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THE
EARTH AND ITS INHABITANTS.

EUROPE.

BY
ÉLISÉE RECLUS.

EDITED BY
E. G. RAVENSTEIN, F. R. G. S., F. S. S., Etc.

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A UNIVERSAL GEOGRAPHY.

FRANCE.

CHAPTER I.

GENERAL ASPECTS.—THE COUNTRY AND ITS INHABITANTS.

GEOGRAPHICAL POSITION.—GEOLOGY.*



FRANCE occupies a medium extent amongst those countries of the world which have played a distinct part in politics and in the history of civilisation. Smaller in area than either China, Russia, the Brazils, or the United States, it is nevertheless far more considerable than that of either Greece, Portugal, Switzerland, Holland, or even of England, all of which have left their mark upon the march of human history. Scarcely covering the 225th part of the habitable portion of the globe, its dense population has nevertheless enabled it to play a part quite out of proportion to its area.

It would be presumptuous if we claimed on behalf of France a sort of moral hegemony amongst the nations of the world. Still, within the comparatively small territory bounded by the Alps and Britany, by the Pyrenees and Vosges, there have taken place events whose influence has made itself felt to the farthest corners of the world. In arts and science France has found worthy rivals since the beginning of this century, and there are other nations which claim to march at the head of civilisation. But this merely proves that the area of the civilised world has been enlarged—that there are other nations capable of giving birth to initiatory movements. But France has at all times performed her share of this work of human progress, and looking to the influence which her ideas have exercised throughout the world, it would be difficult to conceive a future history of nations with France blotted from the map of Europe. To a very large extent

* Dufrenoy et Élie de Beaumont, "Mémoires pour servir à une Description géologique de la France."

the inhabitants of France are indebted for the eminent position they hold to the climate, the soil, and the geographical features of the country which they inhabit, and a faithful description of these will be our task in the following pages.

It has often been said that France enjoys exceptional advantages from its position between the Mediterranean and the open ocean. This position has made it the intermediary between the old countries of the Mediterranean and Northern

Fig. 1.—THE CONTOUR OF FRANCE.



..... Actual boundary. ----- Axes & diagonals of France.

Europe. Nowhere else in Europe is communication between the coasts of the Mediterranean and the Atlantic equally facile. The plains of Poland and Russia may offer fewer obstacles to intercommunication, but the Baltic and the Black Sea, which they unite, are remote inland seas. In Central Europe the Alps are an obstacle to the exchange of ideas and merchandise between the North Sea and the Adriatic, but in France great natural highways join the Atlantic and Mediterranean ports and river basins. Mountainous Europe may be said to terminate at

the foot of the Cévennes, and the great diagonals of the western portion of that continent, viz. that drawn from Germany to the Iberian peninsula, and that connecting Italy with England, intersect each other within the boundaries of France, which is thus marked out by nature as the great centre in which European thought may be elaborated, where North and South may exchange their ideas.

The contour of France is distinguished by compactness no less than by a certain elegance. A meridian passing through the capital connects the two extreme points of the territory, dividing it into two symmetrical portions in such a manner as to form an octagon. Oceanic alternate with land boundaries, and these latter for the most part consist of mountain chains, which separate France very distinctly from neighbouring countries. The principal of these natural frontier ranges are the Pyrenees, the Alps, the Jura, the Vosges, and the Ardennes.* We may even include amongst these bastions the granitic heights of the Armorican peninsula, which overlook the fields of Normandy and Anjou to the west. To these sterile hills France is probably indebted for not having been conquered by England, for if Britany had been capable of attracting hardy Anglo-Saxon settlers, it would have formed a link between Guyenne and Normandy, and these provinces might then have remained for ever in the possession of the foreigner.

Curiously enough, it is the highest amongst these frontier ranges which separate the French from nations of kindred origin, whilst the less elevated ranges constitute the boundaries towards the Germanic countries. The Pyrenees, a most formidable barrier, hardly to be passed in winter, divide France from Spain; the Alps, an obstacle almost equally formidable, separate it from Italy. But farther north, the Jura and the Vosges, which are of comparatively small height, separate the French from the German-speaking populations, whilst in the north-east, in the direction of the ravined plateau of the Ardennes, the boundary in certain parts is completely open and quite conventional. The frontier there has varied much in accordance with the fortunes of war, but the two conterminous races did not assimilate. In the south, however, had there not been the Pyrenees and the Alps, it is to be assumed that instead of three Latin nations—French, Spaniards, and Italians—each possessed of some special genius, there would now be but one.

