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GEOGRAPHY.

REFERENCE COPY.
Fig. I.: The BLACK FOREST & its MARGINAL REGIONS.
I.

Abstract of Thesis submitted for the Ph.D. Examination in Geography
by Alice F.A. Mutton, M.A.,
April, 1937.

SOME ASPECTS OF THE EVOLUTION AND DISTRIBUTION OF SETTLEMENTS AND INDUSTRIES IN THE BLACK FOREST REGION, CONSIDERED IN RELATION TO THE GEOGRAPHICAL SETTING.

Thesis submitted for the Ph.D. Degree in Geography (Internal),
by Alice F.A. Mutton, M.A.,
May, 1937.

Vol. I.
Abstract of Thesis submitted for the Ph.D. Examination in Geography,

by Alice F.A. Mutton, M.A.,

April, 1937.

Some Aspects of the Evolution and Distribution of Settlements and Industries in the Black Forest, considered in Relation to the Geographical Setting.

Chapters I-III. A review of the Regional Geography of the Black Forest, comprising (a) an analysis of the relief, morphology, and drainage, considered in the light of recent research; (b) an outline of the climate and leading features of the soils represented; (c) a survey of plant life and land utilisation, based on maps constructed from 'Gemeinde' data, and on field studies.

Chapters IV-V deal with the evolution of settlement, considered in the various phases: Pre-historic, Roman, Allemannish, early Mediaeval, and late Mediaeval; and the initial growth of industries, based on the exploitation of the forest resources, is noted.

Chapter VI outlines the present distribution and forms of rural settlement, by reference to specific examples.

Chapter VII treats the urban settlements in a similar way, paying special attention to the manufacturing centres of the Forest proper, and to the marginal towns of historic and modern significance.

Chapter VIII surveys the distribution and evolution of factory industries in the Black Forest region, and discusses the various localising factors, where possible.

Chapter IX summarizes population trends, during the last 120
years, noting areas of rural depopulation, static population, and areas of increasing density. Finally, a short study of the history of migration and emigration is made, and some of the causes are suggested.
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PREFACE.

In this thesis an attempt is made to present, especially from the evolutionary aspect, a reasoned synthesis of the distribution of settlements and industries in the Black Forest region, in the light of the natural setting. There is no literature in English on the region, and the general paucity of material, either compiled by English or American writers, or in the form of translations, dealing with the Geography of modern Germany, is very striking. It is felt, therefore, that a detailed account of a major region of S.W. Germany, such as is presented here, written from an objective and English point of view, must contribute very definitely to both our knowledge and our understanding of the problems of this one particular area.

The standard references on S.W. Germany are Dr. R. Gradmann's Süddeutschland, I and II, 1931; Dr. N. Krebs' Landeskunde von Deutschland, III, der Süden, 1931; E. de Martonne: Europe Centrale, I, Allemagne, etc., 1930. These works give excellent short accounts of the Black Forest, but the writer is unaware of a single full description, combining the morphological and the 'human' aspects. L. Neumann's Schwarzwald, which appeared as one of the Land und Leute Monographien zur Erdkunde, in 1902, is still the chief reference. Although of interest because of its 'early' date, the method employed in this monograph is that of topographic description rather than analysis, &., as such,
although it provides useful material, it is hardly in line with modern geographical thought. Important papers, especially on problems of morphology, settlement, etc., have appeared from time to time by such writers as Braun, Metz, Penck, Schmitthenner, Schrepfer, and others, and they will be found listed in the bibliography. Since the scheme of work was drawn up as a plan for this thesis, a monograph has appeared on a comparable region, that of the Spessart, published in 1934, by Dr. Siebert. The rather parallel treatment of the two regions is noteworthy, especially as the two writers worked independently.

The thesis presented is, therefore, the outcome of a study of such literature as exists on the region, of field work carried out during the past three years, when the greater part of the Black Forest has been explored in detail, and also of an analysis by the author of the cartographic and statistical material which was generously placed at her disposal by the Director of the Geographisches Institut, Freiburg in Breisgau. It is a pleasure to acknowledge here the kindness and courtesy not only of the Staff of this Institute, but also of the various farmers and factory directors who opened their doors to an impromptu visitor.

A preliminary survey of the South-Central Black Forest was carried out during the visit of a Le Play Society group in August, 1934, and a member of that group has kindly allowed me to use some of her photographs as illustrations.
I am indebted to Miss A.E. Adams, B.A., who accompanied me on my visits in August, 1935 and August, 1936, and who not only assisted in the field, but also helped to prepare the map showing the distribution of cattle (Fig. 10), and the settlement plans (Figs. 17 and 18). Several friends in Freiburg, who, by their prolonged knowledge of the district, were able to elucidate many points of interest, especially on various excursions, thereby helped to fill in the details of a regional picture, especially memorable for its harmony of landscape and peasant life.
Fig. 2.

THE BLACK FOREST:

RELIEF.

Meters.
1000
900-1000
6-800
4-600
3-400
2-300
-200
CHAPTER I. : THE REGIONAL GEOGRAPHY OF THE BLACK FOREST:
(a) RELIEF, MORPHOLOGY, and DRAINAGE.

The Black Forest is a highly dissected, triangular shaped, Variscan plateau, lying mainly in Germany's S.W. frontier state of Baden. It extends N.N.E-S.S.W. for about a hundred miles, attaining its maximum width of 40 miles in the South and South-Centre, and tapering towards the N.N.E. It is sharply delimited on the West by the line of foothills marking the edge of the Upper Rhine basin. The marginal regions (Cf. Fig. I.), between highland and lowland are designated by the Allemannish term 'Gau'. They include the districts of Ortenau, between the Forest and the Rhine North of the Elz valley, and the Breisgau, between the Markgräfler Hills and the Rhine to the South of the Elz as far as the Swiss frontier at Basle. Between Basle and Waldshut, the steep Southern slopes of the Schwarzwald approach close to the river, and here lies the district of the Albgau, between the Dinkelberg Plateau to the West and the Klettgau, East of the Wutach valley. To the North, the forested hill country slopes gradually down to the depression of the Ufgau, which corresponds to the Pforzheim or Maulbronn Gate.

To the East, the limit of the Black Forest is not so easy to define topographically, for the long, gentle slope to the Danube and Neckar basins merges gradually into the Baar plateau and Alb Foreland of Württemberg. To the N.E., the Unteresgau, Nagoldgau, Oberesgau, and Enzgau form transitional regions in the valleys of the Enz and Nagold, converging on
Plate 1: The rounded summit of the Feldberg (1495 m.); glaciated topography, developed on gneissic rocks.

Plate 2: The Feldsee, 1000ft. below the Feldberg; a corrie lake, partly enclosed by steep, wooded slopes; strongly dissected & glaciated topography of Feldberg massif.

Plate 3: Titisee, looking N.E.; a moraine dammed 'finger' lake, E. of the Feldberg, 4 miles below the Feldsee, & in the upper valley of the Gutach.
the Pforzheim Gate. The limit of the Schwarzwalde to the East is structural rather than topographic, the transition from the Bunter sandstone country of the Eastern and North-Eastern slope to the Muschelkalk plateau being reflected in rock and soil contrasts, breaks in stream "talwegs" along a line of differential erosion, and also in land utilisation, the thick fir forests on the Bunter sandstone giving way sharply to open or lightly wooded, pastoral and arable country developed on the Muschelkalk. This Eastern region carries the state divide between Baden and Württemberg. It is a sinuous boundary, following no special physical feature, but, although the greater part of the Schwarzwalde lies in Baden, parts of it, in the N.E., e.g. in the Upper Murg valley, where the boundary forms re-entrants, lie in Württemberg. This region is, incidentally, a thickly forested zone and almost devoid of settlement.

**RELIEF AND MORPHOLOGY.**

The Black Forest forms an asymmetrical crustal block, attaining its maximum altitudes in the South-Centre (in the Feldberg, 1493m., the Belchen, 1414m., and the Schauinsland, 1283m.), where gneissic rocks form the core of residual massifs extending from the Rench valley in the North to the Feldberg. Similarly, basement rocks form minor hill masses to the South, e.g. around Todtmoos and Säckingen (in the Wehra valley), and they also underlie the culminating height of the Northern Black Forest, the Hornisgrinde (1164m.). Disposed around
Plate 4: Head of the Glottertal, near the Kandel, showing "inverted" relief, i.e., a youthful valley profile in contrast with the mature form of the plateau.

(Photo, M.D. Edmond).
this central core of pre-Cambrian rocks are intruded granites. They occur to the S.W. of the Feldberg from the Blauen across the Wiese valley, in the upper valleys of the Alb and Schlucht, together with its tributary the Schwarza, draining from the Schluchsee. The gorge of the Gutach, North of Triberg, in the Central Black Forest, is cut into granitic rocks, and they also appear in the North, in the "Rand" massif N. and S. of the Hornisgrinde, and in the middle Murg valley. To the N.E., the Enz has also cut down through the overlying Bunter sandstone to reveal the underlying granite. The folding of these rocks during Primary times is reflected in the pronounced Variscan trend of the block (S.S.W.-N.N.E.). An equally important feature is the base levelling of the uplifted and folded rocks which took place in Permo-Carboniferous times. The existence of this peneplaned surface, which was subsequently uplifted to form a "Rumpfläche" now vigorously attacked by stream erosion, is to be seen in the various bevelled surfaces which are a special feature of the South-Central and Southern Black Forest, where they are to be found at levels ranging from 1800 to 2400 ft. (See Plate 20. & 28.). The variety of land forms and the broadly swelling outlines of the South and Centre contrast strikingly with the monotony of the Northern and Eastern sandstone plateaux, which assume a tabular form, deeply cut by steep-sided, narrow valleys (Cf. Plates 4., 8., 9., 11., and 22.).

Carboniferous rocks (Culm measures), unimportant topographically, form a narrow belt, extending from East to West, and narrowing Westwards from the Menzenschwander valley.
Geology of the Black Forest Region

Key:
- Alluvium
- Diluvium
- Miocene
- Oligocene
- Malm
- Dogger
- Lias
- Keuper
- Muschelkalk
- Bunter Sandstone
- Permian
- Carboniferous
- Gneiss
- Granite
- Porphyry
- Basalt
- Faults

0 5 10 Km
They lie wedged between the gneisses and granites, S.W. of the Feldberg. Permian sandstones are found overlying the basement rocks unconformably on either side of the lower Murg valley, and they also extend from Kandern to Zell in the Wiese valley, in the S.W. Contemporary with these rocks are the porphyry extrusions which form isolated, pyramidal-shaped hills behind Baden-Baden (Badener Höhe 1002m., etc.), between Offenburg and Oppenau, and again in the vicinity of Triberg, and in the Blauen, an eminence which margins the Rhine plain behind Badenweiler.

The Triassic sandstones (Bunter), which cover an area approximately equal to the gneissic rocks, give rise to sharp contrasts in land forms, extent of forest cover, density of settlement, etc. The retreating edge of the sandstone covering has been least worn back in the North-East, where the Bunter formation covers a tract as much as 20 miles wide. Along the valleys of the Murg and Enz, the streams have cut so deeply as to reveal the granitic and gneissic rocks beneath. This belt of Bunter sandstone is a continuous feature of the Eastern Black Forest from Pforzheim S. to Bonndorf, but S. of Freudenstadt and the upper Kinzig valley it contracts to a width of often only 5 miles. Patches of Bunter sandstone have been preserved in the South, e.g. on either side of the Steinach valley, in the Hotzenwald, W. of Schopfheim, N. of the Wiese valley. On the Western margin of the Black Forest, between Emmendingen and Offenburg, the Bunter covering has been preserved in a long, narrow horst, culminating in the Hüner-
siedel (746m.). In the Central and Southern Black Forest, as the result of subsequent uplift and erosion by vigorous stream action, the sandstone covering has almost entirely disappeared.

Around the edge of the Black Forest, the occurrence of Triassic Muschelkalk (shelly limestone) is an important feature. It is preserved, as the result of the downfaulting of the Upper Rhine valley, in the form of narrow and discontinuous platforms along the Western edge of the Forest, and it underlies the Markgräfler hills of the Breisgau, and the Dinkelberg plateau in the S.W., together with the Kraichgau depression to the North. The significance of the continuous band of Muschelkalk underlying the Baar plateau and the Alb Foreland to the East of the Forest has already been noted.

The Jurassic rocks (Lias, Dogger, and Malm) give rise to features of minor interest. They cover the lower slopes of the Markgräfler Hills, the heights S.W. and W. of Freiburg, notably the Tuniberg horst and the core of the Kaiserstuhl. The Klettgau and the Randen districts, between the Baar and Lake Constance, are also developed on Jurassic rocks.

The history of the region during Tertiary times is well known and may be summed up as follows: the progressive uplift, tilting, and collapse of the Vosges-Black Forest arch were a consequence of Alpine stresses from the South. As a result, the 20 mile wide rift of the Upper Rhine Basin emerged during Oligocene times, bounded by step faults, trending S.S.W.-N.N.E., and accounting for the terraced ascent of the Schwarzwald, from the Rhine plain, via the foothills, to the dissected scarp edge, in marked contrast with the gentle slope to the East (part of
Plate 5. The Günterstal S.W. of Freiburg, showing trough form & drift filling. N.B. Contrast between forested slopes and meadow on the valley floor.

Plate 6. Obermünsterstal and the Rhine plain f om the Belchen, showing valley due to faulting and subsequent stream erosion.

Plate 7. The Höllental, or upper Dreisam valley, deeply incised into the basement rocks of the Feldberg massif as the result of post-glacial rejuvenation.
the tilted Miocene peneplane surface), feebly attacked by stream action. Other minor features, dating from mid-Tertiary times, include the further breaking of the margin of the Rift, through the formation of lowland "bays", such as the Freiburger Bucht and the Staufener Bucht, and the emergence of the Bunter sandstone horst between the lower valley of the Elz and the Kinzig. The Black Forest block was further shattered by a number of faults, especially in the S.W. in the Dinkelberg Plateau and in the Markgräfler Hills. (See Fig. 3.)

The predominant trend is N.N.E.-S.S.W. (margining the Rhine Rift), and elsewhere N.W.-S.E., e.g. in the Bonndürfer and Freudenstadt rifts. Another fracture line runs diagonally through the central Black Forest, from N.E. to S.W. and serves to explain the course of the middle Elz where the stream has cut back along a line of structural weakness. The flat-floored, steep-sided valleys which open W. or S.W. on to the Rhine valley, such as the Günter, Münster, and lower Wiese valleys, appear to owe their form to tectonic movements, the trough having been subsequently filled in by drift. (See Plates 5, 6, and 44.) A spectacular feature of the Tertiary period was the emergence of the Kaiserstuhl, a volcanic mass N.W. of Freiburg. Here rocks ranging from Limburgite to Tertiary sands and clays are exposed. (The line of volcanic plugs which characterize the Hegau, between the Baar and Lake Constance, dates from the same period.)

Plate 8: The E. slope of the Black Forest, from the Stöcklewald tower (3000'), between Furtwangen & St. Georgen. Thick fir forests on the plateau top contrast with land cleared for strip arable cultivation & pasture on the gently sloping valley sides. The accordance of summit levels corresponding to the uplifted & dissected Miocene peneplane is apparent. (Author's Photo).

Plate 9: The E. slope of the Black Forest; a view also taken from the Stöcklewald tower. It illustrates similar features to Plate 8, & makes evident the high percentage of land under forest on the gneissic & granitic plateau of the E.C. forest (60%), increasing to 80% on the Bunter sandstone to the East. (Author's Photo).
In recent times, the Tertiary sediments of the Upper Rhine Basin have been covered with an accumulation of fluvioglacial gravels and finer alluvium, into which the Rhine cut a devious channel prior to its 'regulation' and straightening which was completed up to Basle as recently as 1905 (Gradmann, *Mitteldeutschland*, Vol. 2., p. 28). The Pleistocene period was also accompanied by the deposition of loess, both on the margins of the plain, capping the terraces and lowest foothills, and lapping round the edge of the Kaiserstuhl, to such an extent that the bare volcanic rock appears only over a very limited area.

At the same time, the Feldberg in the South and the Hornisgrinde in the North were centres of closed ice caps. From these foci, ice streamed down adjacent valleys, down to 800m. at its maximum extent (approximately to the edge of the Baar plateau), and then shrinking to 860m. (*Cf.* the Titisee end moraines), and finally to 1100m. (*Feldsee cirque*). Other moraines, marking stages in the retreat of the ice, occur in the Dreisam valley at Kirchzarten; in the Gutach valley at Neustadt as well as at Titisee; in the Schwarza valley below the Schluchsee, and also in the Menzenschwandertal. To the North, the ice spilled over the Kandel massif down the Northern slope into the Wildgutach valley towards the Elz, while in the S.E. the maximum extent of the ice is marked by Wutach, to the South by the Upper Rhine, while the valleys

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Plate I: W. fault scarp edge of Black Forest, between Schliffkopf & Vogelskopf, near the Hornisgrinde. Fir & spruce forest & scrub are developed on light sandy soils weathered from Bunter sandstones. (Author's Photo).

Plate II: Upper Acher valley, near Rühstein, S. of the Hornisgrinde massif, showing forest covered valley deeply incised into Bunter sandstone rocks. (Author's Photo).
of the Schwarza, Alb, and Menzenschwand, together with the Wehra and upper Wiese, all show glacial features. The full, rounded slopes of the Feldberg massif were especially gouged out on the Eastern side, where the snow and ice stayed longest, and here the ice which plucked the Eastern slope above the 'Kare' or corrie lake of the Feldsee (maximum depth 33m.), 1000 ft. below the summit, also moved down the Bärenental to Titisee (maximum depth 39m.), whence one tongue spread N.E. along the Gutach valley to Neustadt, and another N.W. towards Hinterzarten and the Höllental. Around the Feldberg massif, morainic mounds form minor water partings, e.g. dividing the Gutach drainage from the Schluchsee (the apparent rock basin lake of Windgfäll Weiher occurs on the divide), and the upper Dreisam (Höllental) from the Gutach. (Here also post-glacial diversion seems to have taken place, resulting in the increased eroding power of the Dreisam). In the neighbourhood of the Hornisgrinde, a number of circular lakes, resembling 'Kare' occur, but these are not so well known as e.g. the Feldsee, since they are imbedded in the Bunter sandstone country and are nearly completely surrounded by forest. Moreover, some of them appear to lie below the maximum extent of the ice and cannot therefore be true corrie lakes, e.g. the Huzenbacher See at 747m. (Quoted by Gradmann, ibid., p.61). The Mummelsee, at the Southern foot of the Hornisgrinde, is the most frequented of these small Northern lakes, and its maximum depth is 17m. Other examples also occur South of Kniebis, e.g. the Glaswaldsee and the Wildsee (depth at 12m.) both below Seekopf, the Schurm See, at the head of the
East flowing tributaries of the Murg, again on that slope to the leeward of mild Westerly influence, and where the snow lies longest.

**DRAINAGE.**

The hydrographic pattern of the highly dissected "plateau" of the Black Forest is intricate, in sympathy with the complexity of the underlying rock structure and the morphological evolution of the region. There is, in the first instance, a striking difference in the thinness of the stream network developed on the pervious, less resistant Bunter sandstone rocks of the North and East compared with the highly developed surface drainage evolved on the impervious granites and gneisses of the South and Centre. Valleys cut into the sandstone are usually deep, narrow and flat-floored; those cut into the basement rocks are shallow, except where rejuvenation has occurred, but owing to the polycyclic character of the drainage, these gentle, convex slopes are only apparent in the regions of highest altitude, and 'inverted' longitudinal profiles are common, e.g. around the Feldberg (Cf. Plate 4.). A third regional contrast is between the generally steep, rejuvenated, rugged and abrupt valleys, opening on to the Rhine plain (the flat-floored Himmelreich, the lower Münstertal and Wiese valleys have previously been noticed as exceptions). On the other hand, those draining Eastwards towards the upper Danube basin are narrow, flat-floored valleys, deeply sunk into the sandstone, but of gentle gradient. These valleys are usually devoid of
terraces, except where the stream has cut through the sandstone to a resistant band of conglomerate, or as in the case of the Murg and Enz valleys to the underlying basement rocks. The Gutach valley below the falls at Triberg has also cut down to granitic rocks, the gentle gradient of the upper valley contrasting with the rejuvenated character of the lower valley and the main stream, the Kinzig. Below Triberg, the stream flows through a narrow, steep-sided gorge as far as Hornberg (See Plates 39 and 40).

The present drainage of the Black Forest evolved as the result of the Miocene uplift of the Vosges-Schwarzwald block. Consequent streams developed, such as the Brege and Brigach, headstreams of the Danube, the Wutach, tributary to the Upper Rhine, the Wiese, flowing to the S.W., and the several right bank tributaries of the Rhine in its rift valley section. The maximum uplift of the block in the South, nearest to the region of greatest stress, and its tilting towards the N.N.E., resulted in the Feldberg becoming the focus of a radial system of streams, all flowing to the Rhine, either to the South or West. At the same time, the progressive deepening of the whole of the Rhine valley as the river drained North, instead of rising, as hitherto, possibly a little North of the present Kaiserstuhl, resulted in the increased erosive power of tributary streams, so that vast loads of sediment came to be deposited, not only by the mainstream, but also by tributaries in their lower courses, where breaks of slope occur between the steep mountain section and the edge of the plain. (Some examples of stream gradients are: the Wiese and the Acher; 1 in 25; the Dreisam 1 in 24; and the
II.

Wutach and Murg, I in 100°. The degree to which these valleys have been cut into the highland and have been partially filled in with drift, the coarser material being deposited at the base of the steep slopes and the finer alluvium bordering the stream, may be judged by the illustration of the Günterstal (Plate 5).

An additional factor in explaining the greater erosive power of the tributaries of the Rhine compared with the Danubian headstreams, and hence the asymmetrical water parting, which zig-zags diagonally across the Forest, sometimes to the East of the highest summits, is the unequal precipitation on the Western and Eastern slopes. (See under Climate in Chap. 2.)

The heavy annual rainfall on the Westward and windward slopes (from 1600 to 2000 mms. per annum) contrasts with that on the leeward slopes (only 1000 to 1200 mms. annually.) This marked difference has so increased headstream erosion that the area tributary to the Danube drainage has shrunk to the Brege and Brigach streams, and an outstanding example of capture is provided by the I. Wutach, with its two marked 'elbow' bends. It has already been pointed out that the upper Dreisam appears to have sapped the waters of the upper Gutach, so that the Höllental gorge presents some of the most fantastic scenery in the Black Forest, and is strewn with erratic blocks and morainic material.

Penck recognizes a series of "Piedmonttreppe" especially on the S.E. slope of the Black Forest. The rounded


Longitudinal Profile of the Dreisam Valley from Zarten to Freiburg.

Longitudinal Profiles of Tributaries of the Dreisam - the Esch, Ibbn, Höllenbach, Zastlerbach, and Günther.

