France, alarmed by the failure of the British and American guarantees of assistance in the event of future German aggression, found the friendship and support of Belgium to be a necessity. She therefore withdrew in favour of Belgium, both in connection with the customs union and in the proposed control of the Luxembourg railways (see p. 285).

The attitude of France left Luxembourg no alternative but to open negotiations with Belgium, and after lengthy discussions a treaty was signed between the two Governments on 25 July 1921. When the agreement came before the Luxembourg Chamber of Deputies for ratification, it met with violent opposition from various agrarian and metallurgical interests fearful of Belgian competition. However, it was eventually ratified in the Luxembourg Chamber on 22 December 1921, and in Belgium on 2 February 1922, and entered into force on 1 May 1922.

The Terms of the Economic Union

By the terms of the agreement, the Belgo-Luxembourg Economic Union (*Union Economique Belgo-Luxembourgeoise*) was to be effective for fifty years from May 1922. The customs frontier between the two States was removed, and the Luxembourg customs administration was absorbed into that of Belgium. The total customs revenue, plus the product of certain internal excise duties but minus a small proportion used to safeguard Luxembourg agrarian interests (see p. 160), was to be divided into two parts in the proportion of their respective populations, based on the decennial censuses; this proportion was fixed in 1922 as 28:1. Farmers in the Grand-Duchy were to receive an indemnity if the price of home-grown corn fell below a certain figure as the result of competition by Belgian farmers. A commission was set up to safeguard the interests of the Belgian and Luxembourg metallurgical industries, and a system of arbitration was arranged to settle any difficulties which might arise between them. The former Luxembourg currency was progressively withdrawn from circulation, for which purpose a loan of 175 million francs was advanced by Belgium (see p. 262). The *Conseil Supérieur de l'Union Economique* was set up as a consultative body to ensure liaison between the two Governments in order to carry out the convention; of its five members, three were Belgian and two Luxembourg. There was complete unity of direction; thus all commercial treaties

were concluded by Belgium on behalf of the Union, and although the Luxembourg Government could review agreements and suggest amendments before they were ratified, they had no right of veto. In countries without a Grand-Ducal legation, the Belgian consular officials were to look after Luxembourg interests. The administration of the Union was carried out by the *Conseil Administratif Mixte*, consisting of Belgian and Luxembourg officials.

COMMERCIAL POLICY

The commercial policy of the Belgo-Luxembourg Union is described in full in the N.I.D. Handbook on *Belgium* in this series (pp. 352-7). The following short account summarizes a number of features which are of special interest to Luxembourg.

After the Union had been put into effect, there was considerable commercial expansion within the Grand-Duchy. The formation of the Union itself helped to restore the confidence in business circles which had been lost during the period 1914-18, while the devaluation of the Belgian franc in 1926 (see p. 261), with resultant cheap money and optimism in industry, caused a considerable increase in commercial enterprise. Belgium's widespread economic interests, her extensive carrying trade, and her possession of the great port of Antwerp brought wider markets for the smaller type of article manufactured in Luxembourg. The production of these manufactures was also helped by the expanding internal market up to 1930.

During the period 1922-9, the Union strove to maintain a moderate tariff policy and not to increase agricultural tariffs. The strength of opinion in favour of free trade was shown in 1923, when, after an economic convention had been signed between the Union and 'protectionist' France, the Belgian Chamber of Deputies refused to ratify it. It was finally ratified in an amended form in 1925, and subsequent agreements were added in 1928, 1929, and 1931. In 1925, Germany and the Union re-established normal commercial relations, and further trade agreements were signed with Czechoslovakia, Spain, Switzerland, Turkey, Paraguay and other countries. The policy of the Union, in fact, was dominated by a wish to establish stable commercial relations with as wide a circle of countries as possible. To this end, a commercial fair was held annually in Luxembourg city from 1922 to 1929; it was generally considered to result in a satisfactory volume of business.

When the world economic depression began to make itself felt at the end of 1929, accompanied by declining trade and unemployment, various industrial countries endeavoured to assist their own agriculture by introducing protective tariffs, quotas and various import restrictions. The Union was reluctant to abandon its free-trade policy, but as it became increasingly difficult to resist the demands for protection, duties on some agricultural commodities—notably sugar, tobacco, wheat-flour and fresh pork—were raised, although wheat, rye, barley and maize remained duty free. The Union imposed moderate tariffs on a number of semi-finished and finished manufactured goods during the period 1922–30.

In 1930, the Union concluded the Oslo Convention with Denmark, Norway, Sweden, Finland and the Netherlands, in order to form a powerful economic 'block' within which tariffs could be reduced. In 1932, the Netherlands and the Union concluded the Convention of Ouchy-Lausanne, which provided for the progressive reduction for five years by 10% per annum of the respective tariffs between the signatories; however, largely owing to Great Britain's attitude, this convention was never ratified by the Belgian and Dutch parliaments.

In 1933, an *ad hoc* committee, set up by the Belgian Government, laid down two major considerations for the shaping of the Union's commercial policy; these were to defend the internal market against 'dumping' and to render effective a policy of enlightened reciprocity with other countries, especially with those whose currencies had remained relatively stable. It was difficult to put into effect the first of these without imposing quota and tariff restrictions, and the policy of protecting the home market and home agriculture was continued. To further the second objective, a number of commercial agreements were concluded, the most important being between the Union and France. In 1934, a clearing agreement was reached with Germany, by which the proportion between exports from the Union into Germany and from that country into the Union was stabilized at 62·5 to 100 respectively. After the devaluation of the Belgian franc in 1935 (see p. 261), export licences were introduced to increase foreign outlets for manufactured goods. Further trade agreements followed, notably at The Hague in 1937, when the Union and the Netherlands undertook to abolish quotas for certain commodities exported to them from the other Oslo signatories, while they in their turn agreed not to introduce quotas or increase tariffs on specified commodities. The Hague Conven-

tion was, however, not renewed in 1938. During the years preceding the present war, in many authoritative although unofficial quarters there has been a growing feeling in favour of closer commercial collaboration between the Union and the Netherlands, even to the extent of a complete customs union. The events of the present war and the exchanges of views between the refugee Governments in London appear to have strengthened considerably this feeling.

FOREIGN TRADE

The foreign trade of the Belgo-Luxembourg Economic Union is described in detail in the N.I.D. Handbook on *Belgium* in this series (pp. 357-71). The detailed statistics quoted there as for Belgium refer, of course, to the Union as a whole. Since 1925, however, the Luxembourg Chamber of Commerce has published outline statistics of exports from the Grand-Duchy, which give some indication of the composition and destination of exports. There are, however, no official figures of imports.

The general trend of the balance of trade of Luxembourg is shown by the following summary figures for the trade of the Union as a whole.

Belgian francs

Year	Imports		Exports		Proportion of imports as percentage		Transit		Customs dues
	Weight (million tons)	Value (milliard fr.)	Weight (million tons)	Value (milliard fr.)	By quantity (million tons)	By value (milliard fr.)	Weight (million tons)	Value (milliard fr.)	(milliard fr.)
1926	34.3	23.1	23.2	20.0	67.6	86.7	19.8	20.0	0.7
1927	38.1	29.1	24.2	26.7	63.6	91.6	17.7	24.7	0.9
1928	39.9	32.1	26.7	31.0	67.1	96.5	17.6	32.6	1.1
1929	45.1	35.6	25.8	31.9	57.3	89.5	19.5	39.3	1.4
1930	42.2	31.1	23.8	26.2	56.3	84.1	19.5	34.7	1.4
1931	38.7	24.0	24.6	23.2	61.9	96.7	15.4	28.0	1.3
1932	31.3	16.3	19.6	15.1	62.4	93.1	12.4	13.1	1.6
1933	30.7	15.2	19.9	14.3	64.9	93.7	13.1	21.3	1.5
1934	31.7	14.0	20.0	13.8	63.0	98.0	14.5	15.9	1.5
1935	30.6	17.4	20.3	16.1	66.4	92.4	14.9	16.0	1.5
1936	32.8	21.7	21.9	19.7	66.6	91.0	15.3	15.8	1.6
1937	39.0	27.9	25.0	25.5	64.0	92.9	18.7	31.6	1.7
1938	31.6	23.2	22.0	21.7	69.7	93.8	15.4	22.7	1.6

Source: Based on figures from successive *Aperçu Statistique* (Luxembourg, annually). The exact proportion of Luxembourg trade in the Union's total is not known; however, the total value of exports from the Grand-Duchy in 1938 was 1,225 million francs, or approximately one-eighteenth of the Union's total, while customs were divided in the proportion of 28:1.

A number of features common to Belgium and Luxembourg alike are apparent from this table. Total exports amount as a rule to some two-thirds of total imports by weight, but more than nine-tenths by value; the reason for this is that imports consist mainly of relatively bulky raw materials, while exports are of less bulky but more valuable manufactured goods. The figures reveal too how the total trade of the Union rose to the peak of 1929, then fell as a result of the grave effects of the world economic depression, and afterwards, partly as a result of the measures outlined on p. 254, made considerable progress towards regaining the peak figures. This recovery, however, came to a halt in 1938 owing to the deterioration in the European political situation. Rearmament did not help the steel industry as much as might have been expected, owing to competition with other countries which had expanding industries of their own, particularly Italy, Poland, Spain and Canada.

The importance of transit trade, that is, traffic between foreign countries passing through the territory of the Union, is clearly shown by the figures; in 1937, the value of transit trade was some three-fifths of the value of imports and exports combined, in 1938 about one-half. This is primarily due to the geographical position of the Union, on the North Sea coast in an angle between France, Germany, and the Netherlands, together with possession of the ports of Antwerp and Ghent. Further, the main railway line from Brussels to Strasbourg and Basle passes through Luxembourg (see p. 291). The chief commodities in transit are vegetable produce, minerals, machinery, livestock, textiles and metals.

Exports from Luxembourg

The major part of Luxembourg's exports consist of industrial products, chiefly iron ore, pig iron, raw steel and semi-manufactured steel, and quarry products; minor manufactured articles include gloves, footwear, cigarettes and textiles. Changes in the direction of export trade between 1929 and 1938 are shown in Fig. 57.

In 1938, these industrial products were valued at 1,230 million *lux. fr.*, while exports of agricultural products totalled only 25 million *lux. fr.* The latter category included livestock, dairy produce, wine (see p. 182), rose trees (see p. 183), vegetables, fruit and tanning bark. Thus pigs were sent primarily to Germany and Belgium, wine, butter and small quantities of potatoes, apples and plums to Belgium.

Detailed figures are published by the Luxembourg Chamber of Commerce of certain exports in terms of weight or volume. These consist mainly of iron ore, quarried materials, wine and tobacco, and do not include manufactured goods, the proportional quantities of which are usually represented only by value. The following table summarizes such figures as are available for 1926 (pre-slump),

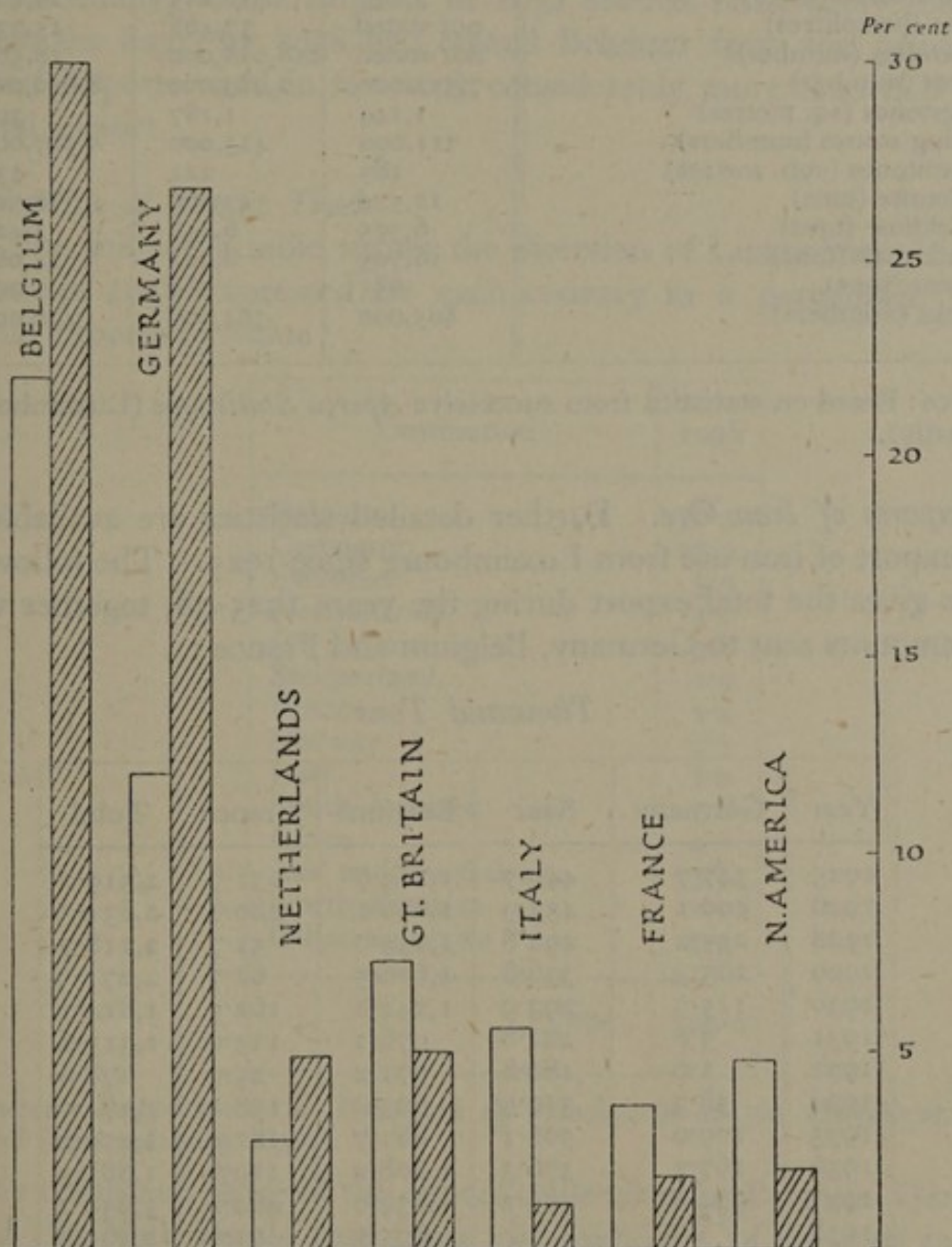


Fig. 57. Changes in direction of export trade between 1929 and 1938

Based on statistics from *Rapport sur la Situation de l'Industrie et du Commerce*, 1938 (Luxembourg, 1939.)

The blank and shaded columns indicate the proportion of total export trade with each country in 1929 and in 1938 respectively.

1932 (during the slump) and 1938. In the case of nearly every commodity the marked decline of 1932 and the recovery by 1938 are clearly shown.

Commodity	1926	1932	1938
Iron ore (tons)	2,830,852	878,582	2,505,797
Pure alcohol (litres)	3,293	12,145	19,400
Wine (hectolitres)	not stated	37,468	15,730
Cigarettes (number)	not stated	218,018,000	58,500
Slates (number)	7,512,000	2,783,000	8,810,000
Flagstones (sq. metres)	1,144	1,187	397
Paving stones (numbers)	711,000	413,000	307,000
Whetstones (cub. metres)	187	221	137
Dolomite (tons)	12,574	13,169	18,526
Quicklime (tons)	6,395	6,458	2,422
Chalk rock (tons)	16,705	8,305	14,080
Plaster (tons)	655	560	992
Bricks (numbers)	805,000	304,000	430,000

Source: Based on statistics from successive *Aperçu Statistique* (Luxembourg, annually).

Exports of Iron Ore. Further detailed statistics are available of the export of iron ore from Luxembourg since 1925. The following table gives the total export during the years 1925-38, together with the amounts sent to Germany, Belgium and France:

Thousand Tons

Year	Germany	Saar	Belgium	France	Total
1925	347.7	449.7	1,289.7	231.9	2,319.0
1926	400.1	453.9	1,696.1	280.8	2,830.9
1928	239.2	292.8	1,635.0	51.7	2,218.7
1929	265.3	336.8	1,606.5	62.7	2,271.3
1930	115.5	293.9	1,242.8	162.5	1,814.7
1931	3.8	221.8	976.1	113.9	1,315.6
1932	1.6	180.8	671.2	25.0	878.6
1934	58.7	310.9	603.0	198.4	1,171.0
1935	109.0	306.1	881.7	182.4	1,479.2
1936	167.2	376.3	1,208.2	129.6	1,881.3
1937	964.6	575.2	1,639.9	460.0	3,639.7
1938	1,558.2		875.7	71.9	2,505.8

Source: Based on statistics derived from successive *Aperçu Statistique* (Luxembourg, annually).

A number of features are brought out strikingly by this table. The heavy iron and steel industry, including the production of iron

ore, is usually a barometer of trade depression and recovery. Thus in the slump year of 1932 the total export of iron ore fell to less than a third that of the peak year of 1926, but under the influence of general rearmament it had risen in 1937 to a figure considerably exceeding that of 1926. The proportions exported to the three customers changed similarly; especially marked is this in the case of Germany, whose imports in 1932 shrunk remarkably, but who with the Saar) by 1938 had ousted Belgium from the position of chief importer and in fact took considerably more than half of the total export.

Direction of Export Trade

The following table shows the direction of Luxembourg's export trade in 1938, expressed for each country as a percentage of the total exports by value :

Destination	1938
Belgium	30.3
Germany	27.0
Sweden	5.5
Netherlands	5.1
Gt. Britain	3.8
Switzerland	2.9
France	1.9
Norway	2.7
Italy	1.0
South America	5.8
Africa	4.1
Asia and Australasia	3.8
North America	2.1
Other countries	5.0
Total	100.0

Source : *Rapport sur la Situation de l'Industrie et du Commerce*, 1929, 1938 (Luxembourg, 1939).

The combined share of the export trade taken by Belgium, Germany and the Netherlands rose from just over 40% of the total in 1929 to over 60% in 1938. Exports to more distant markets, particularly extra-European, fell in proportion.

Imports into Luxembourg

Owing to the lack of statistics, it is impossible to evaluate the import trade of Luxembourg. An official estimate for 1935, how-

ever, put the value of goods coming into Luxembourg as some 650 million *fr. belg.*, of which 220 millions represented coal and coke. The balance consisted of other raw materials (chiefly cotton, wool and chemicals) and of foodstuffs. In 1938, according to a German source, goods worth 42.5 million Rm. (about 400 million *fr. belg.* or 320 million *fr. lux.*) were imported into Luxembourg from the Reich, of which 30 million Rm. (about 285 million *fr. belge* or 228 million *fr. lux.*) consisted of coal and chemicals.

FINANCE

Administration of State Finance

The administration of the finances of the Grand-Duchy is carried out by the Minister of Finance, assisted by a permanent *Chef de bureau*, and by the Treasury (*Trésorerie de l'Etat*). Direct taxes and excise are levied at eight centres, at Luxembourg (two), Eich, Diekirch, Echternach, Esch-sur-Alzette, Mersch and Wiltz. There are also a number of subordinate tax-collectors.

The State accounts are checked and audited by the *Chambre des Comptes* (Accountants' Office).

Currency

The unit of currency in Luxembourg is the franc (*fr. lux.*), which was fixed in 1935 as representing 0.03765798 gm. of fine gold. The Luxembourg franc since 1922 has been tied to the Belgian franc, prior to April 1935 at a fixed rate of 1 *fr. lux.* = 1 *fr. belge*, after this date at the rate of 1 *fr. lux.* = 1.25 *fr. belge*. As a result of this relation between them, the exchange rate quoted on the European *bourses* for the Belgian franc has determined the exchange rate for the Luxembourg franc. There have, of course, been considerable fluctuations during the past twenty-five years. The following table shows the variations of the Luxembourg franc in relation to sterling since 1924 (quoted for December of each year) (*Par* since 1935 140, Belgian franc = 175).

1924	94.45	1928	174.50	1932	118.40	1936	145.44
1925	106.96	1929	174.31	1933	115.68	1937	147.10
1926	174.40	1930	173.86	1934	105.67	1938	139.11
1927	174.65	1931	121.07	1935	146.18	1939	118.50

In 1925 the financial and social problems arising out of Belgium's efforts at reconstruction, together with problems of German reparations culminating in the failure of the Franco-Belgian occupation

of the Ruhr, led to a major financial crisis and a rising tide of inflation. The Belgian franc (and with it the Luxembourg franc) followed the depreciation of the French franc. Various efforts to stabilize the Belgian franc were finally successful in March 1926, when Belgium went back on to the gold standard at the comparatively high rate of 175 francs to the pound sterling, and until 1931 (when Britain abandoned the gold standard) the rate of sterling exchange remained tolerably near par; the Luxembourg franc was, of course, quoted at the same figure.

Both Belgium and Luxembourg experienced the grave effects of the depression of 1929-33. Since the economic life of the Union is largely dependent on foreign trade, the results of the suspension of the gold standard by Great Britain in 1931 and the subsequent depreciation of the dollar were quickly felt. Several attempts to control the situation were made, the most important being in 1933, when Belgium and Luxembourg entered the 'Gold Bloc' with France, Italy, the Netherlands, Switzerland and Poland, declaring that 'the free functioning of the gold standard in their respective countries should be maintained at the existing gold parities and within the framework of existing monetary laws.' In March 1935, M. van Zeeland became Prime Minister and devalued the Belgian franc to a level 28% below the gold standard established in 1926, while exchange control was introduced for a short period. The Luxembourg Government on 1 April 1935 decided that while the Luxembourg and Belgian francs should continue to be tied to each other, their relation should become 1 *fr. lux.* = 1.25 *fr. belg.*, that is, the parity of the Luxembourg franc with sterling was to be 140 instead of the Belgian 175. The devaluation of the 'Gold Bloc' currencies in September 1936 had little effect on the financial position of Belgium and Luxembourg; in fact, the position of the two francs improved slightly during the readjustment of the neighbouring currencies. The rapidly deteriorating European situation in the summer of 1939 resulted in the swift appreciation of the Luxembourg franc relative to sterling; while it stood at 139 in December 1938 and at 136 in August 1939, a month later it had reached 117.

The Issue of Money

The Luxembourg Government was faced in 1919 with the problem of the withdrawal of a considerable volume of German currency which had been issued during the occupation of 1914-18. The amount of German money presented for exchange was the equivalent

of some 251 million francs, of which 201 millions were in circulation and the remainder in the form of treasury bonds. In 1922, when the Economic Union with Belgium took place, it was agreed that Belgian notes should gradually replace those of Luxembourg. At the same time a loan of 175 millions was raised in Belgium for the purpose of withdrawing a large part of the paper currency in circulation; in fact, this was reduced from over 200 millions to 43 millions, at which figure it stayed until 1935. In May of that year there was signed a monetary agreement between Belgium and Luxembourg. The Grand-Duchy was in future to issue its own currency, although Belgian money was to be accepted as legal tender in Luxembourg, but Luxembourg money could be accepted in Belgium only at the banks. The Grand-Duchy was empowered to issue paper currency up to a limit of 100 million francs, a figure which in July 1935 was raised to 125 million francs. The note circulation in 1939 was made up as follows:

	<i>Value (fr. lux.)</i>
100 fr. (old issue)	570,000
100 fr. (new issue)	105,880,000
50 fr.	11,530,000
20 fr. (old issue)	130,000
20 fr. (new issue)	6,890,000
	<hr/>
	125,000,000

Source: *Aperçu Statistique*, 1940, p. 107 (Luxembourg, 1940).

The *Banque Internationale* (see p. 268) also issued a number of its own notes to the value in 1939 of 6½ millions. These were accepted as legal tender throughout the Grand-Duchy, repayment being guaranteed at face value and covered by deposits held by the *Banque Internationale* at the State Bank.

The amount of coinage in circulation varied according to current needs; in 1939, it totalled some six million francs. These coins consist of nickel pieces with holes to the value of 5, 10 and 25 centimes, and of solid nickel or nickel-alloy pieces of 50 centimes, 1 franc, 5 francs and 10 francs.

The Bourse

The Luxembourg Bourse was created by a law of December 1927, and began to function on 1 January 1928. It was thus the newest European stock exchange. It was established as a limited company

with a board of ten members, of whom four were elected by local stockbrokers. Its dealings were limited to people permanently domiciled in the Grand Duchy, and it proved to be a keen competitor of the other European *bourses*.

The Budget

The following table gives the budgetary position for the period 1929-39 :

Million fr. lux.

Year	Revenue	Expenditure	Excess of	
			Receipts	Expenditure.
1929	400.76	362.38	38.38	—
1930	440.58	433.44	7.14	—
1931	512.13	453.72	58.41	—
1932	399.32	393.80	5.52	—
1933	373.99	296.89	77.10	—
1934	371.58	364.39	7.19	—
1935	267.90	313.91	—	46.01
1936	388.73	378.94	9.78	—
1937	338.13	332.84	5.29	—
1938*	369.93*	354.61*	15.32*	—
1939†	371.31†	367.58†	3.73†	—

* Provisional returns. † Budgetary estimates.

Source : *Aperçu Statistique* for successive years (Luxembourg, annually).

The financial credit of Luxembourg, unlike some of the larger European States, has been consistently sound; only in one recent year (1935) have the accounts shown a deficit. This was due to the fact that the budget estimates were completely upset by the devaluation of the Belgian franc in March 1935. Since the budget terms had been published before the devaluation, revenue for that year could not be increased to meet the inevitable rise in expenditure.

Revenue

The following table analyses the chief sources of revenue in 1938 ; for comparison, both the budget estimates and the actual revenues (provisional) are appended :

Million fr. lux.

Nature of revenue	Budget estimate	Actual revenue (provisional)
Excess of revenue over expenditure for previous year	4.42	5.29
Direct taxation	68.03	92.82
Customs and excise	89.40	96.89
Registration, stamp duties and turnover tax	73.12	94.25
Posts, telegraphs and telephones	29.15	29.29
Various receipts	57.57	37.27
Revenues produced from loans	21.65	14.11
Total	343.34	369.92

Source : *Aperçu Statistique*, 1939, p. 92, and 1940, p. 93 (Luxembourg, 1939, 1940).