France is thus doubly privileged. Its southern mountain barriers have preserved it from a premature fusion with other Latin nations, whilst in the north, where the frontier is open, it was preserved by the natural antagonism of race, and yet, owing to the facilities of communication, it rendered possible an extensive commerce and an exchange of ideas. Paris, placed close to this open frontier, was thus marked out by nature as the capital of the country: valleys and hills converge upon it; it is the principal seat of commerce and industry, and whether in peace or war has always held the foremost place.

The physical features of the interior of France are harmonious in their very

* Development of coast-line, not including indentations of less than three miles, 1,939 miles (Channel 696, Atlantic 861, Mediterranean 382 miles). Development of land frontiers, 1,349 miles (Belgium 286, Luxemburg 9, Germany 199, Switzerland 246, Italy 255, Spain 354 miles). Total circumference, 3,288 miles.

contrasts. A granitic plateau of a triangular contour occupies the centre of the country. In the east it is bounded by the deep valley through which flow the Saône and the Rhône; on the south-west it is bounded by the valley of the Garonne, whilst its north-eastern boundary runs parallel with the Loire. The granitic mountain of Rouergué and the heights of Morvan are attached to this plateau-like peninsula. Porphyries and lavas have been erupted through the granites forming the nucleus of this plateau, and on all sides it is enveloped by rocks of more recent age, as the bones of a human body are by flesh.

This comparison may be carried even further, and we may liken the granites and other ancient rocks of the Alps and Pyrenees, of Poitou, Brittany, and Cotentin, of the Vosges and Ardennes, to the skeleton, whilst the sedimentary rocks deposited in the valleys separating them represent the flesh.

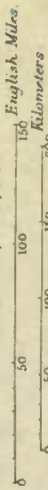
A zone of Jurassic limestones surrounds almost completely the granitic mountain mass of Central France, spreading out in the north-east along the foot of the Vosges and Ardennes, and bounding in the north-west the peninsula of Brittany. A corresponding zone of cretaceous rocks extends along the northern foot of the Pyrenees, from sea to sea, whilst the crystalline rock masses of the Alps rise above the strata of Jurassic formation. The space occupied by rocks of more recent origin than the chalk and Jurassic limestones is of small extent.

Geological formations and the relief of the soil divide France into a number of historical and geographical regions. The elevated granitic plateau of the interior, as well as the mountain barriers on the frontiers, must at all times have exercised a deterrent influence upon the surrounding populations, whilst the rich and fertile plains extending between them proved a powerful attraction. The rugged plateaux, however, offered a secure shelter, whilst the plains were open at all times to the incursions of enemies. Down in the valleys man struggled for the possession of the land; in the mountains he held it securely. The historical contrast between this barren central plateau and the surrounding lowlands is very evident. The valley of the Rhône in the east, the basins of the Garonne and the Charente in the west and south-west, and the huge bend of the Seine in the north, pulsate with life, and the number of mountaineers who descended into these inviting plains has been greater by far than that of the lowlanders who sought a home in the mountains, for men, like water, always travel downhill.

The direction of the great historical highways of France has necessarily been influenced by the configuration of the soil thus indicated. From Paris routes radiate in all directions towards the north, the east, and the west, for there they encounter no obstacles, but to the south of the Seine and the Loire these routes had to accommodate themselves to the relief of the soil, and there are in reality but two of them, viz. the great Roman road which leads across the lowest part of the plateau of the Côte d'Or into the valley of the Rhône, and which Cæsar followed when he invaded Gaul; and the great Iberian road, which passes to the west of the central plateau. A third natural highway joins the extremities of these two roads in the south. This latter skirts the southern slopes of the Cévennes, and joins the Mediterranean to the basin of the Garonne. Nearly all the towns