Vertical Exaggeration: 2.5 x H.E.
summits of the Feldberg (1493m.), the Belchen (1414m.), and the Kandel (1345m.), form 'Inselberge', where the slopes are markedly convex. The most noticeable change in stream profiles appears to take place, however, below the Permo-Carboniferous erosion surfaces which occur as facets at various levels, but are especially conspicuous in the neighbourhood of St. Peter at 720-760m., and at St. Märgen, at 840-900m, and also in the Gutach valley, between 950 and 1000m. Below these bevelled surfaces (illustrated in Plates 4, 20 and 28), nick points ('Gefällsknicke') occur, sometimes marked by falls, as at Todtnauberg, and below these points streams plunge swiftly down a concave slope to heights only a few metres above the level of the Rhine Plain. The Esch, Íbental, and Wagensteig valleys converging on the flat-floored Himmelreich, above Kirchzarten, from the neighbourhood of St. Peter and St. Märgen, are good examples. (See longitudinal profile diagrams). To the North, the Pliocene surface of the Rand massif bordering the Rhine Plain (Plate 10) is being rigorously attacked, but, on the other hand, this erosion surface is much more preserved on the long, gentle Eastern slope to the Danube, developed on both crystalline and sandstone rocks and lying between 800 and 770m. (Cf. Plates 8 and 9). 1.

Within the region of the Black Forest, there is a range of climate, as Gradmann expresses it, from one suitable for the cultivation of the vine to that supporting only meagre sub-alpine scrub and moorland above the tree line. Yet the whole region is characterised by its openness to oceanic influences, especially via the Belfort and Saverne gates, implying the predominance of mild, humid air from the S.W. and W., much cloudiness, especially in the summer, considerable winter snowfall and heavy valley mists, together with high yearly total precipitation. The trend of the Black Forest block, from N.N.E.-S.S.W., at right angles to the prevailing winds, is a major factor in determining the climate of the region.

**TEMPERATURE.** The Black Forest resembles all the forested highlands of Central Europe in that it experiences a 'mountain' type of climate, in which local factors, such as altitude, exposure, slope etc., are as important in determining minor variations as location with reference to distance from Atlantic influence and exposure to 'continental' conditions. The annual temperature range, in the case of several recording stations examined, is actually less than on the Rhine Plain; Kniebis (904m.) averages a yearly range of 16.5°C., Höchenschwand (1005m.) 16.6°C, and Todtnauberg (1023m.) 16.4°C.
On the other hand, stations on the Rhine Plain record yearly ranges of over 20°C. A low yearly range of temperature, cold winters, a cool spring, and mild summer, followed by an autumn warmer than spring, together with considerable daily ranges of temperature, are characteristic of the Black Forest. In winter, the warmest stations occur on the W. or S.W. slopes, while on N.E. or E. aspects, exposed to cold continental winds, much lower temperatures occur, similar to those on the Baar plateau, which is sheltered from the Westerlies by the Black Forest and fully open to keen winds from the plains to the East. There is also a considerable contrast between the temperatures of exposed stations and those lying in wind-sheltered valleys of gentle slope, where cold air is liable to collect, and where severe frosts are experienced. This winter inversion of temperature, during periods of anticyclonic calm, is a common feature in highland districts, and it may be correlated with the location of farm houses with their surrounding gardens and fruit trees on middle slopes (Cf. Plates 22 and 27). Schrepfer compares the figures for Höchenschwand (1005m.) and St. Blasien (780m.). With a difference in altitude of about 680 ft., their maximum and minimum, and consequently their yearly range of temperature are almost identical; Höchenschwand occupying an open site and St. Blasien lying in a deep cut valley sheltered from the wind, and the two sites only 4km. apart.

<table>
<thead>
<tr>
<th></th>
<th>Jan.</th>
<th>July</th>
<th>Yearly Average</th>
<th>Yearly Range</th>
</tr>
</thead>
<tbody>
<tr>
<td>Höchenschwand</td>
<td>2.6°C</td>
<td>14.0°C</td>
<td>5.8°C</td>
<td>16.6°C</td>
</tr>
<tr>
<td>St. Blasien</td>
<td>2.3°C</td>
<td>14.4°C</td>
<td>6.0°C</td>
<td>16.7°C</td>
</tr>
</tbody>
</table>
The climate of the Black Forest falls within a transitional zone between the Rhine plain, with its mild, 'oceanic' type of winter and hot 'continental' summer, and the Danubian and Neckar basins, with their 'continental' extremes of temperature. Within the Black Forest, temperatures decrease with altitude, at an average rate of $48^\circ C$ for every 100 metres (Hellmann). This feature is illustrated by the contrast between the vineyards of the Münster valley around Staufen at 280m., and the sub-alpine found nearby at 1414m. Schrepfer quotes the following figures, based on W. Peppler, as some of the average seasonal temperatures of places in the Southern Black Forest:

<table>
<thead>
<tr>
<th>Alt.</th>
<th>Winter</th>
<th>Spring</th>
<th>Summer</th>
<th>Autumn</th>
<th>Yrly. Aver.</th>
<th>Range</th>
</tr>
</thead>
<tbody>
<tr>
<td>1400m.</td>
<td>-3.2°C</td>
<td>2.3</td>
<td>10.7</td>
<td>4.5</td>
<td>3.5</td>
<td>13.9</td>
</tr>
<tr>
<td>1000m.</td>
<td>-1.4</td>
<td>5.0</td>
<td>13.4</td>
<td>6.4</td>
<td>5.8</td>
<td>14.8</td>
</tr>
<tr>
<td>800m.</td>
<td>0.6</td>
<td>6.3</td>
<td>14.7</td>
<td>7.4</td>
<td>7.0</td>
<td>15.3</td>
</tr>
<tr>
<td>400m.</td>
<td>1.7</td>
<td>9.1</td>
<td>17.4</td>
<td>9.3</td>
<td>9.3</td>
<td>15.7</td>
</tr>
</tbody>
</table>

Considering the altitude of some of the stations, the winter temperatures appear mild, although there is abundant snowfall. Over a thirty year period, Freudenstadt (738m.) records an absolute minimum of $-21.4^\circ C$, Höchenschwand (1005m.) $-23.2^\circ C$, and Todtnauberg (1023m.) $-22.2^\circ C$. On the other hand, temperatures on the Eastern margin are much lower, Calw, in the Nagold valley, recording $-26.2^\circ C$, while Villingen and

Donaueschingen, on the margin of the Forest and the Baar, record -32°8'0" and -32°5'0" respectively.

As in all mountain climates, the daily range of temperature is often considerable, especially in the summer, when a distinct drop in temperature after sunset is a noticeable feature, when on a cloudless day much heat is lost by radiation. Local winds are also of some significance, and the effect of the funnel-shaped valley of the Dreisam is to canalise the Höllentäler (as it is called locally), a down valley wind, with a föhn-like effect, resulting in a lowering of temperature in the summer, e.g. in the suburbs of Freiburg which extend up the Dreisam, and bringing welcome alleviation from the heat of the Rhine plain. (The Kaiserstuhl is the hottest part of Germany in July). Another feature of local climate is the fact that autumn temperatures are usually warmer than those of spring, when heat is lost through the melting of the snow. In fact the bright sunlight and mildness of the late summer and early autumn are especially favourable to the ripening of the grape, vineyards being found on the lower slopes of the Black Forest, especially in the Markgräfler Hills. Some statistics for selected stations in various localities are quoted below:

(a) Open Sites.

<table>
<thead>
<tr>
<th></th>
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<th></th>
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</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>°C</td>
</tr>
<tr>
<td>Badenweiler</td>
<td>400m.</td>
<td>-0.4</td>
<td>I7.9</td>
<td>8.9</td>
<td>I8.3</td>
</tr>
<tr>
<td>Höchenschwand</td>
<td>1005m.</td>
<td>-2.6</td>
<td>I4.3</td>
<td>5.5</td>
<td>I6.9</td>
</tr>
<tr>
<td>Todtnauberg</td>
<td>1023m.</td>
<td>-2.4</td>
<td>I4.0</td>
<td>5.6</td>
<td>I6.4</td>
</tr>
<tr>
<td>-------------------</td>
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<td>------</td>
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<td>-------------</td>
</tr>
<tr>
<td>Schömberg</td>
<td>635m.</td>
<td>-0.8</td>
<td>15.7</td>
<td>7.3</td>
<td>16.5</td>
</tr>
<tr>
<td>Freudenstadt</td>
<td>738m.</td>
<td>-1.9</td>
<td>15.5</td>
<td>6.6</td>
<td>17.4</td>
</tr>
<tr>
<td>Kniebis</td>
<td>904m.</td>
<td>-2.3</td>
<td>14.2</td>
<td>5.7</td>
<td>16.5</td>
</tr>
<tr>
<td>(b) Valley Sites</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Schopfheim</td>
<td>380m.</td>
<td>-1.3</td>
<td>17.8</td>
<td>8.5</td>
<td>19.1</td>
</tr>
<tr>
<td>Villingen</td>
<td>715m.</td>
<td>-4.0</td>
<td>15.1</td>
<td>5.6</td>
<td>19.1</td>
</tr>
<tr>
<td>St. Blasien</td>
<td>780m.</td>
<td>-3.0</td>
<td>14.5</td>
<td>5.7</td>
<td>17.5</td>
</tr>
<tr>
<td>Gegenbach</td>
<td>161m.</td>
<td>-0.4</td>
<td>18.2</td>
<td>9.1</td>
<td>18.6</td>
</tr>
<tr>
<td>Baden</td>
<td>213m.</td>
<td>0.0</td>
<td>18.0</td>
<td>9.1</td>
<td>18.0</td>
</tr>
<tr>
<td>Wildbad</td>
<td>425m.</td>
<td>-0.8</td>
<td>16.2</td>
<td>7.5</td>
<td>17.0</td>
</tr>
</tbody>
</table>

**Precipitation.** The Black Forest, owing to its high average altitude, its exposure to the prevalent S.W. winds, etc., is a region of high humidity, much cloudiness, especially in summer; bright, clear skies, and greater visibility being characteristic of the winter months. The region is, throughout, one of heavy total precipitation. This is in the form of snow in winter, but the distribution is well-divided throughout the year.

Fig. Va. AVERAGE ANNUAL PRECIPITATION.

Fig. Vb. AVERAGE DATES OF LAST KILLING FROST.

( Based on maps in the Atlas of Baden).
year, a double maximum occurring in December and July. This is the combined result of the influence of location with respect to cyclonic winds, to convectional overturning during the heat of the summer, re-inforced by the mountainous character of the region, with the result that the annual precipitation map (Cf. Fig. 5a.) is also an index to relief.

The highest total precipitation occurs on the windward slopes of the Black Forest, i.e. those facing W., S.W., or S., while there is a marked decrease on the leeward side and in the rain-shadowed valleys on the Eastern slope and in the centre of the Forest. The maximum rainfall occurs on the Hornisgrinde (2200mm. or c.88ins.) and also on the Feldberg (2000mm. or c.80ins.). In the Central region, with decrease in altitude, and the 'rain-shadow' effect of the Vosges more pronounced, the total drops to 1400mm. or less, and the Eastern slope, to the leeward of the highest summits, receives only 900mm. or less. During the winter, the snow usually lasts from 22. Sept. until 26. May on the Feldberg, and may linger until July, but at lower altitudes the duration of the snow cover varies according to several factors, such as aspect, slope, etc., and also differs considerably from year to year. The following table illustrates some of these points:

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2. Data from the Heimatatlas der Südwestmark Baden, 1934.
**Duration of Snowfall.**

<table>
<thead>
<tr>
<th></th>
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<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>4-600m.</td>
<td>25.IV. 4.III. 19.V. 14.XI. 5.X. 29.XII.139-300.</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>6-800m.</td>
<td>28.IV.17.III. 30.V. 30.X. 20.X. 5.XII.115-263.</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>1-1200m.</td>
<td>II.V. 25.IV. 18.VI. 16.X. 9.IX. 2.XII. 83.-221.</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**Frost and the Growing Season.** The Black Forest lies within the zone of winter cold, which envelops Central and Eastern Europe, i.e. the region is enclosed by the isotherm of 0°C or 32°F for more than three months of the year. It experiences, therefore, a contracted growing season, and by mid-April the temperature of all but the lower slopes is still less than 45°F., so that plant life is arrested. Fig.5b illustrates the way in which the average date of the last killing frost varies over the region. The influence of altitude, exposure, shelter etc. are apparent, the spring coming earliest in the Freiburg 'bay'(22.-28.April), and latest in the highest districts (and the Baar), where frosts occur up to 20-26. May.

With the oncoming of spring and the melting of the

---

Fig. 6.

SOILS

Scale 1/M.

- Sandy & Gravelly Alluvium of Rhine Plain.
- Alluvial Loams of Black Forest Valleys.
- Clayey Loams of Rhine Plain.
- Loess & Loamy Loess.
- Marls from Triassic Rocks, Keuper etc.
- Calcareous Soils (from Muschelkalk & Basaltic Jura Limestone).
- Sandy Soils (from Bunter Sandstones).
- Siliceous Soils (from Granite, Gneisses).
winter snow, the streams rapidly increase in volume, and springs and freshets are numerous, especially where the impervious rocks occur, for in the sandstone districts much water is lost by percolation. This abundance of surface water favours the rich growth of mountain pasture and meadow grasses, one of the great assets of the Schwarzwald, in addition to the wealth of forest trees, the growth of which is favoured by the heavy precipitation.

(c) **SOILS.**

Fig. 6., which is a modified reproduction of a map in the 'Heimatatlas' of Baden (p.II.), gives the distribution of soils in the Black Forest and its marginal regions based on differences in the underlying rock or drift material from which the soil is derived. The classification also suggests the general composition of the different soil groups. It is felt that, in a region of considerable variety of rock structure, such a classification is the most satisfactory. On a climatic basis, the soils might be distinguished simply as 'steppe' soils, or dark brown earths, found on the Rhine plain, the Kaiserstuhl, and on the limestone plateaux and platforms, where covered by loess; the grey-brown earths of the timbered districts form a second group, and the grey-earths, or podsolized soils which occur in the highest parts of the Black Forest, make a third.

DISTRIBUTION of the VINE, 1925

- dot = 5 hectares
  (1 hectare = 2.47 acres)

- 5 = 10 Kms

--- Limit of the Black Forest.
From the point of view of land utilisation, the map shows striking contrasts in soil potentialities. The highly tractable soils of the Rhine plain, whether weathered from fine alluvium into a rich loam or intermingled with loess to form a loamy loess soil, provide some of the most productive crop land of the 'garden of Germany', and they are intensively cultivated; wheat, maize, tobacco, hay, and fruit being some of the most important crops. Within this region, soils vary from the sterile fluvio-glacial sands and gravels bordering the river and its backwaters, through heavy clay loams, to be found especially N. of the Kaiserstuhl, and the medium grade, loamy loess soils, to loess, a light, highly porous material. This latter soil mantles the slopes of the Kaiserstuhl (See Fig. 6. and Plates I4 & I5 ), together with the foothills marginal to the Forest, in places attaining a depth of over 20metres. It is especially to be correlated with the cultivation and distribution of the vine ( Cf. Fig.7 & Plate I5 ). Where roads have been cut deeply into the loess, as in the Kaiserstuhl, the steep walls of easily excavated material provide convenient sites for cellars, used for the storage of wine or potatoes, etc. ( Plate I5 ). Loess is absent from the valleys of the Black Forest, but tongues of rich alluvial loam, frequently with the addition of glacial drift, extend up such valleys as the Kinzig, and its tributaries, the Elz, Drei­sam, and Wiese, and also up the Brege and Brigach, headstreams of the Danube. Such terrains have provided good pasture and arable land for centuries.
Plate 12: Roads cut in loess, Kaiserstuhl. An exposure of loess appears in the left centre, & vineyards off the main road. (Photo, Miss D. Edmond)

Fig. 7b.
Bordering the Forest, and associated with the Mesozoic limestone outcrops, are found calcareous soils, sometimes intermingled with loess, especially on the Markgräfler Hills, the Tübinberg, and the Dinkelberg plateau to the S.W., as well as on the Baar plateau to the East of the Forest. These soils contain a medium amount of humus, are slightly leached, and are fairly rich in mineral salts. They provide good pasture land and arable, and are especially suitable for the cultivation of cereals, where slopes are not great, otherwise they are usually under woodland or the vine.

Within the Forest, two types of soil predominate: those weathered from the pre-Cambrian gneisses, granites, etc., and those weathered from the Bunter sandstone. Both these soils are podsolized and contain much raw humus, and, as a further result of heavy rainfall and much leaching, they are poor in lime. Of the two, the siliceous soils, derived from the crystalline rocks and the granites, are the more productive and tractable, the gneissic rocks, especially where mantled by boulder clay and glacial drift, breaking down into a clay loam which provides good pasture land and sometimes arable. On the other hand, the sandy soils appear to be the most unproductive of the forest soils, for their low mineral and humus content and their high porosity make them highly untractable. Consequently, it is in these districts, such as the Murg and Nagold valleys and the border country between Baden and Württemberg, that the forest persists uninterrupted.
for miles. In some places, e.g. on the Hornisgrinde, at Hohlohr W. of Kniebis, and elsewhere, soils containing a high proportion of acid humus occur, and here the forest degenerates into scrub and poor heath; the stunted growth of the conifers bears witness to this (Cf. Plate 10), and also the replacement of the silver fir, the characteristic tree of the Black Forest, by the spruce. In such districts, the soil is found to consist of a white, uncompacted sand, which gives rise to 'high' moor rather than forest. Attempts to reclaim such districts for pasture or much less for arable land meet with little success. Around some of the glacial lakes, such as Titisee and Schluchsee, peat has accumulated, giving rise to bogs, known locally as 'Grinden' or 'Missen'. Sphagnum moss develops naturally on such soils.
CHAPTER III: THE REGIONAL GEOGRAPHY of the BLACK FOREST, contd.

(d) PLANT LIFE and LAND UTILISATION.

From the point of view of vegetation distribution, the Black Forest and its adjacent regions may be divided into five zones. The Black Forest itself is the most thickly forested district in S. Germany, and the average percentage of the forest cover is about 50, of which 75% consists of coniferous species. On the lowest W. and S.W. facing slopes, the beech is also found and extends in places up to 3000 ft., e.g. on the Kandel, the Blauen, the Belchen, etc., although the general limit of the mixed forest is about 2100 ft. The beech flourishes where well-aerated, calcareous soils are found, and it will also grow well on siliceous soils weathered from the gneiss, where rainfall is abundant. It is frequently intermingled with the sweet chestnut, e.g. on the hills which half encircle Freiburg. In the North, on the sandy soils, the beech does not appear above 500 m.

The typical tree of the Black Forest, is, however, the silver fir (Pinus silvestris), and it spread widely over the district at the close of the glacial period. The 'Edeltanne', another species of fir, which grows to great heights and forms magnificent stands, is more limited in distribution, although it is fairly common in the Feldberg district and elsewhere in the South and Centre. (Cf. Plates 22 & 24). A few larches intermingle with the firs, but a more usual conifer is the
spruce, which is found predominantly on the light sandy soils, especially in the North (Cf. Plate 10.). The original extent of the forest cover was doubtless more considerable than now, for the trees have been cut for centuries, not only in association with the saw milling and wood working industries, and with the timber export trade, but also to provide land for pasture and crop growing. Tree felling is counteracted to a small extent by natural regeneration, but since the bulk of the forest is either owned by the State or by village communities, and seldom, if at all, by private individuals, the trees are now planted systematically to provide timber ready for cutting in approximately 30 years. The oak, which appears to have been found formerly in the North (Gradmann), has now virtually disappeared from the Forest, although, in the Middle Ages, the timber was cut, together with the fir, for use in boat-building, and for shipment down the Rhine to Holland, where the wood was broken up for firewood etc. A few isolated trees may be found on the damp clay soils of the deep cut valleys, together with the mountain ash, which commonly borders the roadsides, but its more favourable environment is to be found on the badly drained soils of the Rhine Plain and marginal Gäu. The appearance of the cork oak in the Kaiserstuhl illustrates the exceptionally mild climate of this part of the Rhine valley.

A few parts of the Black Forest rise above the tree-line, and above 4000ft. the conifers become dwarfed and stunted in appearance, until they finally give way to 'high moor' and
sub-alpine vegetation, as on the summit of the Feldberg, and the Belchen (See Plate I.). Bog plants such as sphagnum are found in patches at such heights, where raw humus has developed, a relic of glacial times, and the presence of nardus or bent grass suggests attempts at reclamation and improvement for rough pasture. Sub-alpine, xerophytic 'rock and ridge' flora have rather a limited distribution over the Black Forest, comparatively little bare rock is exposed, as in 'younger' mountainous regions, and the general colouring of the Forest is everywhere green, whether the bright green of the meadow grasses or the sombre blue-green of the firs. In places where the forest gives way to heath, on light, thin, sandy soils, for example, berry-bearing plants, such as the blueberry, raspberry, and blackberry are found.

In the valleys, long cleared of timber, meadow grasses are found, intermingled with orchids, campanulæ, and bulbous plants, of which the autumn crocus is a conspicuous example, for it gives a bright colour to the fields in August and September. Some of these meadows lie under a mantle of snow for some weeks in the winter, and in the spring they are frequently flooded. Even in the heat of summer, dew and rain showers are sufficient to maintain the freshness of the pastures, and drainage channels, cut contour-wise, serve to carry off surplus moisture. These meadows compare in richness with those of the Rhine Plain, where again the grass is liable to be covered with standing water during part of the winter.
Plate 13: The Rhine plain from the Sponeck ruin, Kaiserstuhl, showing the "canalised" channel of the Rhine in the right distance, & "dead" arms in the foreground. The thick stands of poplars & deciduous woodland on the river gravels & alluvium, & the marsh land make the terrain a barrier zone, apart from the river frontier, between Alsace & Baden.

(Photo, Miss D. Edmond).
Margining the Rhine, and its cut-offs and 'dead' arms, 'Auengärten' are found (See Plate I2.). These consist of a thick stand of deciduous trees, chiefly poplar, elm, ash, elder, and oak, etc., interspersed with water meadows. These districts, which are found in the part of the Mooswald, W. of Freiburg, which is still only partially drained, as well as by the Rhine, overlie gravel and sandy strips, and do not repay clearance for cultivation.

In contrast, the better-drained soils of the Rhine Plain, the loess and loam terrains, together with the foothill belts, have been cleared and put under cultivation since pre-historic times. Such tracts correspond to the 'Steppen-heide' of Gradmann. They are found in regions of rich soil, medium to low rainfall, but especially where there is a 'continental' yearly range of temperature. In their natural state, these 'steppe heaths' provide good grazing land, but when cultivated prove exceptionally tractable. On the steep slopes of the foothills, where originally heath prevailed, the vine now extends to about 1200ft., e.g. up the Gunterstal, the Markgräfler Hills, on the slopes of the Schlossberg, facing S. to the Dreisam, behind Freiburg, and up the Glottertal to the North.
Plate I4: Oxen drawing cart loaded with maize; the Rhine plain is also shown, & the cultivation of maize on loess soils to the left of the main road, which is bordered with fruit trees. View taken between the Tübinger & the Kaiserstuhl. (Author's Photo).
LAND UTILISATION.

Under the conditions of the physical environment which have been outlined, sharp regional contrasts in the use of the land may be anticipated, especially between the Black Forest and the Rhine Plain. The poor, thin, leached forest soils offer meagre possibilities for cultivation, compared with the generally rich loams of the plain of Baden. However, within the forest, the land has been converted from forest to pasture and arable to the uttermost limit, and wherever gradients are not excessive, but the proportion of the area under pasture hardly ever exceeds 60%, and under arable, 50%. In the flat-floored, Westward and S.W. opening valleys, such as the Dreisam and Wiese, the one accessible to Freiburg and the other to Basle-Lörrach, an extension of the type of mixed farming carried on in the Rhineland is possible. In these districts, maize, wheat, tobacco, rape, chicory, potatoes and hay are important crops, and dairying is carried on extensively, based on the richness of the natural pasture and on the availability of winter feed, as well as on the accessibility to large urban markets. Around Freiburg, especially in that part of the Mooswald which has been fully reclaimed from the marsh, more intensive agriculture is practised, in the form of market gardening and the cultivation of crops under glass. Part of the Mooswald also provides rich water meadows for dairying and cattle rearing. Another way in which the cultures of the Rhine Plain may be seen to extend into the Black Forest is the cultivation of orchard fruits on the slopes of the
Plate 15: Loess cliff, Kaiserstuhl, showing cart with copper sulphate apparatus for spraying the vines, & also entrance to cellar for storing wine, potatoes, etc.