Direct taxation brought in a sum varying from a fifth to a quarter of the total revenue. In 1938, income tax produced some 43 million francs, or nearly half the total derived from direct taxation; surtax brought another 22 million francs. By the income tax law of November 1927, all persons, irrespective of nationality, if habitually resident in the Grand-Duchy, were assessable on all income received except that from shares or bonds held in industrial or commercial companies operating within the Grand-Duchy when tax is paid by the company. Taxable income was assessed in varying proportions : $\frac{1}{2}\%$ paid on taxable income up to 4,000 francs, 1 % on 4-8,000 francs, and the tax was graduated upwards to 10% on taxable income in excess of 750,000 francs. Further, supertax equivalent to 75% was payable on incomes over 25,000 francs, and there was an annual tax on capital of one half per mille (1,000). In March 1928, income tax was reduced by 10%, while in June 1929, earned income not exceeding 35,000 francs was given a rebate of 2,500 francs for expenses and insurance. Other direct taxes included those on hunting, fishing and grazing rights, on motor-cars and on entertainments. The revenue from customs and excise and from registration and transfer duties each produces as a rule a sum slightly exceeding that derived from direct taxation. Registration duties include stamp and similar duties, death duties, registration fees, mortgage duties, fines, etc. The remainder of the national income is derived from

miscellaneous sources, including the profits of the post, telephone and telegraph services, income from State forests and domains, the revenue received from the operation of *Radio Luxembourg* (see p. 300), and revenues received from Government loans; the last can only be issued with the consent of the Chamber of Deputies.

Expenditure

The following table analyses the various items of expenditure in 1938. Figures are given per mille (1,000), as this enables the relative proportions of each item to be readily compared.

Item	Budget estimate	Actual expenditure (provisional)
Public works	125.2	127.2
Public debt	99.1	103.7
Primary education	78.4	78.6
Pensions	75.9	77.6
Commerce, industry and labour	60.2	73.7
Posts, telegraphs and telephones	69.1	70.2
Customs	72.9	66.0
Taxation	41.4	46.7
Communal works and funds	33.2	32.4
Secondary education	32.3	32.6
Agriculture and viticulture	29.7	31.7
Armed Forces	24.5	24.2
Culture	16.2	24.2
Forestry administration	18.4	22.2
Registration	18.5	19.8
Civil list and Government	17.5	17.7
Justice	14.2	15.9
Ettelbruck and Rham hospitals	14.5	13.5
Poor relief	9.3	10.3
Health	8.8	9.0
Prisons	6.3	6.1
Other items	18.4	10.8
Unforeseen expenses	54.1	50.7
Extraordinary expenses	61.9	35.2
Total	1,000	1,000
Actual total (million francs)	355.14	354.61

Source : Based on *Aperçu Statistique*, 1940, p. 93 (Luxembourg, 1940).

National Debt

In 1913, the national consolidated debt stood at 10 million gold francs, representing the gold cover of the State note issue. By 1925, the consolidated debt had risen to 196 million francs, due mainly to a loan of 175 millions issued in Belgium in 1922 (see p. 262), and also to budget deficits and to expenditure on public works. Since 1930, a number of loans have been issued to cover heavy expenditure on public works, such as improvement of water supply, of roads, and of the *Guillaume-Luxembourg* railway system, the purchase of a considerable area of privately owned forest lands, the extension of the telephone lines, and the installation of automatic telephones, etc. During 1935, the National Debt increased by some 22.9 million francs owing to the devaluation of the Belgian franc, some of the State's long-term loans having been contracted in gold currencies. However, the long-term debt was reduced in 1935 by the 175 million francs of the Belgian 6% loan of 1922, which was wiped out by the Belgian Government as compensation for the share of the Grand-Duchy in the increased value of the gold stock held by the Bank of Belgium as a result of the devaluation. In 1936, the rate of interest on the consolidated debt was converted from 5% to 4%. It is a striking fact that the service of the National Debt absorbs only 10% of the total national expenditure. The state of the national consolidated debt in 1939 was as follows:

Date of loan	Interest (%)	Nominal value (fr. lux.)
1930	5	96,399,615
1932	5	124,270,000
1934	4½	181,444,000
1935	4	39,190,000
1936 I	4	39,730,000
1936 II	4	46,340,000
1936 III	4	49,330,000
1937	3¾	33,960,000
1938	3½	14,040,000
	Total	624,703,615

Source : *Aperçu Statistique*, 1940, p. 107 (Luxembourg, 1940).

The following table summarizes the position of the consolidated and floating debts during the period 1933-8:

Million fr. lux.

Year (on 31 Dec.)	Internal Debt			Foreign Debt	Total Debt	Debt Service on Budget
	Consoli- dated Debt	Floating Debt	Total			
1933	285.8	49.4	335.2	373.9	709.1	33.9
1934	281.7	134.5	416.2	371.1	787.3	32.0
1935	318.1	156.5	474.6	235.1	709.7	41.0
1936	364.0	67.6	431.6	223.5	655.1	36.8
1937	394.3	80.8	475.1	222.1	697.2	35.2
1938	404.0	137.8	541.8	220.7	762.2	36.1
1939*	—	100.3	—	—	718.5	36.1†

Source : *Aperçu Statistique* for successive years (Luxembourg, annually) ; and (ii) *Statistical Yearbook of the League of Nations* for successive years (Geneva, annually).

* No details are available of the totals of the internal and foreign Debts in 1939, other than the Floating Debt and the total National Debt.

† Budgetary estimate.

Banking

The central bank in Luxembourg is the State Bank (*Caisse générale de l'Etat*) ; since 1935, it has been concerned with the issue of currency and with the payment of interest on State loans. Prior to 1935, currency (Belgian francs) was issued by the *Banque Nationale de Belgique* for use in Luxembourg ; this bank opened a branch in 1936 in the city of Luxembourg in accordance with the agreement of 1935.

Commercial Banks. During the decade after 1920, a considerable number of commercial and industrial enterprises were created. The stabilization of the Belgian (and Luxembourg) franc in 1926 led to a general growth of optimism in business circles. There was considerable expansion of plant, stock-market prices rose, and commercial lending proceeded apace. The abundance of capital attracted the attention of commercial banks, some of which actually participated in the formation of industrial companies and were represented on their boards by subscribing to their securities and also by sharing in increases in capital and in bond issues. Established mainly by French, German and Belgian interests, the banks created for themselves a dominant place in the financial side of Luxembourg industry.

The principal banks in Luxembourg in 1939 comprised the following :

Banque Générale du Luxembourg (affiliated to the *Société Générale de Belgique*).

Banque Internationale à Luxembourg (founded 1856).

Banque Commerciale S.A.

La Luxembourgeoise S.A. Banque.

Banque Dérulle-Wigreux et Fils, J. Weitzel.

Werling et Cie.

Crédit Anversois S.A.

Crédit Lyonnais S.A.

Crédit Industriel d'Alsace et de Lorraine S.A.

Crédit National de Luxembourg.

Union Financière Luxembourgeoise (Elfina).

Société Luxembourgeoise de Banque.

The Savings Bank. The *Caisse d'Epargne* is a general savings bank subject to State supervision and guarantees. Luxembourg is a country of small savers; in 1938, there were over 200,000 depositors in the savings bank, or about two in every three of the total population, while the average amount in each account was over 3,400 *fr. lux.* The financial stability of the bank is shown by the following table:

	1933	1934	1935	1936	1937	1938
No. of depositors	185,097	188,938	192,801	194,878	200,256	206,331
Total deposits (million <i>fr. lux.</i>)	625.5	684.5	661.8	653.7	668.9	709.8
Average (<i>fr. lux.</i>) per account)	3,379	3,623	3,433	3,354	3,340	3,440
Sum deposited (million <i>fr. lux.</i>)	137.9	156.6	136.9	134.1	139.1	181.7
Sum withdrawn (million <i>fr. lux.</i>)	126.1	120.0	179.1	161.3	143.2	160.9

Source: *Aperçu Statistique* for successive years (Luxembourg, annually).

A large part of the savings bank's deposits are invested in the various State loans. Some of the largest depositors are the communes and mutual benefit and co-operative societies.

Crédit foncier. This office was administered under State guarantee by a Director; it exists to make long- or short-term advances on property, and plays an important part in the Government's housing policy (see p. 49).

Caisses-Raiffeisen. Since 1927, there has been a considerable development of credit- and savings-banks, established primarily for the use of farmers and of the rural population generally, named after the originator in Germany. They afford a convenient safe-deposit for the farmers' capital, and issue short- or medium-term loans, primarily for agricultural development. In 1927, there were

twenty-one regional offices (*caisses*), with 1,135 members ; by 1938, there were seventy-one offices and 4,149 members. In the last year, some 51 million *fr. lux.* were deposited and 45 millions issued on loan ; the total deposits held amounted to some 274 million *fr. lux.*

The Postal Cheque System

The postal cheque system (*Service des chèques et virements postaux*) primarily corresponds to the British postal order service, but it also possesses many of the characteristics of the ordinary bank cheque. It is carried on by the *Direction Postes, Télégraphes et Téléphones*. An account can be opened by making a deposit, cheques can be drawn on this account and transfers can be made from the account of one person to that of another. The deposits do not yield interest and no overdrafts are allowed, but on the other hand no charges are made, no stamp is needed on the cheque, and it can be transmitted by post without charge. Thus the system has considerable advantages, especially for the small tradesmen, who can use it as a current account for deposits, withdrawals and transfers without charges. The *Service interne* operates within Luxembourg, the *Service internationale* allows transfers of credits by postal cheque to people in Belgium and France.

The following table summarises the operation of the postal cheque system in recent years :

	1935	1936	1937	1938
Number of accounts	7,807	8,290	8,748	9,165
Internal service :				
Deposits (number)	563,386	593,900	625,000	645,00
„ (million <i>fr. lux.</i>)	892.3	896.8	967.8	1118.9
Withdrawals (number)	365,957	472,800	437,100	444,000
„ (million <i>fr. lux.</i>)	818.8	758.2	910.9	992.3
Transfers (number)	316,118	352,200	387,900	417,000
„ (million <i>fr. lux.</i>)	965.1	1,083.7	1,241.3	1,466.8
International service :				
Sums received (number)	19,191	21,800	25,900	26,000
„ „ (million <i>fr. lux.</i>)	119.6	109.2	118.3	111.3
Sums despatched (number)	77,532	98,500	110,900	114,000
„ „ (million <i>fr. lux.</i>)	166.0	247.9	169.7	172.5

Source: *Aperçu Statistique* for respective years (Luxembourg, annually).

Assurance

There are many assurance companies either established or represented in Luxembourg. They must be legally authorized to operate in the Grand-Duchy, and before the outbreak of the present war some thirty-six companies were thus registered. The principal Luxembourg concerns were *Foyer Luxembourg*, *Luxembourgeoise* and *Nationale Luxembourgeoise*, while most of the foreign companies having branches in the capital were of French, Belgian and Swiss origin.

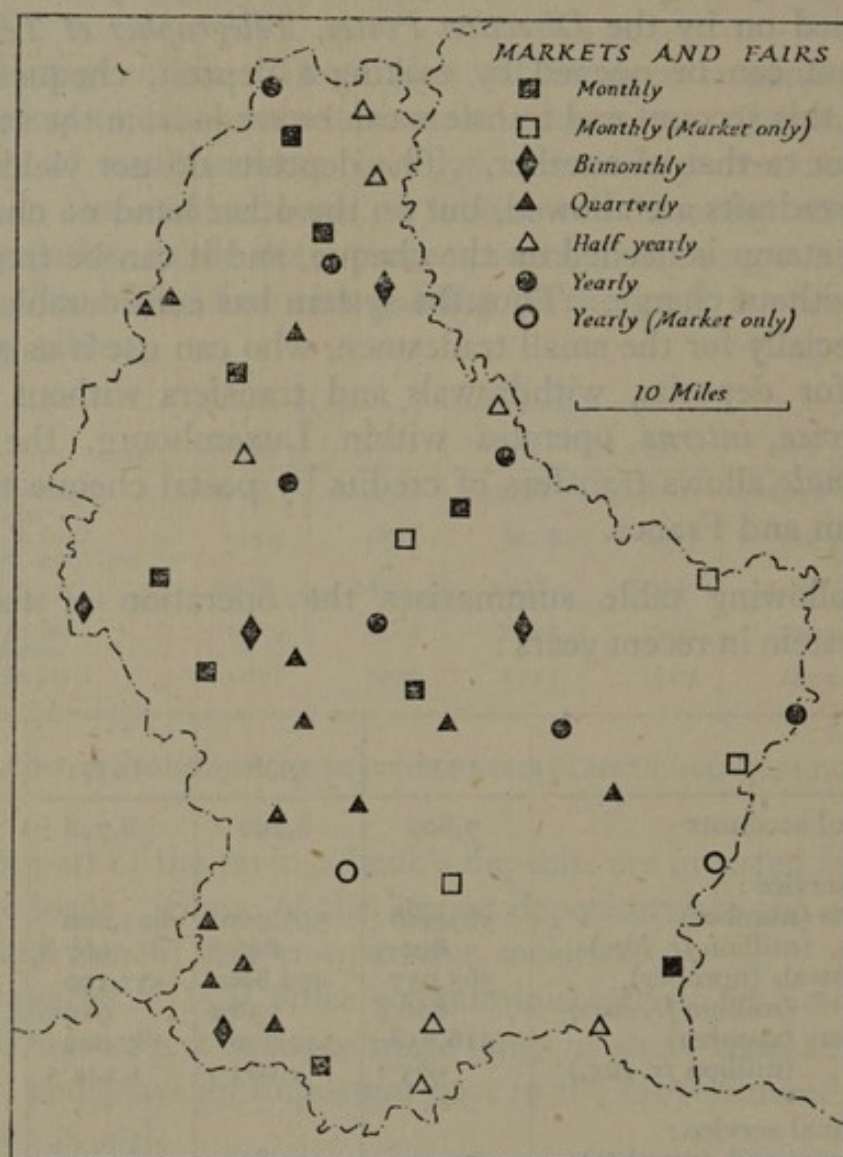


Fig. 58. Markets and Fairs

Based on data given in *Annuaire Officiel*, 1935, pp.4-6. (Luxembourg, 1939).

The relatively even distribution of markets and fairs, providing as they do for the transaction of local business, reflects the universal importance of agriculture.

Markets and Fairs

A large part of the internal trade of Luxembourg is carried on at fairs and markets, which are held periodically in many of the towns and large villages. The most important centres are shown on Fig. 58.

BIBLIOGRAPHICAL NOTE

1. A convenient summary of statistics dealing with Belgo-Luxembourg trade is given annually in the *Aperçu Statistique* (Luxembourg). This also summarizes, with retrospective tables, statistics relating to the Budget, the National Debt, the banks, the rate of exchange and other financial features.

2. The authoritative collection of statistics referring to the Belgo-Luxembourg Economic Union is the *Bulletin mensuel du Commerce avec les Pays Etrangers de l'Union Economique Belgo-Luxembourgeoise*, the latest available being for December 1939 (Brussels, 1940); this deals with trade by countries and by commodities, both by weight and value. Useful retrospective tables are contained in the *Statistical Yearbook of the League of Nations* (1938-39), published by the League of Nations, Economic Section (Geneva, 1939).

3. The various reports on *Economic Conditions in Belgium*, published by the Department of Overseas Trade, contain in each issue an *Annex-Economic Situation in the Grand-Duchy of Luxembourg*. The last published report is dated June 1937 (London, 1938).

4. The principal works describing the formation and working of the Belgo-Luxembourg Economic Union are:

(a) A. Calmès, *Der Zollanschluss des Grossherzogtums Luxemburg an Deutschland, 1842-1918* (Luxembourg, 1919).

(b) L. Hommel, *Une Expérience d'Union Economique* (Louvain, 1933).

(c) E. Majerus, *Das Wirtschaftsbündnis des Grossherzogtums Luxemburg mit Belgien* (Luxembourg, 1928).

(d) J. Treinen, *L'Economie luxembourgeoise sous le Régime de l'Union Douanière belgo-luxembourgeoise* (Luxembourg, 1934).

5. A very detailed *Rapport sur la Situation de l'Industrie et du Commerce* is published annually at Luxembourg by the *Chambre de Commerce du Grand-Duché de Luxembourg*.

Chapter XII

COMMUNICATIONS

Roads : Historical Background : The Modern Road System : Road Traffic Density : Motor Coach Services : Note on the Bridges across the Luxembourg-German Frontier

Railways : General Features : Historical Background : Traffic : International Lines : Railways and the Metallurgical Industry : Narrow-gauge Railways

Waterways : The Moselle : The Sûre : Canal Projects in relation to the Metallurgical Industry

Posts, Telegraphs and Telephones : Postal Services : Telegraphs : Telephones : The Post Office Budget

Broadcasting

Note on Time

Bibliographical Note

Much of the importance of Luxembourg is derived from its position in relation to communications. Several international routes, both roads and railways, traverse the country, the more important of these being focussed upon the capital. There is in consequence a good deal of 'through' traffic, besides local movement within the Grand-Duchy. Thus one of the principal routes from London to Switzerland, i.e., that via Ostende (or Zeebrugge or Antwerp), Brussels, Strasbourg and Basle, passes through Luxembourg city, which stands about halfway on the journey ; this route is used by several express trains. Another 'through' route is that from Amsterdam and The Hague via Liège, which enters the Grand-Duchy from the north. Similarly, the improvement of the roads in recent years has served to emphasize the growing scale upon which foreign motor traffic uses the highways. In pre-war years, according to the figures published by the *Nouvel Automobile Club du Grand-Duché de Luxembourg*, well over 60,000 automobiles of foreign registration passed through the country each year, of which some 30-40,000 were French, 15-18,000 German, and 2,000 Dutch.

Several other considerations determine that Luxembourg should be well provided with means of communication. Among these is the dependence of the metallurgical centres upon supplies of coke from the Ruhr and elsewhere (Fig. 53), and the necessity to despatch ore and pig-iron as return traffic ; the relative handicap of distance from the North Sea ports as compared with Belgium and the Netherlands ;

and the rise of a considerable tourist industry within the Grand-Duchy itself.

ROADS

HISTORICAL BACKGROUND

Both the country and its capital owe their earliest development to the fact that a section of the Roman road from Reims to Trier passing to the south of the Ardenne traverses the region between Arlon (*Orolaunum*) and the river Moselle. Even earlier a Gallic track existed between Arlon and Trier, striking across the Bon Pays (which was then inhabited by the *Treveri*), while another probably followed the heights above the Moselle between Ehnén and Wasserbillig. In part, the Roman highways utilized such tracks, as, for example, the great road already mentioned, which followed the Gallic route eastwards from Arlon and crossed the river Alzette where the city of Luxembourg now stands (Fig. 65). The exact site of the crossing is uncertain, though the remains of a Roman bridge at Hollerich on the west side of the town survived until the seventeenth century. In terms of existing places, the road passed through Steinfort, Capellen, Luxembourg, Niederaanven and Wasserbillig. Two other roads of strategic and commercial importance traversed the Luxembourg region in Roman times. One was the highway connecting Metz (*Divodurum*) with Trier, which, after passing through Thionville, left the Moselle valley and continued via Dalheim (*Ricciacum*) in the Grand-Duchy to join the Reims-Trier road. The other was that leading from Reims to Cologne, which left the Trier road after crossing the Meuse, and struck north-eastwards over the Ardenne, passing across the northern extremity of the present-day Luxembourg through Basbellain. In time a number of lesser roads were made to connect points along the Cologne and Trier highways, and portions of these have survived as elements in the present road system of the country.

With the incursions of the Germanic peoples following the close of the Roman era and the consequent disturbance of the life of the region, roads fell into decay, and with few exceptions were not restored until modern times. In the Middle Ages, certain routes, like that from Luxembourg to Trier and Thionville, and that which crossed the Sûre by the old bridge at Echternach, were much frequented. Later, in 1504, the Emperor Maximilian I initiated the

great postal route between Brussels and Vienna which, on the way from Liège to Trier and the Rhine, passed through the northern part of the present state of Luxembourg, entering the county at Asselborn. Soon afterwards the town of Luxembourg became the focus of several roads, some of which in turn became post-routes. Thus, for example, by 1700 the road to Thionville and Metz via Frisange carried a regular post service, which connected with a growing network spreading across Lorraine to the towns of the middle Rhine. By the middle of the eighteenth century, a further improvement was made by the introduction of a coach service between Thionville and Metz.

At the time of the French Revolution, there were five main roads generally maintained in good condition centred on Luxembourg; these led to Trier, Thionville, Longwy, Arlon and Bastogne respectively. During the Napoleonic period they were improved and incorporated with other highways into the vast imperial system. In 1811, there were eleven main roads in the country—then part of France as the *Département des Forêts* (see p. 65)—of which six were *routes impériales* of second and third grade, the others being known as *routes départementales*. The *routes impériales* consisted of those leading from Luxembourg to Trier, Remich, Thionville, Longwy, Arlon and Mersch, while the chief *routes départementales* comprised that along the Moselle valley, two others leading from Mersch to Diekirch and to Arlon respectively, and another from Ettelbruck to Bastogne.

THE MODERN ROAD SYSTEM

After 1839, the road system within the Grand-Duchy developed rapidly, the principal highways being brought under the control of the State. The growth of the towns, resulting in an increased movement of agricultural produce, promoted attention to local roads. The long period of association with Germany under the *Zollverein* saw the development of a well-organized system of national and local roads. These were all vastly improved, however, both as regards construction and surface, after the war of 1914-18, to meet the demands of increasing motor traffic. The roads in the Grand-Duchy became an example to many parts of the continent, and in 1939 the country possessed, apart from rural and forest tracks, 2,643 miles (4,254 km.) of metalled highways. Their distribution is shown on Fig. 59. This total was made up as follows :



Plates 28, 29. LUXEMBOURG ROADS

The upper photograph shows the Route d'Arlon, one of the highways leading from the capital into Belgium ; the lower, by contrast, shows local roads winding through the rugged Ardennes near Bourscheid. The ruins of Bourscheid Castle, the position of it is shown in Fig. 8, can be seen upon the crest of the long spur.



Plate 30. A MODERN ROAD IN THE PETITE SUISSE

The improvement in these roads has done much to open up this district to tourist traffic. The massive crag of Luxembourg Sandstone, known as Perekop, is on the road from Echternach to Berdorf.

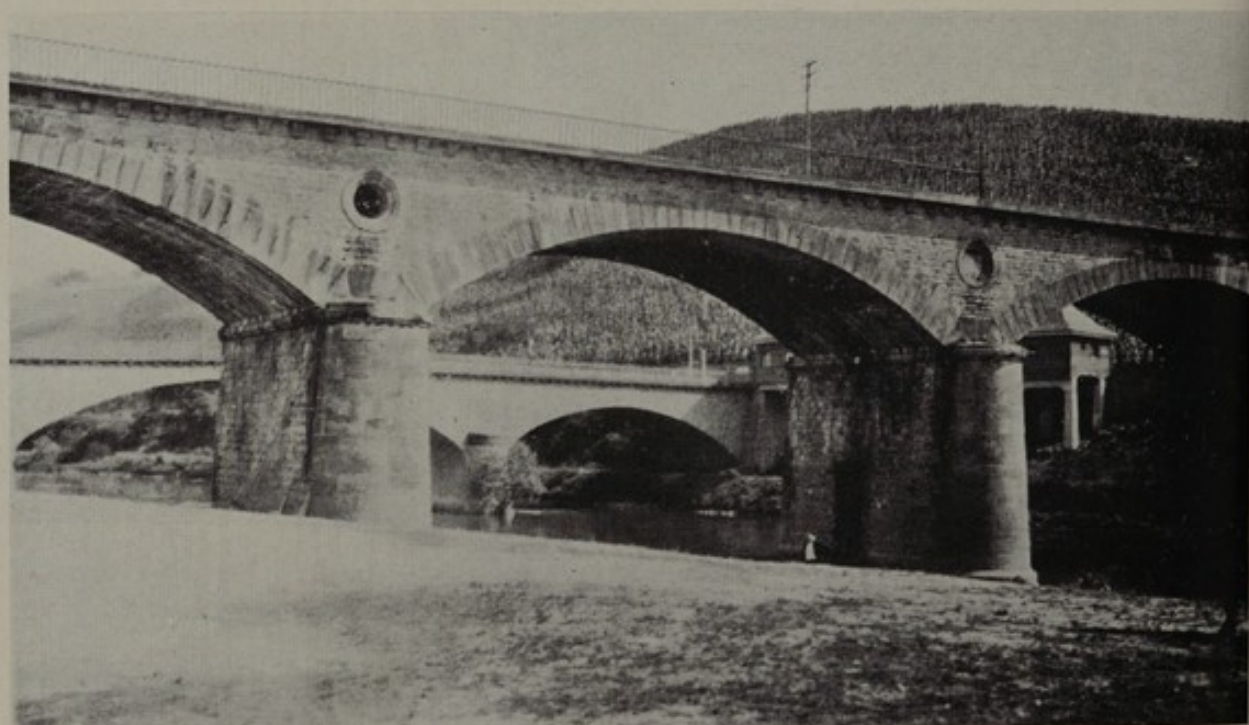


Plate 31. THE ROAD AND RAILWAY BRIDGES AT WASSERBILLIG

The Sûre, entering the Moselle at Wasserbillig, is crossed near the confluence by road and railway bridges; the nearer one carries the main line to Trier.

	<i>miles</i>
State roads	438
Roads taken over by the State	862
Local roads (<i>chemins vicinaux</i>)	1,343
	<hr/>
	2,643

Source : *Aperçu Statistique*, 1940, p. 56 (Luxembourg, 1940).

Roads in the first category (*routes de l'Etat*) are owned and maintained by the State and correspond to the *routes nationales* in France. They connect the principal centres of the country with one another and with those of the neighbouring countries. Those in the second category (*chemins repris par l'Etat*) belong to the communes but are maintained entirely at the expense of the State and serve to connect the chief places in the various cantons with one another. The local roads, of which there are two grades—first and second class—also belong to the communes, though their maintenance is ensured by Government assistance.

Owing to the large number of automobiles in relation to population, reflecting the economic prosperity of the Grand-Duchy, and to the extensive use of the main highways by foreign cars passing through the country, the Luxembourg road system before the present war had to bear a considerable intensity of traffic. By 1939, about 82 per cent. of the entire length of the State roads was metalled and another 15 per cent. either macadamized or surfaced with tarmacadam. On the other hand, commune finances, necessarily limited and subject to considerable annual fluctuations, did not permit of a similar standard to be maintained in the case of the *chemins vicinaux*. The programme for improving traffic conditions, in which substantial progress had been made, included road-widening, the amelioration of dangerous bends, the installation of signs (according to the Geneva International Convention), the lighting of sections upon which traffic was particularly heavy and the provision of footpaths and cycle-tracks (*pistes*). The erection of white kilometre stones, the upper portion of which is coloured red on the State roads and yellow on the *chemins repris*, and the painting of white bands along the verges and on roadside trees are invaluable at night and in fog. Further, in view of the growing tourist traffic, new sections of road have recently been built along the valleys of the Our and the upper Sûre, giving access to some of the finest scenery in the Ardenne (Plates 28–30).