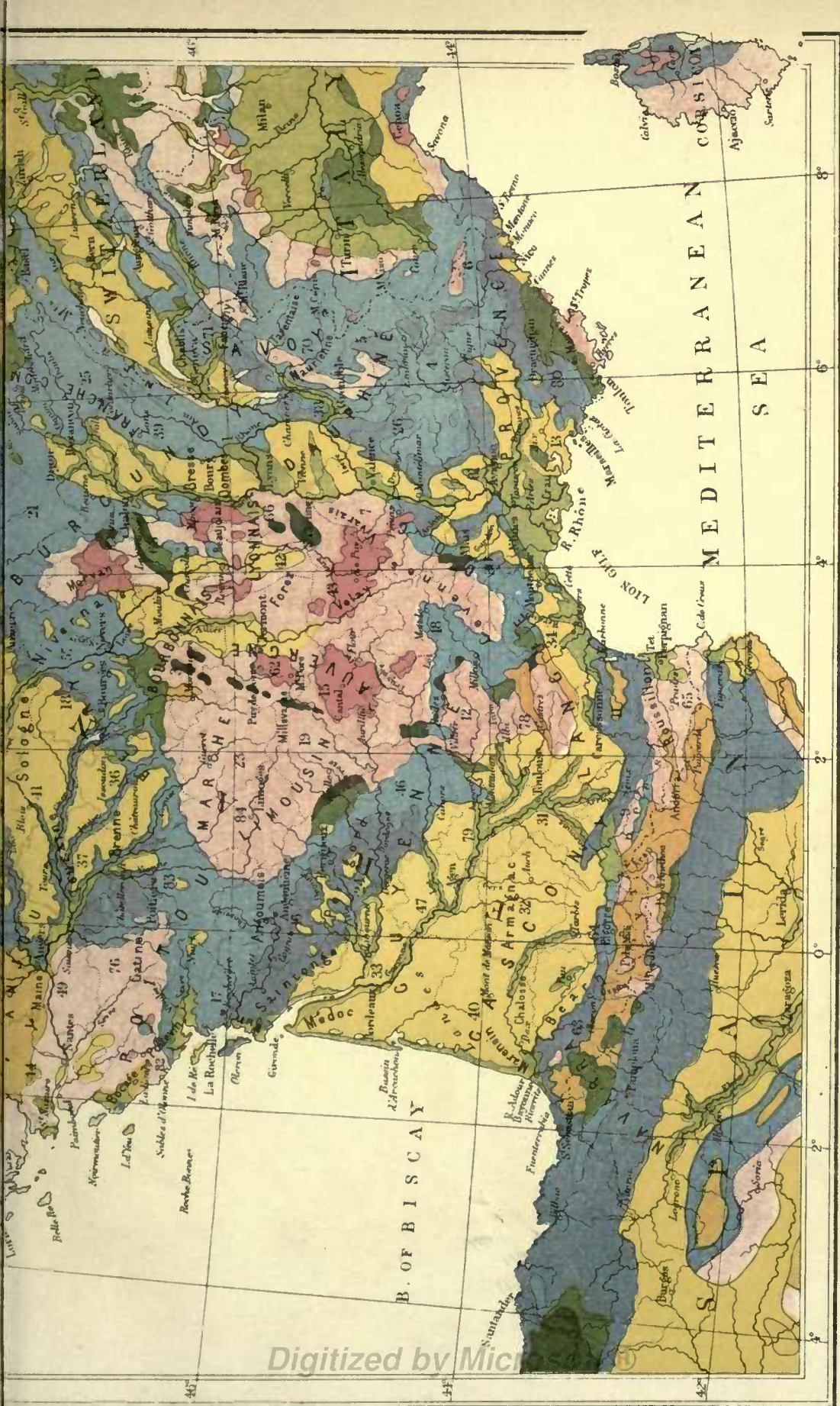
FRANCE, BELGIUM, AND THE NETHERLANDS.

SCALE 1:5,000,000.



French Departments.