(Photo, Miss D. Edmond).
Fig. 8.

PERCENTAGE of
AREA under FOREST

1925

- Limit
of the
Black
Forest.
hills bordering the plain, especially in the Markgräfler district, the hills around Freiburg, Rastatt and Offenburg, etc. Here cherries, plums, apples, pears and mirabelles are grown in considerable quantities, and the vine

Fig. 8, shows the density of the forest on a Gemeindëor parish basis. The distribution which it indicates must be related to a complex set of factors, biotic, as well as climatic and edaphic. It suggests that those areas, which remain under forest, which centuries of settlement and clearance elsewhere have proved negative regions. They are usually those of high precipitation, steep slopes, and permeable rocks. Neumann estimated that the extent of the forest cover varies from 60-65% on the sandstone areas, decreasing to 40-45% in the Centre and West, increasing again to 50% on the granitic outcrops, and 45% on the gneisses, but dropping to 35-25% on the Muschelkalk plateaux. Fig. 8., based on figures 25 years later than those of Neumann, bears out his inferences. The highest densities—up to 80%—occur in the North-East, where great stretches of almost uninter rupted forest extend up the Murg and Nagold valleys. Patches of high density also exist in the South-Centre, notably on the slopes of the Feldberg massif, to the East and South-East, e.g. in the Blasiwald, between the Menzenschwandertal and the Schluchsee, and on the Blaunen.

I. Neumann, L.: Der Schwarzwald, 1902, p. 35.
Fig. 9.

PERCENTAGE of AREA under MEADOW
1925

Legend:

- >50%
- 40-50
- 30-40
- 20-30
- 10-20
- <10

0 - 10 Kms

—— Limit of the Black Forest.
The Hühnersiedel sandstone horst, to the West of the Elz valley, also carries an exceptionally high percentage of forest (>50%), considering its comparatively low altitude (Hühnersiedel, 744m.) so that the porosity of the sandstone is clearly a determining factor. As has been pointed out, both the Feldberg and the Hornisgrinde rise above the tree limit, which lies at about 4000ft., but on the Southern slopes of the Feldberg, the beech as well as the silver fir are found to within a short distance of the summit. The result of centuries of cutting, in order to provide timber for a variety of purposes, including fuel, building material, raw material for such forestry industries as wood carving, the making of implements and utensils, as well as to obtain timber for export, together with the progressive clearance of much of the forest land to provide space for settlement and cultivation, has been to decrease considerably the total area under forest. A consideration of the various factors which have brought about this result, i.e. the growth of settlements and forestry industries, is postponed until a later chapter. (Cf. Chap. V.).

The two other land utilisation maps (Figs. 9 and II), together with Fig. 10, showing the distribution of cattle, complete the picture of land economy. Owing to the different factors already suggested, such as the high prevalent humidity, the preponderance of thin, leached, and often porous soils, the topographic unsuitability of much of the forest land, when cleared, for cropping, the Schwarzwald is, apart from the forests and their utilisation, a region given up to 'Graswirtschaft' or
Fig. 10

DISTRIBUTION of CATTLE 1925
- dot = 10 cattle

--- 5 to 10 Kms
--- Limit of the Black Forest
a grazing economy. In contrast with the density of the forests, that of pasture land shows a striking uniformity, most of the forest providing 10-20% pasture land. The figure is lower in regions of high altitude, e.g. on the Feldberg, the Belchen, etc., or where forests predominate on the Bunter sandstone. The highest densities occur, of course, on the margins of the forest proper, and also along both the valleys opening on to the Rhine Plain, and on to the Upper Rhine valley. Incidentally, the plain of Baden, although primarily an intensive arable farming area, is also a more important pastoral district than the Black Forest, as the cattle distribution map also shows. Clearly, when the forest is cleared, the first choice of the land is for pasture. There is an economic, as well as a physical justification for this, for apart from the increasing demands for dairy produce in the urban centres, the seasonal tourist traffic creates a further demand, especially in the noted resorts of the Forest, such as Triberg, Furtwangen, St. Georgen, St. Blasien, and others. Apart from this local demand, as far as could be ascertained by personal enquiry, owing to the lack of transport facilities, and also it would appear, from the poor quality of the herds and the absence of an efficient system of marketing the produce, very little Black Forest dairy produce finds its way into the markets of the towns on the plain. An exception to this was found in the case of farms, with modern equipment, in the vicinity of St. Peter and St. Märgen, which sent liquid milk, butter, cheese, etc., to the Freiburg market, using lorry transport. In most cases,
Fig. II.

PERCENTAGE of AREA under ARABLE

1925 —

>80 %
70-80
60-70
50-60
40-50
30-40
20-30
10-20
<10

-- Limit of the Black Forest.
an evident lack of capital, as well as remoteness from main roads, and also railways, are serious handicaps in the life of the peasant farmer (Cf. Plates 26 & 27, and ctr. with view in Plate 20). The cost of maintaining the herds is increased by the need for winter stall feeding (and even it would appear during the heat of the summer, when the cattle are only grazed in the open during the early morning and late afternoon and evening). Hay is the chief fodder crop available, although a few farms grow a small amount of clover. Other feedstuffs have to be bought. The high pastures of the Feldberg and the adjacent heights, known locally as 'Wasen', seem to be used, judging by the cattle huts on the slopes, e.g. around the Feldberg on its Northern and Southern slopes, in the Zastler, Menzenschwand, Todtnau and St. Wilhelm districts, for the summer grazing of young and store cattle, a small scale example of transhumance. The cattle sheds are used, however, for sheltering the cattle and as hay stores, and not for the making of cheese, etc. as in the Alps. A similar practice is found in the Allgäu.

The area under crops in the Black Forest is very limited, great tracts in the Feldberg and Triberg regions, and also in the North-East, recording less than 10%, slightly higher figures being reached over the remainder of the Forest, but chiefly between 10 and 20%. An interesting correlation may be made between the chief arable districts and the 2000ft.
platforms, e.g. around the villages of St. Peter and St. Mühlen.
(Cf. Plates 20 and 28). Here potatoes, rye, oats, and clover
are grown, usually on the two-field system, in alternate
years the land is laid down in grass, a system known in
various parts of South Germany as "Gartenwirtschaft" or simply
as 'Feldgraswirtschaft'. In some districts the land remains
for a longer period under grass, before being broken up for
crops, but a characteristic feature is the ubiquitous strip
system (Cf. Plates 17, 18, 20, 24, 25, & 28.). This appears
uneconomic, but over-division of land holdings is one of the
problems of the Black Forest, and the length of the strip is no
doubt the most convenient from the point of view of a day's
ploughing (Cf. the use of the term 'Morgen', signifying, like
the English 'furlong' the amount of ground which could, in
Mediaeval times, be ploughed in a day). Topography is also an
important factor to bear in mind in the location of the arable
strips, especially as a great deal of hand labour is employed,
in sowing, hoeing, weeding, harvesting etc. (Cf. Plate 19.).
Usually only local flats and bevelled surfaces, together with
the rounded shoulders of the valley sides (Plates 17 & 18), are
available for arable farming. Rye, potatoes, oats, and a little
rape and clover are the only crops. Wheat is excluded on climat-
ic, soil, and topographic grounds, and black bread is the staple
foodstuff of the Black Forest peasant. Rye, which is a much
hardier cereal, will grow on poor sandy and siliceous soils,
where the rainfall is heavy, and is found as high up as 1050m.,
e.g. around Altdorf, W. of Schluchsee. It is also found in
I. Gradmann, in his S. Deutschland (Vol. 1, p. 135), says that here
'Egarte' signifies grassland.
Plate 16: Rounded slopes & deep cut valleys of country near St. Peter. The steep gradients, high precipitation, thin soils etc. favour pasture land rather than cropping, but small fields of rye appear sweeping round the middle slope of the hill. A pond for watering stock is shown in the foreground.

(Author's Photo).

Plate 17: Similar view, but taken nearer the farmhouse, Salpeterhof. N.B. Rich meadow land, with much woodland on the lower slopes of the valley, with strips of rye, potatoes etc. on the middle slopes, & pasture on the upper slopes & plateau top. The fence of fir poles in the foreground is characteristic of the Black Forest. It can be easily dismantled when the crop it encloses is harvested.

(Author's Photo).
Northern districts, where the amount of land suited to crop growing is very small, on account of the sandy and porous nature of the soil. Here a practice known as 'Reutbergwirtschaft' is sometimes found. In regions still in the pioneering stage of settlement, woodland or scrub is cleared, cut over, and burnt, so that crops may be grown for a few years before the land again reverts to forest. A similar method is that of 'Hauberg' or 'Hackwaldwirtschaft'. By this method, the trees are cut down to stumps, crops are planted for two or three years, and then the land again reverts to scrub and eventually forest. The significance of these practices in relation to the history of settlement is dealt with in Chapter V. I.

I. See also Schmitthenner, H.:'Die Reutbergwirtschaft in Deutschland, Geog. Zeit., 1923.
Plate 18: Harvesting the hay crop on the Lindenberg, near St. Peter.
Note form of cart & "cradle" attached to scythe.
(Author's photo).

Plate 19: Black Forest cattle grazing on flat upland pasture land near St. Peter. Strip agriculture appears in the middle distance.
Deep cut valleys, wooded, & incised into the Permian peneplane, are a noteworthy feature.
(Photo, Miss D. Edmond).
CHAPTER IV.: THE EVOLUTION OF SETTLEMENT considered in the various Phases: PRE-HISTORIC, ROMAN, & ALLEMANNISH.

Caesar refers to the Black Forest as part of the 'Hercynian Mountains' of Central Europe, and as a forested highland district, the region was left hardly touched during the 'wandering of the peoples', and only became settled on a considerable scale in the later Middle Ages. To-day, the Allemannish peasant farm settlement is typical of the Black Forest, but the growth of factory industries and the tourist traffic in the last century has brought marked changes, the forest villages having often developed into small factory towns or health resorts, especially in the Centre and South-West, so that, although this is, perhaps, Germany's greatest single forested district, the population density is comparatively high (averaging between 65 and 120 to the square mile). In contrast, the Jurassic scarplands of Swabia, lying to the East, which, as open grasslands, attracted pre-historic settlement to a remarkable degree, i.e. on a scale similar to that in the Rhine valley, have now a lower average population density than the Central and Southern Black Forest (40-45 per sq. km. compared with 50-75 for the Black Forest). 1.

(a). THE PRE-HISTORIC PHASE.

In order to view the settlement of the Black Forest in

1. For a generalized population density map based on the 1919 Census, see Krebs, S.W. Deutschland, p. 66.
Map illustrating the Pre-historic Phase of Settlement in S.W. Germany, showing the absence of evidence of settlement in the Black Forest except at Tarodunum (Zarten), and the concentrations in the Rhine Plain and the Baar to the East of the Forest.

( Based on a map in the Heimatatlas der Südwestmark Baden.)
its evolutionary aspect, it is necessary to give some attention to the pre-historic phase. Therefore, although the basis of the present settlement pattern was largely fixed during the period 260-800 A.D., when the Allemanni spread over the region, the Celtic roots of settlement must also be examined. There is, moreover a certain analogy between the pre-Roman settlement of the Rhine and Upper Danube basins and Southern Britain, which makes the topic of added interest. The significance of the 'intermediate' or loamy soils in the settlement of early Britain, demonstrated by Dr. Wooldridge, is also borne out in the Upper Rhine valley and the Baar plateau, on both sides of the Schwarzwald. An abundance of Bronze Age, La Tène, and Hallstatt finds, covering the period 2000 B.C.-50 A.D. have been found on the loess terraces of the Rhine rift valley, especially in the region of the Kaiserstuhl, around Basle, and again on the marly soils weathered from the Muschelkalk around Waldshut, in the Klettgau, and the Baar. (Cf. Fig. 6 showing location of loess and loamy loess soils and Fig. 12). Gradmann distinguished such tracts, as long ago as 1906, on account of their plant cover as 'Steppenheide' (steppe-heath), and as W.G. East has pointed out recently.

on account of the natural ease of movement across these open, largely treeless terrains, their adaptability to primitive methods of agriculture, they attracted the bulk of pre-historic settlement. It is noticeable that, in the Upper Rhine valley, the marshy or wooded strips, such as the Hanauer land, the Mooswald, etc., were left untouched. At the close of the Iron Age, as in Britain, so in Germany an 'uphill' shift in population distribution is traceable, and there is some evidence of the initial penetration of the Black Forest along the river valley lines. The Celts (Brisgavi) not only fortified Breisach (Brisiacum) commanding a Rhine crossing place, but they also built an encampment at Käerleizarten (Tarodunum), on a morainic mound, 5 miles up the Himmelreich behind Freiburg, where the Rot and Wagensteig streams converge on the Dreisam. A few pre-Roman finds have come from the Kinzig and Rench valleys, and Baden appears to have been fortified by the Celts, (Cf. Fig. 12), but otherwise settlement seems to have been limited to the Rhine plain and its margins (as at Herbolzheim, Krozingen, Wyhlen, etc.), and also to the Baar and Klettgau (where Altenburg and Riedbühlingen were encampments). It seems that some of the names of physical features are Celtic in origin, such as those of the rivers Kinzig, Achern, Rench, etc., as also is Abnoba (Cf. the Roman name for the Black Forest-Silva Abnoba).

I. See again Schumacher, K: Kulturgeschichte der Rheinlande, von der Urzeit bis in der Mittelalter.
Fig. 13.

DISTRIBUTION of
ROMAN SETTLEMENTS
cr. in the BLACK
FOREST REGION.

- Settlements
- Fortified Sites
- Burial Grounds

Period 50-260
A.D.

Roads
--- Strategic
----- Major
....... Minor

Scale 1/4
(b). THE ROMAN PERIOD OF OCCUPATION, 50-260 A.D.

The chief significance of the Black Forest from the point of view of the Roman Empire was in relation to the Rhine-Danube frontier. As Silva Abnoba, it became incorporated within the Province of Germania Superior under Vespasian, between 73 and 74 A.D. The territory lying between the Eastern 'limes', which ran from the Main to the Danube and to the East of the Neckar, and the Rhine frontier came to be known as Agri Decumates or Zehntland, the population giving a tenth of their produce as rent. Some of these people were Romanised Celts, living on the plain, and others were Celts who had taken refuge up the valleys of the adjacent highland, while towards the end of the period of the Roman occupation, the Allemanni tribes had begun to settle within the Province. They established themselves as traders along the frontier, and began to settle in the towns, developing industries and trade on the Roman model, and also settling in the country districts, already cleared and brought under cultivation. Such is the viewpoint of Dopsch, who argues in favour of continuity of culture and friendly relationships between the Roman settlers of the Province and the incoming Germanic tribes.

However, the outstanding legacy of the Roman occupation was a series of strategic roads and military stations. Key points included Augusta Rauricorum (Augst), to the East of Basle, Arae Flaviae (Rottweil), where routes converged from the

Danube, Kinzig, and Neckar valleys. From Vindonissa (Windisch), in the Aar valley, a main road led Northwards across the Rhine via Juliomagus (Schleitheim) and Brigobanne (Hüfingen), Arae Flaviae (Rottweil) and down the Kinzig valley to Offenburg, so to the Rhine and Argentoratum (Strasbourg) on the left bank. Along this route, fortifications were erected under Hadrian (117-138 A.D.) at Hüfingen, where the road crossed the Brege tributary of the Danube, and also at Offenburg, and Breisach, which commanded another crossing point over the Rhine to the South. From Vindonissa, a second main road led Westwards to Augst and Basilia (Basle), and, describing a right-angled turn parallel to the bend of the Rhine, it then followed the foot of the Silva Abnoba via Badenweiler, Staufen, and Offenburg, to Aurelia Aquensis or Aquae (Baden Baden), and thence to the Porta Hercyniae (Pforzheim).

Fig. 13 is based on a map in the Heimatatlas der Südwestmark Baden*, and also on data from other sources (such as Schumacher). It indicates features of the Roman occupation during the period 50-260 A.D. Numerous settlements (of a semi-permanent character) are to be found in the lowland regions bordering the Black Forest, especially along the edge of the Rhine Plain, along and to the West of the main S-H-road, along its branches, around the Kaiserstuhl (where the climate in the summer months approaches nearer to that of the Mediterranean than in any other region North of the Alps). Between Augst and Constance, and also in the Baar and Klettgau,
close to the highways, are other strings of settlement. In these regions towns and villas were thickly spread, and an intensive method of agriculture was introduced, based on a two field rotation system for cereal cultivation, together with fruit and viticulture on the hill slopes. The Romans are also said to have initiated the growing of such fruits as the cherry, apricot, peach, plum, and walnut in the Rhine valley (Schumacher). The practice of horticulture was also adopted by the Germanic tribes (according to Dopsch), and the small peasant holdings contrasted with the usual 'latifundia' of the Romans, especially in the Mediterranean region.

The Forest seems to have remained untouched, except where the open, flat-floored valley of the Dreisam provided easy access to Kirchzarten, and where a string of villages paralleled the road up the Kinzig valley above Offenburg, leading to the temple of Diana Abnoba at Röthenburg. Apart from the fact that the Forest provided a hunting ground, along the margin, recreational and health resorts existed wherever mineral springs broke out, as at Baden, and at Badenweiler (accessible to Basle). Both these centres have retained their importance as spas for centuries.

(c) THE ARRIVAL and SETTLEMENT of the ALLEMANNI-
between 260 and 800 A.D.

The coming of the Allemanii tribes into S. and S.W. Germany, analogous in some respects with the Saxon settlement
Fig. 14.

- Settlements.
- Burial Grounds.

Distribution of Allemannish Settlements, etc. between 260 and 300 A.D., showing also lines of migration into S.W. Germany.

( Based on a map showing settlements and burial grounds in the Heimatatlas der Südwestmark Baden.)
of S.E. England, illustrates similar phases. Altogether, the Allemanni branch of the Germanic tribes spread from the line of the Main South as far as the Alps, East along the Foreland to the Lech valley, and West across the Rhine valley to the foot of the Vosges. They are the chief people of the Black Forest, although the Franks settled in the North almost to the line of the Acher. Both here and in the English Plain place name endings and the distribution of burial grounds provide a key to the settlement pattern. The earliest habitations (often close to streams, so as to have access to water supply, and for fishing and fowling) are indicated by such terminations as *-ing*, *-ingen*, and rather later ones by the suffix *-heim*, *-hof*, and *-hofen* (signifying a homestead), together with *-wyhl*, *-weil*; and *-weier* (denoting a hamlet). Some of these latter settlements correspond to the site of a Roman villa, as in Rottweil, Badenweiler, etc., but as in England there is seldom proof of an Allemannish or an English settlement being on the site of a Roman one, in fact often to the contrary. (Cf. Gradmann). The distribution of place name endings shows, however, the persistent attraction of the well-drained, tractable loam and loess soil belts, settled previously by the Brisgavi tribes, and also of the side valleys of the Dreisam and Wiese. Miedel has located at least 60 *weilers* near Freiburg, and it certainly appears that the Allemanni

N.B. The significance of tractable soils, water supply, & ease of movement, in relation to early settlement (endings 1 to 4), & the later penetration of the Black Forest (endings 5 to 9).
settled on the cleared and cultivated land occupied by the Romans. In contrast, the wooded and marshy areas, close to the tortuous windings of the Rhine, as in the Hanauer Land, were avoided until much later. Similarly, the thickly forested district of the Hotzenwald, lying where the gneissic and Bunter rocks approach close to the Rhine, between the limestone plateau of the Dinkelberg and the Baar, repulsed early settlement by the Allemani. In the first instance, the later '-hurst' endings, which occur N. of Offenburg bear witness to this point, and in the second, '-berg', '-bach', and '-reut' endings are common. On the other hand, in the region of the Baar, to the East of the Forest, a close network of early settlements spread on to the tractable marl soil belt extending from Donaueschingen to L.Constance, and Eastwards into the Upper Danube basin. (N.B. The abundance of '-ing' and '-ingen' endings in the Hegau, to the S.E. of the Danube and Wutach valleys.)

The Black Forest itself stands out as a region of comparatively late settlement, the marginal regions being settled by 1000 A.D., in some districts as the result of monastic foundations (a subject which is dealt with later in the next chapter). On the other hand, the more remote parts of the Forest appear not to have been settled until the later Middle Ages, i.e. between the 12th. and the 13th. centuries, when settlers arrived with a view to exploiting minerals, developing small-scale forestry industries, such as charcoal burning, glass making, etc., and the timber export trade (See Chapter V.). The natural lines of movement into the Forest were of course
along the river valleys, where there was direct access to water supply, and where rich water meadows provided pasture for stock. Settlement, therefore, advanced from the Rhine Plain up tributary valleys, such as the Murg, Rench, Kinzig, Schutter, Elz, Dreisam, Münster, and Kander valleys. (Cf. Fig. 15.) In the Wiese valley, the open meadow land proved an early attraction to settlers, and Schumacher says that the Allemanni were established here between the 4th. and the 8th. centuries. (N.B. the abundance of the earliest place name endings, viz. the 'ing' and '-ingen' group around Basle, e.g. Blauringen, Emmendingen, Haltingen, Hüfingen, Müllingen, Wittlingen, etc.). Up the Wutach valley in the S.E., a string of rather later '-heim' endings is to be found, e.g. along the Heerstrasse, leading North to Rottweil, as in Schleitheim, Bad Dürheim, etc., and there are also plenty of '-ing' endings, e.g. Stühlingen, Schwan-ingen, Mundelfingen, etc. These endings are also frequent on the Western margin of the Forest, as far North as the Schutter, as in Hertingen, Bad Krozingen, Müllheim, Vogisheim, etc., but the '-weil' ending is more common between Offenburg and Baden, as in Appenweier, Weier, Ebersweier, Ottersweier, etc. Around Pforzheim, the '-ing' endings begin to cluster again, e.g. Eutingen, Ispringen, Dietingen, Ellmendingen, etc. To some extent, these earliest settlements of the Allemanni seem to have stopped at the limit of the Roman occupation. Schumacher discusses the advance up the Danube and Wutach valleys in relation to this point, and he says that the first line of
Plate 20: Allemanish farmhouse, showing water meadows on valley floor, pasture & arable land on middle slope, & forest above.

Plate 21: Isolated farms on the Kandel. Deep cut, thickly forested valley, incised into rounded gneissic summits.

Plate 22: Allemanish peasant farmhouse, showing overhanging thatched roof, covering house, cattle stalls, & granary; wood store & cart.
advance reached as far as the edge of the Forest between Villingen and Waldshut, and thence settlement spread across to the Wutach and Steinach valleys, to the Bonndorf-Löffringen line (the limit of Roman penetration).