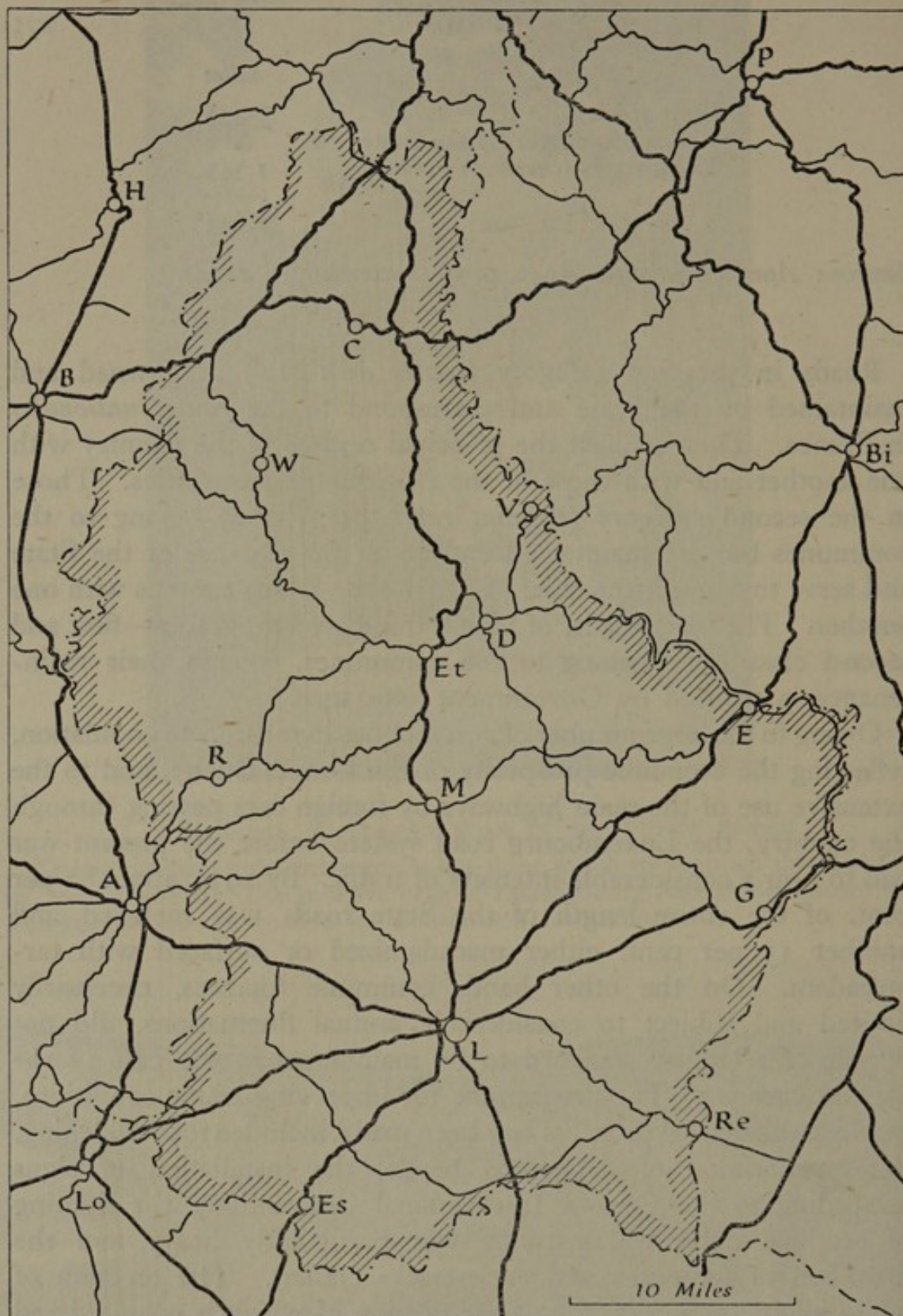


Fig. 59. The road system of Luxembourg

Based on 1 : 200,000, G.S.G.S. Series 4238, sheet 4 (1942), which is reproduced from a French (*Michelin*) map.

The thick lines are major roads, the thin ones minor; the somewhat arbitrary distinction between them is based largely on differences of surface and of width of carriage-way.

The following abbreviations are used :

A = Arlon ; B = Bastogne ; Bi = Bitburg ; C = Clervaux ; D = Diekirch ; E = Echternach ; Es = Esch-sur-Alzette ; Et = Ettelbruck ; G = Grevenmacher ; H = Houffalize ; L = Luxembourg ; Lo = Longwy ; M = Mersch ; P = Prüm ; R = Redange ; Re = Remich ; V = Vianden ; and W = Wiltz.

ROAD TRAFFIC DENSITY

A census of the number of motor vehicles passing along the main roads of Luxembourg was taken between 700 and 1900 hours on 22 September 1932. This census is the most recent that has been carried out; although some years old, it indicates the relative density of traffic on each main road, and the undoubted increase in density since 1932 may be assumed to be proportional.

The results were tabulated on the basis of the two *arrondissements* of Luxembourg and Diekirch. Details were recorded in the *Annuaire* for 1933-34, published by the *Nouvel Automobile-Club du Grand-Duché*, as follows :

	Arrondissement	
	Luxembourg	Diekirch
Number of road sections observed	36	52
Average number of vehicles on all sections during period	504	193
Average number of vehicles on <i>Routes de l'Etat</i>	584	299
Average number of vehicles on <i>Chemins repris par l'Etat</i>	431	122

Source : *Annuaire*, p. 67 (Luxembourg, 1934).

The average number of vehicles on all main roads in the *arrondissements* was 348, or an average of 29 per hour.

By far the greatest density of traffic was recorded on the Luxembourg-Diekirch road; the section of this highway in the *arrondissement* of Luxembourg carried 1,531 vehicles, or nearly 130 an hour, and that section in the *arrondissement* of Diekirch carried 1,068. The other roads used by more than 1,000 vehicles during the twelve hours of the census were those from Luxembourg to Arlon (1,434), from Esch-sur-Alzette to Dudelange (1,311), from Pulvermühl to Feldgen (1,305), and from Luxembourg to Thionville (1,271 cars). All these sections of road are in the *arrondissement* of Luxembourg.

MOTOR COACH SERVICES

Fig. 60 shows that motor coach and omnibus services, most of which are subsidized by the State, provide a valuable supplement to the railways for internal passenger transport. Some carry mails as well

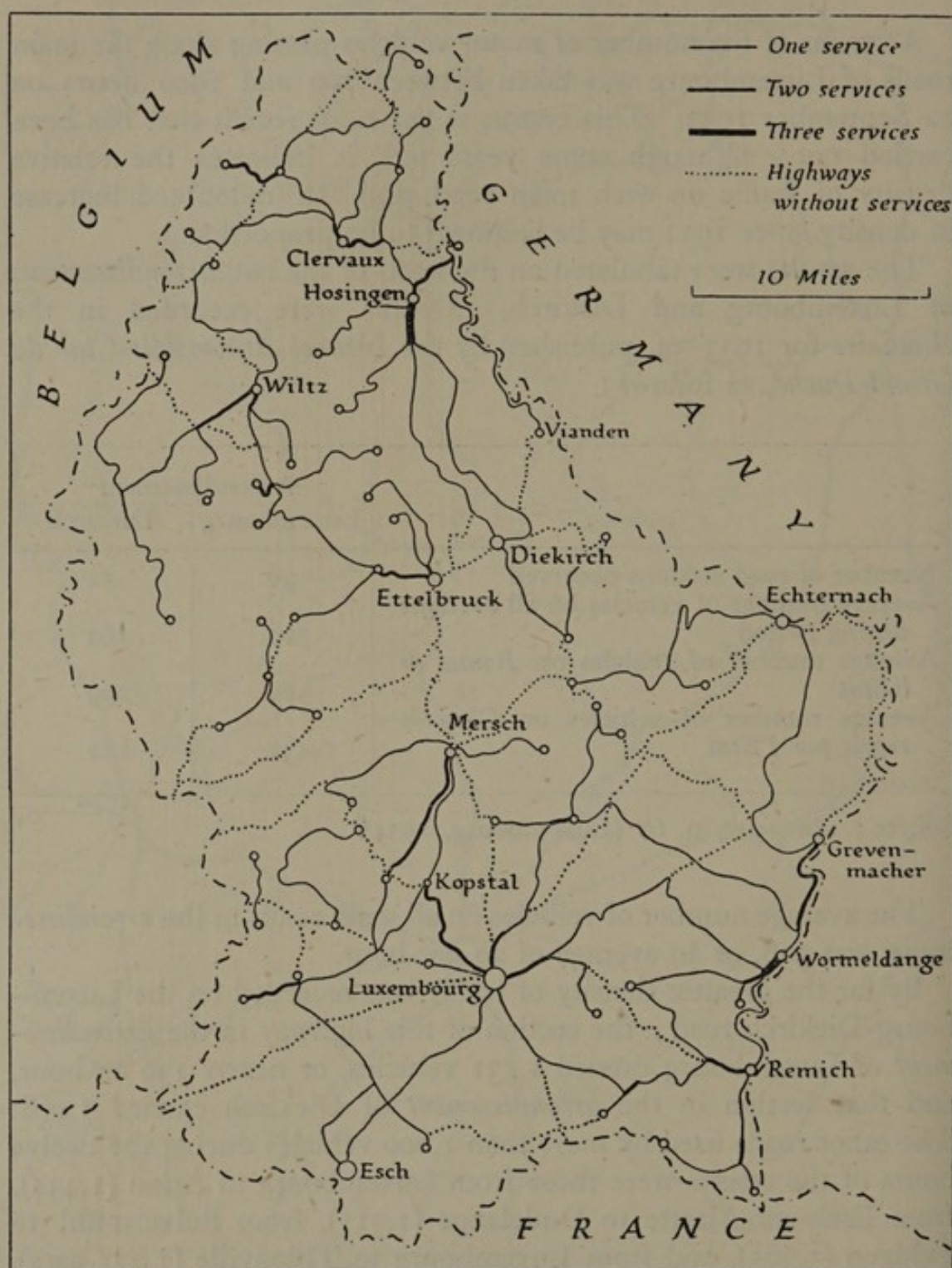


Fig. 60. Omnibus services

Based on data given in *Annuaire Officiel*, 1935 (Luxembourg, 1935.)

The map shows that motor-bus services provide essentially for local needs, especially in rural areas, rather than affording through-routes connecting more distant centres. Road services are not always operated where there is adequate railway transport, as between Ettelbruck and Mersch.

as passengers, but all are operated by private companies. By comparing Figs. 60 and 61, it will be seen that these services rarely operate between places served by the railways, though at a number of points they make contact with the latter, e.g. at Ettelbruck and at Clervaux on the main line running northwards through the Ardenne, at Remich, and at Esch-sur-Alzette. There are a number of obvious cases where, owing to good railway connections, no bus services exist, such as between Luxembourg and Bettembourg, between Luxembourg and Mersch (direct), and between Ettelbruck and Diekirch. Since the motor services are predominantly local, there are no 'through' buses linking places in the north with the capital or with other centres in the south.

In the Ardenne, where the hilly country is more suited to motor transport than to railways, no fewer than twenty-two services are in operation, out of a total of about fifty in the whole country; the main centres are Hosingen, Wiltz and Clervaux. Many of these serve to connect places which not many years ago were relatively remote from each other. One of the routes from Hosingen crosses the Our to the large village of Dasbourg in Germany, the only instance of a regular bus service having a terminus beyond the frontier.

In the south, the capital is of course the principal focus for motor transport; naturally it is the centre for numerous sight-seeing tours. Subsidiary centres are at Mersch, and at Remich and Wormeldange in the Moselle valley. There is a noticeable absence of services in the metallurgical district, owing to the adequacy of railway facilities, including frequent trains and cheap fares, as well as to the excellent tramways system (*Tramways intercommunaux du canton d'Esch-sur-Alzette*), which provides communication between all the centres within the industrial area.

NOTE ON THE BRIDGES ACROSS THE LUXEMBOURG-GERMAN FRONTIER

The bridges between Luxembourg and Germany across the rivers Our, Sûre and Moselle are listed in order from north to south. Towns or villages on either side of the frontier are indicated. The only railway bridge is that carrying the Luxembourg-Trier line between Wasserbillig and Wasserbilligerbruck.

	<i>Luxembourg</i>	<i>Germany</i>
River Our	<ul style="list-style-type: none"> Kalborn Marbourg Obereisenbach No village near frontier Stolzembourg Bettel 	<ul style="list-style-type: none"> Dahlen Dasbourg Übereisenbach Gemund No village near frontier Roth
River Sûre	<ul style="list-style-type: none"> No village near frontier Dillingen Bollendorf-pont hamlet No village near frontier Echternach Rosport Wasserbillig Wasserbillig 	<ul style="list-style-type: none"> Wallendorf No village near frontier Bollendorf Weilerbach Echternacherbruck Ralingen Wasserbilligerbruck Wasserbilligerbruck (railway bridge)
River Moselle	<ul style="list-style-type: none"> Grevenmacher Wormeldange Remich Schengen 	<ul style="list-style-type: none"> Wellen Wincheringen Wies and Nennig Perl

RAILWAYS

GENERAL FEATURES

The railways of Luxembourg are considerably more important than might be expected in the case of such a small country. This is largely because the railway system forms a link in each of several important routes between Belgium, France, Germany and Holland, and therefore carries a considerable amount of international transit traffic. While, however, the geographical situation has given exceptional importance to railways, the construction and operation of the routes have been considerably handicapped by the hilly nature of the country. The main lines follow as far as possible the river valleys, frequently tunnelling to avoid acute bends, while curves are numerous. There is in addition a considerable number of viaducts and long bridges.

The standard-gauge railways of Luxembourg belong to two undertakings, the *Guillaume-Luxembourg* (G.-L.) company, with a length of 128.5 miles (207 km.), and the *Prince Henri* (P.H.) company, with a length of 120 miles (193 km.). This total length of 248.5 miles (400 km.) represents 1 mile of railway for every 4.00 sq. miles of territory (cf. Belgium 1.66 sq. miles, Germany 4.29, Great Britain 4.43, and France 7.87), or 1 mile of railway to every 1,192 inhabitants (c.f. Belgium 1,186 inhabitants, France 1,555, Germany

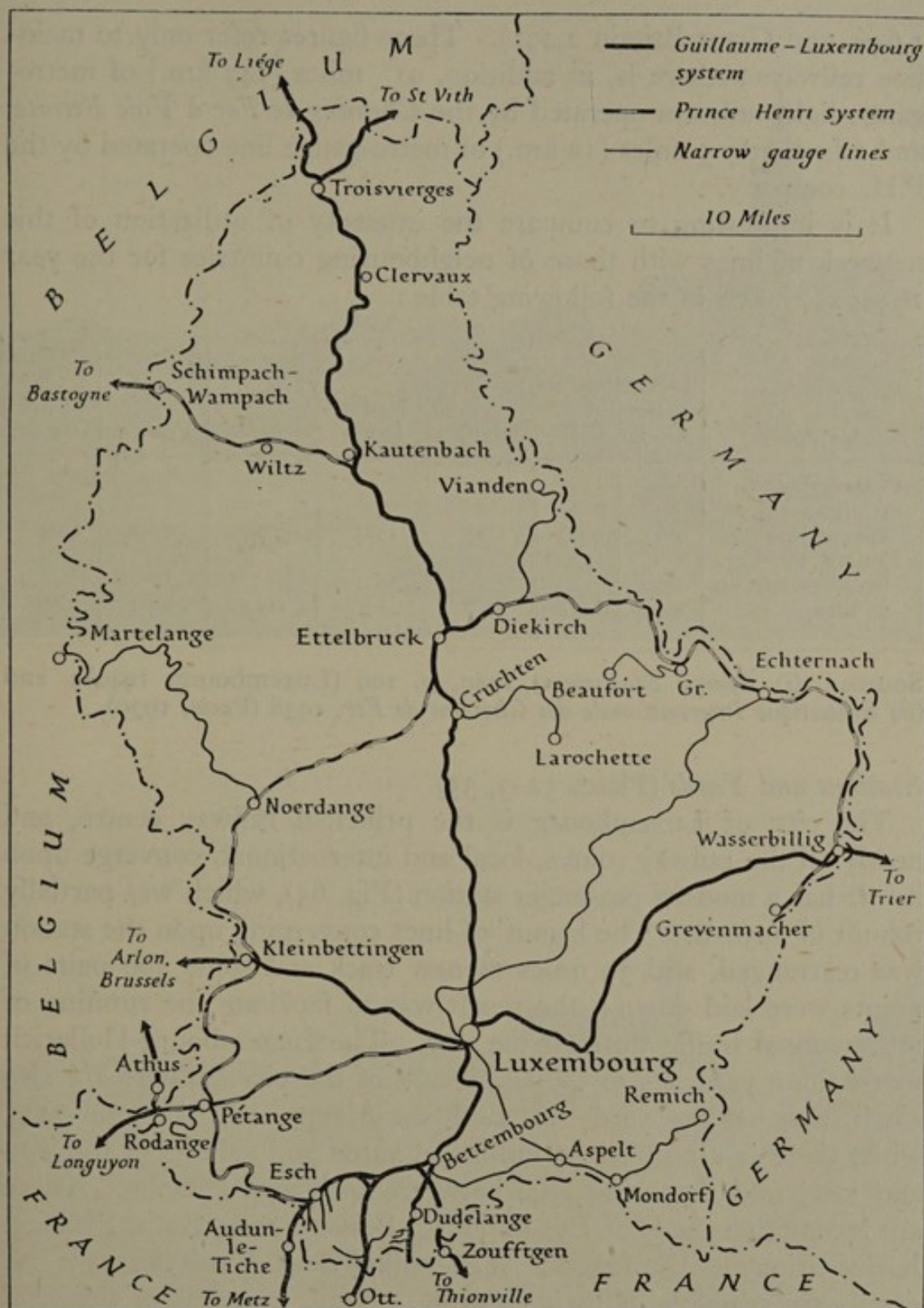


Fig. 61. The railways of Luxembourg

Based on E. Majerus, *Les Chemins de Fer du Grand-Duché de Luxembourg* (Luxembourg, 1933.)

It will be noted that in some cases the Luxembourg companies operate sections of line for a short distance beyond the frontier. The continuation of the railway routes into adjoining countries is indicated by arrows. The numerous short sections of line in the south-west serve the iron-ore workings.

Gr. = Grundhof; Ott. = Ottange

1,646, and Great Britain 2,291). These figures refer only to main-line railways; there is, in addition, 91 miles (147 km.) of metre-gauge light railways operated by the *Chemins de Fer à Voie Etroite*, and a further 7.5 miles (12 km.) of metre-gauge line operated by the P.H. company.

It is interesting to compare the intensity of utilization of this network of lines with those of neighbouring countries for the year 1938, as shown in the following table:

Category	Luxembourg		Belgium	Nether-lands	Germany	France	Gt. Britain
	G.-L.	P.H.					
Passenger-km. (millions) per km. of line	0.67	0.27	1.25	1.03	0.99	0.52	1.05
Freight, ton-km. (millions) per km. of line	1.44	0.55	1.12	—	1.52	0.63	0.86

Source: (i) *Aperçu Statistique*, 1940, p. 109 (Luxembourg, 1940); and (ii) *Statistique Internationale des Chemins de Fer*, 1938 (Paris, 1939).

Stations and Yards (Plates 32-3, 35)

The city of Luxembourg is the principal railway centre, and nearly all the railway routes, local and international, converge upon it. It has a modern passenger station (Fig. 65), which was partially rebuilt in 1936-8. The layout of lines converging upon the station was rearranged, and 39 miles of new track and some 300 pairs of points were laid down; the result was to facilitate the running of international traffic through the city. The Luxembourg-Hollerich marshalling yard lies to the south-east of the city. There are also small marshalling yards at Esch-sur-Alzette and Bettembourg, while there is a number of industrial yards and sidings in the iron and steel manufacturing area between Esch and Pétange. There are locomotive sheds at Luxembourg, Bettembourg, Esch, Pétange, Kleinbettingen, Ettelbruck, Wasserbillig and Troisvierges; no details are available of their capacity. Some 86 miles of the total 128.5 miles of the G.-L. system is double-track; this consists of the sections from Luxembourg to Kleinbettingen, to Wasserbillig and to Zoufftgen. Of the 120 miles of the P.H. lines, only the 13 miles stretch from Esch-sur-Alzette to Rodange is double-track. Axle-loads of 18 tons are permitted over all the main-line network, but this figure is rarely approached on some sections of the P.H.



Plates 32, 33. THE CENTRAL RAILWAY STATION IN LUXEMBOURG CITY



Plate 34. THE VIADUCT DU NORD (PULVERMÜHL) IN LUXEMBOURG CITY
This viaduct thrice crosses the Alzette, carrying the main line northwards to Liège.



Plate 35. CONSDORF STATION
Consdorf is one of the larger villages served by the *Prince Henri* line from Luxembourg to Echternach.

Locomotives and Rolling Stock

The S.N.C.F., and the Alsace-Lorraine company before it, provide the necessary locomotives and rolling stock for use on the G.-L. lines. No separate statistical data are therefore available for the G.-L. lines.

In 1938, the P.H. company owned 66 locomotives, 105 passenger coaches, 48 vans, and 2,336 wagons. Much of this material was of considerable age, especially that used on the outlying sections of line.

HISTORICAL BACKGROUND

Origins and growth

It was not until 1859 that the first railway line in the Grand-Duchy was inaugurated from Luxembourg city to Thionville in France, followed in 1860 by another line from Arlon in Belgium to Luxembourg. These were the result of a ninety-nine years' concession to a company known as the *Société royale grand-ducale des Chemins de Fer Guillaume-Luxembourg*. The lateness of railway enterprise compared with that in adjoining countries was mainly due to political uncertainty and to the lack of necessary capital. The G.-L. company has never worked its own system; as soon as the first lines were constructed in 1859-60, the actual operation and management was ceded to the French company *Chemin de Fer de l'Est*. A second railway concession was granted to the *Prince Henri* company in 1868 to construct and operate a number of lines on a ninety-year lease; this company, unlike the G.-L., has always operated its own lines. It was controlled almost entirely by Belgian capital, the largest shareholder being the *Société Générale de Belgique*. Thus, owing to the geographical position of the country, railway development from the first necessitated agreements with the neighbouring countries, for the lines would have been of little value if they had not formed continuous routes with those already in existence beyond the frontiers. The complicated relationship between the Grand-Duchy and its neighbours arising from this circumstance has remained a permanent feature of railway control and operation.

The growth of the railway network took little over thirty years, as shown on Fig. 62. In fact, the main-line system was complete by 1880, with the exception of the Pétange-Luxembourg line, which was built by the P.H. company during the years 1900-04. The period 1884-1904 was notable, as in Belgium, for the growth of

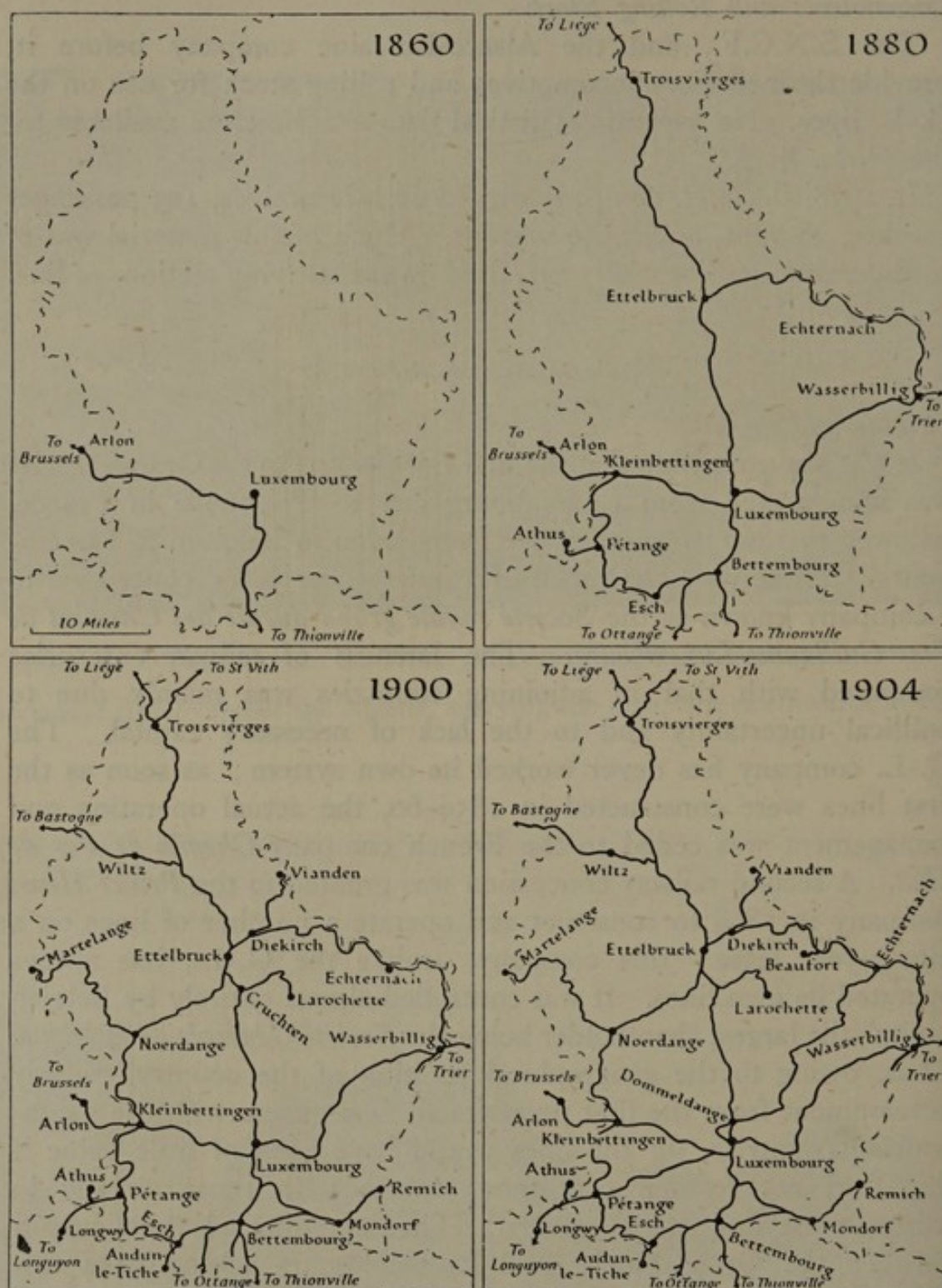


Fig. 62. The growth of the Luxembourg railway system

Based on data from E. Majerus, *Les Chemins de Fer du Grand-Duché de Luxembourg* (Luxembourg, 1933.)

The main period of railway building between 1880 and 1900 was contemporaneous with the development of industry.

Standard gauge and light railways are not differentiated.

light railways or tramways, the object of which was to provide cheap local transport for the rural areas which could not possibly be remuneratively served by standard-gauge lines. The last railway line to be built in Luxembourg, apart from mineral lines and sidings in the iron ore area in the south-west, was the narrow-gauge railway from Luxembourg to Echternach.