- 1 Ain
- 2 Alpes
- 3 Alpes Maritimes
- 4 Ardenne
- 5 Ardennes
- 6 Bas-Rhin
- 7 Haut-Rhin
- 8 Calvados
- 9 Cher
- 10 Corse
- 11 Creuse
- 12 Dordogne
- 13 Doubs
- 14 Finistère
- 15 Gironde
- 16 Hérault
- 17 Ille-et-Vilaine
- 18 Indre
- 19 Indre-et-Loire
- 20 Isère
- 21 Jura
- 22 Landes
- 23 Loire-Inférieure
- 24 Loiret
- 25 Lot
- 26 Lot-et-Garonne
- 27 Maine-et-Loire
- 28 Mayenne
- 29 Meurthe-et-Moselle
- 30 Morbihan
- 31 Nièvre
- 32 Nord
- 33 Oise
- 34 Orne
- 35 Pyrénées-Orientales
- 36 Rhône
- 37 Saône-et-Loire
- 38 Savoie
- 39 Seine-Inférieure
- 40 Seine-et-Marne
- 41 Somme
- 42 Tarn
- 43 Tarn-et-Garonne
- 44 Vendée
- 45 Vaucluse
- 46 Vosges
- 47 Yonne
- 48 Yvelines
- 49 Haute-Saône
- 50 Haute-Vienne
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Geological Formations : Recent, Tertiary, Cretaceous, Oolitic or Jurassic, Triassic & Permian, Carboniferous, Older Paleozoic, Volcanic.

which have played a great part in history are situated along either of these roads. We need only instance Orléans, Blois, Tours, Poitiers, Bordeaux, Toulouse, Carcassonne, Narbonne, Montpellier, Nîmes, Arles, Avignon, Lyons, Chalons-sur-Saône, and Dijon. It has been noticed that the larger towns along these roads are generally two stages apart, the intermediate stages being marked by places of less consequence. In fact, these towns were originally merely military stages, the distances being accommodated to the marching powers of infantry and cavalry.

Fig. 2.—THE HISTORICAL HIGH-ROADS OF FRANCE.



Where exceptions occur, they are due to special features of the soil or to the necessities of commerce. In our own days railways have almost annihilated space, and towns no longer grow up at such regular intervals.

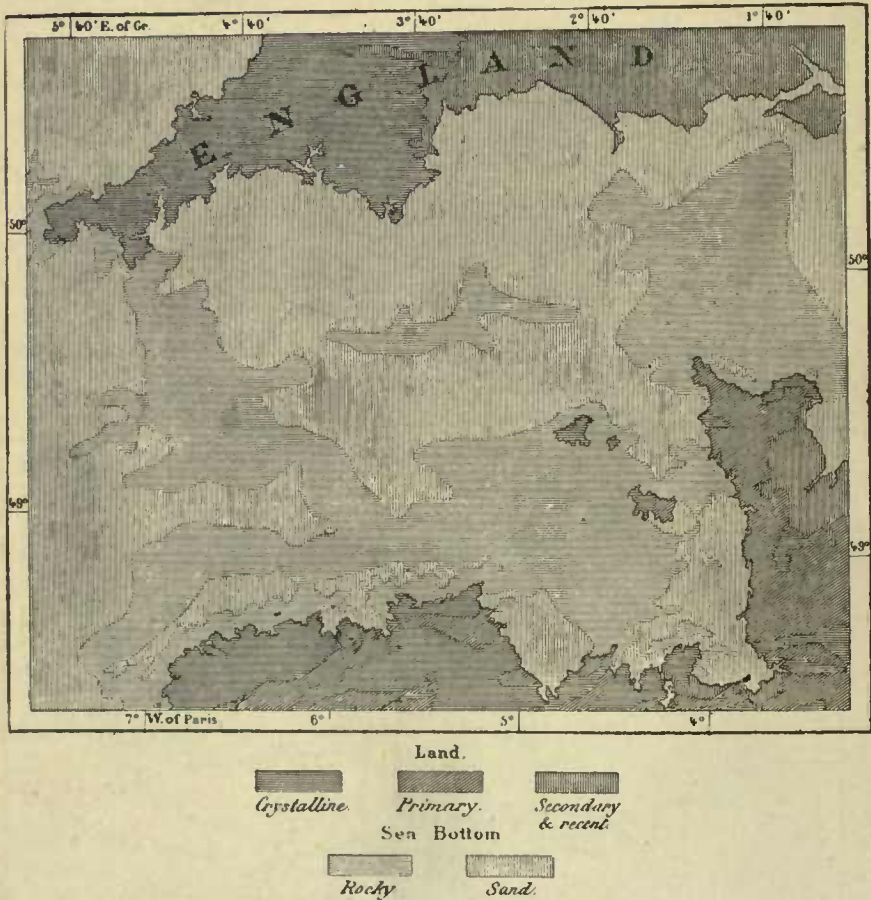
It would be interesting to ascertain the great routes of the migration of man and animals in prehistoric times. But this is a matter of no inconsiderable difficulty. Constant Prévost, Delesse, and others have attempted to construct maps exhibiting France during various geological epochs, but their value is merely