Within the Black Forest, the abundance of '-bach' and '-ach' endings (denoting location by the side of a mountain stream), together with '-berg' (a settlement on a hill slope), suggests the degree to which the settlement pattern may be correlated with that of the drainage, for settlement proceeded into the centre of the Forest, along the lines of least resistance offered by the deep-cut, flat-floored, steep-sided valleys, where glaciated. The spread of single, isolated homesteads, known as 'Einzelhöfe', with their steep Allemannish roofs, either of straw thatch or wooden shingles, their covered wood stacks and roof granary and hay loft (Cf. Plates 21, 22, and 23), their adjacent arable strips, water meadow, and hill pasture (Plates 24, 25, 26 and 27.), continued throughout the Middle Ages, and the Allemannish farmhouse is as typical of the Black Forest to-day as the Swiss chalet of the Alps, or the similar Tyrolean peasant house is of the Eastern Alps. The last group of settlements, if we may take place name endings as evidence, include those ending in '-ried' (a forest clearing for cultivation), as in Ried, Herrischried, Oberried, etc., '-steig' (a settlement on a steep slope), as in Steig in the Höllental, Falkensteig, Wagensteig, etc. In the highest parts of the Black Forest, such endings as '-schwand' and '-brand' are found. Schumacher gives the
derivation of 'schwand' as 'swant'>'swende' meaning a clearing, and 'brand' suggests land which has been burnt over. Such endings are found in the Feldberg region, as in the two hamlets of Hinter- and Vorder Menzenschwand, Wittenschwand, Brandenberg (near the head of the Wiese valley), Oberbrand, etc.

By the 8th. century, the division of S.W.Germany into 'Gaue' had taken place. (Cf. Fig. I and I6a.). These were in each case lowland 'pays', extending from the Rhine Plain and the Upper Rhine valley into the Forest, and as administrative units they resembled the English Hundred. They included the Ufgau or Pfinzgau, N. of the Murg, and Ortenau, Breisgau (from Brisigavia-Brisgowe-Breisgau), the Albgau, Klettgau, and Hegau, in the Upper Danube basin, together with the Baar, the Nagoldgau, and Enzgau, in the valleys of the Nagold and Enz. In 496, Clovis had fixed a divide line between the Allemanns and the Franks, S. of the line of the Murg, and this is still a dialectal boundary (Cf. Atlas of Baden, p.34). It has also been suggested that the abundance of '-heim' endings North of the Kinzig is evidence of Frankish settlement (Krebs, S.W.Deutschland.). It is noteworthy that the Forest never appears a distinct district, although by 868 it was referred to as the 'Swarzwald'. It was parcellled out between the different 'Gaue', and was the forested highland section of an artificial unit, which included a variety of types of country, such as river marshland and water meadow, wooded gravel strips, a wide belt of arable
land, on the edge of the lowland.

Schumacher refers to the Allemannish name of several physical features, in use by the 10th century. In the Feldberg region, the Feldberg itself is called the Veltperch, the Schluchsee is recognisable in the form 'Slouchse', and the Schwarza valley was then known as the Svvarzaha. As a final point concerning the early Mediaeval settlement of the Black Forest, Schumacher mentions two roads in use, partly following their Roman predecessors, and partly new routes. These were the road leading from the Upper Danube via the Brege, and linking Braunlingen, Bruggen, Hubertshofen with the 'Hochstrasse', and Wagensteig in the valley of the same name leading to the Dreisam from St. Märgen. This route skirted the Weisstannen Höhe (1190m.) to the North of the Höllental, and reached Wagensteig via Hammereisenbach and the Hohle Graben, on the divide between the Gutach, Brege, and Dreisam drainage. To-day it is only a minor road, with steep gradients. The second Allemannish road across the South-Central Black Forest, ran from Bonndorf, through Boll-Reiselfingen-Seppenhofen-Löffingen-Göschweiler-Titisee and so to the Höllental and Himmelreich, this latter section following the Roman route to Breisach on the Rhine.

The secluded Black Forest valleys provided suitable sites for the foundation of a number of monastic houses, especially those of the order of St. Benedict. The earliest of these settlements date from the 8th. and 9th. centuries, Ettenheimmünster being founded from Strasbourg in 734 A.D., and Hirsau in 830. St. Trudpert, in the Münster valley, Gegenbach, in the Kinzigtal, and Sulzbach (993), were all founded prior to the 11th. century. The Benedictine abbeys at St. Georgen, St. Märgen (1108), St. Peter (1093), St. Blasien (1084), succeeded these smaller settlements; in some cases the land attached to the monastic house was a gift from the Crown, as in the case of St. Blasien, and also St. Trudpert. In the Northern Black Forest, a number of similar foundations were also made, including the settlements at Klostereichenbach (1082), Alpirsbach (1095), Frauenalb and Herrenalb (1185-93), and Allerheiligen (1196). The hospice at Kniebis, on the main road to Strasbourg from Freudenstadt, dates from the 13th. century (See page70 and Plate 31 & Fig. 18c). Other settlements of monastic origin may be traced in place names associated with saints, such as St. Wilhelm, St. Ulrich, etc., or with such prefixes as 'Kirch', 'Zell', 'Kloster', 'Mönch', 
Plate 23: Isolated farmsteads on Eastern slope of Black Forest, at head of Eisenbach valley.
N.B.: Open pasture land with some strip agriculture & fir plantations.

(Author's Photo).

Plate 24:
Farm at head of Brigach valley (headstream of Danube).
N.B.: Fir forest on crest of ridge, strips of rye, potatoes, etc. on slope, pasture on valley floor, fruit trees around farmhouse.

(Author's Photo).
The monasteries were responsible for the clearance of much of the forest land in the vicinity of the house, and this was either brought under pasture land for cattle grazing, or under strip arable cultivation, where sufficient land of gentle gradient was available. In the Northern region the soil was generally too sterile, the slopes too steep, and the water table too deep for cultivation, and consequently the forest land has been cleared entirely for pasture and rough grazing. It is this region which is associated especially with forest clearing settlements ('Waldhufendörfer'), and their distribution has been mapped by Gradmann (S. Deutschland, II, p. 77). In the South, remarkably compact settlements have, in some instances, developed around the monastery, as in the village of St. Peter, a double 'Hof' (See Fig. 18a and Plates 28 and 29). Altogether, these monastic foundations may be designated the 'pioneer settlements' of the Black Forest, and so significant were they in the Mediaeval life of the region that a monk of St. Blasien, living in the last half of the 18th century, wrote of the Black Forest in his Historia silvae nigrae as a 'colony of St. Benedict'.

(b) Forest Settlements and Industries in the later Middle Ages.

While the fringe of the Black Forest appears to have

Gradmann defines 'Waldhufendörfer' as holdings in the forest with 50 or more 'Morgen' (land ploughable in a day).
Maps illustrating the political disunity of S.W. Germany until after 1806.
been inhabited by 1000 A.D., the interior was not permanently settled until the 12th. and 13th. centuries, or even later. Within the Forest region, the number of ' -berg', ' -steig', ' -schwand', ' -reut', and ' -brand' place name endings provides a key to the pattern of settlement in this phase. (See Fig.15). Material relating to this period is necessarily fragmentary, but, during these centuries, when the Forest was part of the Hapsburg domains, (See Fig.16) it appears to have developed a certain unity of culture, stamped by Catholicism. The influence of the Fürstenbergs in the St. Blasien region (and also the Baar) was an additional factor in stimulating settlement, and forest industries. In contrast, the Kinzig valley, where a line of farming and mining settlements extended S.E. into the Forest, was the centre of an independent 'Bauernrepublik' (peasant state).

The 13th. and 14th. centuries saw the establishment of a number of isolated mining settlements, which appear to have declined subsequently. They included centres connected with copper mining and cobalt working up the Kinzig valley (Neumann, p. 51); galena in the Badenweiler, Münster, Wiese, and Sulzburg districts (the last place being founded in 1524); while at Erzkasten, in the Schausinsland district, zinc, lead sulphide, and silver were mined. Iron ore was worked in the vicinity of Pforzheim, and in the upper Alb and Wutach valleys,

Plate 25: Isolated farm at head of Nussbach valley near Triberg.
N.B.:
Overhanging hip roof of thatch, shingles, & slate; granary & hay loft beneath roof; cattle stalls as part of building.

( Author's Photo).

Plate 26: Isolated farmhouse (Einzehof), on rounded but strongly dissected gneissic uplands near the Kandel massif(1243m.).

( Photo: Miss D. Edmon)
while smelting was carried on in the Friedrichstal and Christophstal, N.W. of Freudenstadt. One factor which seems to have brought about the decline of the small scale mining industries of the Black Forest, during and after the 16th century, apart from the exhaustion of the ores, was the general fall in the world price for precious metals, resulting from the flooding of the market with bullion and specie from Spanish America.

The process of forest clearance for settlement and the development of pastoral and some crop farming continued throughout the Middle Ages, especially between the 10th. and the 14th centuries (Gradmann). This sometimes involved merely the periodic removal of the forest and scrub in order to bring it under temporary cultivation or pasture. This practice, known as 'Reutbergwirtschaft', is reflected in such place name endings as Kollmarsreute, Rütte, Reute, etc. It involves the uprooting of forest trees and the burning of the cut-over land, the ashes being dug in to enrich the soil. For one or two years a crop is grown, such as buckwheat, oats, or potatoes, and then the land reverts once more to forest. This may come about through simply leaving the land fallow and allowing scrub and finally forest trees to invade the clearing, or, alternatively, trees may be planted. Another method of temporary clearance for cultivation is known as 'Hauberg' or 'Hackwaldwirtschaft'. This method involves cutting the trees down to stumps,

planting for two or three years, and then allowing the land to revert to scrub again. 'Brandwirtschaft' is another variant of this practice, implying the burning of the forest and scrub to provide land for crops and pasture. This practice, which sometimes meant the permanent clearance of forested land (cf. the place names ending in 'brand', e.g. Oberbränd near Neustadt, and also Brandenburg in the Wiese valley), was common in the Remich, Acher, and Kinzig valleys, opening Westwards on to the Rhine Plain.

(c) The Development of Peasant Crafts and Industries from early Modern Times until 1836.

Permanent clearance of much of the primeval forest appears to have taken place on a considerable scale in the 18th century, with the further development of forestry industries, iron smelting, charcoal burning, and glass blowing. The extraction of resin, the making of tar and pitch, the cutting of timber for shipment down the Rhine, especially to the treeless Rhine delta lands, brought new settlers. (There is a forested tract across the middle Murg valley which is still known as the Murgschifferschaftswald). Moreover, for the two previous centuries, after the decline in mining activity, settlers had developed new industries, especially those using wood as a raw material, such as the cutting of wood for vine-stocks, shingles, buckets, and wooden implements and utensils. Triberg, in the centre of the Forest, came to be noted for its fine wood carving, and also for its straw plaiting, as a basis of

Plate 27: Overshot water wheel, Esch valley. Many Black Forest valley farms, accessible to water power, provided by streams of swift gradient, make use of it for grinding corn, & sometimes for driving threshing machines etc. .

(Author's Photo).
basket weaving and hat making, while the making of wooden and metal spoons was carried out in the Feldberg district, e.g. at Löffelschniedertal near Winterzarten, and at Löffelhäuser, Todtnauberg. The making of brushes, at Todtnau and Schönau, in the Wiese valley, shingles of local pine for roofing, metal implements, such as scythes, sickles, knives, etc., and also the clock making industry were all winter occupations for the peasants, when out of door work was impossible, and they provided an additional source of remuneration, in a region where farming is not particularly favoured by physical conditions, and also where little of the farm produce could be sold outside the district.

Water power, in a region abundant in timber for raw material, seems to have been a major factor in the siting of settlements with which domestic industries have been associated. It might be used for driving saw mill machinery, for grinding corn, or oil crushing, etc. The very large number of sites where a small head of power is available from Black Forest streams, sufficient for the driving of simple machinery, serves to explain the highly dispersed character of rural industries. The most considerable falls in the Black Forest are at Triberg and Todtnauberg, but, although several industries have developed in both these centres, and are still flourishing in Triberg, water power is no longer used in the mills, although the falls are utilised in the generation of hydro-electricity which is transmitted down the Gutach valley for use in the factories. Todtnauberg (a collection of hamlets considered in Chapter VI)
although it was noted for its spoons, never appears to have made use of the falls, for they occur below the village and a mile below Löffelhäuser.

The transition from these domestic industries to factory organisations took place during the 19th century, but the process became speeded up especially during the years following the Customs Union (Zollverein) in 1836, when the market for all kinds of manufactured articles opened up throughout the whole of Germany. Soon after, the coming of the railways and improved roads revolutionized transport facilities, with the result that most of the 'typical' Black Forest peasant industries are now carried on in factories run on mass production lines.

The clock making industry is a good example of this change in organisation. Fig. 25 shows that the chief centres of the industry to-day are in St. Georgen, in the upper Brigach valley, Furtwangen, near the head of the Brege valley, Villingen to the East of the Forest, and Triberg, near the source of the Gutach. Actually, the making of clocks dates back to 1680, when the first Black Forest clock was made, using a wooden pendulum and wheels (Cf. the exhibition in the clock museum in Furtwangen), to be followed by cuckoo clocks in 1720. In the middle of the 18th century, pendulum clocks were introduced, and wooden clocks were made with metal wheels and machinery. The industry was then widely dispersed over the Hochschwarzwald, with Neustadt and Triberg
as the chief centres, while, in 1796, 500 clock makers are recorded in the Black Forest, the industry being still very largely a domestic one or else was carried out in small works, similar to the glass-blowing and straw-plaiting industry. A further impetus to the expansion of the clock industry came with the development of an export trade, not only with the rest of Europe, but also with America and the Far East. By the beginning of the 19th century, there were 1600 master workers and twice that number of assistants. It was not until after 1851, however, that the first large factories were established, beginning with the one in Lenzkirch (See Chapter VIII.).

A subsidiary industry to that of clock making was the production of bells and toys for clocks, which led to the development of the musical instrument trade. By 1784, the making of barrel organs in Waldkirch had been started, and the making of mechanical instruments spread later to Furtwangen, Vöhrnbach, Kirnach, Lenzkirch, and Triberg, but the establishments were always small. In the same way, the jewelry industry developed in Pforzheim, as an offshoot of the clock industry, which itself owed its origin to Swiss initiative. The first clocks were made in Pforzheim on Swiss models in 1767, and were followed by gold and silver watches in 1774. By 1810, 14 jewelry firms had been established, and had initiated an export trade with France, Holland, England, and America. Similarly, the stone cutting and polishing industry developed in some centres, such as Pforzheim, in association
with the clock making trades. In some districts, this industry began with garnet polishing, a domestic activity.

The metallurgical trades, which are now widely scattered through the Forest, began with the smelting of metals by means of charcoal. A certain amount of iron ore was formerly obtained in the Kinzig valley, and on the Eastern margin of the Black Forest, e.g. near Hammereisenbach and Donaueschingen, on the edge of the Baar. The smelting of the ore was made possible by the abundance of fuel for charcoal burning, but the larger scale development of the industry was handicapped by the absence of coal in Baden, and by the exhaustion of local ores. In the S.E. of the Forest, Villingen has specialized in the casting of bells since the end of the 18th. century, including the making of bronze bells for churches. Other small-scale industries of the pre-factory days include the making of metal spoons, as mentioned previously, and also metal hammering, rolling, and drawing, which has been an activity in Rastatt since 1778.

The beginning of the textile industry, in the S.W. of the Black Forest, may be traced to the 18th. century, when, with increasing pressure of population on local resources, there came a need for the establishment of new industries. The first factory for the making of 'Indian' cottons was established in Lürrach in 1753, and was followed by a cotton spinning and weaving mill in Schopfheim in 1755. Another mill was set up in Binzen, outside Lürrach in 1765, and later a cotton spinning mill.

I. See Kettel, P.: Deutsche Hausindustrie, 1936.
and calico bleaching works were established in Emmendingen. By the end of the 18th century, a cloth factory was set up in Pforzheim, which, like the one in Lahr, concentrated on woollen goods. On the whole, however, the textile trades seem to have had little foundation in the original spinning and weaving of wool or flax, the mills in Schönau, Säckingen, and Waldshut making cotton from the beginning. At the beginning of the 19th century, there were some linen mills in S.W.Germany, e.g. in Breisach, Emmendingen, Lahr, Schopfheim, Zell, and Lörrach, but, since the Black Forest is devoted to cattle and not sheep rearing - the rich, damp pastures are too valuable and not suitable for sheep, except, perhaps in the marginal limestone districts - the woollen industry has never been of much significance.

The real basis of the textile industry in S.W.Germany seems, therefore, to have been the existence of a surplus of rural labour, the availability of water power and soft water at a number of sites, and a reservoir of adaptable labour, skilled in domestic spinning and weaving and also in straw plaiting. In some districts, as an illustration of the last point, local tradition stimulated the development of a textile industry. The silk industry of Kandern, North of the Wiese valley, had long existed as a domestic institution, catering for the local costumes of the Markgräfler district, and the making of silk ribbons in the Hotzenwald had a similar foundation. In the case of the textile industries of the Wiese and upper Rhine valleys, however, proximity to the stimulus of
kindred Swiss industries, such as cotton and silk spinning and weaving, embroidery work, etc., seems to have been a major factor in the establishment and subsequent growth of the cotton and silk trades, especially in the case of Basle-Lörrach, the hub of the industry. No less than 10 firms were established by the beginning of the 19th. century, and at the time of the entry of Baden into the Zollverein, in 1836, the number had doubled, there being 16 cotton spinning and weaving mills and 4 silk mills ( Cf. Fig. 29 ).

The wood-working industries of the Black Forest date from the earliest clearing settlements, and they have always provided a supplementary source of income for the peasant farmer. Timber, in demand for fuel, building material, paper making, and for the export trade, has been cut for centuries. Since the 19th. century, 'Waldwirtschaft' or forest economy has been carried out systematically, by planting seedlings in the clearings, either in strips, circles, or wedges, so that the cutting of the trees can proceed in order as the trees attain the right height ( usually 30 metres ). Such methods have replaced former haphazard cutting according to local need. A very large number of sites occurs throughout the Black Forest for the location of saw mills, driven by water power, and the industry remains a highly scattered one, employing only a few at each establishment.

Among the first industries to develop from the saw milling trade was the making of wood pulp to supply the paper mills, although in the early days of the industry, when
paper was made by hand, rags were the chief raw material. Actually, the hand made paper industry was established as far back as the 15th century in Freiburg, as part of its early publishing and book-binding trade. The large scale development of the industry dates, however, from the early 19th century, when hand made paper mills were set up in Säckingen, Kandern, Schopfheim, Freiburg, Emmendingen, Waldkirch, around Neustadt, and at Gegenbach and Schiltach in the Kinzig valley. Machine made paper was first produced in Schopfheim in 1835, in Gegenbach in 1844, and in Emmendingen in 1847, and towards the end of the century it had practically exhausted the better quality, hand made material.

The making of brushes and brooms began in the closing years of the 18th century, using local wood as raw material and importing bristles (now mostly from North Germany, China and India, etc.). The industry was originally centred at the head of the Wiese valley, in and around Todtnau. Small factories were set up for the manufacture of the brush holders, etc., and the hair or bristles were fitted by the peasants. The first of these factories was established in 1827 in Todtnau, and others came later in Todtnauberg and Brandenberg, although the industry has now died out in these centres, and elsewhere there is no piece work done outside the factory.

See Kettel, P.: Deutsche Hausindustrie, 1936, p. 56.
Glass making is another long established local industry in the Black Forest. Glass furnaces (suggested by the occurrence of such local names as 'Glashütte') were formerly widespread, especially up the Murg valley, e.g. at Gaggenau, and in Nordrach, Herzogenweiler, Bubenbach, Aule, and Hausen in the Feldberg district, where Alt- and Neuglashütten speak for themselves. These sites, often in deep inaccessible valleys, were in proximity to local sandstone as a source of silica, potash, and fuel for the furnaces. The glass was drawn into shape by means of a blow pipe and subsequently modelled by simple tools. Water power was in some instances an asset, where the industry was not merely a domestic one. It has now disappeared from the Forest, although it is important in other forested highland districts of Germany, e.g. in Thuringia, although it is severely handicapped by competition with e.g. Czecho-Slovakian glass.

Finally, the chemical industry, the last of the major groups represented in the Schwarzwald, and which antedates the 19th century, was an activity which was scattered throughout the Forest, according to local demands. Blue dyes were made in Wolfach from local cobalt, together with white lead, used as a base in calico printing, which was also produced in Zell in the Wiese valley. Saltpeter was formerly obtained in the Hotzenwald, and an occasional farmstead named 'Salpeterhof' points to this. In the Rench valley, the extraction of resin, turpentine etc. from the pinewoods, and the making of pitch, smoke black, coal tar, etc. were other domestic occupations. A more
extensive industry, though also on a small scale, was that of salt making, e.g. around Schönau, Staufen, Freiburg, and up the Murg valley. Competition with substitutes for vegetable dyes, especially aniline products, chemical fertilisers of the Kali salts type, has killed many of these local industries, and their place has been taken by the large concerns of the upper Rhine valley, and by the potash salts obtained from the Triassic rocks underlying the drift of the Rhine valley near Staufen. (See Chapter VIII.)

The following notes on the industrial activities of the Wiese valley in the first half of the 19th century, based on information given in the 'Universal Lexikon von Grossherzogthum Baden', published in 1847, together with Fig. 29, serve to illustrate the varied industries existing in the region during a transitional phase before large scale factory enterprises were well established:

Lörrach: population, 2853; industries included calico printing, (established in 1753), silk and linen mills. The calico trade developed rapidly after the Napoleonic wars and by 1847 employed 1000 men in the Wiese valley. Other activities include a tobacco factory, wood-working, saw-milling, flour milling, and the manufacture of iron ware.

Kandern: population, 1356; industries chiefly silk and wool spinning and weaving (after 1838), paper manufacturing, and cloth making.

Grenzach: population, 810; spinning.

Steinen: population, 937; cotton spinning. employs 110; also a
hemp and oil crushing mill.

Haagen: population, 665; cotton spinning replaced saw milling, using water power, and also accessible to canal. The factory employs 300 in the making of American cotton. Industry originated from Basel.

Schopfheim: population 1699; cotton spinning industry employed 200. In addition, linen bleaching, a fulling mill, 5 flour mills and 2 saw and oil seed crushing mills, a tannery; stone grinding.

Zell: population 1207; cotton spinning employed 300; calico making, 230; also bleaching, weaving, tanning, and sail making.

Schönau: population 987; 1 cotton spinning mill, and a 'new' weaving mill financed by a firm in Basle, using water power and employing 250 workers. Also a tanning and dyeing works.

Todtnau: population 1425; 2 cotton spinning mills, 1 paper and 2 flour mills; 3 match factories. Brushes made in the houses of peasants. Domestic industries include the making of brushes, tinder, iron goods, and cotton articles.

Brandenberg: population 491; industries chiefly wood-working and the making of brushes for export.

Todtnauberg: population 789; chief activities; brush and tinder making, cotton spinning (employing 150 workers). Also saw-milling and a flour mill.

Adelsberg: population 299; cotton spinning and weaving.

Hausen: population 447; iron working industry established for 350 years. Making of pig, wrought iron and ingots.

Wyhlen: population 1111; brewing, wine making, flour milling, and gypsum quarrying.
CHAPTER VI.: THE PRESENT DISTRIBUTION AND FORMS OF RURAL SETTLEMENT.