Political Control, 1871-1940

After the Treaty of Frankfurt in 1871, Alsace-Lorraine was annexed by Germany, and the G.-L. company was faced with the problem of finding a company to operate its lines. Long and difficult negotiations between Germany and Luxembourg led to the Railway Convention of 1872, under the terms of which the exploitation of the G.-L. lines was ceded to the new German Alsace-Lorraine company. The G.-L. thus became part of the communication network of the *Zollverein*. In 1902, this Convention was superseded by another, under which the G.-L. company agreed to the continued direction from Strasbourg until the expiration of the original concession, that is, in 1959; the German government agreed not to use the Luxembourg railways for military traffic. At this time industrial traffic increased greatly, and the international importance of the system was reflected in the growth of transit traffic. Thus while the latter in 1900 amounted to 1,829 million tons out of a total traffic of 6,062 million tons, by 1913 it had reached 6,162 million tons, an amount exceeding the entire traffic at the beginning of the century.

During the war of 1914-18, despite the undertaking to the contrary, the German government made much use of the Luxembourg system for military transport; the geographical position of the Grand-Duchy made this inevitable. On these grounds, after the cessation of hostilities in 1918, the Luxembourg Government denounced the Railway Convention of 1902, and at the same time the lease was transferred to the administration of the new French *Compagnie des Chemins de Fer de l'Alsace et de la Lorraine*. During the discussion of the proposed Customs Union of Luxembourg with either France or Belgium (see pp. 74, 251), the future control of the railway systems was also discussed. After France had withdrawn her interests in a Customs Union, negotiations proceeded between France and Belgium for the divided control of Luxembourg railways, and an agreement was reached. Luxembourg not unnaturally

objected to the proposed division of her railway system into two spheres controlled by different foreign governments. In the convention concluding the Belgo-Luxembourg Economic Union (July 1921), the future régime of the railways was left over for arrangement between Belgium and Luxembourg. After prolonged negotiations, a further convention was signed at Brussels in May 1924, under which the Luxembourg railways were unified, and their operation was made over to the P.H. company under the joint control of the Belgian and Luxembourg Governments. The Luxembourg Chamber of Deputies, however, refused to ratify this agreement in January 1925, and the Government resigned. The new Government brought forward another agreement with the P.H. company alone, without Belgian control, which was accepted by the Chamber. The G.-L. company, however, considered that the new terms infringed the rights of the original concession, and brought a successful action against the Government. In the meantime, the lines had to be worked, and the A.-L. company continued to do so; this was confirmed by the *Modus vivendi* of 9 October 1925. Under this agreement, as the wages of the Luxembourg railway staff were at a higher rate than in Alsace-Lorraine, the Luxembourg Government agreed to make good the difference, but they were compensated by being allowed to raise fares and rates within the Grand-Duchy. The business management of the G.-L. company had to pay rental of a million francs annually to the Government, but in 1927 the Government and the G.-L. company agreed to divide profits and losses equally.

Further efforts have been made to unify the Luxembourg railway systems, but owing to the numerous conflicting interests involved no success had been achieved by 1939. In 1929, a draft agreement was signed by representatives of the Belgian and Luxembourg Governments, under which the two Luxembourg systems were to be grouped and run as one by a new company to be called the Luxembourg National Railway Company. Shareholders in the P.H. company were to receive $2\frac{1}{2}$ shares in the new company for every one of the P.H. shares. This agreement too was not ratified by the Luxembourg Chamber, and the P.H. company continued to operate its own lines and the French A.-L. company to operate the G.-L. lines. In 1938, when the A.-L. was incorporated into the newly formed *Société Nationale des Chemins de Fer français*, the S.N.C.F. continued to operate the G.-L. lines.

TRAFFIC

The relative importance of the G.-L. and P.H. systems in 1938 is shown by the following table :

Category	G.-L.	P.H.
Total receipts (million <i>fr. lux.</i>)	119.03	52.09
Receipts per km. (thousand <i>fr. lux.</i>)	567.5	269.9
Passenger-km. (millions)	138.16	76.47
Passenger-km. per km. of line (millions)	0.67	0.39
Freight (million ton-km.)	298.94	105.71
Freight, million ton-km. per km. of line	1.44	0.55

Source : *Aperçu Statistique*, 1940, pp. 109, 115 (Luxembourg, 1940).

It will be seen that the average intensity of passenger traffic and the receipts per kilometre in 1938 on the G.-L. system was more than twice that on the P.H., and that the intensity of freight traffic was nearly three times. The reason for this, of course, is that the G.-L. system includes a section of the main route from Brussels to Strasbourg, as well as a main line running north-south through the country, and also the important lines in the south-west which carry a heavy freight of iron ore, coke, iron and steel. While the P.H. lines from Rodange to Luxembourg and from Esch-sur-Alzette to Pétange have a great intensity of similar freight traffic, the average figures are reduced by the low intensity on the outlying lines serving rural areas.

As the two companies are operated individually and issue returns which are not comparable in some details, it is convenient to describe the traffic of each in turn.

The Guillaume-Luxembourg System

Passenger Traffic. Statistical data of traffic on the G.-L. system are not available, as the returns are included in those for the Eastern Region of the S.N.C.F. However, figures are published of the number of passengers departing from stations on the G.-L. system (although not of arrivals nor of those in transit), and also in most years of the total passenger receipts, including the receipts from international traffic paid on a mileage basis. A useful indication of the passenger traffic intensity is also given in the form of the number of passenger-kilometres travelled. The following table summarizes the available statistics for the period 1933-8 :

Passenger traffic of the G.-L. system

Category	1933	1934	1935	1936	1937	1938
No. of passengers departing from G.L. stations	4,289,169	4,193,942	4,260,216	4,140,589	4,190,557	3,911,324
Passenger receipts (million fr. lux.)	19.16	n.s.s.	n.s.s.	n.s.s.	18.09	n.s.s.
Passenger-kilometres (millions)	143.53	135.88	132.50	150.99	172.98	138.16
Passenger-kilometres (millions) per km. of line	0.69	0.66	0.64	0.73	0.84	0.67

n.s.s.—not separately specified

Source : *Aperçu Statistique* for successive years (Luxembourg, annually).

Freight. As shown in the table on p. 282, the average intensity of freight traffic on the G.-L. lines as a whole is exceeded in Europe only by that of Germany. The main items of freight traffic received and despatched from the G.-L. stations (not including transit traffic, for which no figures are available) are as follows :

Freight Traffic of the G.-L. system (1,000 tons)

Commodity	1937		1938	
	Received	Despatched	Received	Despatched
Iron ore	578.4	3,274.9	317.1	2,410.3
Coal and coke	1,549.4	8.8	1,018.3	6.2
Finished and semi-finished steel	84.9	450.2	75.4	366.5
Fertilizers	27.4	203.8	38.3	113.3
Agricultural products	73.5	23.5	64.5	18.5
Timber	37.4	20.2	32.8	23.2
(constructional)				
Chalk and cement	32.7	7.8	107.2	78.7
Building materials	112.4	93.9	{ 98.9	{ 72.5
Quarry products	116.2	105.2		
Mineral oils	23.7	1.4	22.8	1.4

Source : *Aperçu Statistique*, 1939, p. 113, and 1940, p. 113 (Luxembourg, 1939, 1940).

Outstanding, of course, and an obvious reflexion of the mineral wealth and heavy industry of southern Luxembourg, is the prominent part played by the traffic in coal, coke, mineral ores and metals. The decline in 1938, resultant upon political unrest and a slump in the metallurgical industry (see p. 232), is marked. Less striking but important are the products of the Ardenne quarries, while

in 1938 there was an unusually heavy traffic in chalk and cement.

Complete statistics are available of the sources and destinations of freight arriving from and departing to other countries, with the single exception that import figures are not available for France, due to the G.-L. lines being worked as an integral part of the S.N.C.F. ; curiously enough, exports to France are available. The outstanding export item was iron ore ; some two-thirds went to Belgium and most of the remainder to France and Germany, as shown in the following table :

Exports of iron ore by the G.-L. system (1,000 tons)

Year	Belgium	France	Germany
1936	490.8	163.7	195.0
1937	1,065.1	406.1	598.1
1938	780.4	145.6	611.1

Source : *Aperçu Statistique*, 1939, p. 110 and 1940, p. 110 (Luxembourg, 1939 and 1940).

The outstanding import by rail was coke and coal, of which by far the greatest proportion came from Germany.

Imports of coal and coke by the G.-L. system (tons)

	Year	Germany	Belgium	Holland	Total
Metallurgical coke	1936	1,014,982	24,143	36,594	1,074,719
	1937	1,331,198	16,549	5,093	1,352,840
	1938	822,134	11,417	5,874	838,625
Gas coke	1936	126	1,304	201	1,631
	1937	826	1,489	236	2,551
	1938	20	—	25	45
Coal and anthracite	1936	36,222	31,172	7,704	75,098
	1937	45,022	28,442	8,957	82,421
	1938	41,579	20,409	13,562	75,550

Source : *Aperçu Statistique*, 1940, p. 114 (Luxembourg, 1940).

The Prince-Henri system

Passenger Traffic. The prosperity of the P.H. company does not compare with that of the G.-L. ; in fact, the former has not paid a

dividend since 1930. The total number of passengers conveyed in 1938, was about 4.4 millions. The receipts per passenger, however, were only 1.0 *fr. lux.*, showing that the railway catered extensively for short-distance local passenger traffic. This, of course, is to be expected, for, apart from the important section Rodange-Luxembourg, the P.H. sections of line serve the outlying rural parts of the Grand-Duchy and are not used by international through traffic.

Freight. The total merchandise conveyed in 1937 totalled some 11.3 million tons, and in 1938 some 7.3 million tons. The following table analyses the composition of the more important items of this freight :

Freight handled at P.H. stations (1,000 tons)

	1937			1938		
	Received	Despatched	In Transit	Received	Despatched	In Transit
Iron ore	211.4	5,260.4	18.4	244.0	3,410.1	0.5
Coal and coke	1,884.5	—	339.9	1,261.3	—	206.8
Pig iron	18.0	17.7	—	12.2	56.76	6.9
Finished and semi-finished steel	8.3	1,832.87	—	5.7	1,005.9	—
Basic slag	—	408.5	—	—	240.7	—
Timber	34.8	36.7	0.32	27.4	32.1	0.33

Source : *Aperçu Statistique*, 1939, pp. 117-19, and 1940, pp. 115-18 (Luxembourg, 1939 and 1940).

It will be seen that the P.H. line carried a greater amount of iron ore and of coke than did the G.-L. Almost all of these materials were conveyed on the Rodange-Luxembourg and Esch-Pétange sections. The other sections of the P.H. lines serve rural areas of the Grand-Duchy, where goods traffic was much less, and consisted mainly of building stone, timber, agricultural produce, and coal for domestic use ; thus, in spite of the heavy traffic on the two sections of the P.H. line in the south-west, the average freight receipts per kilometre were much less than those for the G.-L. system.

Of the merchandise received from or despatched to countries outside the Grand-Duchy, imports of coal and exports of iron ore are outstanding, as in the case of the G.-L. The following tables summarize the exports of ore and imports of coke and coal for the years 1936-8 :

Exports of iron ore by the P.H. system (1,000 tons)

Year	Belgium	France	Germany
1936	780.2	1.6	33.7
1937	1,500.7	11.0	157.0
1938	1,078.8	4.3	207.8

Source : *Aperçu Statistique*, 1939, p. 117, and 1940, p. 117 (Luxembourg, 1939 and 1940).

Imports of coke and coal by the P.H. system (1,000 tons)

Year	Belgium	France	Germany	Holland
1936	198.6	0.2	981.2	228.7
1937	327.7	0.4	1,303.2	253.2
1938	232.0	0.7	742.6	286.0

Source : *Aperçu Statistique*, 1939, p. 118, and 1940, p. 118 (Luxembourg 1939 and 1940).

INTERNATIONAL LINES

Luxembourg's central position in western Europe has given rise to a considerable and remunerative international transit traffic (Fig. 63). The Kleinbettingen-Luxembourg-Zoufftgen line forms a section on the Brussels-Namur-Arlon-Metz-Strasbourg-Basle route, one of the main rail links between the North Sea and Switzerland and beyond. This line is Luxembourg's chief connection with Belgium and with the ports of Antwerp, Ostend and Amsterdam. It carried a heavy international passenger and goods traffic, including a number of luxury expresses (such as the 'Edelweiss') run by the International Sleeping Car Company (*Compagnie Internationale des Wagons-Lits et des Grands-Express Européens*). The Rodange-Luxembourg-Wasserbillig line forms a section on the route between France and Germany, and is the quickest way between Paris and Coblenz. In addition, it carries a heavy traffic of coal, coke and iron ore between Lorraine and the Ruhr, although some of this traffic takes the direct line from Thionville via Apach/Perlé to Trier, thus avoiding Luxembourg territory. From Rodange, the main route is via Longuyon to Mézières-Charleville, Reims and Paris; other through trains run from Mézières via Hirson and Lille to

Calais or Dunkirk. From Wasserbillig, the line continues north-eastwards to Trier, Coblenz and the Rhine valley. There are also through trains from France, via Luxembourg city and Wasserbillig, to Saarbrücken. Finally, from Luxembourg a line runs north to Troisvierges, from which a main line continues to Liège, Amsterdam and The Hague.

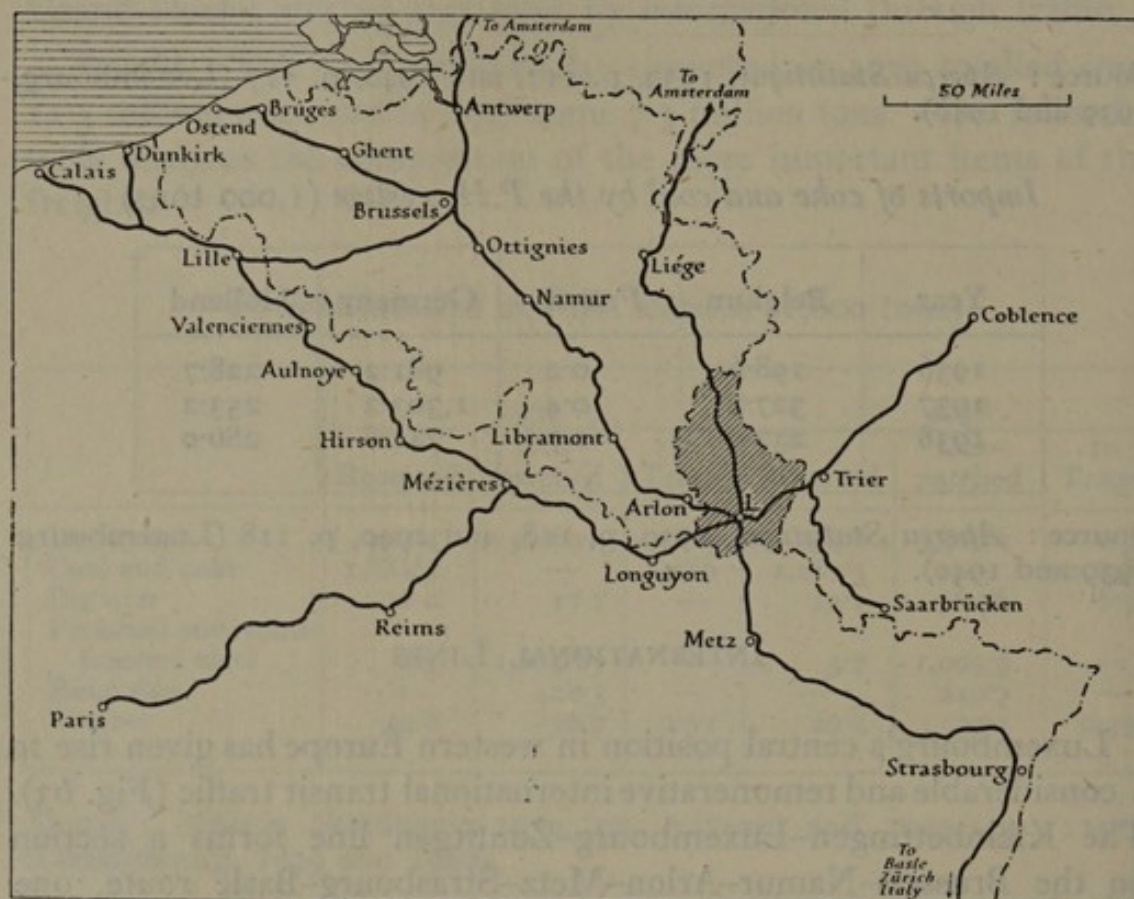


Fig. 63. International railway routes passing through Luxembourg

Based on 1 : million, G.S.G.S. Series 4237 ; the railway routes are those given in the *Continental Bradshaw* for 1939.

Only those routes are shown on which through-trains are run. The places named are important junctions on these through-routes.

RAILWAYS AND THE METALLURGICAL INDUSTRY

It has already been mentioned in dealing with the freight traffic of the P.H. and G.-L. lines that iron ore, coke and finished iron and steel constitute the most important items of freight traffic.

Transport in relation to iron and steel production is clearly a factor of fundamental importance. This is particularly true in the case of Luxembourg from at least three points of view, including (1) the movement of ore, (2) the provision of coke supplies, and (3) the

export of the finished and semi-finished products. In view of the situation of the smelting units and other installations, it is essential that railway communications with the neighbouring countries should operate expeditiously and at low cost. That the existing railway net largely satisfies these needs may be seen by reference to the actual routes involved.

The line to the north through Liège crosses the new Campine coalfield, and beyond gives connection with Rotterdam, while a branch from Liège makes for Aachen and Eschweiler. The latter is of the highest importance for the conveyance of coke from both the Eschweiler basin (in which the *Arbed* concern has properties) and the Ruhr. The main line itself carries quantities of steel and finished products, which find an outlet in the Netherlands. The route via Arlon to Brussels and Antwerp, however, is the most important of all from the point of view of the metallurgical interests. From Namur, branches connect Valenciennes and Charleroi on the Franco-Belgian coalfield, while from Brussels an alternative route to the seaboard reaches Ostend. Thus coke from Britain and Belgium, manganese, and other essential alloy materials which must be imported, are transported by this route. Further, the bulk of the finished steel exported overseas is sent in the opposite direction, mainly through Antwerp.

The line leading southward to Thionville, Metz, Strasbourg and Basle serves in two distinct ways. It provides a direct route for the movement of finished products to Switzerland and Italy, and in addition affords the chief means of conveying ore from Lorraine to the furnaces in the Grand-Duchy. This function is likely to increase in importance as the reserves of 'minette' in Luxembourg are diminished. The railway via Trier and the Moselle valley to the Rhine at Coblenz is used for the conveyance of products into Germany and central Europe, while that via Longwy and Longuyon, which provides a route to Calais and to Dunkirk, permits some competition with Antwerp in overseas trade.

NARROW-GAUGE RAILWAYS

The narrow-gauge (one metre) light railways in Luxembourg have been operated since 1934 by the State as the *Chemins de Fer à Voie Etroite de l'Etat de Luxembourg*. Prior to that date, they were worked by the P.H. company, but in view of the continual loss incurred that company gave up its contract to the Government.

There is also a short section (7.5 miles) of narrow-gauge line between Beaufort and Grundhof in the Sûre valley, which was retained by the *Prince Henri* company. No separate details are available of this line.

In 1938, the total length of the system was 91 miles (147 km.), made up of six separate sections. As in Belgium, these light railways constitute an important feature of the communications; their total mileage represents more than a quarter of the whole railway system. The lines follow main roads throughout much of their length.

The following table summarizes the main features of the operation of each individual line in 1938:

	Luxembourg to Remich	Cruchten to Larochette	Luxembourg to Echternach	Aspelt to Bettembourg	Diekirch to Vianden	Noerdange to Martelange
Length (miles)	17.4	10.6	28.6	6.8	9.3	18.6
" (km.)	28	17	46	11	15	30
No. of passengers	641,396	55,783	189,688	74,491	112,802	68,433
Passenger receipts (thous. and fr.)	1,173.5	90.4	568.5	126.8	251.1	161.9
Merchandise (tons)	9,414	5,607	10,536	1,969	2,487	13,503
Total receipts per km. of line (thous. and fr.)	52.9	9.7	16.7	12.7	22.5	11.2

Source: *Aperçu Statistique*, 1940, pp. 120-1 (Luxembourg, 1940).

The Luxembourg-Remich line is by far the most important section of light railway, although it terminates at a point in the Moselle valley which has no other railway connection. Its relatively high passenger traffic is due partly to the fact that it serves Mondorfles-Bains, an increasingly popular tourist centre. It is also significant if obvious that the two most important lines both originate from the capital.

The light railways have suffered severely from road transport competition. In 1933, their working showed a deficit of 274,000 *fr. lux.*, or more than twice that of 1932, and there have been proposals to reduce some of the services and to close sections of the lines.

The light railways are with one exception operated by steam locomotives or steam tramcars, although details of rolling stock are not available. In 1914, two petrol-driven railcars were introduced on to the Diekirch-Vianden line; in 1939, these were rebuilt as double-bogie diesel electric railcars.



Plates 36, 37. THE LUXEMBOURG NARROW GAUGE SYSTEM

The upper photograph shows the terminus of the line from Luxembourg to Remich ; the lower is of a section of the Diekirch-Vianden line passing through a street in the former town.

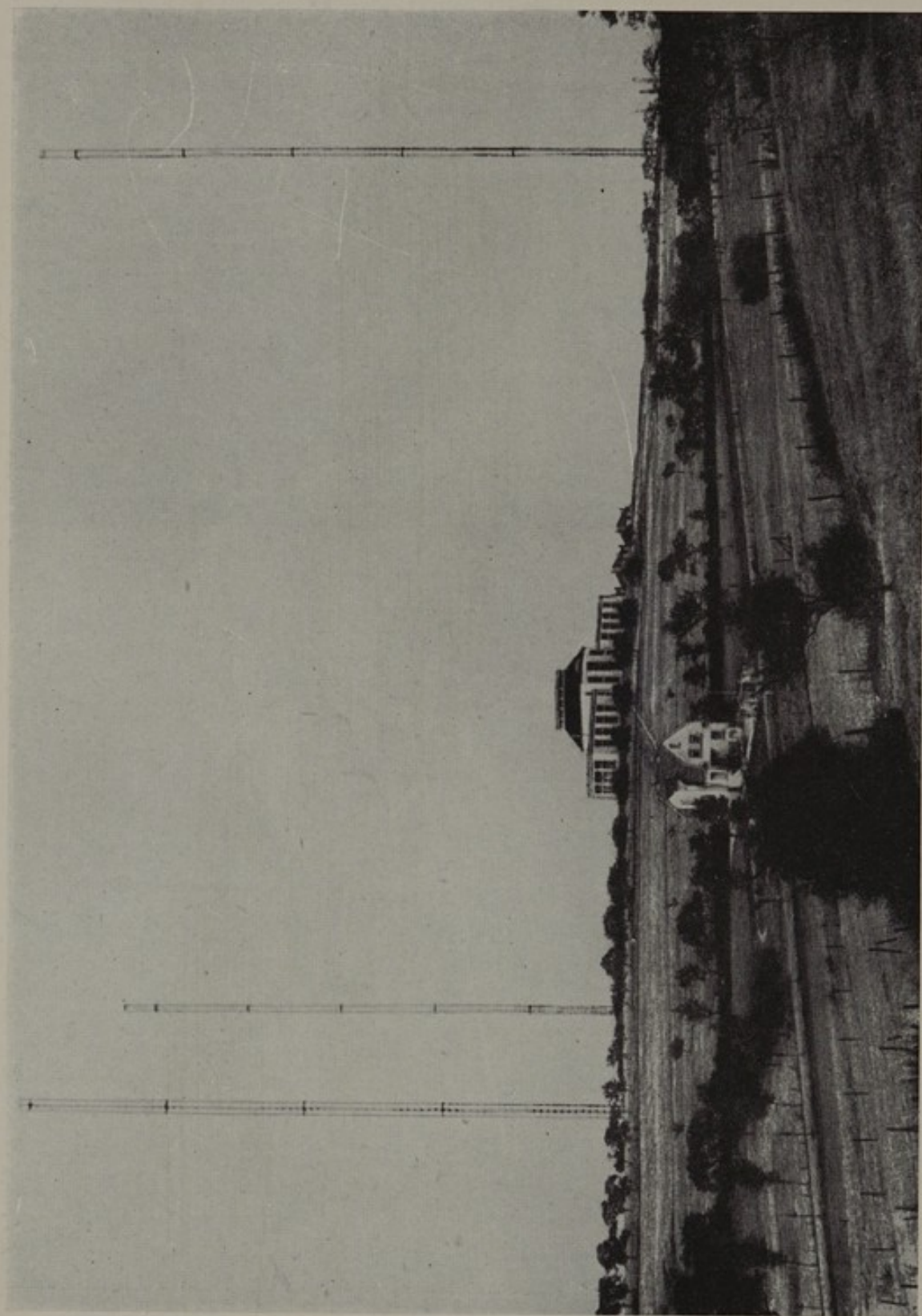


Plate 38. THE RADIO LUXEMBOURG TRANSMITTING STATION AT JUNGLINSTER

WATERWAYS

In the region of the present Grand-Duchy, rivers were used considerably for navigation in earlier times ; in fact, until the end of the eighteenth century, much of the traffic between Luxembourg and the Rhine passed along the Moselle. A legal distinction, still obtaining, between navigable and non-navigable rivers was made by an ordinance of Louis XIV in 1669, by which the navigable rivers (as far as Luxembourg was concerned) were defined as (i) the Moselle, and (ii) the Sûre as far as its confluence with the Alzette at Ettelbruck. On the former, Ehnen and Remich were the principal points of shipment, while on the Sûre, which had been canalized below Echternach under the direction of the Abbey authorities as early as the eleventh century, Echternach and Ettelbruck were the chief centres. Even as late as 1880, a boat-building yard was active at Echternach. In 1928, a project for connecting the Moselle with the Meuse by means of the Sûre and the Ourthe led to further canalization of the Sûre, but the scheme was soon abandoned. The beginnings of a tunnel intended to link the two tributary streams can still be seen at Hoffelt. To expedite the carrying of iron from the furnaces at Septfontaines (Simmern) to the forges and works at Ansembourg in the mid-seventeenth century, the river Eisch was also canalized and traffic maintained thereon for well over a century.

THE MOSELLE

The prospect of commercial navigation in Luxembourg turns on the much debated question of the canalization of the Moselle. Though the project is an old one, it received a new stimulus with the industrial developments in Lorraine after 1870. If the river could be made to carry 1,000-ton barges, it was claimed that success would be assured. But the scheme involved conflicting interests, both industrial and political, which, together with the unpromising physical conditions, largely explain the continued failure to bring the Moselle into the category of a commercial waterway. The principal interests in support of the project were found among industrialists in the Rhineland, in the Saar district, and in Lorraine, and among the vine-growers of the Moselle valley who would obviously benefit from regular transport facilities on the river. Opposition came from certain industrialists in Lorraine, who feared that their competitors in the Rhineland would secure too great an advantage, and from others in Luxembourg (including

railway promoters), who pleaded that an unfair advantage would be won by concerns situated close to the river. Support for these views also came from Alsace, where it was felt that to embark upon an ambitious scheme for the Moselle could only result in the further postponement of improvements to the Rhine above the Moselle confluence at Coblenz.