The Black Forest has always exercised a centrifugal influence on population distribution, and an absence of large towns from the Forest proper is to be expected. Moreover, the number of small agglomerated settlements is not large, although the average density of population in the Southern Schwarzwald (between 25 and 50 to the sq. km.) is high for a largely forested highland district, as has been pointed out elsewhere. Most of the compact settlements (Cf. Fig. 19.) are either small industrial centres (with a population of between 500 and 5000 inhabitants) such as Schopfheim, Neustadt, Hornberg, etc., tourist or health resorts, such as St. Blasien, Badenweiler, etc., or villages with less than 500 inhabitants. As the former group will be considered as small urban centres in the following chapter, the villages, hamlets and isolated farms form the basis of the rural settlement pattern to be studied here.

Fig. 19 shows the thick spread of villages on the Southern slopes of the Black Forest, on the heights above the valleys leading Southward to the Rhine, as well as by the side of streams such as the Wutach, Schwarza, Alb, Wehra, and Wiese. Apart from the villages scattered on the flat floor of the Dreisam valley behind Freiburg, and on the bevelled plateau above (Cf. the sites of St. Peter and St. Märgen), and apart from the valley
villages which have spread up the Elz, Kinzig, Rench, and Acher valleys, the number of agglomerated settlements on the steep Western slope of the Black Forest is very small. To the North, a number of compact villages extend along the deeply incised Murg valley, but, to the North-East, there are none on the little cleared, sandstone heights. On the long, gentle Eastern slope, and also on that to the South-East, there is a fairly thick spread of villages, but the increase immediately to the East of the Forest, in the open limestone country of the Baar, is noticeable. Within the Black Forest, the largest number of villages occurs in the highly broken, but nevertheless fairly accessible region of the Feldberg massif. On the slopes, above the water meadows of a number of deep cut valleys, stand such settlements as Hinterzarten, Hammereisenbach, Todtnauberg, Altglashütten, etc., and Titisee and Schluchsee, above the lakes that bear their name.

Although there are a large number of route villages, or hamlets, which have arisen where several farmsteads coalesce, the Black Forest remains par excellence, the domain of the single, isolated farmstead. ( Cf. Plates 21, 22, 24, 25, 26, & 27). These are to be found where well-drained sites are available, either at the heads of valleys (with access to spring water, as in Plate 26), or on the middle slopes of valleys (Cf. Plates 22 and 27). Such farms avoid the cold air which collects over the floor of the valley during periods of winter anticyclonic calm, causing temperature inversion. Other frequent sites
are shoulders and flats, where the land may be of sufficiently gentle gradient to enable crops to be grown, as in Plates 17 and 18. Plate 21 illustrates the essential elements in a Black Forest farmstead: water meadows for cattle grazing on the narrow valley floor, pasture on the steep slopes, and crops, cultivated on the strip system, on the middle flats, with woodland above, and fruit trees in the shelter of the farmhouse. Plate 23 shows a typical Allemannish farmhouse, with its great overhanging roof of straw thatch, facilitating snow and rain run-off, and covering not only the dwelling house, cattle stalls and granary, but also the wood stack.

Some Examples of Rural Settlement.

Apart from the 'Einzelhöfe' of the Black Forest, groups of farmsteads, whether enough to form a hamlet or a village, provide interesting instances of types of 'lay-out', in response to local topography, etc. Farmsteads may be found, especially at the lower ends of valleys, clustering round the church, school and inn, as at Ettenheimmünster, in the Hölziersiedel district; Windenreuthe, in the lower Elz valley. Where such valleys open directly on to the Rhine Plain, long, straggling street villages sometimes occur, as in the lower valley of the Glotter. Such villages are sometimes in pairs, with a 'lower' and an 'upper' element, and the case of Ober-merging into Unterglottertal is one in point; Obermünster and Untermünster, North of the Belchen, is another. As the Glotter emerges on to the Rhine Plain, a superb example of a 'Strassendorf' occurs in Denzlingen, (Cf. Fig. 18b.), where
farmsteads line both sides of the road for nearly two miles!

Figures 17a and 18b & c. illustrate some types of settlement 'lay-out'. Todtnauberg, at the head of the deep cut Wiese valley, is a good example of a 'Streusiedlung' (a scattered or 'dispersed' settlement). It comprises no less than six hamlets, of which Todtnauberg, on a shoulder above the water-meadows of the valley floor, is the largest. Rütte (a late clearing in the forest) lies highest up the valley; Löf-felhauser, formerly associated with the making of wooden and metal spoons; Büreton, also on the West of the valley; Ennerbach, on the Eastern slope, and Hangloch, above the waterfall are the other hamlets. (Cf. Fig.17.) The industries of this village are now dead, and, apart from stock rearing and the production of milk and butter, not only for the need of the inhabitants, but also for the seasonal tourists (Todtnauberg is a winter sports centre), there is little other activity.

St. Margen— an Augustinian foundation, dating from 1108,— is to-day a collection of farmhouses and small hotels, near the meeting of cross roads, converging from the Dreisam valley, via the steeply graded Wagensteig valley, and via the Esch valley and the plateau top route from St. Peter, both of these roads meeting an ancient road from Neustadt, via the Hohle Graben, mentioned earlier. These roads carry a considerable amount of tourist traffic in the summer months, as an alternative to the Himmelreich-Hüllental route across the South-Central Black Forest. The abbey of St. Margen was closed in 1806, and as
Fig. 17 (a).

Forest

Spot heights in meters.

1 2 Kms.
Plate 28: St. Peter from the air, showing the "Hof" grouped around the original Benedictine monastery, & the extensive arable strips laid out on the bevelled 1200m. platform, into which the Esch valley is incised in the left distance.
the church has three times been destroyed by fire, there is little to mark the original nature of the settlement. However, it may be classed as a 'Rodungssiedlung' (a settlement where land has been cleared for cultivation), for to-day arable fields spread widely around the village, on the 2400' platform previously referred to, as in the case of St. Peter, and the monastic clearings in the Middle Ages are largely responsible for the exceptional amount of plough land in the vicinity of the village.

St. Peter, a Benedictine foundation of the IImth century (it was founded as a daughter abbey of an earlier abbey at Hirsau, near Stuttgart, in 1093), is an example of a 'Hof' type of settlement. It stands at the steep head of the Esch valley, with access to spring water, while much flat land (the 2200' platform), extends behind the village, and is highly cultivated. The village, like St. Märgen, is largely agricultural; rye, oats, potatoes, and some clover being the usual field crops grown near the village. Some land is also given up to grazing, and the production of milk, butter, and cheese for the needs of the village and also for sale, e.g. in the Freiburg market, is of some importance. The village itself is arranged around two squares, the church (with its twin towers which serve as a landmark for miles), seminary, and school, savings bank, etc., surround the one, while the one hotel, the post office, general stores, saddlery etc., are grouped around the other. The baker's shop and a few farmhouses straggle down the main road to the East, and along
Plate 29: View of St. Peter looking S., showing monastery of 10th century origin, & "Hof" closely grouped around it.
(Photo, Miss D. Edmond).

Plate 30: View of St. Peter looking N.W., showing position on edge of plateau (largely cleared) & at head of Esch valley, leading to Freiburg via the Himmelreich.
(Photo, Miss D. Edmond).
the road to the Lindenberg are a few isolated farmhouses, completing the village community. The original abbey buildings of St. Peter were destroyed during the French wars in 1678, when fortifications were erected, the site being one of some strategic value. During the 18th. century, the church was rebuilt, of local sandstone, in South German style, but the abbey was suppressed in 1806, and became a seminary for priests. The Mediaeval fish ponds, formerly belonging to the monastery are to be seen in the fields behind the church. (The view of St. Peter, taken from the air, and reproduced in Plate 28, gives a good impression of the village plan, and its compact grouping around the central 'Hof'. Plates 29, 30, 19, and 20, together with Fig. 17 illustrate some other features).

Littenweiler, in the Dreisam valley, is mainly of historical interest, and is an example of an Allemannish hamlet. It lies between the regulated river and the steep slopes of the edge of the Forest. To-day it is losing its individuality through the growth of the industrial suburbs of Freiburg, and paper mills line the North side of the river here. It is also a growing residential district and there is now a continuous built up area extending outwards from Freiburg, via Wiehre to Littenweiler.

Hammereisenbach, as its name suggests, is a settlement of former importance, on account of mining and metal-working activity. Iron ore was obtained in the neighbouring hills, during the Middle Ages, and was the basis of a local iron
Fig. 18 (b).
smelting industry, using charcoal from the nearby forests as fuel. Other later industries were the making of wooden nails, clock machinery, etc., but there is no longer any trace of any of this former activity, and the settlement consists of a straggling row of farms, extending for over a mile down the valley of the Eisenbach, as Ober- merges into Unterhammereisenbach. The village is on the railway which follows the Brege valley, of which the Eisenbach is a tributary, from Donaueschingen to Furtwangen, where the clock making industry of the district has now concentrated.

Kirchzarten is a mile away from the Celtic settlement of Zarten, on the North side of the Dreisam. The Celtic fort of Tarodunum later became known as Zarduna (in 765), and by 816 a settlement called Ecclesia Zartun appeared. This must be the modern Kirchzarten ("the place of the church on the mound"), standing at a point where the Zastler and Brugga side valleys open on to the Dreisam. Kirchzarten is an example of an Allemannish 'Haufendorf' or agglomerated settlement, where farmhouses are closely grouped, and around them spread the arable fields. Owing to its accessibility from Freiburg, since the coming of the railway (now being electrified), it has become a starting point for tourists for the Feldberg district, and has consequently increased in size of recent years (its population in 1933 was 1394).

Schopfheim is the largest of the industrial settlement in the Wiese valley, with the exception of Lürrach, a suburb of Basle, but lying inside the German frontier. Here the flat
floored, steep-sided valley has provided space for the town to develop from its original nucleus South of the Wiese, above the water meadows, towards the present railway line, and beyond as far as the canal. Schopfheim grew rapidly during the last century, with the introduction of cotton, linen, and wool spinning and weaving, in addition to paper making, flour milling, and leather working. The population increased from 1210 in 1813, 1699 in 1847, to 4752 in 1933. New industries have also been introduced, such as the spinning and weaving of first silk and now artificial silk.

Triberg, like Schopfheim, is really too large a population centre to be considered here (its population is 4418), but as it appears on the page of sketch maps, illustrating different types of settlement plan, it may be mentioned as a contrast to the others examples described. Its reversed L form may be taken as representing its Mediaeval plan, and it is strictly controlled by local topography, the valley of the Gutach, the falls at the head, and the side valley of the Untertal, both deeply cut into granitic rocks, preventing the further spread of the settlement. Founded by the Allemanni in the 9th century, Triberg to-day combines several functions. It is the market town for the district, and produce from neighbouring farms is displayed for sale in the main street; it developed a watch-making industry in the middle of the 18th century, and is to-day a metal-working centre of some importance. Factories concerned with clock making, the manufacture of machine parts, chromium plating, enamelling, etc. are to be found at the lower
Plate 31:
Kniebis, a forest clearing settlement (Waldhufendorf).
N.B.: Farmsteads around ruins of Mediaeval hospice.
(Author's Photo).

Fig. 18 (c).
end of the town, along the Gutach valley (Cf. Plate 39). and adjacent to the Black Forest railway. This line, which incidentally provided a model for the St. Gotthard railway, provides a diagonal route through the Schwarzwald, and its section up the Gutach valley (See Plate 39) consists of a series of spirals and tunnels, the gradient in places amounting to 1 in 58, where the line pierces the Rhine-Danube watershed, via the Sommerau tunnel, at 3,730'. This line is responsible for bringing a good deal of tourist traffic to Triberg, which is accessible to some of the finest scenery in the Central Black Forest. It is a winter sports centre as well as a well known summer resort, and health centre, and hotels line each side of the main street.

Kniebis (See Plate 31 and figure below), is of special interest as a case of a pair of forest clearing settlements (Waldhufendörfer), of which there are a considerable number in the Northern Black Forest (Cf. Map showing their distribution in Gradmann, S. Deutschland, Vol.2, p.77.). In the Middle Ages, Kniebis offered a hospice to travellers from Freudenstadt following the main road across the Northern Black Forest to Achern and so across the Rhine to Strasbourg. This clearing in the forest differs from those in the South, for, owing to the light, porous soils weathered from the Bunter sandstone, the land, when cleared, can only be used for grazing and not arable. Where the pastures are well-watered, e.g. on the steep slopes of the Forbach valley, rich meadows occur, but elsewhere the cleared land consists of rough pasture and heathland. Kniebis
is a small dispersed hamlet, mainly composed of farmsteads, with one small hotel to cater for summer visitors. Its population has slightly increased of recent years, but the difference between that of 1813 and 1953 is only 159: 198!
DISTRIBUTION OF
AGGLOMERATED
SETTLEMENTS
1933

- 30-100,000 inhabitants
- 5000-30,000
- 500-5000
- Villages with ≤500

- Limit of the Black Forest.

Fig. 19.
CHAPTER VII. : THE DISTRIBUTION AND FUNCTIONS OF THE URBAN SETTLEMENTS.

The towns of the Black Forest and its margins, with the exception of the city of Freiburg, have a total population of less than 30,000 inhabitants, and are all either industrial centres, such as Neustadt, Wolfach, Hornberg, Waldkirch, Schopfheim, and Lörrach, or health resorts, such as St. Blasien, Todtnauberg, Freudenstadt, Baden-Baden, and Badenweiler. A few towns in the centre of the Forest combine both functions, such as Triberg, St. Georgen, and Furtwangen.

Fig. 19 shows a line of agglomerated settlements parallel to the Rhine and skirting the Western margin of the Black Forest. These towns are usually located where a tributary valley opens on to the Rhine Plain, providing a routeway linking highland and lowland, and joining the main road which leads from Basle to Mannheim, Mainz, and eventually Cologne. Examples of small industrial towns which occupy such sites are Aechern, Renchen, Offenburg, Lahr, Emmendingen, and Staufen. The growth in importance of these centres as markets and manufacturing towns increased rapidly in the last century with the construction of the main railway line from Cologne to Basle, completed in 1845. A consideration of the industrial development of these towns is given in Chapter VIII.

In the Upper Rhine valley, there is an almost continuous
Plate 32: Air view of Freiburg, looking N.E., & showing site on gently sloping fan formed by the Dreisam where it emerges from the Himmelreich on to the Rhine plain. The Cathedral, Schwaben Tor, & the scarp edge of the Forest are shewn.

Plate 33: General view of Freiburg, showing its site at the lower end of the Dreisam valley, on the edge of the Freiburger Bucht & at the foot of the Black Forest. Forested scarp slopes rise to the East & South of the city. The village of Günterstal is in the foreground.
line of small industrial towns, extending Eastwards from Basle, and including Grenzach, Wyhlen, Rheinfelden, Schwörstadt, Säckingen, Murg, Kleinlaufenburg, and Waldshut. These centres lie at the Southern foot of the steep hills of the Dinkelberg and Hotzenwald, where small tributaries join the Upper Rhine, providing originally a source of water power, and now the basis of a number of hydro-electric plants, the largest of which (excluding the recently completed Schluchsee scheme) are at Riburg-Schwörstadt and Rheinfelden. Not only do these plants supply the towns and villages of the Southern Black Forest with electricity, but they have made possible the recent growth of the chemical and aluminium industries at Rheinfelden (population in 1933, 65II), together with silk weaving, metallurgy, and wood working, e.g. at Waldshut.

Freiburg-in-Breisgau stands apart from these small towns of comparatively recent growth. It is essentially the gateway town to the Black Forest, lying in the embayment of lowland, known as the Freiburger Bucht, on the margin of the forest and the plain, with the partially reclaimed swamps of the Mooswald to the West. At the site of Freiburg, the Dreisam emerges from the Himmelreich, and formerly deployed itself over a gently sloping alluvial fan, before threading its way by a maze of channels through the Mooswald, and eventually joining the Rhine, North of the Kaiserstuhl. This latter section of the Dreisam has now been canalised, so that an artificial cut runs N.W. from the suburb of Stühlinger, turns Northward past the Kaiserstuhl, and finally
PLAN OF FREIBURG, 1/ 50,000.

N.B. Site on the gently sloping fan formed by the Dreisam (now a regulated stream to the South of the Mediaeval city. The wooded foothills of the Black Forest bound the town and its suburbs to the East, South, and South-West, while the woods and marshes of the Mooswald, to the North-West, limit expansion towards the Rhine Plain.
joins the Rhine as Leopold's canal, below Oberhausen.

Freiburg, as its name suggests, was not of Roman origin, and its foundation by the House of Zähringen in 1188 was due to its advantage of site as a market town for the Breisgau, and not for any reason of strategic value as was often the case with Mediaeval cities. Berthold II and his successor, Konrad of Zähringen, saw in the choice of Freiburg a site sufficiently far from the Rhine frontier to ensure security, but especially a location where two important trade routes intersected: the one through the Rhine valley, linking Cologne-Mainz and Basle with the Italian cities, and the other coming from Austria and Bavaria, either via Ulm and Constance or Donaueschingen, the Höllental-Dreisam valley to the Rhine crossing at Breisach for Colmar in Alsace. Moreover, the Breisgau itself was a rich agricultural district, and offered possibilities of exchange between a highland and lowland district. Timber, forest products, such as resin, pitch, etc., and minerals, e.g. silver from the Schauinsland, came to be sold in exchange for foodstuffs, stock products, etc. from the Breisgau. Freiburg, as a 'free city', in which servitude was prohibited, and where administration was to be by officials elected by the burghers and not by the Duke or Emperor, offered a further attraction to settlers through the cheap price of land and the element of security existing.

The plan of the city (Cf. Fig. 20) is that of a grid, similar to some Roman cities, and remarkably simple in design.
FIG. 21.

Plan of Freiburg in 1640, showing walls and gates around the Mediaeval city, and the newer outer ring.

( Based on a sketch in Merian's Topographia Alsatiae.)
The 'Altstadt' is oval in form, consisting of a number of blocks or 'insulae', slightly curved and oblong in shape, and bisected by the main street, the former Kaiserstrasse, which ran as a comparatively wide street, N.N.W.-S.S.E. through the middle of the old town, and now extends along a N.-S. line through the modern suburbs. Here the market was formerly held, parts being reserved for the selling of meat, fish, and general wares. Entrance to the city was by means of at first three gateways: the Martin's Tor or Norsinger Gate, at the Southern end of the Kaiserstrasse, the Christopherstor at the Northern end, and the Ober-or Schwabentor, which provided an entry, as its name indicates, from the direction of Swabia, in the S.E. via the Hölletal. The main street is crossed at right angles by the Salzgasse, which runs from the Schwabentor to the Kaiserstrasse, and it is continued West of the Kaiserstrasse in the Bertholdstrasse.

Outside the bounds of the city walls a number of suburbs grew up in the later Middle Ages. These were Neuberg, built between 1240 and 1252, in the North; Predigervorstadt, outside the Predigertor, a later gateway, at the end of the Schiffstrasse; Lehenervorstadt, outside the Lehenertor; and later the Schneckenvorstadt, which stretched between the Altstadt and the present channel of the Dreisam. This suburb, dating from 1303, was the only one to survive the fortifying process of Vauban, in 1677. In that year, Freiburg was reduced to its original extent within the Mediaeval walls, with the exception of Schnecken. (Cf. Fig. 21). These
Plate 34: The Kaufhaus, dating from 1532, & the Münsterplatz, Freiburg-in-Breisgau.

Plate 35: The market in the Münsterplatz.
(Author's Photo)
fortifications were finally demolished in 1745 and the space on which they stood was laid out as boulevards, a common continental device. (Cf. Fig. 22). The town has since spread freely Northwards towards Herdern, and Zähringen, Westwards to the industrial suburb of Stühlinger, Southwards to Wiehre, beyond the Dreisam, whence the town is rapidly expanding up the valley to Littenweiler. Immediately to the East, the expansion of the city is prevented by the steep slopes of the Schlossberg (Cf. Plates 32 & 33).

The Mediaeval growth of Freiburg was dependent not only on its importance as a market centre, in which a number of strong trade guilds arose, but also upon the fact that it was the chief ecclesiastical city of Baden, a later a University city. In 1247, the population is said to have been 40,000, and the 13th. century was associated especially with the building of the Cathedral, of local red sandstone, although the work was not completed until the period of the Renaissance. The number of Benedictine monastic houses established in the Breisgau during the Middle Ages has been noticed elsewhere, and Freiburg also attracted a large number of monastic houses. The Franciscans arrived in the year 1226, and were followed by the Dominicans in 1246.

During the 14th. century, the district of the Breisgau passed into the possession of the Hapsburgs, and the University was founded in 1457, under the patronage of the Emperor Maximilian. One of the oldest universities in Germany, it became a centre of the New Learning, during the
Freiburg in 1715, showing the fortifications on Vauban's star plan, enclosing the 'Altstadt'.

( Based on a map in Sauer, J. Alt Freiburg ).
Renaissance, but appears to have been little touched by the Reformation, and to-day the population of Freiburg is predominantly Catholic (66% according to the census return). Freiburg had the reputation of being one of the healthiest cities in Europe in the Middle Ages, and it seems to have suffered less from the ravages of the Black Death than many European cities, although the population appears to have dropped to only 6000 in 1450, when not only the plague, but also peasant revolts took their toll. An outstanding feature of the city is its excellent drainage, by means of channels diverted from the Dreisam, and which carry a clear stream of water through some of the main streets in the city, from East to West. These stone channels of the Altstadt are still in evidence.

The most chequered period in the history of the town was, perhaps, in the 17th century, when it suffered from no less than seven sieges, three during the Thirty Years' War, and the others during Louis XIV's wars of aggression in the Rhineland. In 1645, Mazarin obtained Breisach, as a key fortress in the Rhine valley, and in 1679 Louis XIV added Freiburg, which remained in French hands until its restoration to the Habsburgs at the Peace of Ryswick, (in 1697). It was not in fact until the break up of the Holy Roman Empire at the time of Napoleon, that the district of Breisgau, and with it the city of Freiburg, became incorporated in the Grand Duchy of Baden, in 1806. The plan of the city in the 18th C. is sketched in Fig. 28, which also
Plate 36: Vauban's late 17th century gateway, overlooking an abandoned meander of the Rhine. Part of the former fortifications of Breisach.

(Photo, Miss D. Edmond).
illustrates the star plan of Vauban's fortifications. (Cf. also Plate 36, showing the gateway erected by Vauban at Breisach, overlooking a former channel of the Rhine).

During the 19th century, Freiburg grew rapidly as a residential city, with a developing tourist industry. The recent spread of urban settlement up the Dreisam valley, and also to the North and West has already been referred to, so that such formerly outlying villages as Zähringen, Herdern, St. Georgen, and Littenweiler are part of a continuous urban area, and the population now touches 100,000, whereas in 1901, it was only 61,000. Manufacturing industries have been added to the various activities of the city, and these include saw milling, clock making, cement manufacture, various metallurgical industries, and paper making, especially up the Dreisam valley, with access to clear and abundant water supply, and, originally, timber for pulp. Other noted industries are the making of scientific instruments, optical apparatus, etc., the spinning and weaving of silk, and artificial silk. These are comparatively new industries, in contrast with the long established book binding, publishing, and printing trades, which are in keeping with the importance of the town as a University centre for centuries.

Freudenstadt (See Fig. & Plate 37.), on the N.E. margin of the Black Forest, in Württemberg, offers a complete contrast, and it dates only from the end of the 16th century. Founded during the Counter Reformation by immigrants from Styria, as a Protestant refugee settlement, in 1599, its
Plate 37: North corner of central square, Freudenstadt.