Plans were prepared for canalizing the river, involving the construction of weirs and locks on the Luxembourg section at Stadtbredimus, Ahn and at a point a little below Grevenmacher. But the German government repeatedly demurred against lending support to so costly a scheme, regarding expenditure on the lower Rhine and on the Elbe as a sounder policy. Thus while the French later improved the Metz-Thionville stretch—the so-called ‘Iron Mines Canal’ being opened in 1932—the Moselle as far as Germany and Luxembourg are concerned has remained in a condition unfavourable to modern traffic; the quiet river presents a marked contrast to the busy railway routes which follow the valley.

The Moselle is able to carry 200-ton barges and small pleasure craft during six months of the year, but the actual traffic is slight, consisting mainly of the local movement of limestone and gypsum, the cost of which is borne jointly by Germany and the Grand-Duchy, while the care of the banks is the separate responsibility of each State.

THE SÔRE

Like the Moselle, the Sôre is mostly shallow, rather swift and liable to flood (p. 22), and is therefore unsuited to navigation on a modern scale. Almost the only traffic to-day consists of pleasure-boats, canoes being paddled downstream to Wasserbillig by tourists staying at Echternach, the return being made by train. Canoes and rowing craft are made in Echternach. Gravel for road metal is obtained from the river bed during the summer, when the water is low. Though the method usually adopted is by hand-shovel and cart, a floating dredger with mechanical sifters raising up to fifty tons a day was introduced at Echternach in 1932.

CANAL PROJECTS IN RELATION TO THE METALLURGICAL INDUSTRY

The metallurgical centres of Luxembourg, like the neighbouring installations in Lorraine, are remote from the principal waterway systems of the adjoining countries, though they are comparatively

well situated with regard to the chief rivers of the region or their tributaries, i.e. the Moselle and Saar, the Meuse and Chiers. Not unnaturally, therefore, several projects, involving further canalization and the improvement of rivers, have been launched during the past forty years, having as their object the provision of water transport connections between the districts of iron and steel production and the waterways of the Rhine, the Low Countries and north-eastern France. Three of these projects are of interest to Luxembourg industrialists and should be mentioned, though their realization, despite the existence of detailed plans, is doubtful, owing to the scale of expenditure which any one of them would necessitate.

The first scheme concerns the canalization of the Saar and the Moselle as far as Coblenz, with which the industrial district of Luxembourg would be connected by a branch canal. Though careful plans have long been prepared by German engineers, the project involves the major problem of the navigability of the Moselle, to which reference has already been made.

The second scheme envisages an axial canal running through the length of the Grand-Duchy from the vicinity of Esch-sur-Alzette via Mersch and Ettelbruck and across the Ardenne to join the Belgian system. At an early stage the Antwerp Chamber of Commerce manifested an interest in this project, but its attitude was subsequently modified in view of the construction of the Juliana Canal linking Liège and Maastricht with Rotterdam.

The third project, which falls into two parts, makes a stronger appeal to Luxembourg industrialists than either of the others. This provides for (a) a canal from the Moselle to the Chiers, thus bringing the former into connection with the French and Belgian waterways; and (b) a canal from the Meuse at Mézières to the Scheldt (Escaut) at Valenciennes. For the first part, plans were made by the French engineers Hegly and Rigault as early as 1906 for a canal leaving the Moselle at Stadtbredimus and passing across southern Luxembourg to Rodange and Mont-St. Martin on the Chiers, having a length of just over 31 miles. The deepening of the Chiers in France, together with the Est Canal and a new artery between Mézières and Valenciennes, would provide an alternative and probably competitive route to the seaboard. The distance from Esch-sur-Alzette to Antwerp by means of the rivers Chiers, Meuse and Sambre and the Brussels-Charleroi and Willebroeck canals would be 173 miles, while that to Dunkirk via Valenciennes would be little greater, some 180 miles.

Apart from purely economic considerations, it must be added that the political grouping following the war of 1914-18, involving the orientation of the Grand-Duchy towards Belgium and France rather than as formerly to Germany, has favoured the consideration of projects such as the last described, in preference to those affecting the Moselle. From the point of view of the disposal of metallurgical products, however, the case for improved connections between the Luxembourg-Longwy district and the ports of Antwerp and Dunkirk certainly merits close examination.

POSTS, TELEGRAPHS AND TELEPHONES

POSTAL SERVICES

In 1938, there were 144 post offices (*bureaux de poste*), found in most towns and large villages. The Grand-Duchy issues its own postage stamps, and despite the disparity in value between the Luxembourg and Belgian francs, the two countries maintain uniform postal rates. The postal services handled in 1938 nearly twice as many international as internal letters, although considerably fewer of other categories of mail, as shown in the following table :

(Millions)

Category	Internal	International
Letters	4.24	8.04
Other mails	13.51	8.09
Parcels	0.29	0.21

Source : *Aperçu Statistique*, 1940, pp. 56-7 (Luxembourg, 1940).

The post office also handled some 15 million newspapers, of which nearly a million came from abroad.

The postal administration supervises other services ; these include the issue of postal cheques (*cheques postaux*), special fiscal stamps, and various types of permits. There is no post-office bank in Luxembourg, but the postal service co-operates with the popular State savings bank or *Caisse d'Epargne* (see p. 268).

TELEGRAPHS

In 1938, the length of telegraph line was 795 miles (1,280 km.), with a total length of 2,015 miles (3,243 km.) of wire, serving 468 telegraph offices. Both for technical reasons and to avoid disfiguring the countryside, much progress was made in pre-war years in laying the wires underground. In the case of old-established networks in built-up districts like the capital, this was not possible, but elsewhere the practice prevailed. The following table summarizes the working of the public telegraph services in 1938 :

	No. of telegrams
Within Luxembourg	59,606
International	135,944
	<hr/>
Total	195,550

Source : *Aperçu Statistique*, 1940, p. 57 (Luxembourg, 1940).

Several international telegraph lines crossed the Grand-Duchy ; these were (1) Luxembourg city to Brussels ; (2) Luxembourg to Arlon ; (3) Luxembourg to Cologne ; (4) Luxembourg to Metz, Nancy and Strasbourg ; (5) Esch-sur-Alzette to Longwy ; and (6) Clervaux to Gouvy in Belgium.

TELEPHONES

The telephonic system was operated by fifty-two exchanges (*réseaux*). In 1938, there were nearly 16,000 instruments installed, connected by some 1,500 miles of line, including local and inter-urban lines, together with sections of international lines. International telephonic communication is important ; no details are available of transit calls between two other countries across Luxembourg, but in 1938 there were over half a million conversations between subscribers in Luxembourg and other countries. The chief international telephone lines entering Luxembourg were (1) Brussels-Jemelle-Aubange-Luxembourg ; (2) Luxembourg-Metz ; (3) Luxembourg-Gouvy ; (4) Ettelbruck-Bastogne ; and (5) Luxembourg-St. Vith.

The following table summarizes the working of the telephonic system in 1938 :

	No. of conversations (millions)
Within Luxembourg	9.37
International	0.50
Total	9.87

Source : *Aperçu Statistique*, 1940, p. 58 (Luxembourg, 1940).

THE POST OFFICE BUDGET

In recent years, the working of the postal services has shown a profit to the State, as summarized in the following table (in millions of fr. lux.) :

	1935	1936	1937	1938
Receipts :				
Posts	15.75	17.11	16.53	15.94
Telegraphs	0.77	0.92	1.01	0.97
Telephones	11.69	11.59	12.66	12.38
Total	28.21	29.62	30.20	29.29
Expenditure	23.83	23.06	25.68	26.41
Balance	4.38	6.56	4.52	2.88

Source : *Aperçu Statistique* for successive years (Luxembourg, annually).

BROADCASTING

The broadcasting station *Radio-Luxembourg*, which began operations in the spring of 1933 with a 200-metres transmitter, was one of the most powerful in Europe. Its programmes were based largely upon commercial advertising and were international in character. Regular news bulletins were broadcast in French and German.

In 1930-1, a company known as *La Compagnie luxembourgeoise de Radiodiffusion* obtained a twenty-five years' concession from the Luxembourg Government to operate a wireless station, the Government reserving some right of control over news bulletins and programmes. The company was financed by foreign capital and derived its entire revenue from international advertising, the

Government receiving 30% of the revenue. The transmitting station was erected on an open expanse of ground at Junglinster, some 11 miles north-east of the capital (Plate 38). The site lies near the Luxembourg-Echternach railway, some 1,200 feet above sea-level, while the three aerial masts are over 600 ft. high. The new transmitter broadcast on a wavelength of 1,305 m. The studios were in the Villa Louvigny, a house standing in a quiet corner of the Park in Luxembourg (Fig. 65). Though primarily devoted to commercial advertising for which, in addition to French and German, the principal languages used were English, Italian, Spanish, Dutch and Flemish, the transmissions also included programmes for Luxembourg listeners and, for those in the different countries, regular evening concerts of a national character.

With this attempt to make Radio-Luxembourg an international station, the company became the chief commercial broadcasting concern on the Continent but, with the German invasion of 1940, broadcasting ceased and the company was dissolved. After a time the station was included in the German radio system, and has been extensively used for propaganda broadcasting.

NOTE ON TIME

The standard time normally adopted in Luxembourg, as in Belgium, France and Spain, has been that of the Meridian of Greenwich. Summer time, one hour in advance, is usually in force from the middle of April until the beginning of October.

On 24 February 1940, one hour of summer time was introduced, and a second hour of summer time came into force at the time of the German occupation. Since then, Luxembourg time has changed with that of Germany, as follows :

May 1940-2 November 1942	2 hr. ahead of G.M.T.
2 November 1942-29 March 1943	1 hr. " " "
Since 29 March 1943	2 hr. " " "

BIBLIOGRAPHICAL NOTE

General

Statistics of roads, railways and P.T.T. are contained in the *Aperçu Statistique* (Luxembourg, annually); the latest edition, published in 1940, contains statistics referring to 1938. The *Annuaire Officiel*, to which the *Aperçu* is an Annex, comments on the figures at some length.

Roads

Useful details of the road system are given in the *Annuaire* published by the *Nouvel Automobile-Club du Grand-Duché*. This Club, together with the *Touring-Club luxembourgeois* and the *Office du Tourisme de l'Union belgo-luxembourgeoise*, publish much useful road information for motorist-tourists.

Railways

1. Summary statistics for the *Prince Henri* system and for the French A.-L. system as a whole are given in *Statistique Internationale des Chemins de Fer* (annually, latest edition 1938, Paris, 1939).

2. The following works contain considerable detail of the history of the railways : (a) P. Ruppert, *Recueil des lois, arrêtés, conventions et autres actes relatifs aux Chemins de Fer Guillaume-Luxembourg et Prince Henri dans le Grand-Duché de Luxembourg* (Luxembourg, 1872).

(b) G. Wampach, *La situation internationale des Chemins de fer du Grand-Duché de Luxembourg* (Paris, 1905).

(c) F. von Roll, *Enzyklopädie des Eisenbahnwesens* (Berlin, 1912).

(d) P. Simon, *Le problème ferroviaire luxembourgeois* (Luxembourg, 1933).

(e) E. Majerus, *Les Chemins de Fer à section normale du Grand-Duché de Luxembourg* (Luxembourg, 1933).

(f) P. Welschbillig, *Les Transports au Grande-Duché de Luxembourg* (Grenoble, 1934).

3. Useful articles appear from time to time in the following London periodicals : *Railway Magazine* (monthly), *Railway Gazette* (weekly), and *Modern Transport* (weekly).

Waterways

A discussion of waterway communications in relation to the metallurgical industry is contained in C. Wagner, *La Sidérurgie luxembourgeoise sous les Régimes du Zollverein et de l'Union Economique Belgo-Luxembourgeoise* (Luxembourg, 1931).

Appendix I

LUXEMBOURG DURING THE GERMAN OCCUPATION, 1940-44

The German Invasion : Political Conditions : Social Conditions : Economic Conditions

THE GERMAN INVASION

When war broke out in September 1939, Luxembourg immediately proclaimed her neutrality. A week previously the German Minister to Luxembourg had given a pledge that Germany would respect the independence and neutrality of the Grand-Duchy. Measures were promptly taken by the Government to ensure the strictest neutrality; among others, regulations were enforced forbidding the organization of a propaganda service or the opening of an enlisting office on behalf of a belligerent, while flying over the Grand-Duchy was prohibited. Unfortunately, however, the country lay in the strategic angle of the main lines of fortifications (Fig. 64) and it was realized that, as in 1914, a German invasion of France, even through Belgium, would almost inevitably involve the Grand-Duchy, especially as the main Maginot defence system ended in effect near Thionville.

Luxembourg was invaded, in the initial stages by air-borne troops, during the early hours of 10 May, 1940, and the German army within twenty-four hours gained control of the whole country. The Grand Duchess and her family, together with her Ministers, left Luxembourg the same day, in order to carry on the struggle for independence from outside and to avoid any appearance of collaboration with the invader. The seat of government was established in the Luxembourg Legation in Paris. On 11 May the Chamber of Deputies met in the city of Luxembourg, protested against the violation of the country, and affirmed their loyalty to the Grand-Duchess and to the Constitution. After the fall of France, the Grand-Duchess and her Government spent a short time in Spain and Portugal, and arrived in London in August. They were possessed of all the necessary legal status to enable them to associate the Grand-Duchy with Britain and the other Allied Powers under a law of 1938, which had given them full powers to take any steps required to preserve the safety of the State. Since then, Luxembourg has acted and has been treated by the Allied Powers as an ally.

POLITICAL CONDITIONS

After the occupation of the Grand-Duchy, the Germans placed it under their Military Administration, which for a short time sought the co-operation of the Luxembourg Administration Commission. This was a body of government officials which had taken over the routine administration of the civic services of the State when the Government left the country, but made no attempt to exercise legislative authority. Since the Commission acted as far as possible in the interests of the Luxembourg people, there was considerable friction with the Military Administration.

In August 1940, Luxembourg was placed under a German civil administration; its head was Gustav Simon, Gauleiter of Koblenz-Trier, who

was directly responsible to Hitler. He announced that the Grand-Duchess and her Government had forfeited their authority, that the oath of allegiance to the Sovereign was therefore rendered null, that all political parties except the *Völkische Bewegung* (V.D.B.) (see p. 305) had been dissolved, that the Constitution was no longer in force, and that the expression 'Grand-Duchy of Luxembourg' was no longer to be used. The Administrative Commission was dissolved and its chairman imprisoned. The Chamber of Deputies and the Council of State were abolished. Most Luxembourg officials were dismissed and replaced by Germans, those retained were placed under strict German control. Many were sent to Germany to attend courses on Nazi administrative methods, while in 1941 an Administrative Academy was created in the city of Luxembourg to undertake the instruction of officials. The whole policy of the Gauleiter was designed to pave the way for a *de facto* incorporation of Luxembourg in the Reich.

Local government was completely reorganized and closely resembled that which obtains in the Rhineland and Westphalia. In December 1940

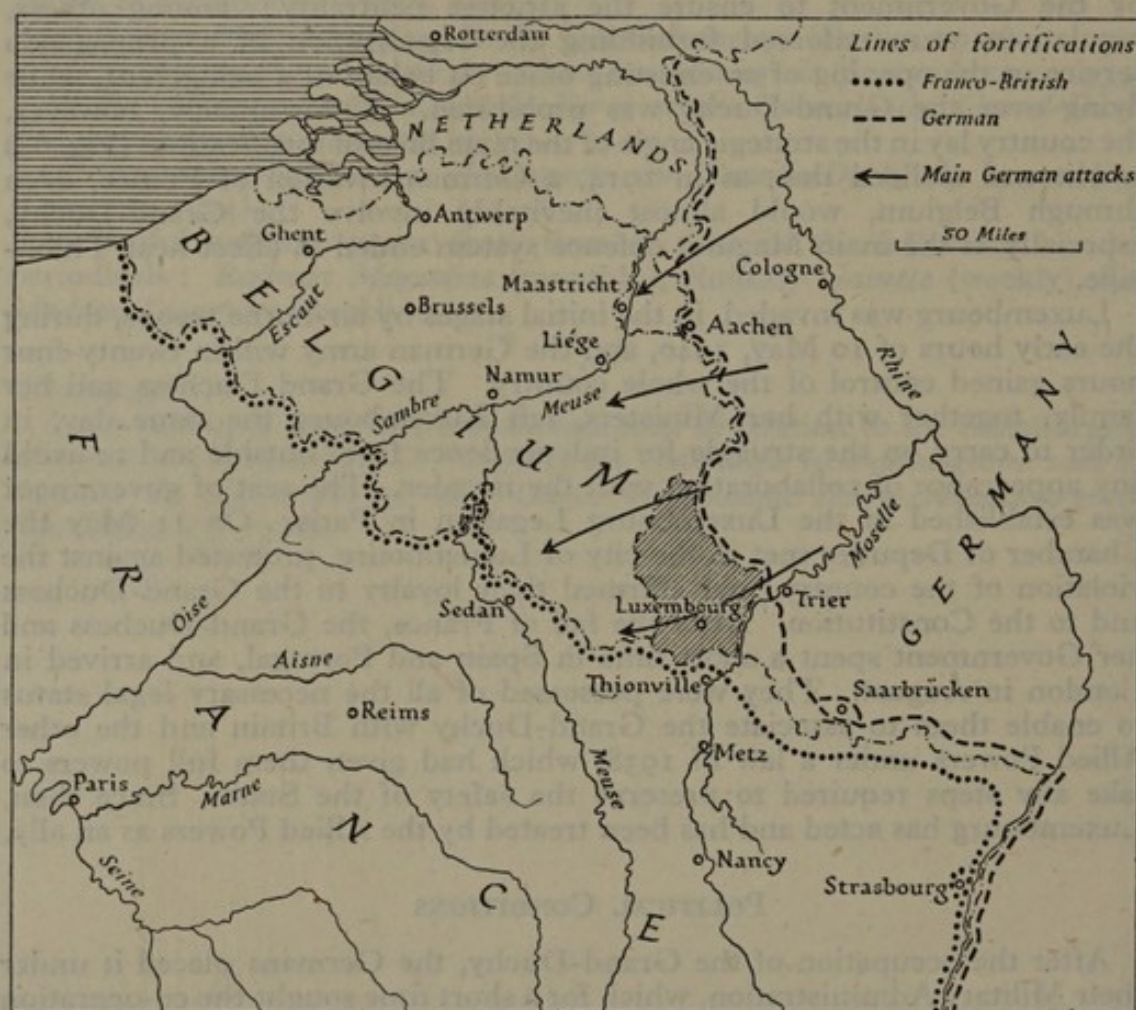


Fig. 64. The German invasion, May 1940

Based on official sources.

It was obvious that the neutrality of Luxembourg, situated in the angle of 'no-man's land' between the Franco-British and German lines of fortification, and completely demilitarized, was a matter wholly outside the Grand-Duchy's control. The country fell a victim to ruthless Nazi expediency, since it lay in the most direct path of the German thrusts into France.

the country was divided into four *Kreise*; these were the *Stadtkreis Luxembour* (Luxembourg city), and the *Landkreise* of *Esch* (comprising the former cantons of Esch, Capellen, Luxembourg-Campagne, and Mersch), of *Diekirch* (cantons of Diekirch, Clervaux, Redange, Vianden and Wiltz), and of *Grevenmacher* (cantons of Grevenmacher, Echternach and Remich). Each *Kreis* was placed under a *Landrat*. The *Kreise* were further divided into a number of *Ämter*; at the head of each of these was placed an *Amtsbürgermeister*. The former elected councils were dissolved and replaced by councillors with a purely advisory capacity—*Amtsälteste* in the case of the *Amt*, *Ratsherren* in the case of the principal commune. Some of the smaller communes in the *Amt* were placed under *Ortsbürgermeister*, who were made directly subordinate to the *Amtsbürgermeister*. At the head of the *Stadtkreis* of Luxembourg was placed an *Oberbürgermeister*, advised by a number of *Ratsherren*; the first man to hold this position was a German, Hengst, former *Bürgermeister* of Kothén in Anhalt. Many, if not all, of these officials were *Reichsdeutsche*, on whose fidelity the Gauleiter could depend, while most were members of the Nazi party or of the V.D.B. Clearly, while these administrative changes were claimed by the Germans to have produced a great increase in efficiency, they certainly gave greatly increased opportunities for bringing pressure to bear on the population.

In February 1941, Luxembourg was attached to the Gau of Koblenz-Trier, and the extended Gau was renamed Moselland. Simon remained Gauleiter of Moselland, and also retained his special powers as head of the Civil Administration of Luxembourg.

For some years before the invasion, pro-German propaganda had been carried on by the Luxembourg Association for the Study of German Literature and Art, the president of which was Professor Kratzenberg—a Luxembourg national but of German descent. Immediately after the occupation he founded a *Volksdeutsch* Group, which in June 1940 was renamed the *Volksdeutsche Bewegung* (V.D.B.). This organization professed the complete Nazi creed. Large numbers of Luxembourgers were regimented into the V.D.B. by making it almost impossible for them to earn a living unless they joined.

Other National Socialist organizations have been fostered, and the Nazi party intervenes directly or indirectly in nearly every sphere of life, using a combination of terrorism and economic pressure. Besides being forced into the V.D.B., the people have to join the Labour Front. The children have to attend Nazified schools and to join a Nazi youth organization (see p. 308). Young persons have been conscribed into the Reich Labour Service, and many have been conscribed into the German army. Large numbers of people have been deported for forced labour in the Reich. Whole families were transplanted to other parts of the Reich, while numerous German families, particularly those of the swarm of officials which permeated the organization of the country, of Reich Germans who had been bombed out, and of *Volksdeutsche* from Transylvania, Bukovina and the Tyrol, were settled in the Grand-Duchy.

The Germans intended from the first to incorporate the Grand-Duchy in the Reich, but they hoped to do so with some semblance of consent on the part of the Luxembourgers. However, all attempts to cajole them into a realization of the advantages of Reich membership have been unsuccessful; German policy has met with steady resistance from the Luxembourgers, who are intensely patriotic, devoted to free institutions and for the most part devout members of the Roman Catholic Church. While nearly all Luxembourgers were compelled to join the V.D.B. and other organizations in order merely to exist, they have steadfastly offered such resistance as is

in their power to incorporation in the Reich. At the census of 1941, details had to be given of the nationality and language of all persons resident in the Grand-Duchy; no person was allowed to give Luxembourg as his nationality or language, for according to German theory there was neither a Luxembourg nationality nor language. However, in the towns 96% and in the country 99% recorded their nationality and language as Luxembourg; these results showed the complete failure of German propaganda, coercion and oppression. The announcement in August 1942 that military conscription was to be applied to the Grand-Duchy led to widespread strikes, which were harshly repressed. Numerous imprisonments and deportations of patriots have taken place. Yet as late as May 1943, in spite of the fact that Luxembourg has been subjected to a more intensive process of 'Germanization' than has any other occupied territory, the official German Press in Luxembourg complained that many Luxembourgers were merely waiting for the fulfilment of the hopes of the Government in exile.

SOCIAL CONDITIONS

Religion

The Roman Catholic Church, to which nearly all Luxembourgers belong, has suffered severely during the occupation. Many priests have been arrested and deported, including Mgr. Origer, the Vicar-General of the Diocese of Luxembourg, who afterwards died in a concentration camp. Nearly all the monasteries, religious congregations and charitable Orders have been dissolved; Clervaux Abbey has been turned into an Adolf Hitler school, and Echternach Monastery used as offices of the S.A. Further, religious teaching has been abolished in schools and religious ceremonies and rituals banned.

The plight of the Luxembourg Jews is beyond description; most Jewish property has been confiscated and the Jews deported to labour camps in Germany or to the eastern occupied territories. A number of synagogues have been destroyed.

Justice

The Gauleiter of Luxembourg concentrated all the administrative authority and ultimate judicial power in his own hands. A Special Court (*Sondergericht*) was set up in 1940, with jurisdiction over all political offences, a term capable of the widest interpretation. It tried, for example, persons guilty of black market offences, of breaches of the food regulations, of listening to foreign broadcasts, and of anti-German utterances. The Court was composed of three professional judges, with a Public Prosecutor (*Staatsanwalt*) attached. All other courts were brought into line with the Nazi judicial system, juries were abolished, and extorted confessions became the basis of evidence. The High Court of Justice was abolished, but its framework was temporarily maintained and it functioned under the name of 'Senate of the *Oberlandesgericht Köln*.'

Most German laws were made applicable in Luxembourg, including the German penal and family codes and the anti-Jewish laws. A large part of the Luxembourg civil code remained in force, although a German translation replaced the French original as the valid text. A profusion of new decrees and laws has been issued, and the introduction of various branches of German law was still in progress in 1944. All members of the legal profession in Luxembourg who had refused to associate themselves by May 1941 with the German *régime* were deported to Germany. Lawyers admitted to the Bar after that date had to give sufficient guarantees that they would everywhere show their German sentiments.

The Gestapo and their usual methods, together with the ordinary German police (*Schutzpolizei*), were introduced into the country to enforce the new regulations ; the former took up their headquarters in the Villa Pauly in the capital. All members of the local police who refused to join the V.D.B. were dismissed and deported.

Language

One of the first tasks of the Gauleiter was to endeavour to extirpate the use of French in the Grand-Duchy. In August 1940, a decree provided that German was to be the sole official language and the sole language of instruction in the schools. The publication of newspapers in French was forbidden, as was subsequently the use of French speech in public. Further, persons with French names were ordered to adopt German equivalents or completely new German names, and similarly, streets in the various towns were renamed ; it is a grim commentary on the state of the Grand-Duchy that the 'Avenue de la Liberté' in the capital has been renamed 'Adolf Hitler Strasse.'

The Luxembourg Press was placed under Nazi control. Nearly all newspapers printed in German were allowed to continue publication, but most of their staffs and journalists were dismissed. A special Luxembourg edition of the Nazi Party paper for the Gau Moselland was introduced shortly after the occupation.

Education

The Germans have concentrated on winning over the children and the young people as a most important part of their efforts to incorporate the Grand-Duchy in the Reich, and thus an attack was inevitably made upon the educational system. The essential aim of the changes which were introduced was to ensure that the children should grow up to be willing adherents of National Socialism. In pursuit of this end, intellectual development definitely took second place. The organization of primary education was transformed so that the schools now fall into three classes : (a) the *Grundschule*, which is attended by all children for the first four years of their school-life ; (b) the *Hauptschule*, which gives a further four-year course of a higher standard to children selected from the *Grundschule*, though some may be transferred after two years to a secondary school ; and (c) the *Volkschule*, which provides a four-year course for those not selected for the *Hauptschule*, i.e. for the great majority of children, some of whom may afterwards enter the technical schools. From the *Hauptschulen*, which are being established in all the principal centres of Luxembourg, scholars may proceed to the secondary schools, i.e. grammar and high schools or to the training colleges.