(Fig. 23). Plan of Freudenstadt, showing block form, with streets parallel to the central square.
square-within-a-square lay out appears to be unique. The open central square (a corner of which appears in Plate 37), covers roughly half a square mile, and it contains the market, town hall, post-office, together with rows of arcaded shops, similar to the style of those in Berne, while the Lutheran Church occupies a right angle in the S.W. corner. Except for a weaving establishment in the Christophstal to the West, the town appears to be mainly residential in character. It is a noted health resort, and the fact that it is served by a railway (which makes a wide detour around the town to the S.W.) may partly explain its importance as a tourist centre. This line links Freudenstadt with Rastatt via the Murg valley, a route which parallels an old 'wine road', and it is also connected with Offenburg and the Rhine valley towns by the line through the Kinzig valley. Moreover, a main road leads Westwards from Freudenstadt leading to Strasbourg via Kniebis, a route mentioned elsewhere, and this carries a considerable amount of traffic in the summer months. Freudenstadt is, therefore, a convenient starting point for the Northern Black Forest. The town stands on the margin of the open limestone plateau of Württemberg, and the thickly forested sandstone heights of the North-Eastern Black Forest. Beyond the deep cleft of the Christophstal, which limits the town to the West, the fir forests begin, and extend continuously for miles. Freudenstadt appears to be growing steadily, and its population approaches 10,000.
The Industrial Towns of the Black Forest.

The manufacturing centres of the Black Forest are limited to the East-Central district, the Gutach valley, in the Central region, the Rench, Elz, upper Wutach, and lower Wiese valleys. St. Georgen and Villingen lie in the Brigach valley, and Furtwangen in the upper Brege, both of these valleys converging on that of the Danube at Donaueschingen. St. Georgen has a population of 5355 (representing a 600% increase during the last 120 years). It stands on the plateau above the deep cut Brigach valley, and it is a focus of roads following highland tracts across the forest from Schramberg, in the North, Triberg in the West, and Eastwards a main road leads to Königsfeld, on the plateau of the Baar. The Black Forest railway loops round the town, but serves to connect it with Triberg and Villingen, via the Vordertal (a headstream of the Gutach) and the Brigach valley. The town combines the functions of a high altitude health resort, a winter sports centre, and a small manufacturing town. The chief industries (which are referred to again in Chapter VIII) include metal working, the making of machine parts and tools, clocks, and enamelling (an industry linked to that of clock making). The works are accessible to the main road, but not to the railway at the bottom of the valley, but the market for the products extends over the whole of Germany, and there is a considerable export trade in clocks and in machine parts, e.g. with South America, Australia, and the U.S.S.R.!

Villingen on the margin of the Black Forest and the
Baar, has a population of 14,565. It has grown rapidly during the past century, and is the chief town of the Baar. It owes its origin, like Freiburg, to the choice of a ruling House, in this case that of the Fürstenbergs, and the elliptical form of the Mediaeval city, with its walls, is outlined by a broad girdle of parks, beyond which spread the newer parts of the town. It is served by the Black Forest railway, and by a line running Eastwards to Rottweil and Tübingen, in the Neckar valley. Its industries are mainly concerned with metallurgy (iron was formerly worked in the vicinity), and also with clock making (See Figs. 24 & 25).

Neustadt (population 5149) at the point where the Reichenbach valley converges on to the upper Gutach, just below one of its elbow bends, is almost encircled by wooded hills. It stands on the railway linking Freiburg with Donaueschingen, via the Hüllental and Titisee, and is a 'climatic' resort, a winter sports centre, and a small manufacturing town. The factories lie mainly below the town in the Gutach valley, concerned with access to water power, and they are with saw milling, paper making, and clock manufacture. (See Chap. IX.).

Two important industrial centres lie in the Gutach valley, which flows North to the Kinzig. They are Triberg, with a population of 4418, already dealt with (See pages 69-70) and Hornberg (population 3162). The latter town, which extend along the floor of the Gutach valley for over a mile, where two side valleys open on to the main one, the Offenbach and the Reichenbach. The town is cramped beneath the wooded
heights of the central Black Forest, e.g. the Schlossberg, 1495 ft. It is a small tourist centre, on the Black Forest railway, and has metallurgical and pottery and porcelain industries.

Wolfach, further North, where the Wolfach joins the Kinzig from the North, is a small wood working and metallurgical centre, with a population of 2299. Oppenau (2104) and Oberkirch (4480) are examples of similar towns in the Rhine valley. Oppenau has a chemical industry and saw mills, while Oberkirch is chiefly concerned with wood working, paper making, and metallurgy. Waldkirch (population 5764) at the lower end of the Elz valley, is noted for the manufacture of musical instruments, especially church organs, pianolas, musical boxes, etc., and also for the cutting and polishing of precious and semi-precious stones. Sewing cotton is also made here and at Kollnau.

The Manufacturing Centres of the Wiese Valley.

A chain of industrial settlements, increasing gradually in size, extends from Brandenburg, and Todtnau in the vicinity of the Feldberg, to the outskirts of Basle. They include Brandenburg (population 256), Todtnau (493), Schönau (1714), Zell (3701), Schopfheim (4752), and Lürrach (18,254). Weil and Wyhlen are industrial suburbs of the Basle conurbation, and, like Lürrach, lie on the right bank of the Rhine, inside the German frontier. Kandern, to the North of Schopfheim, is also an outlying industrial centre, with a population of 2131.
Plate 38: Cotton mill at Hausen, in the Wiese valley.
Note location by the side of the river, which has been 'regulated' to provide power for the mill.
(Author's Photo).

Plate 39: Textile machinery factory, near Zell in the Wiese valley. Note access to timber, road & rail transport facilities, & local market.
(Photo, Miss A.E. Adams).
These settlements had developed a variety of industries by the middle of the last century (Cf. Fig. 29), based mainly on local raw materials, i.e. wood, wool, hides, skins, grain, etc., and some minerals, such as lead and silver from the Brandenberg, Schönau, and Hausen districts. Lörrach was noted for its saw milling and wood working trades; Schopfheim and Kandern for silk; while paper making was undertaken in Brandenberg and Todtnau. Todtnau also made matches; metallurgy was carried on at Lörrach and Zell; and flour milling at Wyhlen, Lörrach, Schopfheim, Todtnau, and Brandenberg. At this time, Todtnauberg was noted for small scale industries which have since died out. They included the making of brushes, using imported bristles, and wooden and metal spoons.

The cotton spinning and weaving industry, which is now the most important occupation in the Wiese valley, together with silk manufacturing, were introduced from Switzerland, and set up often with Swiss capital during the early years of the 19th century. The growth of these small, detached industrial centres has been steady, and the siting of the factories is often ideal (Cf. Plates 58 & 59). They are usually by the side of streams, with direct access to water power, while the steep, forested sides of the valley rise on each side. A further consideration of the factors involved in the development and present position of the textile centres in the Wiese valley is postponed until the next chapter.
The Health Resorts of the Black Forest.

Apart from Freudenstadt and Triberg, already dealt with, the most noted health resorts of the Black Forest lie in the sheltered valleys of the South, such as St. Blasien, Todtnauberg, or else they are marginal to the Forest, as in the case of Baden-Baden, Badenweiler, and Königsfeld. Baden-Baden (Aquae Aureliae) is one of the most noted spa towns in the world, and its medicinal springs were well known to the Romans, as the town was easily accessible from Strasbourg (Argentoratum) across the Rhine. The town is sheltered by the Badener Höhe which rise steeply behind it, and the climate of this part of Baden is particularly mild in winter and warm in summer, so that sub-tropical vegetation grows in the gardens of the town, in the same way as at Badenweiler. This latter town, which reproduces the features of Baden-Baden on a small scale, is also a centre of historic interest on account of its Roman bath (it was a convenient distance from the Roman towns at Basle and Augst, and it is a noted health resort, with a resident population of 1207, and an average number of annual visitors amounting to 12,000.

St. Blasien is the only settlement of note in the Southern Black Forest. It lies, hemmed in by forested mountains, on the flat-floored valley of the upper Alb, where a tributary stream enters—the Steinenbächle. Rounded granitic hills encircle the small town, and include the Lehenkopf (1041m.), the Ahornkopf (1057m.), and the Bützberg (1211m.), while so overdeepened is
the valley of the Alb, that the altitude of St. Blasien is only 780m. Meadows cover the floor of the valley, and there is almost no arable land near the settlement, while the steep sides of the valley are covered with fir forests. The seclusion of the site is further enhanced by the fact that the nearest railway connections are at Waldshut or Albstadt in the upper Rhine valley, and at Seebrugg, S.E. of Titisee.

St. Blasien was one of the earliest monastic foundations in the Black Forest, and it dates from the middle of the 10th century, when Otto the Great made a large grant of land to the Benedictines (Gradmann). During the Middle Ages, it came under the patronage of the Fürstenbergs, and it appears to have maintained a considerable population until the last century, when, presumably because of its isolation and lack of industries, it suffered a marked decline. It is reputed to have had a population of 9574 (for the whole 'Bezirk') in 1813, but the last census returned only 2002, the same as in 1925. The whole of the Hotzenwald region, which extends to the South of St. Blasien, seems to have provided a source of emigrants during the last century, and also the previous century, when, as is pointed out in the concluding chapter, a number of peasants left for Yugo Slavia and Hungary.

To-day, the outstanding importance of St. Blasien is as a health resort, comparable to the Swiss Davos, and consequently it receives a large number of visitors annually, both in connection with the winter sports and its sanatorium, etc. The several climatic advantages of the town include its fairly
equable temperature (ranging from \(-3^\circ C\). in January to \(14^\circ C\). in July), its small diurnal range of temperature in summer, when warm days and fairly cool nights are the rule. On the other hand, in winter, owing to its sheltered location in a deep valley, temperature inversions are common, and, as Schrepfer points out, the range of temperature may then be greater than that of some exposed stations at higher altitudes. St. Blasien also advertises itself as being remarkably free from storms, 'Föhn' winds, and mists. The average number of misty days quoted is only 6, compared with 45 for Pforzheim, and 53 for Freiburg!

Although mining, e.g. for lead, appears to have been carried on in the neighbourhood of St. Blasien in former times, and although timber is available in abundance, together with water power, the town has escaped the industrialism which has overtaken the nearby towns in the Wiese valley, probably on account of its seclusion, and lack of easy connections with outside markets. It is interesting to note, however, that, with the use of Swiss capital, the first cotton spinning machinery to be set up in the Black Forest was installed at St. Blasien in 1811, in the former monastic building! Cotton manufacturing now employs over 100 people in St. Blasien and three other small mills are located further down the Alb valley. Stone cutting and polishing is also a local industry.

CHAPTER VIII: THE DISTRIBUTION & EVOLUTION OF FACTORY INDUSTRIES IN, & ON THE MARGIN OF, THE BLACK FOREST.

Two outstanding features of the Black Forest industries are their small size (only 3.3% of the factories in the whole of Baden employ more than 20 workers), and their considerable variety. The following table gives a list of the chief groups of industries, arranged in order of importance according to the number employed, and it also shows the relative numbers of men and women engaged in both factory and domestic industries.

<table>
<thead>
<tr>
<th>Groups</th>
<th>No. of Establish-in Factories</th>
<th>No. of Employees</th>
<th>No. of Domestic Employees</th>
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<td>78</td>
<td>17</td>
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<tr>
<td>Wood</td>
<td>253</td>
<td>13</td>
<td>2</td>
</tr>
<tr>
<td>Chemicals, etc.</td>
<td>50</td>
<td>6</td>
<td>2</td>
</tr>
<tr>
<td>Working.</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
| Total.               |                              | 3                | 3                        | 3 3

These figures apply to the whole of Baden, and are not available for a later year than 1925. In view of the fact that they represent a period prior to the depression of the last decade, they may be taken as fairly representative of the general position of the industries, and in the last three years there has been some recovery, especially in the

I. Figures from Die Industrie in Baden, published by the Badischen Statistischen Landesamt, 1926.
metallurgical, textile and chemical trades. Other industries of considerable importance in Baden, such as the preparation of foodstuffs, tobacco, and the making of clothing, are not considered here, because they are limited to the towns and small industrial centres of the Rhine Plain, and are not found in the Black Forest.

Of the total population of Baden (2.3 million), only 10.9% is engaged in industry. The highest proportion of the total population so occupied is found in the districts of Säckingen (21%), Lorrach, and Schopfheim (17%), all in the S.W. of the state, close to the Swiss frontier, and also in Pforzheim (20%), with its important jewelry trade, together with Lahr (14%), Waldkirch, Rastatt, and Offenburg (all over 10%), districts in the border zone between the Rhine Plain and the Black Forest. In the Forest proper, the proportion is everywhere lower, although Wolfach records 9%, Neustadt, 8%, and Waldshut, 7%, districts which include some of the largest industrial centres of the Forest, but on the margin the figure falls to only 4% in Oberkirch and also in Freiburg. On an urban basis, the distribution of industrial workers in the larger centres is as follows:

**Industrial Population by Towns. (1925).**

<table>
<thead>
<tr>
<th>Town</th>
<th>Population (1000s)</th>
<th>Industrial No. Employed (1000s)</th>
<th>% of Total Population</th>
</tr>
</thead>
<tbody>
<tr>
<td>Pforzheim</td>
<td>78</td>
<td>345</td>
<td>24</td>
</tr>
<tr>
<td>Rastatt</td>
<td>14</td>
<td>36</td>
<td>3</td>
</tr>
</tbody>
</table>
Regarded regionally, the chief industrial centres of the Black Forest may be said to lie in the East-Central district, in which the clock making industry has concentrated since the 17th. century, and where the metal and wood-working trades have also been developed, e.g. in Villingen, St. Georgen, Furtwangen, Triberg, and Neustadt. The Wiese valley (including Lörrach, Schopfheim, Zell, and other smaller centres), together with the towns between the Upper Rhine and the Southern Black Forest, from the Wehra to the Wutach valley, specialize in the textile trades, notably cotton, silk, and of recent years artificial silk, while the electro-chemical industry is also a notable 20th. century addition, especially in Rheinfelden, Säckingen, and Waldshut. In this upper Rhine valley region, there are about 60 industrial centres of varying size and importance, comprising 175 factories, employing more than 20 workers, and 80 large firms, employing in all more than 26,000.

The side valleys opening on the Rhine plain also contain a number of factories, e.g. in the lower Dreisam valley (Freiburg and suburbs), the lower Elz valley (Waldkirch,
Emmendingen), together with the Gutach valley (Triberg, Hornberg, etc.). In these valleys are scattered about 30 centres, with some 12,500 workers, occupied in the metallurgical, textile, wood-working, paper, and other trades. Up the Murg valley, a string of settlements, including Rastatt, Gaggenau, Gernsbach, and Forbach, specializes in the wood-working, paper, and metallurgical trades.

The growth of manufacturing industries in the Black Forest up to the Customs Union in Germany, in 1836, has been outlined in the conclusion of the previous chapter. In 1862, only 2% of the population of Baden (31,000 workers) were engaged in industry, there being 357 factories employing more than 20 workers. The largest number of factories was in Pforzheim, with a 100 establishments employing nearly 4000 people, mainly in the jewelry trades. Lahr came second, with 13 factories, employing 1033; Freiburg recorded 9, with 873 workers; Lœrrach had 973 industrial workers, Säckingen, 615, Emmendingen, 337, Kehl, 179, each with 5 factories; while in Waldshut, Todtnau, Zell, Waldkirch, and Offenburg, there were 3. The proportion employed in the various groups of industries, in 1861, was as follows, the textile trades occupying the bulk of the industrial workers, while the jewelry, paper, and metal trades were also developing:

- **Textiles**: 107 factories employing more than 20 workers.
- **Jewelry**: 93
- **Foodstuffs**: 64 (Tobacco 46)
- **Paper**: 19
- **Metals**: 15
After the political unification of Germany in 1870, industries received a fresh impetus. By 1883, the number of factories had increased in Baden to 769, employing a total of 60,000 people, i.e. double that of 1861. The largest establishments were then in Lörrach, where cotton dyeing and printing employed 1181 people; Säckingen, where silk ribbon weaving employed 1030; and in Freiburg, where a silk firm employed 538 people. At this period, certain industries, such as iron smelting, gun powder making, sugar refining seem to have died out, and new industries, such as chemicals, clock manufacture in factories, cement making, bicycle manufacture arose. In 17 years, the number of factories increased to 1724, employing 146,000. Of these, apart from tobacco factories, the textile group was the largest, with 164 factories employing 27,000 workers, in Lörrach one firm employing over 900 workers.

During the 20th century, there has been a general increase in the industrial activity of Baden, so that the total number of factories at the last census, in 1925, was 2408, employing over 37,000 workers, and with an average number of employees amounting to 105. Pforzheim leads with more than 60 establishments, Lahr returns 153, Freiburg and Rastatt each 93, Emmendingen 75, and Villingen, 68. The growth of the various groups of industries is summarized in the following table:

<table>
<thead>
<tr>
<th>Groups</th>
<th>No. of Estabs.</th>
<th>Before 1836</th>
<th>1836-1851</th>
<th>1851-1875</th>
<th>1875-1900</th>
<th>1900-1914</th>
<th>1914-1918</th>
<th>Unknown</th>
<th>Known</th>
</tr>
</thead>
<tbody>
<tr>
<td>Metallurgy</td>
<td>780</td>
<td>22</td>
<td>22</td>
<td>138</td>
<td>235</td>
<td>183</td>
<td>17</td>
<td>148</td>
<td>15</td>
</tr>
<tr>
<td>Woodworking</td>
<td>253</td>
<td>14</td>
<td>12</td>
<td>42</td>
<td>77</td>
<td>45</td>
<td>4</td>
<td>53</td>
<td>7</td>
</tr>
<tr>
<td>Quarrying, etc.</td>
<td>192</td>
<td>6</td>
<td>3</td>
<td>20</td>
<td>67</td>
<td>30</td>
<td>6</td>
<td>27</td>
<td></td>
</tr>
<tr>
<td>Textiles</td>
<td>192</td>
<td>13</td>
<td>20</td>
<td>50</td>
<td>46</td>
<td>30</td>
<td>6</td>
<td>27</td>
<td></td>
</tr>
<tr>
<td>Paper</td>
<td>110</td>
<td>10</td>
<td>4</td>
<td>17</td>
<td>36</td>
<td>23</td>
<td>1</td>
<td>19</td>
<td></td>
</tr>
<tr>
<td>Chemicals</td>
<td>50</td>
<td>1</td>
<td>1</td>
<td>4</td>
<td>21</td>
<td>13</td>
<td>5</td>
<td>5</td>
<td></td>
</tr>
<tr>
<td>Total</td>
<td>1583</td>
<td>66</td>
<td>62</td>
<td>271</td>
<td>482</td>
<td>324</td>
<td>51</td>
<td>275</td>
<td>34</td>
</tr>
<tr>
<td>% of Total</td>
<td></td>
<td>4</td>
<td>4</td>
<td>15</td>
<td>32</td>
<td>22</td>
<td>3</td>
<td>18</td>
<td>2</td>
</tr>
</tbody>
</table>

I. Including:-

| Jewelry           | 293            | 1           | 5          | 49         | 114        | 72         | 7          | 39      | 6      |
| Clocks & Mus. Instruments | 76          | 3           | 3          | 17         | 19         | 13         | 1          | 20      |        |
| Electrical Apparatus | 65         | -           | 1          | 6          | 12         | 16         | -          | 29      | 1      |

I. Metallurgy.

The various branches of the metal trades (including machinery, electrical apparatus, optical instruments, musical instruments, etc., etc.) form the largest group of industries in Baden. They comprise in all 780 establishments, including especially the following groups:-

<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Jewelry</td>
<td>293</td>
<td>12,3</td>
<td>3</td>
<td>107</td>
<td>60</td>
</tr>
<tr>
<td>Clocks &amp; Mus. Instruments</td>
<td>76</td>
<td>5, 8</td>
<td>7</td>
<td>78</td>
<td>118</td>
</tr>
<tr>
<td>Elect. Eng.</td>
<td>65</td>
<td>6,5</td>
<td>1,5</td>
<td>8</td>
<td>-</td>
</tr>
</tbody>
</table>
The iron-working industry, which developed first in the form of iron smelting huts and hammer forges, e.g. at Albbruck, Wehr, Kandem, etc., especially under the stimulus of the House of Fürstenberg, grew speedily in the 19th century, and iron works were established at Hammereisenbach, based on proximity to local iron ore. Similar advantages account for the early iron working industry up the Kinzig valley, and in the Baar, near Donaueschingen. By 1850, 30 large firms were employing 1700 workers, mainly in Pforzheim and Bühlertal, while smaller works were established in Gaggenau and Villingen. Copper hammering was also undertaken in Pforzheim, and in Neustadt, and a few factories began to specialize in various products, e.g. needles in Waldshut, employing 40 workers, metal thread in Kehl, machinery in Pforzheim, Wiesental, and Immendingen.

By 1860, the number of factories had increased to 125, employing 6100 workers, engaged as follows:

- Precious metals & jewelry: 96 firms, employing 4108 workers.
- Machinery & rolling stock: 12 firms, employing 1026 workers.
- Beating & rolling firms: 3 firms, employing 483 workers.
- Wire drawing & metal: 8 firms, employing 352 workers.
- Foundries: 6 firms, employing 179 workers.

In another 15 years, there were 189 firms, employing over 10,000 people, 131 being branches of the light metal trades, and employing 5960, and 58 being concerned with the making of machinery, occupying over 4,000. In the Black Forest, 14 clock factories had been established, employing 531 workers.
Fig. 24.

METAL WORKING
(Without Jewelry).

- 20–100
- 100–500
- 500–1000
- 1000–2000
- 2000–3000
- 3000–4000
- 4000–5000
- workers.
in 1875. The close of the 19th. century saw the beginning of the electro-technical industry, which had expanded to the number of 570 firms before the war, and now exceeds 730, employing over 96,000 people.

(A) The Metallurgical Industry.

In all, over 400 firms employ 33,000 workers in the various branches of the metal trades. (Cf. Fig.24 for their distribution). They include the reduction of ores at Rastatt and Pforzheim (especially gold and silver); the making of castings at Schonach, near Triberg, and at St. Georgen; machinery and machine parts at St. Georgen, Triberg, etc.; aluminium at Rastatt, Teningen (Amt Emmendingen), Singen, and Rheinfelden, a rapidly expanding industry which has developed since 1912. Steel hammering, rolling, and drawing has been carried on in Rastatt and in Haslach, in the Kinzig valley, since the beginning of the 20th. century, especially in association with the motor car industry. Villingen makes clock parts and machinery, like St. Georgen, and also carries out metal rolling, like Schramberg.

Lighter branches of the metal industry are represented by the making of screws and wire, a trade subsidiary to electrical engineering, clock and musical instrument making, etc. This industry, which began with the making of wooden screws for export to France and Holland, began at Falkau, in 1827, at Wieslet (Amt Schopfheim) in 1853, and at Neustadt and Triberg in 1870. At the present time, Falkau makes nails and screws; Triberg nails and chains; Neustadt, Triberg, and St.
Georgen screws; and Lahr, wooden screws. Small metal fittings, such as bells, for various uses, are made in Villingen, St. Georgen, Gutach, and Vöhrenbach; locks in Freiburg; and scissors and cutting tools in Rastatt and Pforzheim. Many of these small scale industries are supplementary to, and have developed from the clock making trades. The enamel plating of tin sheets has been undertaken in St. Georgen since 1841, and now includes all branches of the trade, in addition to the enamelling of clock faces and figures. The industry is also carried on in Offenburg, as a basis for advertisements.