The curriculum is governed by German School Law, which stresses the attention to be given to ideological principles and allocates the amount of time to be devoted to the various subjects. Particular emphasis is laid on physical culture, a minimum of four hours a week being required. Equally important is character training (*charakterliche Erziehung*), which is the inculcation of Nazi ideology, largely through German history, and in support of this two hours a week are devoted to racial knowledge (*Rassenkunde*). In the *Volkschule* only German is taught and this is used exclusively in teaching other subjects. French is taught as a foreign language for three hours a week in the *Hauptschule*, but has been eliminated from the other two types of school. Religious instruction is forbidden in school hours, though opportunity is given to attend lessons on Christian doctrine in the churches at other times.

Text-books formerly used in the schools have been confiscated and replaced by those supplied from Germany. School hours vary from twenty-two to thirty hours per week, and are arranged in somewhat long morning sessions, the afternoons being largely devoted to various forms of physical culture under the control of the Hitler Youth (*Hitler Jugend*). Teachers' salaries are paid entirely by the State instead of jointly by the commune and the State. This has the effect not only of making teachers wholly dependent upon the State, but gives the latter complete control and deprives the teachers of their interest and influence in local affairs. Teachers under fifty years of age have been sent to Germany for special courses, through which they are familiarized with the principles of National Socialism, and no one may hold a teaching post who is not wholly devoted to the German cause.

As might be expected, the organization of the Hitler Youth (*Hitler Jugend*) and of the League of German Girls (*Bund Deutscher Mädel*) has been vigorously developed. Further, it was decreed that all lads of sixteen to nineteen were to attend a Hitler Youth Training Camp, that all youths of seventeen were to take a course at a pre-military training camp, and that certain children should be sent to Child Evacuation Camps in the Reich, where they would receive intensive National Socialist training by selected teachers and Youth Leaders.

ECONOMIC CONDITIONS

Currency and Customs

Immediately after the occupation, German occupation currency (or *Reichskreditkassenscheine*) was made legal tender, the rate of exchange being fixed at 8 fr. lux. = 1 Rm.; later this rate was altered to 10 fr. lux. = 1 Rm. At the end of August 1940, the currency frontier between Luxembourg and the Reich was abolished, and in February 1941 the *Reichsmark* was made the sole legal tender in the Grand-Duchy.

In August 1940, the customs union between Belgium and Luxembourg was abolished, and the Grand-Duchy was included within the German customs area. Exports from Luxembourg to Germany, however, required licences.

Soon after the occupation, the *Deutsche Bank* set up a branch in Luxembourg, which in October 1941 took over the *Banque Générale*. The Luxembourg Savings Bank was also taken over by the German authorities and completely reorganized.

Industry

As in the case of all German occupied countries, Luxembourg has been fitted into the controlled frame-work of Reich economy, and industry has been organized to support the German war effort. Many of the heads of firms were removed and replaced by managers (*Betriebsführer*), who were urged to get the utmost out of their workmen. This production drive has been accompanied by efforts to direct labour from less to more essential industries.

The industrial life of Luxembourg was centralized under the *Arbeits-Amt*, or Central Labour Office. This alone was authorized to grant permits for taking work, for the employment of labour, for obtaining raw materials and for allocating manufactured goods for sale. In January 1941, trade unions were dissolved and all industrial workers were enrolled in the German Labour Front (*Deutsche Arbeits-Front* or D.A.F.). Compulsory service in the Reich Labour Service (*Reichs-Arbeits-Dienst* or R.A.D.)

was introduced in June 1941. Only members of the V.D.B. were allowed to join the Labour Front and therefore to obtain work ; those who refused to be ome members, and thus found themselves without employment, were sent to Germany for forced service in labour camps.

Considerable changes have been introduced into the steel industry, in which of course Germany was primarily interested. *Arbed* (see p. 220) at first remained nominally independent, but was placed under the supervision of a director of the *Reichsbank*. In 1943 it was turned into a German A.G. and its capital valued in *Reichsmarks*. The *Hadir* group (see p. 221) was taken over by the *Vereinigte Stahlwerke*, and later reorganized as a German company, the *Differdinger Stahlwerke*.

Agriculture and Food Supplies

Soon after the occupation, German control was speedily extended over agriculture. Farmers were compelled to surrender fixed quotas of their produce and stock to the authorities, and marketing was subject to numerous regulations. The agricultural co-operatives were reorganized on German lines, and the whole of the agriculture was placed under the general supervision of the *Bauernschaft Luxemburg*. A production drive was steadily intensified ; several censuses of stock were taken, and special efforts were made to increase the area under cultivation, especially of oilseeds and cereals. It seems clear that the farming population has taken very unkindly to the regimentation imposed upon their activities by the local officials.

In September 1940, the people of Luxembourg were brought within the German food rationing system. Since Luxembourg was to be incorporated in the Reich, they were given the same rations as Reich citizens. Thus in theory they fared much better than the people of other occupied countries, but it is doubtful how far this worked in practice.

Transport

After the outbreak of war in September 1939, no through international trains were run on the Luxembourg railways. Communication between Brussels and Luxembourg city was maintained by a single express train daily in each direction, together with several stopping trains. For a time there was no rail traffic across the Franco-Luxembourg frontier, but in November railway services between France and Luxembourg were resumed, visas being necessary for Frenchmen in Luxembourg. In April 1940, rail communication was re-started between Luxembourg and Trier, two services being run in each direction.

Immediately after the German occupation of Luxembourg, the two railway systems (*Guillaume-Luxembourg* and *Prince Henri*) were placed under the *Wehrmachtverkehrsdirektion* (W.V.D.) Brussels. The old frontier customs stations of pre-1918 were re-established, most of the railway staff were replaced by German officials, and the large railway offices in Luxembourg city used by the Germans in 1914 were reopened. The *Guillaume-Luxembourg* company was taken over officially by the *Deutsche Reichsbahn* in September 1940, and the *Prince Henri* company in December 1940 ; they were incorporated in the *Reichsbahndirektion Saarbrücken*. It is reported that the two companies have been amalgamated.

Since the occupation, the Germans have of course made considerable use of the Luxembourg railways for military traffic between France and Germany. To increase the capacity of the lines, they have carried out a number of improvement works, including the construction of by-pass lines, so that traffic can proceed from the Zoufftgen-Luxembourg-Wasserbillig line without passing through the Luxembourg main station.

Appendix II

MAPS OF LUXEMBOURG

HISTORICAL INTRODUCTION

The earliest known maps of Luxembourg were produced by J. Surhonijs in 1579. The important strategic position caused the city of Luxembourg to be a strong fortress; a facsimile map of the city dated 1582 is included in J. P. Biermann's *Notice sur la Ville de Luxembourg*, published in 1892, and numerous military maps in the seventeenth and eighteenth centuries show the fortifications. Notable examples of these maps were produced by Eugène Fricx, J. B. Nolin, and J. C. Maillart. In 1804, a *Carte des Provinces Beligues* was published; Luxembourg appears on this as the *Département des Forêts* (Fig. 19), one of the nine new departments established in 1798 when Belgium and Luxembourg were incorporated into the French republic.

In 1831, when the London Conference established an independent kingdom of Belgium to which was given part of Luxembourg, a map was attached to the treaty. This map was published as the *Carte de la Province de Luxembourg par Konen, Bruxelles—d'après la carte officielle jointe au Traité 15 Nov. 1831*. It is interesting to note that this map showed the proposed waterway connection between the Moselle and Meuse systems, by way of the rivers Sûre and Clervaux, and hence by a proposed canal (on which work actually started in 1827) to the river Ourthe. A map on a scale of approximately 1 : 45,000 was attached to the final Treaty of London in 1839, showing the historical changes in the extent of Luxembourg since the reign of Louis XIV, and the 1839 boundaries of the Grand-Duchy; Fig. 21 in this Handbook is based on this map.

In 1832 was published a map on the scale of 1 : 200,000, entitled *Grossherzogthum Luxemburg*, compiled by W. Voss. It formed one of the *Reymannsche Karten*, a series begun in 1800 by *Plankammer-Inspektor* Reymann, continued by a private firm, and purchased by the *Preussische Landesaufnahme* in 1874. A new edition of the Luxembourg sheet appeared in 1860.

During the nineteenth century, a number of tourist maps were produced by private firms. Notable examples include W. Voss's *Carte du Grand-Duché de Luxembourg, pour servir au Voyage historique et pittoresque* (1844), which was published by the prolific *Etablissement géographique de Bruxelles*, M. Borman's map of 1866, and C. Rosbach's two-sheet tourist map on a scale of 1 : 160,000 (1870, second edition, 1874). Numerous town-plans also appeared, such as Rosbach's *Plan de la Ville et de la Forteresse de Luxembourg* (1867), Blockx's map *Diekirch et ses Promenades* (1886), Berg's *Carte des Environs d'Echternach* (1891), and A. Lefort's *La Forteresse de Luxembourg* (Luxembourg, 1898).

Two useful bibliographies of the maps of Luxembourg are C. de Muyser's *Recueil des Cartes et Plans du Pays et de la Ville et Forteresse de Luxembourg* (Luxembourg, 1886), and *Cartes et Plans du Grand-Duché de Luxembourg*, by J. Vannerus (Luxembourg, 1898).

There is no official State topographical survey of Luxembourg, although there exists the manuscript series of cadastral plans, 1,741 in all, on scales of 1 : 2,500 and 1 : 1,250. The service of the *Cadastre* (Land Survey) is

subordinate to the administration of direct taxation. It is carried out by a *Géomètre-en-Chef* and eleven *géomètres cantonaux*.

In 1883, J. Hansen, a Paris map-maker, decided to carry out a topographical survey of the Grand-Duchy, and obtained permission to base his series on the cadastral plans. He reduced these to 1 : 20,000, and with their assistance resurveyed the topography in the field. This work took nearly twenty years; the maps were published 'sous le Patronage du Gouvernement Grand-Ducal' and have been recognized as the standard topographic series. The 1 : 50,000 sheets appeared in 1907, attractively printed in colours by the *Service Géographique de l'Armée* in Paris. The most recent edition is dated 1928-34. Hansen published the thirty-seven sheets of the 1 : 20,000 series on which the 1 : 50,000 maps were based; the latest edition in 1936. His firm has also produced a number of special maps (chiefly town plans and road-maps), which are designed primarily for tourists. Many others have been published by other firms, which bear the caption 'édition autorisée par J. Hansen,' and have been derived largely from his maps.

The Grand-Duchy appears for strategic reasons on some of the official series published by the adjoining French *Service Géographique de l'Armée* and the German *Reichsamt für Landesaufnahme*; these are mainly on scales of 1 : 100,000 and less. Small areas appear also on some of the sheets published by the Belgian *Institut Cartographique Militaire*.

DESCRIPTION OF MAPS

The maps of Luxembourg may be described under the following heads :

- A. Miscellaneous maps.
- B. Geological maps.
- C. Town plans.
- D. Maps issued by the Geographical Section of the British General Staff.
- E. Foreign official series on which Luxembourg appears.

In each group the maps are listed as far as possible in order of scale, those on a large scale coming first. The following particulars are given where possible for each series :

- (1) Scale and title.
- (2) Authority responsible for its production.
- (3) Date of production, with subsequent revisions.
- (4) Number of sheets in the series.
- (5) Size of sheets, measured to the margin of the area mapped.
- (6) Projection. (This is rarely stated on the various Luxembourg maps.)
- (7) Meridian of origin : grid and/or graticule.
- (8) Miscellaneous marginal information.
- (9) Whether coloured or in black.
- (10) Method of representation of relief.
- (11) Details of representation of roads, of railways, and of other features.

Where a map has been issued in several editions, full details are usually given for the first edition only, and amendments are noted in the case of the others.

A short note is sometimes added on the value of the map, its legibility and its accuracy.

MISCELLANEOUS MAPS

The following list of miscellaneous maps includes the 1 : 20,000 and 1 : 50,000 series of J. Hansen, maps produced for the use of tourists, and

other special maps which have been used in the compilation of Figures in this Handbook. Luxembourg of course appears on many other small-scale series, notably those of Belgium, Germany, and France, but of these only the 1:500,000 *Carte Oro-hydrographique* and the Bartholomew 1:500,000 *Belgium and Luxembourg*, which accompanies the N.I.D. Handbook on *Belgium* in this series, have been included in the list. Both of these depict the relief very clearly.

(1) 1:20,000 *Carte Topographique du Grand-Duché de Luxembourg*.

Produced by J. Hansen (Paris, latest edition 1936). It was the base-map, drawn from the cadastral maps resurveyed on the ground, for the 1:50,000 series (No. 4). Thirty-seven sheets, of irregular size, but usually either 57 × 47 cm. or 53 × 88 cm. Margins unruled. No latitude or longitude. In black.

Relief shown by form-lines, but many areas blank or in outline, and by spot-heights. Roads (four grades), railways (two grades). State boundaries pecked, cantonal and communal by dotted lines. Various symbols for hamlets, houses, farms, chapels, springs, quarries, vineyards, etc. Towns shown by symbols and by three grades of lettering.

(2) 1:30,000 *Carte de la Petite Suisse Luxembourgeoise*

An official map published by the *Société d'Embellissement d'Echternach*. Single sheet (n.d.), 53 × 41 cm., with inset plan of the town of Echternach (see p. 325). In colours.

Relief shown in outline by brown shading, with spot-heights in black. Roads in black (two grades), railways by filled black and white lines, recommended 'promenades' from Echternach in red, lettered to correspond to marginal description. Woods shown by green symbols. Buildings in solid black.

(3) 1:30,000 *Carte de la Petite Suisse Luxembourgeoise*

A map largely similar to No. 2, but shows recommended 'promenades' in red from Consdorf. Single sheet, 35 × 42 cm. (Luxembourg, n.d.). In colours, with all line-work in blue.

No relief shown. Roads in blue (three grades), 'promenades' in red, railways by filled blue and white lines, rivers by blue shading or heavy blue. Woods tinted green. Built-up areas shaded.

(4) 1:50,000 *Carte topographique du Grand-Duché de Luxembourg*

Produced by J. Hansen (Paris, first edition 1907, latest edition 1928-34). Fifteen sheets, 50 × 65 cm., in colours. Margins divided into kilometre intervals. In colours.

Hill features shown by unnumbered brown form-lines, with brown spot-heights, and names of relief features in brown. A fine green line is traced at the bottom of each valley to clarify the relief. Rock outcrops, quarries, excavations, etc., shown by brown shading. Rivers and names of rivers in blue. Roads by red and black lines (five grades), railways by filled black and white lines (two grades). Woods and vineyards tinted green. State boundary, by black pecked lines, cantonal and communal boundaries by black dotted lines. Buildings, churches, farms and mills by various red symbols, view-points by brown symbols.

A clear and attractively produced series.

- (5) 1 : 50,000 *Carte Industrielle du Bassin Minier Lorrain-Luxembourgeois*

Produced by C. Limpach (Luxembourg, 1908), with accompanying text.

- (6) 1 : 125,000 (approx.) *Carte des Distances du Grand-Duché de Luxembourg*

Produced by J. Hansen (Paris, latest edition 1936). Single sheet, 73 × 54 cm. In black and red.

Roads in black (three grades), railways in red, tramways in red. Distances in hectametres in black along routes. Towns and villages by black symbols (four grades).

- (7) 1 : 135,000 *Grand-Duché de Luxembourg : Carte Routière*

Produced by J. Hansen (Paris, latest edition n.d., but probably 1935). Single sheet, 64 × 48 cm. Two styles : (a) in black, red and green ; (b) as (a), but with water in blue.

Relief shown only by black spot-heights. Roads in red and black (five grades), railways in black and red (two grades). State frontier by black dotted line, emphasized in green. Inhabited places by black symbols and lettering (three grades). Miscellaneous black symbols for mills, farms and châteaux.

- (8) 1 : 140,000 *Carte pluviométrique du Grand-Duché de Luxembourg / Niederschlagskarte des Grossherzogtums Luxemburg*

Compiled by A. Gloden and published by Ed. Huss (Luxembourg, n.d., but after 1930). Graticule drawn at 30 min. intervals, longitude from Ferro. In colours.

Isohyets drawn as thick red lines at 50 mm. intervals, with layer-tinting in eight shades of blue.

- (9) 1 : 150,000 *Carte Touristique et Politique du Grand-Duché de Luxembourg*

Produced by Blondel la Rougery (Paris, n.d.), based on the J. Hansen 1 : 500,000 series, by permission. Single sheet, 59 × 45 cm.

Relief shown only by black spot-heights. Roads in red (three grades), with kilometrages in red, and steep descents shown by red arrow-heads. Railways in black (two grades), rivers in blue. State, district and cantonal boundaries by various black pecked lines, the first emphasized by purple cross-hatching. Woods tinted green. Inhabited places shown by red symbols (seven grades), customs points by black letters.

- (10) 1 : 200,000 *Chemins de Fer du Grand-Duché de Luxembourg*

Produced by J. Hansen, and published at Luxembourg (n.d.). Single sheet, 51 × 36 cm. In black.

Railways by various black lines (four grades). Stations by rectangles (two grades), and customs points by stars.

- (11) 1 : 200,000 *Carte du Grand-Duché de Luxembourg et des contrées limitrophes à l'usage des Touristes et Cyclistes*

Produced by B. Wolff (Luxembourg, n.d.). Single sheet, 44 × 35 cm. In three colours.

No relief shown. Roads in red and black (three grades), tracks by dotted lines, railways in black (two grades). Kilometrages in red and black. Boundaries of state, *arrondissements* and cantons by various black lines, the first emphasized in green. Towns and villages by four grades of symbols and lettering.

(12) 1 : 200,000 *Carte Routière et Touristique du Grand-Duché de Luxembourg.*

Produced by *Les Services Tourisme Michelin et Cie* for *Le Nouvel Automobile Club du Grand-Duché de Luxembourg* (Luxembourg, 1933). Single sheet, 43 × 57 cm. Graticule drawn every 20 min., centesimal system, longitude from Paris. In colours.

Relief is not shown. Roads are in red, yellow and black (seven grades of width, three grades of surface), with kilometrages in red, tracks and paths in black. Railways in black (two grades), rivers in blue. Towns in black, with main streets in white. Usual detailed information for tourists.

(13) 1 : 250,000 *Chemins de Fer du Grand-Duché de Luxembourg*

Produced by J. Hansen, as a supplementary sheet to his 1 : 50,000 series, the sheet-lines of which are shown. Single sheet, 31 × 42 cm.

Railways shown by various black lines, indicating the two main systems and the narrow gauge lines. Main stations in red, minor stations in black.

(14) 1 : 270,000 *Carte Scolaire du Grand-Duché de Luxembourg / Schul-Handkarte des Grossherzogtums Luxemburg*

Produced by J. Hansen (n.d.). Single sheet, 23 × 31 cm., in colours.

Shows clearly the cantons in colours, with their chief towns. Rivers, roads and railways in black. A small inset shows the State's international position, and another the *arrondissements* and civil administration districts.

(15) 1 : 500,000 *Belgique : Carte Oro-hydrographique*

Produced by A. de Ghellinck, M. A. Lefèvre and P. L. Michotte, and printed by the *Institut Cartographique Militaire* (Brussels, 1937). Single sheet, 73 × 67 cm. Graticule drawn at degree intervals (sexagesimal from Brussels).

Although the Grand-Duchy appears only as a small section of this sheet, the relief is very clearly shown by layer-tinting; eleven shades of green, yellow and brown at 5, 20, 50, 100 and every 100 to 700, and over 700 m. Rivers and their names in dark blue.

(16) 1 : 500,000 *Belgium and Grand-Duchy of Luxembourg*

Produced by John Bartholomew & Son (Edinburgh, 1943). Luxembourg appears as a small part of the sheet, 12 × 18 cm. The relief is shown in various shades of brown.

B. GEOLOGICAL MAPS

The earliest geological survey was made by N. Wies and P. M. Siegen, who published at Paris in 1877 nine sheets of the *Carte géologique du Grand-Duché de Luxembourg* on the scale of 1 : 40,000. No details are available of this series, or as to whether it is complete. In 1886, L. van Werveke produced at Strasbourg a *Geologische Übersichtskarte der südlichen Hälfte de Grossherzogtums Luxemburg* on the scale of 1 : 80,000.

The standard modern geological map is the 1 : 100,000 *Geologische Übersichtskarte des Luxemburger Landes* (*Carte géologique du Grand-Duché de Luxembourg*), compiled by L. van Werveke, M. Lucius, and J. Gosselet, and edited by J. Robert (Luxembourg, n.d.). It was produced in two sheets, each 63 × 83 cm. Detail in black, with relief shown by light brown shading, and the geology superimposed in colours. There are a number of clear geological cross-sections, and an inset on the scale of 1 : million of *Geologische Gestaltung Luxemburgs*.

C. TOWN PLANS

(1) 1 : 4,800 (approx.) *Plan Monumental de la Ville de Luxembourg*

Produced by the *Syndicat Officiel d'Initiative et de Tourisme* (Luxembourg, 1934). Single sheet, 52 × 65 cm., in colours.

Relief shown in outline by black hachures. Built-up areas in solid grey, streets in white, rivers in solid blue, woodland and open areas in green. Railways and tramways by solid black lines. Prominent buildings shown pictorially, and numbered 1-36 to correspond to a marginal list. View-points, car parks, police stations, post-offices, banks, etc., indicated by symbols.

This plan has been reproduced by the G.S.G.S. as Series 4485.

(2) 1 : 5,000 *Plan d'Esch-sur-Alzette*

Produced by the *Société d'Initiative et d'Embellissement* (Esch, 1926), accompanying an official guide to Esch. Single sheet, 38 × 48 cm., in black.

Built-up areas shown by diagonal shading, with important public buildings in solid black, numbered to correspond to list in key. Main-line railways by filled black and white lines, light railways by pecked lines.

(3) 1 : 10,000 *Luxembourg : Plan de la Ville et Alentours*.

Produced by J. Hansen (n.d.). Single sheet, 38 × 47 cm. Map net drawn every 5 cm. in green, numbered for reference. In colours.

Relief shown by light brown form-lines, with spot-heights in green. Buildings in solid pink, with lettering in black. Woodland tinted green. Detailed street gazetteer in margin.

(4) 1 : 10,000 *Plan de la Ville de Luxembourg*

Produced by the *Nouvel Automobile Club du Grand-Duché de Luxembourg* (1933). Single sheet, 23 × 28 cm. In colours.

Buildings in black and pink, with chief buildings numbered and listed in margin. Railways and tramways by heavy black lines.

(5) 1 : 12,250 *Diekirch et ses Environs*

Produced by the *Société d'Embellissement de Diekirch* (Diekirch, n.d.) Single sheet, 35 × 48 cm. In colours.

Relief shown only by spot-heights in black. Roads in black (two grades), paths by single black line. 'Promenades' in red, lettered to correspond to marginal text. Railways by filled black and white lines. Rivers in blue. Woods tinted green, buildings in solid black.

(6) 1 : 12,000 (approx.) *Plan de la Ville Luxembourg*

Produced by the *Syndicat Officiel d'Initiative et de Tourisme*. Single sheet, 23 × 39 cm. In colours. Detailed list of hotels in margin.

(7) *Carte de la Petite Suisse Luxembourgeoise (Carte officielle de la Société d'embellissement d'Echternach)*

This has a large-scale inset plan (1 : 5,000 approx.) of the town of Echternach.

(8) *Environs de Luxembourg*

This sheet, 49 × 31 cm., contains two maps, *Plan de Direction pour Promenades* (1 : 25,000) and *Visite de la Ville et Promenades* (1 : 20,000). Produced by J. Hansen (Paris, 1934). In colours.

Line-work of town detail in red. Indication of relief by brown stippling, names and spot-heights in black. Woodland shown by black stipple. Concentric circles radiating from Notre Dame de Luxembourg in green, at kilometre intervals.

(9) Town-plans published by G.S.G.S.

See p. 317.

(10) Town-plans in guide-books.

Numerous guide-books containing town-plans have been published by various firms. These include :

(a) *Les Guides Bleus—Belgique et Luxembourg.*

Published by the *Librairie Hachette* (Paris, latest edition, 1935). It includes plans of Diekirch, Luxembourg and the environs of Echternach.

(b) *Baedeker's Belgium and Holland.*

Published by Karl Baedeker (Leipzig and London, latest edition 1931). This contains a plan of Luxembourg on a scale of 1 : 18,000.

(c) *Cook's Guide to Belgium and Luxembourg.*

Edited by T. G. Barman and J. de Geynst (London, twelfth edition, 1938). This contains a clear town-plan of Luxembourg in colours (1 : 7,500 approx.).

D. MAPS ISSUED BY THE GEOGRAPHICAL SECTION OF THE BRITISH GENERAL STAFF

Luxembourg appears on portions of various sheets in several G.S.G.S. series. Unfortunately, the Grand-Duchy is bisected by the 6° E. meridian, which marks the limit of a number of series. As a result, no large-scale series covers it completely, and owing to its marginal nature it sometimes lies across the point of junction of four small-scale sheets. For convenience, the following list includes the sheet numbers which cover Luxembourg in each particular series :

(1) 1 : 25,000 Series 4041. Sheets 107/NW, SW, 122/NW, SW, 137/NW, SW, 152/NW, SW.

(2) 1 : 25,000 Series 4414 (in course of production, 1944). Sheets 5802, 5803, 5903, 5903, 6002, 6003, 6004, 6102, 6103, 6104, 6105, 6202, 6203, 6204, 6205, 6302, 6303, 6304, 6305, 6402, 6403, 6404, 6502, 6503, 6504, 6505.

Series 4041 and 4414 will together cover all Luxembourg, with the exception of a very small area in the south-west.

(3) 1 : 50,000 Series 4040. Sheets 107, 121, 122, 136, 137, and 152 cover western Luxembourg only.

(4) 1 : 50,000 Series 4471. Sheets 11/xxiii and 11/xxiv cover southern Luxembourg.

- (5) 1 : 100,000 Series 4336. Sheets 13 and 17.
- (6) 1 : 100,000 Series 4416. Sheets T1 and U1 (in course of production). Series 4336 and 4416 will together cover all Luxembourg.
- (7) 1 : 200,000 Series 4238 Road Map (*Michelin*). Sheet 4 of the Belgian series and Sheet 57 of the French series cover Luxembourg.
- (8) 1 : 250,000 Series 4042. Sheets 6 and 7. These are available in both Ground and Ground/Air editions.
- (9) 1 : 250,000. Series 3982. Sheets M31/6, 32/4, 31/9, 32/7. Air edition.
- (10) 1 : 500,000. Series 4072 and 4369. Sheets NE 50/6 and NE 48/6 of Series 4072, together with Sheet 8 of Series 4369.
- (11) 1 : 1,000,000. Series 2758. Luxembourg appears on the combined *Bruxelles-Frankfurt* sheet (M 32 and part of M 31), in both Ground and Ground/Air editions.
- (12) Town Plans. Series 4420. Sheet 15 of this series is of the city of Luxembourg.
- (13) Throughway Town Plans. Series No. 78 (Misc.). This volume of Belgian town-plans contains plans of Luxembourg, Ettelbruck, and Diekirch.
- (14) The 1 : 4,800 *Plan Monumental de la Ville de Luxembourg* (see p. 315), has been reproduced as Series 4485.

E. FOREIGN OFFICIAL SERIES ON WHICH LUXEMBOURG APPEARS

Series of smaller scale than 1 : 500,000 are not included.

(1) *Belgian*.

Luxembourg appears on a number of small-scale sheets published by the *Institut Cartographique Militaire*. It is not covered by any series on a scale as large as 1 : 200,000.

(2) *French*.

The *Service Géographique de l'Armée* has published the following sheets on which Luxembourg appears :

- (i) A uniform gridded series of 38 sheets, compiled from the Hansen 1 : 20,000 series (see p. 312), and the German 1 : 20,000 series, for military use only.
- (ii) *Carte au 200,000°*. Sheet 11. Longwy.
- (iii) *Carte au 320,000°*. Sheet 9. Mézières.
- (iv) *Carte au 500,000°*. Lille, Cologne, Reims, and Strasbourg sheets.

(3) *German*.

The *Reichsamt für Landesaufnahme* has published the following sheets on which Luxembourg appears :

- (i) 1 : 100,000 *Karte des Deutschen Reiches*. Sheets 502, 503, 522, 523, 539, 540, 553.
- (ii) 1 : 200,000. *Topographische Übersichtskarte des Deutschen Reiches*. Sheets 136, 148, 149, 158.
- (iii) 1 : 250,000. *Karte von Südwestdeutschland*. Sheet 6.
- (iv) 1 : 300,000. *Übersichtskarte von Mitteleuropa und Reichs-Autokarte*. Aachen sheet.

Appendix III

LUXEMBOURG AND OTHER CHIEF TOWNS

According to the results of the census of 31 December 1935, the chief town, Luxembourg, had a population of 57,740, the next largest being the metallurgical centre of Esch-sur-Alzette with 27,517. There are, strictly speaking, only twelve 'towns' in Luxembourg. Of these, seven are the old 'free towns' of Luxembourg, Diekirch, Echternach, Grevenmacher, Remich, Vianden and Wiltz. There are five new towns, raised to that status in recent times because of their increased industrial and commercial importance, with the resultant growth of population; these are Esch-sur-Alzette, Ettelbruck, Dudelange, Differdange and Rumelange. All of these are described in detail in this Appendix, and a short note is added on Clervaux, Mersch, Mondorf-les-Bains and Wasserbillig, which, although not of 'town' status, have features of interest or of importance.

LUXEMBOURG (57,740) (Fig. 65) (Plates 40-3)*

General Features

The city of Luxembourg is the capital and by far the largest town of the Grand-Duchy, to which it gave its name. It is situated on the Luxembourg Sandstone plateau at the confluence of the Pétrusse and the Alzette. Both rivers have entrenched themselves in deep ravines, between which is a steep-sided rocky 'peninsula,' known as the Bock or Bouc, overlooking the confluence; the summit is about 180 feet above the rivers. This has therefore been a fortress site of great strength since Roman times.

History

Little is known of the history of Luxembourg before the tenth century, except that the Romans had a fortress there. Prior to A.D. 963, the site was owned by the Abbey of St. Maximin at Trier, to which it had been given by Charles Martel. In that year, it was ceded by the monks to Siegfried, an Ardenne noble, who was the first of a long line of the Counts of Luxembourg. He laid the foundations of the medieval castle on the site of the Roman fortress. The town developed westwards on the plateau surface, and was protected on this side by a wall built in 1050. Houses were also built on the valley floor at the foot of the steep sandstone cliffs, and this part of the town was protected by another wall across the Rham plateau to the east. Successive counts elaborated the fortress, enlarging and extending the defences as the city grew. Among sieges which the city underwent was that of 1684, when it was captured from the Spaniards by the army of Louis XIV. His great military engineer, Vauban, elaborated the fortifications to such an extent that it became the most powerful inland fortress in Europe; some twelve miles of emplacements, casemates and galleries were cut into the solid rock. In the eighteenth century, the fortress was further strengthened by its Austrian owners; its western approaches were protected by a triple wall, with strong detached forts at the point where the plateau narrows between the meanders of the Pétrusse and Alzette. In 1795, its

*Note. The population figures given in this Appendix are of the 'population municipale'; a total does not include people living away from the 'chef-lieu' of the commune.



Fig. 65. The city of Luxembourg

Based on 1 : 4,800 (approx.) *Plan Monumental de la Ville de Luxembourg* (Luxembourg, 1934).

The old town grew up round the fortress-site protected by the river gorges; the new town developed to the south round the railway station, and is connected with the former by viaducts (Plates 34, 40) crossing the Pétrusse. There has been considerable expansion westwards from both.

Austrian defenders withstood a siege of eight months by the French Revolutionary armies.

From 1815 to 1867, Luxembourg remained a powerful fortress under the German Confederation. In 1867, however, the Grand-Duchy was demilitarized in accordance with the terms of the Treaty of London, and the fortifications were demolished, with the exception of a few of the oldest parts in the Alzette and Pétrusse valleys, which were retained for their historic interest. The defences were replaced by a public park.

Since 1867, Luxembourg has remained the residence of the Sovereign, and the seat of government and of the High Court of Justice. With its contiguous suburbs, it has a population of nearly one-fifth of that of the whole State, and is to an exceptional extent the focus of national life. Further, it is an important industrial town and an international route focus.

The Ground Plan of Luxembourg

The upper part of the old town stands mainly on the peninsula which projects eastwards between the meanders of the Alzette and the Pétrusse. The centre is the Place Guillaume, where the weekly market is held. Most of the main buildings are found in this part of the town, notably the Town Hall (*Hotel de Ville*), the Government offices (*Hotel du Gouvernement*), the Cathedral of Nôtre-Dame, the Grand-Ducal Palace, built in 1572 in Spanish Renaissance style, the Law Courts (*Palais de Justice*) and the parliament buildings (*Chambre des Députés*).

The lower portions of the city, with narrow streets and riverside buildings, lie on the floor of the ravines at the foot of the sandstone cliffs; they consist of the districts of Pfaffental in the north, Clausen in the north-east, and Grund in the south-east, the last separated from the second by the Bouc promontory.

The newer portions of the town have grown up westwards and southwards in the last seventy years since the dismantling of the fortifications. In 1910, there were, according to the official census returns, 10,396 houses in Luxembourg-Ville, by 1930 there were 14,455. West of the public park lie the pleasant residential suburbs of Limpertsberg and Neu-Merl, which have grown out along and between the roads to Diekirch, Arlon and Longwy. To the south of the old town is the railway station (*Gare Centrale*), with the adjoining goods-yard (*Nouvelle Gare des Marchandises*); around this and especially to the west is an area of modern hotels, shops and offices on the Plateau Bourbon, and a considerable industrial area. The most striking building is the *Hotel des Arbed*, the headquarters of the great Arbed steel company.

Outside the city proper have grown the contiguous suburban communes of Eich to the north, Hamm to the east, Hollerich to the south, and Rollingergrund to the west. Together with the *Ancien Territoire*, they make up the canton of Luxembourg-Ville.

A striking feature of the layout of the town is the number of bridges and viaducts, necessitated by the deeply cut river valleys. From the southern part of the city round the station, the Avenue de la Liberté runs north-eastwards, crossing the Pétrusse by the Pont Adolphe, a single arch of 280 feet, 130 feet above the river (Plate 41). It was built in 1903 by the French engineer Séjourné. From the station the Avenue de la Gare runs north to the Viaduct, built in 1859-61 and crossing the Pétrusse by twenty-five arches. The Pulvermühl viaduct, 850 feet long and nearly 100 feet above the river, carries the main railway line from Troisvierges and Liège



Plate 39. THE SOUTHERN PART OF THE CITY OF LUXEMBOURG

A view of Luxembourg from the main station along the Avenue de la Liberté towards the Old Town.



Plate 40. THE PONT ADOLPHE, LUXEMBOURG CITY

This bridge crossing the Pétrusse connects the Old Town in the background with the Quartier de la Gare. The road across it is a continuation of the Avenue de la Liberté.



Plates 41, 42. LUXEMBOURG CITY : THE OLD TOWN

The upper view is of the citadel with the Bouc in the background to the right, while in the foreground is the Alzette with the suburb of Grund. The lower photograph shows the ramparts overlooking the Pétresse, which is here regularized,

round the north-eastern suburbs, crossing the meanders of the Alzette three times, to the railway station on the south (Plate 34).

Growth of Population

The following table shows the growth of population in the city of Luxembourg during the present century :

<i>Population de résidence habituelle</i>			
1900	..	..	20,879
1910	..	..	20,848
1922	..	..	46,506
1927	..	..	52,440
1930	..	..	53,791
1935	..	..	57,740

Source : *Résultats du Recensement de la Population* for various years (Luxembourg).

The apparent sudden increase between 1910 and 1922 is due to the fact that in 1920 for administrative purposes the adjoining communes of Eich, Hamm, Hollerich and Rollingergrund were added to the old city or *Ancien Territoire* to form the administrative area of Luxembourg-Ville. Strictly speaking, therefore, the figures for the city before 1922 should be compared with those after that date for the *Ancien Territoire* alone. The following table shows the population of the various parts of Luxembourg-Ville at the two last censuses :

Population de résidence habituelle

Commune				1930	1935
<i>Ancien Territoire</i>	..	..		20,843	20,710
Eich	..	..	..	8,420	8,454
Hamm	..	..	..	1,454	1,624
Hollerich	..	..	..	20,270	24,113
Rollingergrund	..	..		2,804	2,839
Total				53,791	57,740

Source : *Résultats du Recensement de la Population* for 1930 and 1935 (Luxembourg, 1932, 1938).

The most striking feature in recent years has been the rapid growth of Hollerich, the industrial suburb south and west of the railway station. As might be expected from the restricted area of its site, the old town or *Ancien Territoire* has remained relatively steady, actually showing a slight decline between 1930 and 1935, due to population moving out into the residential suburbs.

Detailed figures are available for the various parts of the *Ancien Territoire*, shown in the following table :

Population de résidence habituelle

District of city	1930	1935
Ville-haute	7,878	7,877
Quartier de la Gare ..	2,541	2,339
Limpertsberg	4,158	4,487
Clausen	1,268	1,197
Grund	2,873	2,698
Pfaffenthal	2,125	2,112
Total ..	20,843	20,710

Source : *Résultats du Recensement de la Population* for 1930 and 1935 (Luxembourg, 1932, 1938).

Administration

Luxembourg has a complex administrative rôle, for in addition to being the capital of the Grand-Duchy and the seat of the Government, it is the chief town of the civil district of Luxembourg and of the canton of Luxembourg-Campagne. Luxembourg-Ville, although consisting of the five communes of *Ancien Territoire*, Eich, Hamm, Hollerich and Rollingergrund, is administered as a single commune. Its communal organization is similar to that of other communes in the Grand-Duchy, that is, a burgomaster, a number of *échevins* (aldermen), and a number of councillors, except that it has four aldermen instead of two, who were appointed by the Sovereign instead of by the Government, as is usually the case. There were twenty-five communal councillors in 1939.

The complex administrative rôle is again reflected in the judicial sphere (see pp. 84-7), for it is the chief town of the civil *arrondissement*. The *Cour Supérieure de Justice* is the supreme court of the Grand-Duchy, while as it is the chief town of a judicial *arrondissement* there is a *Tribunal d'Arrondissement*, and as it is the chief town of the canton of Luxembourg-Ville there is a Magistrate's Court (*Justice de Paix*). The non-permanent criminal court (*Cour d'Assizes*) also meets in the city. The chief prison is situated in Grund.

The city is an episcopal see, the bishop of which is appointed directly by the Pope. The Cathedral of Nôtre-Dame in the centre of the city is the enlarged chapel of a former Jesuit college. The Pastor of the Protestant Church and the Chief Rabbi are both resident in Luxembourg. There is no university, but the various higher educational institutes include the *Athenée* (the classical gymnasium), the *Ecole industrielle et commerciale*, the *Lycée* for girls, the *Ecole d'artisans* and the *Ecole normale*.

Economic Importance

The importance of the city lies mainly in the fact that it is the administrative capital of the Grand-Duchy. It is also the focus of the professional and commercial life of the country, and is an important industrial centre. The numerous small factories are concentrated mainly in Hollerich. The industries include brewing, distilling, tanning, light engineering, light electrical apparatus, cigarettes, textiles, especially clothing, furniture,

pottery, and bricks. At Eich, in the northern suburbs, the first ironworks to use the 'minette' ore from the south-west was established in 1845; in 1939, there were two foundries, as well as a structural engineering department, owned by *Arbed*.

Luxembourg contains the head offices of the main steel companies of the south; the large *Arbed* building (*Hotel des Arbed*) is situated in the southern part of the town. The city is also the centre of the International Steel Cartel (*Entente Internationale d'Acier*).

The city is an important tourist centre (see pp. 243-5).

Communications

Luxembourg is the main focus of railway routes, not only within the Grand-Duchy but in western Europe. Main lines converge on the city from Arlon, from Troisvierges, from Wasserbillig and from Zoufftgen (all the G.-L. system), as does the P.H. line from Rodange. The railways are shown on Fig. 61 and are described in detail on pp. 280-92. All these lines are used by international expresses. Light railways run to Echternach (28.5 miles) and to Remich (17.5 miles), and are extensively used by tourists. Local tramway services start from and return to the railway station, serving the principal streets. Other routes serve the suburbs, including Eich, Dommeldange and Walferdange to the north, Clausen and Neudorf to the east, and Hollerich and Bonnevoie to the south.

Luxembourg is equally the road centre of the Grand-Duchy, and all parts are easily accessible by road. The most important roads run (1) northwards to Ettelbruck and St. Vith; (2) north-westwards to Arlon; (3) south-westwards to Esch; (4) southwards to Frisange and Thionville; and (5) eastwards to Grevenmacher and Trier. The capital is well served by motorbus services (Fig. 60), while a large number of circular excursions by motor coach operate in summer.

The studios of the powerful *Radio Luxembourg* station are situated in the public park west of the old town (see p. 301).

CLERVAUX (1,001) (Plate 43)

General Features

Clervaux (Clerf), in the extreme north of the Grand-Duchy, is situated at a height of 1,090 feet in the narrow wooded valley of the Clervaux (Clerf), a tributary of the Wiltz, which itself flows into the Sûre. The town is almost enclosed by a sweeping meander of the river. It is the chief place of the canton of the same name.

History

The town is dominated by a fine feudal castle, the oldest part of which dates from the twelfth century. Under its shelter grew up a small market-town. Nearby was fought the last battle in the Peasants' War against the French in 1798; the people had rebelled against the introduction of conscription by the French. The present town has grown in the last forty years; recent buildings includes the Benedictine Abbey of St. Maurice (1909-12) with a tower 220 feet high, the parish church (1911), and several modern hotels.

Economic Importance

Clervaux is a small market-town and tourist centre, and has a few local industries, such as textiles and brick-making.

Communications

The town stands on the G.-L. line running southwards to Luxembourg (36.5 miles) and northwards to Troisvierges (6.5 miles) and to Liège. The line follows the Clervaux valley, although it frequently tunnels to avoid the sweeping meanders of the river's course.

The town is a road centre for the northern Ardenne. A main road runs westwards to Bastogne in Belgium, and another eastwards, crossing the main road which runs from north to south through the Grand-Duchy, to Dasbourg, which is just across the German frontier. Minor roads radiate into the Ardenne. The town is well served by motor-coach services, notably to Hachiville, Asselborn and Hosingen.

DIEKIRCH (3,798)

General Features

Diekirch stands at an altitude of 640 feet, on the left bank of the river Sûre where it is joined by the Bamerbach and by the Flossbach. The broad river valley, with its alluvium-covered floor, is bounded on the north by the heights of the Herrenberg (1,260 feet), the Seitert and the Goldknapp, and on the south by that of the Hardt.

It is the administrative centre for the northern part of the Grand-Duchy, as it is the chief town of the district (*arrondissement administratif*) for civil and judicial purposes, the seat of a *tribunal d'arrondissement* (the only one outside Luxembourg city), and the centre of a police district (*Commissariat de Police*).

History

Diekirch is an ancient market-town, and its old houses and tortuous streets cluster around the tenth-century church of St. Laurent. It was walled until the beginning of the nineteenth century, when under the French *régime* the walls were demolished and replaced by shady boulevards. It remained a garrison town until the demilitarization of the Grand-Duchy in 1867. A new town has grown up outside the boulevards round the kernel of the old, including several hotels.

Economic Importance

A number of small-scale industries are carried on, notably the brewing of beer, which is widely famed, and the manufacture of sweets. Apart from the various administrative offices, the town is chiefly concerned with the tourist industry. Not only are its immediate surroundings in the Sûre valley of great charm, but it is conveniently situated between the Ardenne and the Bon Pays.

Communications

Diekirch stands on the P.H. railway line, about three miles from Ettelbruck and seventeen miles from Echternach. It is also the terminus of a light railway, which goes northwards via Fohren to Vianden, a distance of 9.3 miles.

The town is a crossing-place of roads running west-east along the Sûre valley between Ettelbruck and Echternach, and north-south between Clervaux and Grevenmacher. It is the terminus of bus routes to Medernach and to Hosingen.



Plate 43. CLERVAUX



Plate 44. ECHTERNACH



Plate 45. ESCH-SUR-ALZETTE

Esch is the second town of the Grand-Duchy, and the chief centre of the iron and steel industry.

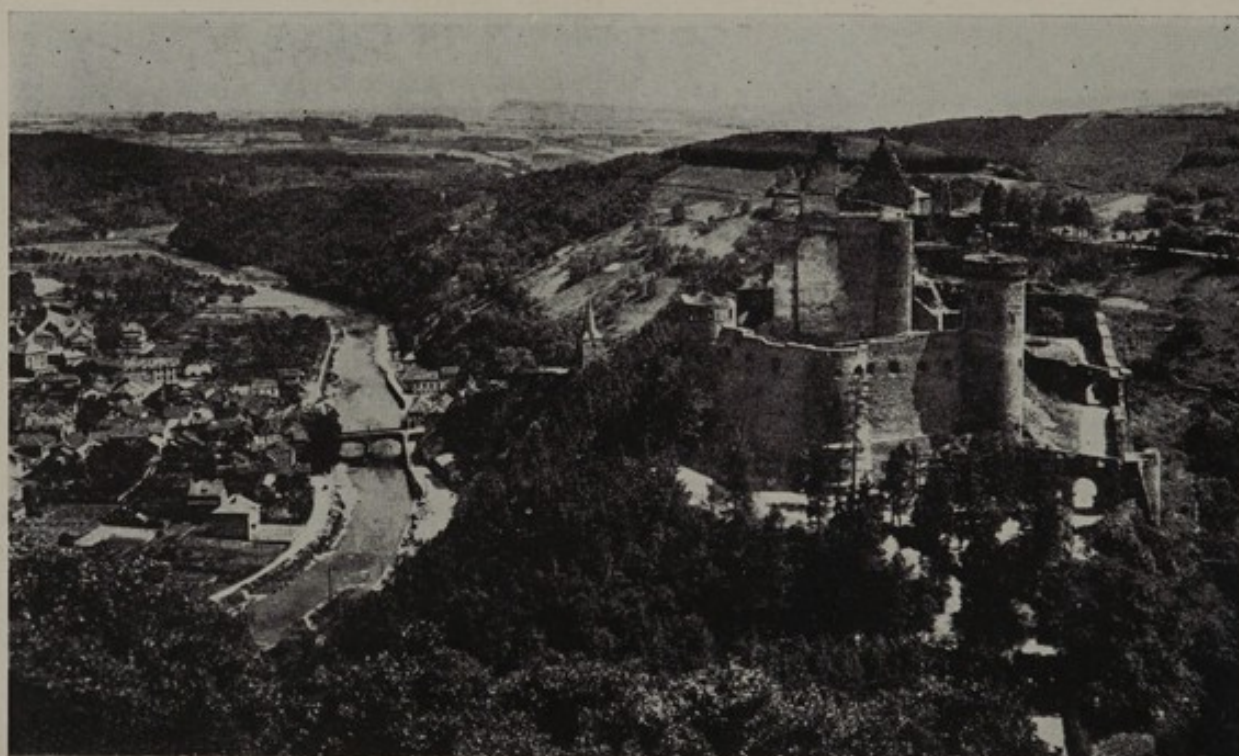


Plate 46. VIANDEN

This small town on the Our grew under the protection of the great castle which was the seat of the Orange-Nassau family.

DIFFERDANGE (8,111)

General Features

Differdange is situated among the hills in the south-west of the Grand-Duchy near the headwaters of the river Chiers (Korn), which flows northwards and then westwards into France.

Economic Importance

The growth of Differdange has been due entirely to its position in the 'minette' zone, and the resultant development of the main iron and steel works of the *Hadir* group. These are described on p. 228. It is a modern township, and there are many streets of workers' dwellings.

Communications

The town is served by the P.H. line, which runs south-eastwards to Esch-sur-Alzette (5 miles) and north-westwards to Pétange (2.5 miles). A number of mineral lines run from the works to the iron-ore mines in the hills.

Roads run northwards to Pétange and eastwards to Esch-sur Alzette.

DUDELANGE (12,814)

General Features

Dudelage stands on both banks of the small river Dudelage, which flows northwards to join the Alzette near Bettembourg. Hills rise steeply above the town—on the east the Kreuzberg, Rodenberg and Gintzenberg, on the west the Weich, the Langoicht and the Langenberg.

Economic Importance

The town owes its growth in the last seventy years to the development of the iron and steel industry. Situated near the eastern extremity of the 'minette' zone (Figs. 51, 54), large metallurgical works have been developed by the *Arbed* company. These are described on p. 227.

Communications

A single-track railway with its terminus at Dudelage runs northwards to Burange and to the important junction of Bettembourg, 3.5 miles away. Numerous mineral lines run into the hills to the iron ore workings west of the town.

Roads run (1) westwards to Kayl and to Esch-sur-Alzette; (2) eastwards to Roussy on the main Luxembourg-Thionville road; (3) northwards to Bettembourg and Luxembourg; and (4) southwards into Lorraine.

ECHTERNACH (3,066) (Plate 44)

General Features

Echternach lies on the right bank of the river Sûre, at an altitude of 500 feet, near the eastern frontier of the Grand-Duchy. Near this point the river emerges from its deep narrow valley in the Müllerthal (Petite Suisse), and flows across open meadowland backed by wooded hills. A small stream, the Lauterbach, joins the Sûre immediately below the town. It is the chief town of the canton of the same name.

History

Although there is some proof that the Romans had a settlement near the site of the present town, and the pillars of the old stone bridge across the Sûre are almost certainly of Roman origin, the town is first mentioned in records in 698, when an abbey was founded by St. Willibrord of Northumbria. The town grew up round the abbey, and became both a religious and cultural centre and a market town. The famous *Dingstuhl* or *Denzelt* was built in the fourteenth century as a Court of Justice, was rebuilt in 1506-39 in Gothic style, was remodelled in 1897, and was restored to its original condition after the war of 1914-18. It now serves as the town hall. The present buildings of the Benedictine Abbey, built in the eighteenth century, spread over a large area of the town, and are now occupied in part by a school. Some twenty hotels lie in or near the town, eighteen of which have been built since 1919.

Economic Importance

Echternach functions as a market and frontier town, with a customs post, and as a local administrative centre. Formerly there were many small industries, including tanning and the manufacture of tiles, cloth, and hats; of these, only a small tile factory is still active. The town's economy depends almost entirely on the tourist industry, the result of its proximity to the Müllerthal to the west and of its being a centre for eastern Luxembourg. It is estimated that more than ten times its resident population may attend the famous Whitsun 'Dancing Procession' through the streets of the town in commemoration of St. Willibrord.

Communications

Echternach is situated on the P.H. railway line from Ettelbruck to Wasserbillig, about 20 miles from the former and 13 from the latter. The main line station at Echternach is adjoined by the terminus of a light railway, which runs south-westwards through Consdorf, Junglinster and Dommeldange to Luxembourg city, a distance of 28.5 miles.

Roads radiate in several directions. The more important are (1) along the Sûre valley westwards to Reisdorf and beyond to Diekirch and Vianden; (2) along the Sûre valley eastwards to Rosport and Wasserbillig, and beyond to Trier; (3) south-westwards through Junglinster to Luxembourg city; (4) southwards to Mompach, Manternach and Grevenmacher; and (5) northwards across the Sûre into Germany at Echternacherbruck and beyond to Bitburg. Omnibus services are operated from Echternach to Larochette and to Grevenmacher.

ESCH-SUR-ALZETTE (27,517) (Plate 45)

General Features

Esch-sur-Alzette, the second largest town in the Grand-Duchy and the centre of the iron and steel industry, is situated in the extreme south-west of the country near the French frontier. The river Alzette, which rises a few miles west of the town, is conducted for the most part under the town in a conduit. To the south lies the Galgenberg ridge.

It is the chief town of the canton of the same name. A notable feature is that unlike any other commune it has two Magistrates' Courts (*Justices de Paix*). Higher education institutions include the *Ecole Industrielle et Commerciale*, a *Lycée* for girls, the *Ecole Professionnelle d'Etat* and the *Ecole des Mines*.

History

The name 'Esch' is said to be derived from the Gallic 'Asic,' meaning water, and the town was originally called 'Esch Mauvaise' because of the marshes bordering the Alzette. The little border town, first mentioned in 1185, has suffered a stormy history of sieges and pillages, and has several times been decimated by disease. It was rebuilt for the last time after 1794, and by 1841 it had become sufficiently important to be called 'capital' of the canton. In the second half of the nineteenth century Esch entered upon a previously unknown phase of prosperity with the development of the metallurgical industry, based on the 'minette' iron-ore deposits of the Dogger scarp (see p. 208). Mining expanded considerably after 1867, when the Government granted working concessions on condition that the ore was smelted within the Grand-Duchy. In 1871 the first blast furnace was established at Esch by the *Cie. Forges d'Eich*. After 1876, when the Thomas-Gilchrist process was invented, expansion was rapid. Esch became the metropolis of the iron-mining and metallurgical area, and the three great *Arbed-Terres Rouges* works (see p. 226 and Fig. 55), developed so much that the company became the second largest steel concern in Europe.

Economic Importance

The function of Esch as an iron and steel centre is described on pp. 226-7 (and see Fig. 55). Other industries include the manufacture of basic slag fertilizer and of cement.

Communications

Esch is linked by a branch line 13.5 miles long with the main G.-L. line from Luxembourg to Zoufftgen, thence to Thionville, Strasbourg and beyond. Another line runs south to Audun-le-Tiche and to the Alsace-Lorraine railway system generally. Esch is also the terminus of the P.H. line, which runs north-westwards to Pétange (6 miles), where it crosses the main P.H. line between Paris and Rodange. The works at Esch are the focus of numerous mineral lines.