(B) Machinery.

The making of machines, especially turbines in Immendingen, dates from 1835, and to-day the town turns out all varieties of petrol engines. In St. Georgen, machine tools, made from special steel, clock machinery, musical instruments, metal parts, etc. have been made since 1870, when the firm of Heinemann was founded, beginning with the making of wooden nails, and now exporting machine shop products to S. America, Australia, and the U.S.S.R., and employing 250 people in 1935. Other firms in the town specialize in making precise measuring instruments, optical apparatus, etc. Eisenbach makes clock works, lathes, and electrical saws, the same as Villingen, and, in Pforzheim, the machinery is naturally for use in the jewelry and stone cutting trade. Zell, in the Wiese valley, concentrates on textile machinery (see Plate 39, showing the factory of J. Rückel and Son.). Dinglingen also makes textile machinery.
St. Georgen, near Freiburg, specializes in making wood-working machinery, including tools used in cabinet making, while Pforzheim makes plant for the paper and cellulose industries.

(C) The Precious Metal and Jewelry Trades.

This industry, which caters essentially for a luxury trade, dependent on the vagaries of taste and fashion, finds its markets largely outside Baden, and in fact Germany. The main centre in the Black Forest region lies near the Württemberg boundary, in Pforzheim, where the Enz and Würm converge on the Nagold, in the vicinity of the Maulbronn Gate, which provides an easy route W-E across the Northern end of the Forest. Pforzheim, which is one of the most noted centres of the jewelry trade in the world, specializes in the production of gold and silver ware, watches, ornaments, etc. etc., industries which make a maximum demand on skilled labour and use a minimum of expensive raw materials, in the manufacture of high priced articles for a limited market. Many of the works lie outside the town, but their concern is equally with the jewelry, gold and silver trades. The industry, which originated in the 18th. century, under Swiss influence, has expanded thus:

1820 - 900-1000 workers employed.
1852 - 100 firms employing >20 workers.
1868 - 338 " " 6748 "
1916 -1616 " " 28,000 "
1925 -2212 " " 35,000 "

(C) The Precious Metal and Jewelry Trades.

The fine mechanical and optical industries are carried on by 95 firms, 29 of which employ more than 100 workers, and totalling 10,000. The chief branch of the industry is concerned with the making of clock works & musical works, 76 firms being engaged in this trade, which employs 7921 workers. The state of Baden in fact contains the chief centres of this trade in Germany. Other branches include the making of instruments of precision and scientific apparatus, especially in Freiburg, where the science and medical faculties in the University are an important stimulus. Pforzheim makes spectacles, and Villingen, barometers.

The development of the electro-technical industry may be correlated with the existence of sites providing hydro-electric power. The first of these power plants were small and located on stream banks, where there could be utilised sufficient head of water to provide power for a single factory. These plants were later enlarged and water power was sometimes supplemented by steam power, and by the turn of the last century saw the transmission of current to works in rural areas. The oldest power plants were established in the Upper Rhine valley, at Rheinfelden, Wyhlen, Laufenburg, and Eglisau, each having a capacity of more than 50,000 kilowatts. From Rheinfelden and Wyhlen current is transmitted to the factories of Lorrach, Müllheim, and Freiburg; the Ryburg, Schwörstadt plants supplying Säckingen, Waldshut, and also Schopfheim and Wehr, while
another line transmits from Schopfheim along the Wiese valley via Zell to Schönau. In Laufenburg, the chemical industry takes 60% of the current generated, but power is also supplied to Säckingen, Waldshut, Neustadt, Donaueschingen, Villingen, and Constance.

Other small power plants existing in the South of Baden are located in Triberg (at the falls), in St. Blasien, and Schönau, but the most important scheme, recently completed, is at Schluchsee, with a capacity of 100,000 kws. The main use for the electricity to be derived from this scheme, which has involved the raising of the level of the Schluchsee, by damming it at the S.E. end, will be to supply current to the Black Forest railways, now in process of electrification. In addition, 600 kws. are generated in the Kinzig valley, and the power is supplied to factories in Offenburg, which is also served by the Achern power plant (4000 kws.). In the Murg valley, a scheme whereby the Schwarzenbach has been dammed to form a lake reservoir, enabling 125,000 kws. to be generated has been in operation since 1926. The main markets for the current here are in the saw mills, metallurgical works, and paper mills of the Murg valley (See Plate 45).

The comparatively newly developed electro-technical industry is centred chiefly in Freiburg (where, e.g. electric light cables are made), in Furtwangen (Telephone apparatus, electro-medical apparatus), Neustadt and Waldshut (Electrical fittings).
Fig. 25.

- 20-100 workers
- 100-500 "
- 500-1000 "
- 1000-2000 "

CLOCKS
(E) Clock Making and Musical Instruments.

The products of these two industries are, perhaps, the best known of all the manufactures of the Black Forest.

(I) The Clock Industry is carried on by 65 firms, of which 21 are large establishments, employing more than 100 workers, and in all occupying 7406 people. The industry is located in three chief areas ( Cf. Fig. 25 ): they are in the East-Central Black Forest, in Furtwangen, St. Georgen, Villingen, and Triberg, where there are 44 of the factories, with six large firms, and employing in all 6778 workers; while Pforzheim contains 15 factories, all small and employing in all 467 workers; the third region is represented by those towns in the upper Rhine valley, such as Weil and Säckingen, which take part in the industry, 6 firms being located here, employing 161 people.

The pre-factory phase of the clock making industry has already been outlined in the previous chapter. The change from a small scale, scattered and largely domestic industry, took place in the middle of the 19th century, when the export trade began to be adversely affected by American mass produced articles. The first large factory was established at Lenzkirch in 1851, and, by 1882, there were 20 such factories in the East-Central Black Forest. The need for the concentration of skilled workers into factories, in sites accessible to timber and water power, seems to have been stimulated by the demand for small, precise works, especially for watches, which could
only be made in factories, and in 1853 a 'Company for the making of Pocket Watches in the Black Forest' was founded. In 1882, the chief factories were located in Triberg, Villingen, and Neustadt, while smaller works were established in Lenzkirch, St. Georgen, and Furtwangen. Thus:

<table>
<thead>
<tr>
<th>No. of Firms</th>
<th>100 workers</th>
<th>Total No.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Triberg</td>
<td>10</td>
<td>1</td>
</tr>
<tr>
<td>Villingen</td>
<td>8</td>
<td>2</td>
</tr>
<tr>
<td>Neustadt</td>
<td>2</td>
<td>2</td>
</tr>
</tbody>
</table>

By 1925, the number of factories employing more than 20 workers, representing a total of 6800 workers (2000 of whom are women), had increased to 44. These factories are either concerned in the making of clocks alone (24 of the total, employing nearly 5000), or with the making of clock cases, figures, etc., accounting for the remaining 20 firms, employing 1623 people. In the district of Villingen are found the largest firms, 29 establishments employing more than 4000, Donaueschingen containing 7 of these, with 1483 employees, Neustadt 6, with 567 workers, and Wolfach 2, employing 300.

As the Black Forest industry is mainly designed for the tourist and export trades, the firms are large, since mass production is the rule, and little of the work is now done by hand (in some of the smaller works in Triberg, wood carving, and the assembly of the various parts is carried out by a family, long engaged in the industry, and employing only a few workmen). Several of the firms employ over 100 workers, and three between 500 and 1000. The range of products is very
wide, from the simplest and the cheapest clocks, turned out by the hundred, to the most precise and expensive models. In Lenzkirch, which is the oldest centre of the industry, gold pendulums were first made, and later, regulators, chiming clocks etc. In view of the restricted world market after the war, the industry has been somewhat rationalized, so that it now concentrates on turning out a few standard types of clocks, for assured markets, rather than hundreds of patterns, as in former years. The current trade restrictions in Germany have also affected the trade adversely during the last three years.

In St. Georgen, a clock factory was set up in 1863, and is now one of the largest in the Forest. It makes a wide variety of clocks, and also wheels and springs for electrical apparatus, calculating machines, etc. Another firm, which specializes in clock works, wheels and springs, has expanded rapidly since 1890, and now makes clocks for electrical and meteorological instruments, etc., for export to all parts of the world. In a different category are the cheap, mass produced 'American' clocks, made in Villingen, Triberg, St. Georgen, and Schönwald, an industry which developed in the last half of the 19th. century. It began in St. Georgen, one of the chief centres of the carved clocks and cuckoo clocks trade, and, like Triberg, caters especially for the export trade. Several of these firms began by making alarm clocks, as in Villingen, and now 3000 a day are turned out by one firm! Most of these factories are located with convenient access to water power, and drew originally on local skilled labour, using pine wood, and also beech,
as raw material. In this part of the Black Forest, the clock trade supercedes by far the making of watches.

Another branch of the industry, which has developed in these central valleys, is the making of wheel works, clock cases, and machine parts, etc. Schönach, near Triberg, had a brass foundry in 1856, and later began to make clock wheels, metal moulds, springs, etc. in factories. Vöhrenbach, in the Brege valley below Furtwangen, makes springs; St. Georgen, clock faces (enamelled in the same town); Triberg makes metal cases for clocks; and Furtwangen has a brass and metal foundry.

In Pforzheim, a minor centre of the industry, clock making is second in importance to the precious metal and jewelry trades. The industry has specialized on different lines from that of the Central Black Forest, for the production of the most expensive types of clocks proved uneconomic in face of competition from similar Swiss models. Pforzheim has, therefore, concentrated mainly on the making of gold and silver watches, cases for clocks, clock keys, chains, and goldsmith's work generally. Like the jewelry trade, to which it is allied, the industry in Pforzheim caters for a restricted, luxury market.

In the Upper Rhine valley, there are a few firms, employing mainly Swiss capital, in Weil (Amt Lörrach) and Säckingen, which make watches and clocks, and also carry out enamel and metal letter making. The industry may be taken as an extension of that of the Swiss Foreland, in the same way as the
silk and cotton manufacturing industry. (See infra).

(II) The Making of Musical Instruments is carried out in II factories, one of which employs over a 100 workers, and it occupies in all over 500 people. The industry has developed from the toy clock industry of the Black Forest, and was established in the 18th. century. It is located chiefly in Furtwangen, Vöhrrenbach, Kirnach, Lenzkirch, Triberg, and Waldkirch. No factory employs more than 30 workers, but there is a considerable export trade, especially with America. The largest firms are, however, to the East of the Forest, in Württemberg, e.g. that of Hohner in Öfingen, near Donaueschingen. Freiburg and Offenburg have piano factories, and Waldkirch makes church organs, electrical pianos, pianola rolls, musical boxes, etc.

2. Textiles.

The basis of the Black Forest textile industry was the spinning of wool and flax and the weaving of cloth in peasant homesteads, and also the straw plaiting industry. After the Zollverein, in 1836, a number of factors favoured the concentration of the industry into factory units. They included improvement in transport facilities, especially with the construction of railways, in the latter half of the 19th. century, thereby facilitating the import of raw cotton and silk, and the marketing of the finished goods, while at the same time the industry remained in small centres, with access to abundant water supply, water power, etc. The number of factories increased in Baden from 16 in 1835 to 50 in the middle of the
19th. century, employing 8000 people. Of these, II were cotton spinning mills, 14 were weaving mills, 7 combined both processes, 6 were woollen mills, 1 made linen, 5 made silk, and 6 were concerned with dyeing and finishing processes. Of these, 22 were large firms, employing more than 100 workers (a mill in Maulburg -Amt Schopfheim- employed 400, and Haagen near Lürrach, 500). Mechanical weaving had been introduced in the Wiese valley, under Swiss influence, in 1841, and at this period the textile industries had not been overtaken by others, e.g. metallurgy. At the present time, there are 192 firms in Baden, employing more than 20 workers, engaged in the textile trades.

In the siting of the mills, access to soft water for use in the washing, bleaching, and dyeing processes, appears to have been equally as important as water power for driving machinery, and the catchment area of the Wiese is mainly composed of impervious, granitic rocks, the Muschelkalk of the Dinkelberg Plateau lying to the South and not providing any significant surface drainage. The usual sites for the mills are, therefore, to be found where there is a steep drop in the gradient of the valley, e.g. at Kollnau; where valleys open on to the Rhine Plain, as at Murg, Lürrach, Offenburg; or where the stream can be used for power by regulation, as in the Wiese valley (See Plate 38). Other factors in the development of the industry included the existence of adaptable & adequate labour, made available through the precarious livelihood of the peasant farmer, combined with the inevitable surplus of labour, resulting from the prevalent system of inheritance. Factory
Plate 40: Cotton mill at Zell in the Wiese valley. Access to rail transport is an obvious advantage, and the Wiese provides power for electric lighting. (Author's Photo).

Plate 41: View of a cotton mill down a side street in Zell in the Wiese valley. (Photo, Miss A.E. Adams).
workers could, therefore, be readily drawn from the rural districts into the small developing industrial centres, such as those of the Wiese and Wehra valleys. It is characteristic of the industry that it has remained in these small centres, where there is access to pure water supply, water power, rural labour, and good transport facilities. Pforzheim and Baden are exceptional in the size of their establishments, there being in all only 13,000 employed in the industry, by some 60 firms. Lörrach, the economic hub of the textile industry in the Wiese valley, has 10 firms employing 2,500 workers, with 6 others up the Wiesental, outside the town, totalling 4,500. In this centre, all branches of the industry are represented, including spinning, weaving, bleaching, dyeing, and printing. From Lörrach, where the industry developed under the influence of the proximity of Basle, a string of industrial centres, decreasing in size, extends up the Wiese valley, via Schopfheim, Zell, Schönau, to Todtnau near the foot of the Feldberg. ( Cf. Figs. 26, & 27, & Plates 38-41 ). This section of the Wiese valley, together with the side valleys, opening on to it from the North, includes 11 textile mills, employing 2,400 workers. Cotton, silk, and artificial silk are the main activities here. A mill inspected in Zell was found to be carrying out both cotton spinning and weaving, and specialized in the making of damask cloth, woven on Jacquard looms. The industry was started in c. 1880 but had suffered acutely from the depression dating from 1931. Cotton is imported via Hamburg and Bremen, mainly from Egypt. The mill no doubt used water power originally, but with expansion in out-
Fig. 27.

- 20-100
- 100-500
- 500-1000
- 1000-2000
- workers
put, steam power has been introduced to drive the looms, and the Wiese is only used to generate electricity for lighting.

Other textile centres are located in the Upper Rhine valley, where side valleys open on the plain, e.g. in Grenzach, Rheinfelden, Wehr, and especially in Säckingen, and Waldshut. In the last two centres are found more than half the total workers (3767 in all), 14 factories in Waldshut occupying 2123 people. Most of these mills are at the lower end of the Wehra valley, where the Hasel converges on it (6 factories employing 1278). Similarly in the S. Murg valley, there are two factories employing 728 workers, and others in the lower Alb (including St. Blasien, Niederwihl, Gürwihl, and Rüswihl) employing 577 workers. In the Wutach valley, there are textile mills in Stühlinger, Unterreggingen, Unter and Oberlauchringen, and Tiengen, together with a few firms in the Schlucht valley. In the Upper Rhine district, the chief branch of the industry is that of silk spinning and weaving, cotton taking second place. More than 600 are employed in this industry in Unterlauchringen, and more than 500 in Murg and Wehr. Most of these firms are Swiss in origin, and they have branches in Zell, Grenzach, and Schopfheim. Not only is the textile industry here financed by Swiss capital, but economically the existence of the Rhine frontier was of little significance, complete freedom of transport being restored in 1925, after the period of dislocation during and immediately after the war. This condition of affairs was completely altered by the restrictions on the export of German currency, etc., imposed in 1933.
In the Freiburg-Emmendingen-Waldkirch textile region, silk is again the most important branch of the industry. This group includes 20 firms, employing nearly 6500 workers, with branches in Staufen, Donaueschingen, and Villingen. Smaller firms are also to be found in Untermünstertal, Herbolzheim, Reute, Waldkirch, Kollnau, Gutach, and Breisach. Cotton is manufactured in Kollnau, artificial silk in Waldkirch and Gutach, in the Elz valley, and also in Freiburg, both of these centres specializing in embroidery silk and sewing thread (Firm of Gutermann). On the other hand, the 9 factories in the Gutach valley, including those in Triberg, Hornberg, Gutach, Wolfach, and Schiltach, etc., only make cotton, in the same way as the Lahr-Offenburg-Kehl group. Here there are 13 firms, employing over a 1000 workers, all small establishments. The distribution of the textile mills throughout the Black Forest is summarized in the following table:

<table>
<thead>
<tr>
<th></th>
<th>Large Firms</th>
<th>Workers</th>
<th>Other Firms</th>
<th>Workers</th>
</tr>
</thead>
<tbody>
<tr>
<td>1925-</td>
<td>(&gt;100 workers)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Wiesental</td>
<td>29</td>
<td>9858</td>
<td>II</td>
<td>610</td>
</tr>
<tr>
<td>Oberrhein</td>
<td>26</td>
<td>6977</td>
<td>13</td>
<td>555</td>
</tr>
<tr>
<td>Freiburg, etc.</td>
<td>12</td>
<td>6036</td>
<td>8</td>
<td>440</td>
</tr>
<tr>
<td>Triberg, etc.</td>
<td>1</td>
<td>149</td>
<td>8</td>
<td>375</td>
</tr>
<tr>
<td>Lahr-Kehl, etc.</td>
<td>1</td>
<td>645</td>
<td>12</td>
<td>441</td>
</tr>
</tbody>
</table>

The history of the textile trades in the Black Forest region has been somewhat chequered. Woollen and linen goods

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1. Table taken from Die Industrie in Baden, 1925, p.173.
were made on a small scale at the beginning of the 19th century, when calico making was also introduced in the Wiese valley. (See Fig. 29). These industries have now practically disappeared, and the textile industry relies on imported raw material via the Rhine valley and Basle. The number of firms now engaged in the woollen trade is only 21, employing about 2000. The number of factories increased from 20 in 1836 (when 16 mills were spinning and weaving cotton, and 4 were twisting and weaving silk) to 50 in 1850. For the next twenty years, the number increased steadily to 88, and by 1900 another 50 had been added. In the last years of the 19th century, the silk industry declined relatively, and the number of cotton mills increased, but more were established again at the turn of the century. Lörrach began to make silk ribbons in 1859; Waldkirch, silk gauze in 1875; Säckingen, silk material in 1883, and Emmendingen began spinning 'ramie' grass fibre in 1887. Six new factories were set up during the war years in Schopfheim and Säckingen. After the war, the textile mills began to increase their output, so that by 1925, the number of those engaged in the industry was greater than that before the war. After 1929, however, the acute world depression greatly affected the textile trades in this part of Germany, although some of the mills are now increasing their output, under artificial stimulus.

In contrast with most of the other industries of the Black Forest, the textile trade makes a demand on women rather than men workers. The proportion is highest, of course, in the silk trades (72% Cf. 54% in the cotton industry). Men are,
Fig. 28.

WOOD WORKING

- 20-100
- 100-500
- 500-1000 WORKERS

Laahr
Freiburg
Todtnau
however, employed in larger proportions in the few woollen and linen mills, and in the artificial silk trade (in Freiburg, Waldkirch, Zell, Schopfheim, etc.). The making of cloth and carpets (as in Freiburg, Wehr, near Schopfheim, etc.), textile machinery (in Lörrach, Weil, Schopfheim), jute, hemp, and 'ramie' spinning, etc. (in Schopfheim, where there is a branch of the 'Hanf Union' of Hamburg, Triberg, and Emmendingen), employ mainly men, where less dexterous labour is required, and a heavier raw material has to be handled.


In view of the fact that Baden is one of the most thickly forested states in Germany (39% of the total area is forested) and the multiplicity of mountain streams of steep gradient, providing sites for saw mills, the number of such mills is naturally enormous, and they are widely scattered throughout the Forest. They are often small undertakings, worked by waterwheels, but in contrast, there are the large, modern saw mills, which have been erected as the result of improvement in means of transport through the Forest, especially by railway. The construction of railways, e.g. up the Murg, Kinzig, and Dreisam valleys, has facilitated the marketing of the timber, whether it is to be used for constructional purposes, for the making of wooden articles, packing cases, coach work, or in the local clock and brush factories. Consequently, some of the largest mills find the supply of water power insufficient, and steam engines have been introduced (Cf. Plate 40, where new plant was being installed.
Plate 48: Oxen transporting logs (cut to even lengths) from the pine forests of the Glottertal slopes to the saw mills in Oberglottertal. (Author's Photo).
when the mill was visited in August, 1935).

In 1829, there were 300 saw mills in Baden, worked by water wheels. Wood-working factories increased rapidly during the second half of the 19th century, thereby increasing the demand for sawn timber, and, by 1860, there were 15 such factories employing 310 workers, but only 7 of these employed more than 20 workers, the latter group including 5 furniture factories, 1 factory for the making of wooden articles, and 1 for gold mouldings. By 1890, the number of large saw mills had increased to 86, employing 3900, and by the time of the last census, in 1925, 253 firms were employing 15,624 people. To-day, the wood working trades rank third in importance in the industries of the Black Forest, from the point of view of demand on labour. 86% of the labour is supplied by men, the women finding employment mostly in the furniture, penholder, broom, brush and comb industries. The following table shows the relative importance of the various branches of the trade:

<table>
<thead>
<tr>
<th>Branch</th>
<th>No. of Firms</th>
<th>Total Employed</th>
<th>No. of Women</th>
</tr>
</thead>
<tbody>
<tr>
<td>Sawmills</td>
<td>28</td>
<td>2914</td>
<td>68</td>
</tr>
<tr>
<td>Furniture &amp; Constructional Timber Boxes, etc.</td>
<td>82</td>
<td>4698</td>
<td>247</td>
</tr>
<tr>
<td>Coachwork, etc.</td>
<td>24</td>
<td>1345</td>
<td>164</td>
</tr>
<tr>
<td>Basketry</td>
<td>15</td>
<td>805</td>
<td>331</td>
</tr>
<tr>
<td>Brushes, brooms.</td>
<td>26</td>
<td>1811</td>
<td>699</td>
</tr>
<tr>
<td>Combs, etc.</td>
<td>1</td>
<td>25</td>
<td>18</td>
</tr>
<tr>
<td>Cork</td>
<td>2</td>
<td>229</td>
<td>69</td>
</tr>
</tbody>
</table>

Plate 43: Metal working factories in Gutach valley, below Triberg. N.B. Access to hydro-electric power, & thick fir forests on steep slopes. (Author's Photo).

Plate 44: Saw mill in the Gutach valley, between Triberg & Hornberg. Hydro-electric power is used in the mill & also in operating the cross cut double hand log saw, seen in the foreground. Logs are floated down the Gutach (left) to the mill, where plant has recently been increased, & a steam engine introduced. (Author's Photo).
The chief saw milling centres are to be found in the Murg valley, in Gernsbach, Obertsrot, Hörden, etc. Here timber is not only sawn into required lengths, but wood pulp is made, and the timber is treated for future use, as planks, sleepers, telegraph poles, electricity standards, etc. The stream itself was formerly used for floating timber down to Rastatt and the Rhine, for much was exported to France, Holland, and Switzerland, and also to the Mediterranean countries. Now that the industry has become more specialized, a certain amount of timber has to be imported, e.g. cabinet woods, for the furniture industry in Rastatt (where cherry wood is also used), and in Freiburg. The furniture industry is essentially a town industry, with largely an urban market, whereas the preparation of constructional timber is more widely scattered and makes less demand on skilled labour.

The other branches of the wood-working industry include the making of an endless variety of wooden articles, apart from the amount of wood used in the clock making industry. These include the making of packing cases, coach work, brooms, brushes, combs, etc., together with the making of wheels, milling machines, clock cases, beehives, household utensils, etc. These industries are located mainly in Villingen, Triberg, and Hornberg. Staufen specializes in beehives, and Freiburg, Bühl, and Säckingen make snow shoes, etc. Hotzlebruck, near Neustadt, is a centre of the packing case trade, and Obertsrot and Gengbach are others. Coach work and the construction of car chassis are undertaken in Freiburg, Offenburg, & Lörrach, occupations...
Fig. 29.

Distribution of Industrial Settlements in Wiese Valley in 1847.

- Cotton & Calico Spinning & Weaving
- Linen Spinning & Weaving
- Wool Spinning & Weaving
- Silk Spinning & Weaving
- Wood Working
- Saw Milling
- Paper Making
- Match Making
- Brush Making
- Metallurgy
- Tanning
- Flour Milling
- Tobacco Manufacturing
which began, in the case of Freiburg, with saddlery and coach building.

In the Wiese valley, a variety of wood working industries has been established, in addition to the textile trades. Brushes have been made in Todtnau since the end of the 18th century. The industry was only organised on a small scale until 1860, and parts of the brushes were made in the peasants' homes, as a winter occupation. The first factory was set up in Todtnau in 1827, and others followed in the neighbourhood, making larger and finer quality brushes than had been possible before. ( Cf. Fig. 29 ). The industry now ranges from the making of the simplest brushes from local wood to more expensive types, made from imported woods, and using celluloid, tortoiseshell, and ivory. In some cases, the bristles used are still assembled by hand, others by machine. The industry has now disappeared from Todtnauberg, at the head of the Wiese valley, but it is still carried on in Brandenberg, in small establishments, in Utzenfeld, where it is connected with the local saw milling industry, and also in Freiburg, Obermünstertal, Offenburg, and Kappelrödeck (near Achern).


The making of paper, an industry which is closely allied to that of saw milling, is found in a number of centres in the Black Forest, where cheap power is available, wood pulp, clear water, adequate labour, and railway facilities. The paper manufacturing industry is in the hands of 192 firms in Baden, employing 15,600 workers, and the industry also includes the
Fig. 30.

PAPER

• 20-100
• 100-500
• 500-1000
• workers.
making of wood pulp, cellulose, paper, and its many kinds.  
29% of the labour employed is that of women. The largest firms 
in Baden, relying on imported pulp, are in Kehl, Mannheim, etc. 
outside the region under consideration.

The industry has been long established in the 
Black Forest (See previous chapter), but many earlier centres 
have now disappeared, with the decline of hand made paper mills. 
The organisation of the industry in factories came in the 
middle of the 19th century, the Schopfheim mill adopting 
machinery in 1835, Gegenbach in 1844, Freiburg in 1845, and 
Emmendingen in 1847. A further revolution in the industry 
came with the use of cellulose, instead of linen rags, etc., 
as raw material. Cellulose is now made in factories in Zell 
in the Wiese valley, Neustadt, Kandern, and Gemsbach in the 
Murg valley.

The distribution of paper mills and the relative 
importance of the various centres may be seen in Fig. 30. 
Most of the mills are located on the edge of the plain, e.g. 
in Waldkirch, in the lower Elz valley, in the Dreisam behind 
Freiburg, in the lower Kinzig, Murg, Rench, Nagold, and Enz 
valleys. In the South, paper mills are found in the Wiese 
valley, at Zell and Schopfheim, and in the Albtal, at Albbruck. 
Many of these had their origin in the days of hand made paper 
production, e.g. in Gegenbach, Emmendingen, and Schopfheim. 
The mill at Albbruck stands on the site of a former iron works, 
where water power is available, and dates from 1880. On the 
other hand, with the increased demand for paper of all des-
Plate 45: Pipe lines from the Schwarzenbach reservoir, in a tributary valley of the Murg, serving the power station which transmits 125,000 kws. to the saw mills and factories of the Murg valley.

( Photo, A. Partridge. )
criptions, many new mills have arisen, e.g. at Gernsbach (since 1860) and Weisenbach in the Murg valley (since 1887), Neustadt and Wehr. Gernsbach specializes in the making of cigarette papers, an industry in which 500 are employed, and which gives rise to a large export trade. Weisenbach makes writing paper, etc., and both centres have the advantage of access to timber, in the heavily forested valley of the Murg, and to water power. Oberkirch, up the Rench valley, has made paper since the 17th. century, using machinery since 1864. Schopfheim is another long established centre, and specializes, like Freiburg and Emmendingen, in writing paper.

The number of wood pulp mills in the Black Forest is small, only 7 firms employing more than 20 people, and 2 more than 100. Access to timber and water power are again the most important factors in the location of the mills, as at Obertsrot in the Murg valley, Gegenbach, Todtnau, and Hornberg. Other branches of the paper trade include a comparatively new industry, that of wall paper, paste board and cardboard boxes, all of which are made in Lehr, Offenburg, and Pforzheim. The book binding trade is represented by 7 large firms, employing 485 workers. 267 of these are women, and two of the largest firms are in Freiburg, a centre of the industry for centuries.

5. Quarrying, Stone Cutting, Glass Making, etc.
Under this heading are included a variety of industries, often using local raw materials. They are (in order of number employed): pottery making, granite quarrying, cutting, and polishing, porcelain manufacture, lime, gypsum,
and cement works, glass making, limestone and sandstone quarrying, the making of briquettes, and the cutting and polishing of precious stones. These industries are carried on in nearly 200 establishments, each employing more than 20 people, and in all over 13,000, in the whole of Baden. Most of these firms employ less than 100 workers, except for such large centres of industry as are found in Mannheim, which is outside the region under consideration. Zell, with its pottery factory, occupies 398 people, Offenburg, 270, engaged in the making of plate glass, etc., and Achern with 270 in the glass bottle trade.

The most important of these industries in the Black Forest are the bricks and porcelain, granite cutting, glass, and the stone polishing and cutting trades. Bricks are made in the vicinity of such large urban centres as Freiburg, Emmendingen, and Lürrach, using local clay. The porcelain industry is chiefly found in Hornberg, where 300 people are employed, and also in Freiburg, Villingen, and Zell, while pottery is made at Kandern. In the case of Hornberg, timber was abundant locally for use as a fuel in the firing process, although steam coal is now used, and water power from the Gutach drove the first machinery. Granite cutting, with its many uses as paving blocks, sets, and for the upkeep of the permanent way, etc., is undertaken in Bühl, S. of Baden-Baden. The making of glass, an industry which developed in the Black Forest in the Middle Ages, is now found in Gaggenau, in the Murg valley, in the neighbourhood of the Schluchsee
(Cf. Altglashütten and Neuglashütten); at Hüle; at Herzogenweiler, near Villingen, and at Bubenbach, near Neustadt. Both these latter centres specialize in table glass, while Offenburg is the chief centre of the industry, and makes not only plate glass, but also glass for various instruments, etc.

The cutting and polishing of precious and semi-precious stones, an industry which is chiefly located in Waldkirch and Elzach, in the lower Elz valley, is also found in Zell, Waldshut, and St. Blasien. In the case of Waldkirch, the industry developed out of granite polishing, after 1852. At first, semi-precious stones were handled, but after 1884, with increased prosperity, rubies, sapphires, and emeralds. To-day, a much wider range of stones is imported, but by the nature of the industry, it depends on skilled hand labour, and the establishments are small workshops. In Elzach, sapphires have been cut since 1900, and in Zell the industry began with the polishing of garnets as a home industry. In Pforzheim, stone cutting and polishing is an integral part of the jewelry trade. At first agates and rock crystal were cut, for use in the clock and jewelry industry, but now synthetic stones are made. Branches of these firms are found in the Southern Black Forest, in Menzenschwand, Niederwihl, and Rotzingen, in the Hotzenwald.

6. The Chemical Trades.

The manufacture of chemicals is largely a development of the 20th century. In the previous century, small firms
were scattered throughout S.W. Germany, making madder and other dyes, lead acetate, alum, sulphuric acid, salt peter, and potash salts. Many of these industries have, however, since died out, e.g. the making of vegetable and other dyes, in face of competition from the aniline dye industry. Potash salts are made around Schönnau, Freiburg, and Staufen ( 'Kali' salts being obtained from the Triassic rocks, underlying the drift of the Rhine Plain, in Baden as well as Alsace ). However, the larger scale industry in Stassfurt has adversely affected the activity of these centres in Baden.

The present important foci of the chemical industry are in the Upper Rhine valley, between Grenzach and Waldshut, where some salts occur in the neighbourhood, others can be imported, e.g. via the Rhine up to Basle, and electrical power is available. The industry is organized on a large scale, 50 firms employing more than 100 workmen, in addition to many smaller firms, and production en masse is the rule. Rheinfelden is the chief centre for the transmission of electrical current, some of which is used locally in the reduction of gold and silver ores, in the making of fertilisers, calcium carbide and ammonium sulphate, and especially in the making of aluminium. This last industry, which superseded diamond cutting, dates from 1898, and is an offshoot of the Swiss works at Neuhausen ( deriving power from the Rhine Falls at Schaffhausen).

Using local hydro-electric power, aluminium is reduced from
imported bauxite and is marketed in the form of blocks and bars.

Electro-chemical works employ 465 people in Waldshut, especially in the making of chemical fertiliser (nitrate of lime), while Rhina makes artificial nitrates by electrical methods, and synthetic nitrogen from the air, power being derived from the plant at Laufenburg. Here ferro-chrome, ferromolybdenum, etc. are also made, tin being imported from the Far East, chrome ore from India, S.Africa, and New Caledonia, and molybdenum, from S.America and Australia.
Fig. 31.

POPULATION DENSITY
1813

>1000 per 100 hectares
500 - 1000
250 - 500
125 - 250
100 - 125
75 - 100
50 - 75
25 - 50
< 25

(1 hectare = 2.47 acres)

--- Limit of the Black Forest.
CHAPTER IX.: CONCLUSION.

In this final chapter a summary of population trends will be made, especially with reference to changes during the last 120 years. Some of these changes may be traced to migration and emigration, and their cause may be explained sometimes geographically, sometimes as the result of economic and political factors, etc. In conclusion, some of the factors which tend to retard rural depopulation will be mentioned.

Two maps have been made showing the density of population per 100 hectares (Isq.Km.), in 1813 and 1933. The map for 1933 is based on the census returns for Baden of that year, and the former was prepared from figures taken from the *Historisch-topographisches Lexicon von dem Grossherzogthum Baden* edited by I.B.Kolb, Karlsruhe, 1813, and available in the library of the Geographisches Institut, Freiburg. A comparison of the two maps, showing the changes which have taken place in the last twelve decades, reveals some interesting features.

The most marked increase in population density has taken place, of course, in the Rhine valley, where, in a number of Gemeinde( the smallest division for which figures are available ), the population has doubled or more than doubled itself, as in the case of Kleikems, Wollbach (Amt Lörrach), Badenweiler, Müllheim, Neuenburg, Obereggenen (Amt Müllheim ),
Fig. 32.

POPULATION
DENSITY
1933

1000 per 100 hectares
500 - 1000
250 - 500
125 - 250
100 - 125
75 - 100
50 - 75
25 - 50
< 25

Limit of the Black Forest.
Ebnet, Kirchzarten, Steig, Wolfenweiler (Amt Freiburg),
Denzlingen, Kollmarsreute (Amt Emmendingen), Dinglingen,
Kürzell, Nonnenweier, Reichenbach (Amt Lahr), Appenweier,
Rammersweier (Amt Offenburg). In all these instances the
population in 1813 was less than 1000 persons. In the larger
settlements (between 1000 and 10,000 inhabitants), the propor-
tional increase has been much larger, for example, the
population of Lahr has increased threefold since 1813, that of
Offenburg, fivefold, that of Emmendingen, sixfold, that of
Kehl, eightfold, and that of Lörrach (part of the Basle
population agglomeration), tenfold, the last census return
recording over 18,000. Freiburg, the largest population
centre in the whole region, has now attained the status of a
city, the population having increased from 10,000 to 99,122
in 1933. In none of the small towns has there been a decrease
in population during the last total 120 years, and the
general increase may be accounted for by a steady growth in
industrial activity, improved transport facilities and a
widening of markets, and various other factors. At the same time
there has been an increase in the population density of the
rural areas, especially as the outcome of the importance of
the Rhine Rift valley as 'the garden' of the S.W. of Germany.
In the agricultural areas, the greatest increase in the
density of population appears to have taken place North of
Freiburg, i.e. on the rich alluvial loam soils of the Ortenau
district (See again Fig. 6.). The increase seems to have been
much less on the loess and heavy loams in the Breisgau, towards
the Swiss frontier. An explanation of this fact may be that the most enterprising elements in the population have been drawn into the towns of Upper Baden, or have emigrated (a topic dealt with later). A strip of sterile sands and gravels bordering the regulated Rhine, as a belt of varying width, remains a zone where the population density, with one exception (at Kehl opposite Strasbourg), never exceeds 250 to a sq. km., and averages one person per hectare. The function of the Rhine as a frontier divide (up to 1870 and since 1918) no doubt checks the advance of settlement into this riverine strip. At the same time, the thickly wooded nature of the gravel terraces, especially in the Hanauer Land, W. of the Kaiserstuhl (Cf. Plate 12.), and in the Sundgau, serves to maintain the barrier character of the region between Baden and Alsace, apart from the comparative paucity of river traffic on this upper section of the river.

The Upper Rhine valley, in the narrow strip between the Southern edge of the Forest and the German-Swiss frontier formed by the Rhine (with the exception of the enclave at Basle and Eglisau) is also a region of greatly increased density of population, the density of the Gemeinde of Rheinfelden now being 584 per sq. km., compared with 56 in 1813; and Waldshut, 650 compared with 105 per sq. km.. Greater security in proximity to the Swiss frontier compared with that with France in the last 100 years, together with special facilities for industrial development, such as accessibility to hydro-electric power. E.g. at Rheinfelden, the timber resources of the Southern Black Forest.
combined with proximity to the terminal port for barge navigation on the Rhine, at Basle, available for the import of raw materials and the export of such products as chemical fertilisers. These are some of the factors which are responsible for the increase in population in this region. This upper section of the Rhine valley, the Albgau, sloping steeply down to the river, is mainly under pasture rather than arable (Cf. Figs. 9 & 11.), and the high average density of population is to be explained by the frequent occurrence of urban and industrial centres strung out along the valley. East of Basle, through Rheinfelden, Säckingen, Murg, and Laufenburg to Waldshut.

Such are the striking features of population change in the regions marginal to the Black Forest. In the Schwarzwald proper, four main features are conspicuous. There has been a general decrease in the virtually uninhabited areas (those with less than 25 persons to the sq. km.). Apart from the Gemeinde for which figures were not available from the records for 1813, and which may or may not have been very sparsely populated (they often lie adjacent to such areas - as seen in Fig. 31.), the unshaded areas on the map in 1813, i.e. with less than 25 to the sq. km., were widespread in the South-Centre, in the region of the Feldberg massif, and in a belt extending to the North-East of it, in the Schauinsland district, S. of Freiburg, in the Blauen and Markgräfler Hills, to the S.W., in the thickly wooded Hotzenwald, and around the Schluchsee. Patches of thinly populated country appear in the Central and
North-Central Black Forest, e.g. N. of the Elz valley, and in the hills behind Baden-Baden, but the patches are not so large as in the South. A third belt of thin population density, in this case not continuous, is seen to extend in the region of the Württemberg boundary, where the forests on the Bunter sandstone appear to have been hardly exploited. Two prongs of this almost uninhabited belt extend W.N.W. and S. of the Schramberg re-entrant, the latter towards Triberg, so that there is an almost continuous strip of largely unsettled forested highland country extending, during the Napoleonic period, from the Blauen, E. across to the Feldberg, then N.E. to the East of the Gutach valley, then North, following the inter-state boundary to the West of Freudenstadt, to Herrenalb.

During the last century, these population 'blanks' have been largely filled in, or decreased considerably. The most obvious bare spaces on the population density map for 1933 are again on the Feldberg massif, where altitude is too high, exposure too great, winter snowfall too heavy, for anything but seasonal habitation. Other similar districts, but slightly lower in altitude, are to be found on the Tote Mann and Schauinsland massifs to the N.W., the highlands within the irregular quadrilateral formed by Görwihl, Todtmoos, St. Blasien, and Bernau, to the South of the Feldberg (the Northern Hotzenwald), and the Herzogenhorn-Spiesshorn-Schepphalde line of heights extending S.E. of the Feldberg. Between the Gutach and Brege valleys (i.e. between Neustadt-Titisee, and Furtwangen-Vöhrenbach) another thickly forested, sparsely
settled region occurs, and again between Furtwangen and St. Georgen (in the Stöcklewald and Kesselberg districts—seen in Plates 8 and 9). Settlement has spread somewhat into the boundary zone of Württemberg-Baden, since the political and economic unification of Germany, when the boundary became a line of little practical significance. Some attacks on the forests have been made, in this major reserve region, especially in association with saw milling, wood working, and paper making, industries which have developed in the Murg valley (See Fig.26 & 30.), e.g. at Gernsbach and Langenbrand. Similarly, timber cutting is increasing up the Rench valley, and Oberkirch is a wood working and paper making centre of some local importance.

Viewing the two population maps of the Black Forest as a whole, it is evident that over large areas the density has changed hardly at all during the past 120 years. The average density figure remains between 25 and 50 people per sq. km. (about 65-120 per sq. mile). This is a fairly high figure for a forested highland area, and it points to the fact that the Black Forest has a stable population element in the Allemannish peasant, who is a pastoralist, a cultivator of the soil where possible, and a workman in the forest.

In a few districts, marked increases in population have taken place. These are mainly in the tourist centres, health resorts, and small industrial towns or villages, such as Gernsbach (increase from 496то 3372), Triberg (824-4418), St. Georgen (195-2948), Furtwangen (2058-5053), Neustadt.
Moreover, where topography and soils are favourable to cash crop farming, e.g. on the floor of the Dreisam valley, East of Freiburg, in the lower Wiese valley, etc., here there has been a thickening in the density of rural population, stimulated by access by road and railway to an urban market, such as Freiburg and its suburbs, Wiehre and Littenweiler, in the case of the Dreisam valley, and Basle-Lörrach in the case of the Wiese.

Finally those areas of actual population decrease, stationary population, or very slow increase must be noticed. As it has not been possible to trace movements of population within the Black Forest during the last century, although a certain drift of rural population into the industrial centres and tourist towns and large villages may be assumed, it is only possible to calculate such figures of population for the whole period, 1813-1933. Gemeinde which show a decrease in population are: a large group on the Eastern margin of the Forest in Amt Donaueschingen; another in the South-West of the Forest, in Amt Säckingen, Schopfheim, and also in Amt Waldshut, presumably in the Gemeinde which are largely rural, for all the important industrial centres have increased in size. In the Feldberg Gemeinde population has slightly decreased, and also in St. Blasien, St. Peter, St. Märgen, Stegen, Wagensteig, Zarten, and other small centres in the upper Dreisam valley and its tributaries. Some of the Gemeinde lying in largely non-industrial districts, in the higher parts of valleys opening on to the Rhine Rift valley, also record a decreasing
population, or a stationary one, such as in the Amt Wolfach, in the valley of the same name, and Amt Waldkirch, which includes a number of small centres up the Elz valley, where the only important industrial settlements are at the S.W. end, e.g. in Waldkirch itself.

The significance of these regions of rural depopulation is that they reflect the low standard of living of the Black Forest peasant, compared, for example, with the agricultural worker in the Rhineland. Consequently, a constant migration into the foothill industrial, tourist towns, and market centres takes place, apart from the less apparent movement into the similar centres in the Black Forest. A further factor in the depopulation of the whole of this region is emigration. This movement of people has been traced to various causes, often not directly geographical, and to various regions of the world, including the 'Germanised' agricultural districts of S.E. Europe, such as the Banat and Siebenburg regions of Transylvania, the Ukraine, and also to the New World.

The Atlas of Baden includes a map showing the source, date, and direction of emigration, and from this data Fig.  has been prepared, and the following notes are giving as a summary and conclusion. The causes of these considerable migrations may be frequently traced to economic factors, such as the general poverty of the peasants, and land waste which took place during the wars of Louis XIV in the Rhineland at the end of the 17th century; the general excess of population, pressure of food supply, and poverty of soil in the forested
Fig. 33.

Centres of Emigration from S.W. Germany since 1680, showing the centres of depopulation in the Black Forest, especially in the North and South.

(From data and map in the Atlas of Baden.)
districts, unfavourable to further clearance and cultivation; together with local causes of bad harvests, e.g. due to flooding in the Hanauer Land, drought in 1816 and 1846 which ruined the grape harvest. In some instances the emigration was stimulated by a desire for religious or political freedom, e.g. on the part of the Calvinists, those influenced by the ideas of the French Revolution, etc. Some settlement in other parts of Europe was fostered by the 'Germanizing' policy of the Hapsburgs, especially under Maria Theresa and Joseph II, who settled ex soldiers in the Banat and in Hungary. Finally, a large number of Germans have left Baden to settle overseas, with a view to building up a colonial empire, or to finding new openings in the New World.

The main population movements were in the first instance to Russia. Catherine II encouraged immigration in the middle of the 18th. century, and between 1760 and 1770, 50,000 settlers from S.W. Germany arrived in the Volga basin (Cf. the German Autonomous Republic of the Volga, established in 1927!). In S. Russia, the Tsar Alexander invited settlers in place of the Turks, between the Bug and the Dniester. A stream of German settlers arrived, therefore, in the Ukraine, between 1803-6, 1808-II, and 1814-23. In Rumania, the chief German settlements are in Bessarabia, the Dobrudja (Constanza district), Bukovina (after its freedom from the Turks in 1771-74), and in the Siebenbürgen. In this last region, settlers arrived from Upper Baden (Badenweiler, Müllheim, Grenzach, the Feldberg district,
Lörrach, etc.) in 1748-9, when 800 left for Rumania. A second band arrived in 1770-I, from the Hanauer Land (Lahr, Kehl, etc.) In the Banat, Allemannish settlements were also made in the 18th century, e.g. at Saderlach in the Maros valley, between 1725 and 1755. The Hanauer Land again proved a source of population, and also the Hotzenwald (112 settlers), from St. Blasien, Schluchsee, and also from Donaueschingen.

In Yugoslavia, settlements were also made from the Black Forest and neighbouring regions, in the 18th century. In the Batschka, Maria Theresa and Joseph II founded colonies, between the years 1747 and 1787. Roman Catholics from St. Blasien, Kirchzarten, and Freiburg, and also from the Ortenau, arrived at Hodschlag in 1756.

In the New World, the only direct evidence for emigration is to Venezuela, in 1843, when 360 people left the Kaiserstuhl district for Tovar. In 1840, a number of jewellers left Pforzheim for Newark, New Jersey, and Providence, Rhode Island, and emigration is also recorded to Brooklyn and California. It has not been possible to estimate the number of those who, for various reasons, have left the Black Forest region since 1932. Such departures have been largely to France, Britain, Czecho-Slovakia, the U.S.S.R., and also to the Argentine and the United States of America.
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