Numerous roads converge on Esch, including (1) the main road north-eastwards to Luxembourg; (2) the continuation of this road south-westwards into Lorraine; (3) a road westwards to Differdange and Pétange; and (4) another road eastwards to Bettembourg. There is a motorbus service between Esch and Luxembourg.

ETTELBRUCK (4,322) (Plate 5)

General Features

Ettelbruck lies at an altitude of 650 feet in a small area of sheltered lowland formed by the junction of the rivers Sûre, Alzette and Wark. The town is built partly on the alluvium of the valley floor and partly on the Bunter sandstone west of the Alzette. Situated in the heart of the Grand-Duchy, it has several State institutions, including the agricultural college (*Ecole Agricole*) and a mental hospital, and is an important route centre.

History

The town is exceptional in having no castle or ancient ruins. It existed as a small market town of little importance until 1848, when it was for a short time the capital of the Grand-Duchy. In recent years it has developed as a tourist and communications centre, largely due to its unusual nodality.

Economic Importance

There are a number of minor industries, including brewing and distilling, tanning and cigarette-making. There is also a large co-operative butter factory. It is an important agricultural centre, and is a market town. With its central position, its modern hotels and its good communications, it is a good tourist centre. Indeed, it is often called the 'Gate of the Ardenne,' and the Müllerthal region to the east is equally accessible.

Communications

Ettelbruck is the junction for the two main railway systems. The G.-L. line runs northwards to Clervaux and to Troisvierges (24.5 miles) and beyond to Liège, and southwards to Luxembourg (18.5 miles). The P.H. line runs south-westwards to Noerdange, Kleinbettingen and Pétange (33.5 miles), and eastwards to Diekirch and Wasserbillig (33 miles).

The town is situated at the crossing-point of the north-south and west-east roads. Main roads run (1) to Hosingen and Clervaux; (2) southwards to Luxembourg; (3) north-westwards to Heiderscheid and Wiltz; and (4) eastwards to Diekirch and Echternach. Motorbus services run westwards to Feulen, thence to Wiltz and to Mertzig, and northwards to Bourscheid and Welscheid.

GREVENMACHER (2,738)

General Features

Grevenmacher stands on the left bank of the Moselle, at a height of 680 feet at the point where the two small streams of the Johannesbach and Rodenbach flow into the main river. The town lies in a small sheltered amphitheatre, backed by the terraced vine-clad hills. It originally grew up around its castle.

It is the chief town of the canton of the same name, the centre of the civil district (*arrondissement administratif*) also of the same name, and has a district commissioner of police (*commissaire de police*).

Economic Importance

Its present-day importance is due largely to its position in the heart of the Moselle vine region (see pp. 178-80); it is famed especially for its 'mosel-blümchen' wine. It is also a small tourist resort with several hotels.

Communications

Grevenmacher is the southern terminus of the P.H. line, which runs northwards to Wasserbillig (3.5 miles), to Echternach (17 miles) and to Ettelbruck (36.5 miles).

A main road runs through Grevenmacher along the Moselle valley, northwards to Wasserbillig and southwards to Remich. Another runs south-westwards to Luxembourg. Three bus services converge on the town (Fig. 62).

MERSCH (1,354)

General Features

Mersch stands at the confluence of the Alzette with its tributaries the Mamer and the Eisch. At this point the narrow Alzette valley opens out to form an alluvium floored basin, surrounded with wooded sandstone hills. It is the chief town of the canton of the same name.

History

There was probably a Roman settlement near the site of the present town, which grew up around the medieval moated castle. It is a striking feature that within a few miles of the town there are to be found seven castles, perched usually on sandstone crags. The modern little town has grown up as a market centre and a route focus.

Communications

Mersch is on the G.-L. line, 31.5 miles south of Troisvierges and 11.5 miles from Luxembourg.

It is an important road centre; main roads lead (1) northwards to Ettelbruck; (2) southwards to Luxembourg; (3) eastwards to Larochette; and (4) westwards to Saeul and Arlon. The town is served by several motor bus services (Fig. 62).

MONDORF-LES-BAINS (1,008)

General Features

Mondorf is situated in the extreme south of the Grand-Duchy near the French frontier. It stands at an altitude of 636 feet in the valley of the river Gander (or Altbach), which here forms the frontier between France and Luxembourg and finally flows in a south-easterly direction to join the Moselle. The valley of the Gander is crossed near Mondorf by one of the numerous fault-lines (see p.), 26 which is responsible for the Schanzberg scarp overlooking the town on the north-west.

Economic Importance

The importance of Mondorf dates from the discovery in 1841 of mineral springs during trial borings, which were continued to a depth of 2,500 feet. The tepid saline waters (about 76° F.), which flow at a steady rate of some 8,000 gallons per hour, were first exploited privately, but in 1886 the springs were taken over by the State. A modern thermal establishment was laid out on the outskirts of the town (see pp. 123, 150), and a number of large hotels have been built. Tourists are also attracted by the fishing; stretches of the Gander are preserved.

Communications

Mondorf stands on the light railway from Luxembourg (11 miles), which continues on to Remich, a further 6.5 miles.

Roads run (1) westwards to Frisange, Bettembourg and Esch; (2) southwards into Lorraine across the French frontier; and (3) north-eastwards to Remich. Mondorf is linked by a bus service with Remich.

REMICH (1,770)

General Features

Remich is situated in the south-east of the Grand-Duchy on the left bank of the Moselle, where the hills flanking the valley recede somewhat to form a small amphitheatre of lowland. The town has extended up the eastern slope of the hills.

It is the chief town of the canton of the same name.

History

Remich, originally an old Roman settlement (*Remacum*), was in the Middle Ages a strongly fortified border town. It has many times been pillaged and burnt, but after the French Revolutionary period it became a peaceful little market-town.

Economic Importance

The town is one of the chief centres of viticulture (see pp. 178-80), and a Viticulture Research Station (*Station viticole*) was established in 1925. It is much frequented as a summer holiday resort, both by Luxembourgers and foreigners, and has several hotels; there is a bathing beach on the river bank.

Communications

Remich is linked to Luxembourg by a light railway 17.5 miles long. Mondorf-les-Bains is an intermediate station 6.5 miles from Remich.

A road runs northwards along the Moselle valley to Grevenmacher and Wasserbillig, and southwards to Remerschen and the French frontier. Another from Luxembourg via Sandweiler crosses the Moselle to the German village of Nennig. Remich is served by four bus services (Fig. 62).

RUMELANGE (4,198)

General Features

Rumelange is situated in the extreme south of the Grand-Duchy in the steep-sided valley of the Kaylbach, which flows northwards to join the Alzette. Hills rise steeply on either side of the town.

There is a small mining school (*école des mines*) in the town.

Economic Importance

The growth of Rumelange in the years prior to 1914 has been due entirely to its position in the 'minette' zone and to the resultant development of the iron industry. There are three blast furnaces owned by the *Hadir* group, but this unit has not worked since 1919.

Communications

Rumelange is served by a single-track railway, which runs southwards to its terminus at Ottange in Lorraine and northwards to a junction east of Schifflange with the line from Bettembourg to Esch. Numerous mineral lines run into the hills on either side of the town.

Minor roads run along the valley, northwards to Kayl and southwards to Ottange.

VIANDEN (1,111) (Plate 46)

General Features

Vianden has grown up on both banks of the river Our, about ten miles above its junction with the Sûre. At this point, the German frontier ceases to follow the left bank of the Our and swings away from the river for a few miles to the east.

It is the chief town of the canton of the same name.

History

The old feudal castle was built in the eleventh century by the Counts of Vianden, a powerful family who were allied to many of the foremost

European dynasties. In 1351, Countess Adelaide of Vianden married Count Athon of Nassau-Dillenburg, thus founding the house of Orange-Nassau-Vianden, from which the present royal families both of the Netherlands and of Luxembourg are descended. The County and town of Vianden were taken from William the Silent by Philip II of Spain, and were not regained by the House of Orange until 1604. From that date until the personal separation of Luxembourg from the Kingdom of the Netherlands in 1890, the ruler of the latter retained the title of Count of Vianden. The ruins of the castle are now the property of the State.

The old town on the right bank consists of ancient houses clustering round the rocky spur on which stands the old castle. A comparatively new quarter has sprung up on the opposite bank of the river.

Economic Importance

The town is a small tourist centre and health resort, and has seven hotels. Its favourable factors include the accessibility of the picturesque upper Our valley and the wooded valleys of the Ardenne, its numerous buildings of historic interest, and its modern sanatorium on a nearby hill overlooking the left bank of the Our.

Communications

Vianden is connected by a light railway with Bettel and Diekirch, a distance of 9.3 miles.

Roads radiate (1) southwards to Blesbruck, thence either to Diekirch or Echternach; and (2) eastwards across the Our into Germany to Bitburg. Local roads run (1) northwards along the right bank of the Our to Clervaux and (2) north-westwards to Putscheid. A bus service runs along the Our valley to Clervaux.

WASSERBILLIG (1,863)

General Features

Wasserbillig is situated near the German frontier on the left bank of the Moselle, at the confluence of the Sûre. At this point the Moselle valley widens to form a small alluvial plain, backed by the vine-covered sandstone scarp of the Bochsberg.

History

The old town grew up on lands belonging to the monastery of St. Maximin near Trier, and was a centre of religious life. Its subsequent growth was due to its importance as a centre of viticulture, as a market town, as a customs post, and as a railway junction.

Economic Importance

Minor industries include pottery, tiles and mosaic work. It is an important little market-town.

Communications

Wasserbillig stands at the point where the G.-L. line from Luxembourg (23 miles) is continued by the German State Railways to Trier and beyond, and is thus a customs halt on the main Paris-Trier-Coblence line. This railway is crossed by the P.H. line, which runs northwards to Echternach (13.5 miles) and on to Ettelbruck (33 miles), while it continues southwards to the P.H. terminus at Grevenmacher (3.5 miles).

The town stands at the junction of the road which runs along the valleys of the Sûre and the Moselle along the eastern frontier with that which goes eastwards across the Sûre into Germany to Trier. A minor road runs north-westwards to Mompach.

The Sûre is crossed east of the town by two bridges. The modern road bridge, upon which the Customs House stands, replaced the old fifteenth century bridge, while just south of it is the railway bridge.

WILTZ (3,594)

General Features

Wiltz, often called the capital of the Ardenne, grew up in the valley of the river Wiltz, which flows to the Sûre. The old part of the town (Oberwiltz), with its narrow tortuous streets, grew up round the castle at an altitude of 1,300 feet; the newer part, Niederwiltz, was built on the opposite (left) bank of the river. To-day the town is a small administrative, industrial and commercial centre, and is the chief town of the canton of the same name.

History

The Counts of Wiltz, said to have been descended from Charlemagne, built the castle on a prominent hill in the twelfth century. The family was powerful for nearly seven centuries, and the castle was enlarged and partially rebuilt in the seventeenth century. It was seized by the French invaders in 1798 and later became national property. During the nineteenth century a number of small factories grew up in Niederwiltz.

Economic Importance

Wiltz contains a few small factories, including a thriving tannery, cotton and linen mills, now mainly disused and pottery works. It is a small market town, serving the western Ardenne, and has several hotels.

Communications

The town is situated on a branch of the P.H. line, 5.5 miles from Kautenbach on the east, which is the junction with the G.L. line, and 6.5 miles from Schimpach-Wampach, the terminus of the P.-H. line; this is continued by the Belgian line through Benonchamps to Bastogne.

A number of roads, mostly local, converge on Wiltz, the most important being (1) south-eastwards to Ettelbruck; (2) north-eastwards to Hosingen; and (3) north-westwards to Oberwampach. The town is served by five motorbus services (Fig. 62).

Appendix IV

PLACE NAMES

The place names of Luxembourg may be divided into three groups, those in French, those in German, and those with alternative forms in both. The third category is numerous, as might be expected from the Grand-Duchy's geographical position. The most notable alternative forms are as follows (the French form is given first in each case) :

(i) The alternative suffix *-ange/-ingen*, as in Differdange/Differdingen, Wormeldange/Wormeldingen.

(ii) A fairly large group of names are formed by direct translation, as Septfontaines/Siebenbrunnen, Pont-Pierre/Steinbrücken, Larochette/Fels, Chiers/Korn, and Mondorf-les-Bains/Bad-Mondorf.

(iii) In the French form, the German *umlaut* or vowel modification is frequently but not invariably dropped, as Mullerthal/Müllerthal and Mullendorf/Müllendorf. Place names which retain the modification include those with the suffix *-mühle*, as Heidermühle.

(iv) French accents are commonly introduced, as Perlé/Perl.

(v) The French *-ou* and German *-u* are often interchangeable, as Luxembourg/Luxemburg.

(vi) The alternative suffix *-ette* and *-eid*, as Folschette/Folscheid, and Elschette/Elscheid.

(vii) Occasionally *-ville* is used as a suffix as well as *-dorf*, as Hamiville/Heisdorf, Bigonville/Bondorf.

(viii) There are a number of alternative place names which have no apparent relation, such as Troisvierges/Ulflingen.

Official Usage

Where alternative names exist, the French is generally the official form, although both are freely used for general purposes. The list of official names, which has been followed throughout in this Handbook, is contained in *Résultats du Recensement de la Population du 31 décembre 1935*, published by the Office de Statistique (Luxembourg, 1937). Alternative forms are listed in *Nomenclature alphabétique des localités . . .*, in Vol. II of the *Résultats*.

Since the German occupation of May 1940 a rigid policy of Germanization of place names has been followed.

Table of Official and Other Forms of Place Names

The following table lists a number of places in Luxembourg, together with their non-official alternative forms ; those with a direct and obvious change, such as *u* for *ü*, *ou* for *u*, *-ange* for *-ingen* and *-ette* for *-eid*, are not included.

<i>Official Form</i>	<i>Other Form</i>	<i>Official Form</i>	<i>Other Form</i>
Basbellain	Niederbesslingen	Kobenbour	Marscherwald
Bascharage	Niederkerschen	Lamadelaine	Rollingen
Bavigne	Boeven	Larochette	Fels
Belvaux	Beles	Mondercange	Monnerich
Berlé	Berl	Mondorf-les-Bains	Bad-Mondorf
Bigonville	Bondorf	Perlé	Perl
Bivange	Bivingen	Petitnobressart	Klein-Elcheroth
Boevange	{ Bogen	Pont-Pierre	Steinbrücken
Boulaide	{ Böwingen	Sanem	Sassenheim
Brouch	Bauschleiden	Septfontaines	{ Siebenbrunnen*
Chiers	Bruch	Soleuvre	Simmern
Cinqfontaines	Korn	Sonlez	Zolver
Clemency	Fünfbrunnen	Tarschamps	Soller
Clervaux	Küntzig	Troine	Ischpelt
Grand-Bivange	Clerf	Troisvierges	Trotten
Hamiville	Grossbevingen	Val des Oseraies	Ulflingen
Hachiville	Heisdorf	Val Ste. Croix	Weidenthal
Hautbellain	Helzingen	Watrange	Kreuzgründchen
Hautcharage	Oberbesslingen	Wincrange	Walter
	Oberkerschen		Wintger

* There are two places called Septfontaines; one, in the canton of Luxembourg-Ville has the alternative form of Siebenbrunnen, the other, in the canton of Capellen, has the alternative form of Simmern.

CONVERSION TABLES

METRIC AND BRITISH UNITS

It is customary to think of the 'metre' and the 'yard' as representing unalterable units of length. This is not so. The metre was originally intended to be the 10,000,000th part of the earth's meridional quadrant. But the accurate determination of this length proved to be extremely difficult—partly for technical reasons, and partly because of different conceptions of the 'figure of the earth.' In view of these difficulties it became necessary to define the length of the metre in terms of suitable metal bars measured under specified conditions of temperature, pressure, humidity, etc. Similar standard bars were also used to define the length of other units such as the yard. As all these metallic standards are subject to change, conversion tables differ according to the date of comparison between different bars. The tables that follow are based on the comparison between the yard and the metre made in 1895. This made 1 metre equivalent to 39·370113 in.

Metric System. List of Prefixes

Deca means ten times.	Deci means a tenth part of.
Hecto means a hundred times.	Centi means a hundredth part of.
Kilo means a thousand times.	Milli means a thousandth part of.
In abbreviations the Decametre, etc., is Dm., and the decimetre, etc., dm.	

Note on 'Nautical,' 'Geographical' and 'Statute' Miles

A British 'nautical mile' is the length of the minute of the meridian at any given latitude, and is therefore a variable unit. It is given in feet for Clarke's 1880 spheroid by the formula

$$60771\cdot1 - 30\cdot7 \cos 2 \text{ Lat.}$$

This is the sea mile of the scale of latitude and distance of the Admiralty Charts. From the above formula it will be found to vary from 6,046·4 ft. at the equator to 6,107·8 ft. at the poles, being 6,077·1 ft. at latitude 45°.

The so-called 'international nautical mile' of 1,852 m. or 6,076 ft. is the length of the minute of the meridian at latitude 45° on the international spheroid. This corresponds to the 6,077 ft. for Clarke's spheroid.

A 'geographical mile' is a fixed unit, being defined by some as the length of a minute of the equator and by others as that of the minute of the meridian at latitude 45°. According to the former definition its value on Clarke's spheroid is 6,087 ft. and according to the latter 6,077 ft. The round figure 6,080 is usually adopted for the purposes of ordinary navigation.

The British 'statute mile' measures 5,280 ft.

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Table 1. *Length*

Nautical mile	Statute mile	Kilometre	Metre	Yard	Foot	Inch	Centimetre
1	1.152	1.853	1853	2027	6080*	72,960	185,300
0.8684	1	1.60934	1609.34	1760	5280	63,360	160,934
0.5396	0.621372	1	1000	1093.61	3280.84	39,370.1	100,000
0.0005396	0.0006214	0.001	1	1.09361	3.28084	39.3701	100
0.0004934	0.0005682	0.0009144	0.914399	1	3	36	91.4399
0.0001645	0.0001894	0.0003048	0.3048	0.33333	1	12	30.48
0.0000137	0.0000158	0.0000254	0.0254	0.02778	0.083333	1	2.54
0.0000054	0.0000062	0.00001	0.01	0.0109361	0.032808	0.393701	1

* This is the customary British practice, and not the 'international nautical mile,' which Great Britain has not adopted.

Table 2. *Area*

Square mile	Square kilometre	Hectare	Acre	Square metre	Square yard
1	2.58998	258.998	640	2,589,980	3,097,600
0.386103	1	100	247.106	1,000,000	1,195,990
0.003861	0.01	1	2.47106	10,000	11,959.9
0.0015625	0.0040469	0.404685	1	4046.85	4840
0.00000039	0.000001	0.0001	0.000247	1	1.19599
0.00000032	0.00000084	0.0000836	0.000207	0.836126	1

Table 3. *Yield per Unit Area*

Tons per acre	Metric tons per hectare	Quintals per hectare
1	2.51071	25.1071
0.398294	1	10
0.0398294	0.1	1

Table 4. *Volume and Capacity*

Kilolitre	Cubic metre	Cubic yard	Bushel	Cubic feet	Imp. gall.	Litre	Pint
1	1·000027	1·30799	27·4969	35·3157	219·976	1000	1759·80
0·999973	1	1·30795	27·4962	35·3148	219·970	999·973	1759·75
0·764532	0·764553	1	21·0223	27	168·178	764·532	1345·43
0·0363677	0·0363687	0·0475685	1	1·28435	8	36·3677	64
0·028316	0·028317	0·037037	0·778602	1	6·22882	28·3160	49·8306
0·0045460	0·0045608	0·0059461	0·125	0·160544	1	4·54596	8
0·001	0·001000	0·001308	0·027497	0·035316	0·219976	1	1·75980
0·0005682	0·0005683	0·0007433	0·015625	0·020068	0·125	0·56824	1

Table 5. *Weight*

Ton	Metric ton or millier	Quintal	Kilogram	Pound
1	1·01605	10·1605	1016·05	2240
0·984207	1	10	1000	2204·62
0·0984207	0·1	1	100	220·462
0·0009842	0·001	0·01	1	2·20462
0·0004464	0·0004536	0·004536	0·453592	1

Table 6. Temperature : Equivalents of Fahrenheit and Centigrade Scales

°F.	°C.	°F.	°C.	°F.	°C.	°F.	°C.	°F.	°C.	°F.	°C.	°F.	°C.
100	37.7	79.25	26.25	58	14.4	37.4	3	17	8.3	—	—	—	—
99.5	37.5	79	26.1	57.2	14	37	2.7	16.25	8.75	—	—	—	—
99	37.2	78.8	26	57	13.8	36.5	2.5	16	8.8	—	—	—	—
98.6	37	78	25.5	56.75	13.75	36	2.2	15.8	9	—	—	—	—
98	36.6	77	25	56	13.3	35.6	2	15	9.4	—	—	—	—
97.25	36.25	76	24.4	55.4	13	35	1.6	14	10	—	—	—	—
97	36.1	75.2	24	55	12.7	34.25	1.25	13	10.5	—	—	—	—
96.8	36	75	23.8	54.5	12.5	34	1.1	12.2	11	—	—	—	—
96	35.5	74.75	23.75	54	12.2	33.8	1	12	11.1	—	—	—	—
95	35	74	23.3	53.6	12	33	0.5	11.75	11.25	—	—	—	—
94	34.4	73.4	23	53	11.6	32	0	11	11.6	—	—	—	—
93.2	34	73	22.7	52.25	11.25	31	—0.5	10.4	12	—	—	—	—
93	33.8	72.5	22.5	52	11.1	30.2	—1	10	12.2	—	—	—	—
92.75	33.75	72	22.2	51.8	11	30	—1.1	9.5	12.5	—	—	—	—
92	33.3	71.6	22	51	10.5	29.75	—1.25	9	12.7	—	—	—	—
91.4	33	71	21.6	50	10	29	—1.6	8.6	13	—	—	—	—
91	32.7	70.25	21.25	49	9.4	28.4	—2	8	13.3	—	—	—	—
90.5	32.5	70	21.1	48.2	9	28	—2.2	7.25	13.75	—	—	—	—
90	32.2	69.8	21	48	8.8	27.5	—2.5	7	13.8	—	—	—	—
89.6	32	69	20.5	47.75	8.75	27	—2.7	6.8	14	—	—	—	—
89	31.6	68	20	47	8.3	26.6	—3	6	14.4	—	—	—	—
88.25	31.25	67	19.4	46.4	8	26	—3.3	5	15	—	—	—	—
88	31.1	66.2	19	46	7.7	25.25	—3.75	4	15.5	—	—	—	—
87.8	31	66	18.8	45.5	7.5	25	—3.8	3.2	16	—	—	—	—
87	30.5	65.75	18.75	45	7.2	24.8	—4	3	16.1	—	—	—	—
86	30	65	18.3	44.6	7	24	—4.4	2.75	16.25	—	—	—	—
85	29.4	64.4	18	44	6.6	23	—5	2	16.6	—	—	—	—
84.2	29	64	17.7	43.25	6.25	22	—5.5	1.4	17	—	—	—	—
84	28.8	63.5	17.5	43	6.1	21.2	—6	1	17.2	—	—	—	—
83.75	28.75	63	17.2	42.8	6	21	—6.1	0.5	17.5	—	—	—	—
83	28.3	62.6	17	42	5.5	20.75	—6.25	0	17.7	—	—	—	—
82.4	28	62	16.6	41	5	20	—6.6	—0.4	18	—	—	—	—
82	27.7	61.25	16.25	40	4.4	19.4	—7	—1	18.3	—	—	—	—
81.5	27.5	61	16.1	39.2	4	19	—7.2	—1.75	18.75	—	—	—	—
81	27.2	60.8	16	39	3.8	18.5	—7.5	—2	18.8	—	—	—	—
80.6	27	60	15.5	38.75	3.75	18	—7.7	—2.2	19	—	—	—	—
80	26.6	59	15	38	3.3	17.6	—8	—3	19.4	—	—	—	—

Table 7.

Pressure : Equivalents of Millibars, Millimetres of Mercury, and Inches of Mercury at 32° F. in Latitude 45°

Mercury in.	Milli- bars	Mercury mm.	Mercury in.	Milli- bars	Mercury mm.	Mercury in.	Milli- bars	Mercury mm.	Mercury in.	Milli- bars	Mercury mm.
27.02	915	686.3	27.82	942	706.6	28.62	969	726.8	29.41	996	747.1
27.05	916	687.1	27.85	943	707.3	28.65	970	727.6	29.44	997	747.8
27.08	917	687.8	27.88	944	708.1	28.67	971	728.3	29.47	998	748.6
27.11	918	688.6	27.91	945	708.8	28.70	972	729.1	29.50	999	749.3
27.14	919	689.3	27.94	946	709.6	28.73	973	729.8	29.53	1,000	750.1
27.17	920	690.1	27.97	947	710.3	28.76	974	730.6	29.56	1,001	750.8
27.20	921	690.8	28.00	948	711.1	28.79	975	731.3	29.59	1,002	751.6
27.23	922	691.6	28.03	949	711.8	28.82	976	732.1	29.62	1,003	752.3
27.26	923	692.3	28.05	950	712.6	28.85	977	732.8	29.65	1,004	753.1
27.29	924	693.1	28.08	951	713.3	28.88	978	733.6	29.68	1,005	753.8
27.32	925	693.8	28.11	952	714.1	28.91	979	734.3	29.71	1,006	754.6
27.35	926	694.6	28.14	953	714.8	28.94	980	735.1	29.74	1,007	755.3
27.38	927	695.3	28.17	954	715.6	28.97	981	735.8	29.77	1,008	756.1
27.41	928	696.1	28.20	955	716.3	29.00	982	736.6	29.80	1,009	756.8
27.44	929	696.8	28.23	956	717.1	29.03	983	737.3	29.83	1,010	757.6
27.46	930	697.6	28.26	957	717.8	29.06	984	738.1	29.86	1,011	758.3
27.49	931	698.3	28.29	958	718.6	29.09	985	738.8	29.89	1,012	759.1
27.52	932	699.1	28.32	959	719.3	29.12	986	739.6	29.92	1,013	759.8
27.55	933	699.8	28.35	960	720.1	29.15	987	740.3	29.94	1,014	760.6
27.58	934	700.6	28.38	961	720.8	29.18	988	741.1	29.97	1,015	761.3
27.61	935	701.3	28.41	962	721.6	29.21	989	741.8	30.00	1,016	762.1
27.64	936	702.1	28.44	963	722.3	29.24	990	742.6	30.03	1,017	762.8
27.67	937	702.8	28.47	964	723.1	29.26	991	743.3	30.06	1,018	763.6
27.70	938	703.6	28.50	965	723.8	29.29	992	744.1	30.09	1,019	764.3
27.73	939	704.3	28.53	966	724.6	29.32	993	744.8	30.12	1,020	765.1
27.76	940	705.1	28.56	967	725.3	29.35	994	745.6	30.15	1,021	765.8
27.79	941	705.8	28.59	968	726.1	29.38	995	746.3	30.18	1,022	766.6

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