conjectural, for, irrespectively of the uncertainty still existing with regard to the age of certain rocks, it is almost impossible to tell to what extent the more ancient formations have disappeared, owing to subsidence or denudation.

In the Silurian age it would appear Gaul consisted merely of an elongated peninsula extending from where the Alps are now to modern Britany. Subsequently a wide strait separated this peninsula from a few Alpine masses, then recently upheaved above the ocean, whilst newly formed land joined it to the

Fig. 3.—LITHOLOGICAL MAP OF THE BRITISH CHANNEL, SHOWING THE ANCIENT CONNECTION BETWEEN BRITANY AND ENGLAND.

According to Delesse.



Pyrenees and to England. The rocky bottom of the channel, as laid down on M. Delesse's lithological map, shows where the union between the two Britanics existed. When the liassic strata were being deposited in the gulfs of the sea, the contours of the great plateau of Limousin and its outer fringe, consisting of the Cévennes, the Forez, and the Morvan, were pretty much as they are now, excepting that a deep strait intersected the southern portion. Four wide arms of the sea separated this plateau from the Ardennes and Vosges, the Alps, the Pyrenees, and Britany. The framework of modern France had thus become

apparent, and each subsequent formation helped to fill it up. During the cretaceous age the central plateau was finally united on the one hand to Brittany, and on the other to the Vosges and the Ardennes: Boulonnais rose like an island in the centre of the sea to the north. At the commencement of the tertiary age this sea had become a gulf, the estuaries of the Garonne and the Adour had much diminished in size, lakes were drained or filled up by alluvial deposits, and at the time of the last glacial epoch, the date of which cannot be fixed even approximately, the contour and relief of France were nearly what they are now.

The innumerable agencies, however, which change the surface of the land are still at work: mountains are being washed away, lakes silted up, rivers change their courses, extend their deltas, or enlarge their estuaries, while secular oscillations of the land effect changes along the coast. As regards these latter an upheaval during historic times has been distinctly traced along the Mediterranean coasts. On the Atlantic seaboard the coast of the Landes has subsided; to the north of the Gironde we meet with incontestable proofs of an upheaval; and along the British Channel there are again indications of a subsidence, which extends through the Netherlands as far as Denmark and the southern shores of the Baltic. These slow movements have resulted in changes which have exercised an appreciable influence upon the march of history.

CLIMATE.—RIVERS.*

THERE can be no doubt that the climate of France has undergone changes since the beginning of the historical period, although it would be difficult precisely to determine their extent. The destruction of forests, the draining of swamps, and the embankment of rivers must necessarily have affected local climates. There exist no precise data in that respect, for exact meteorological observations are only of recent growth, but a few general considerations prove it incontestably. Certain plants can no longer be cultivated at the same altitude as during the Middle Ages: olive, fig, and orange trees have retired farther south; the vine no longer grows in Picardy and along the Channel. This retreat of certain plants, however, may be due to our improved means of communication with countries where their cultivation yields a richer harvest than under the inclement northern skies, and we cannot therefore conclude from it that the climate of France has deteriorated since the Middle Ages. But that changes in the climate have nevertheless taken place is amply proved by an examination of our fossiliferous strata, from which we learn that a sub-tropical and an arctic climate succeeded each other at intervals.

France at the present moment is divided into two climatic zones by the granitic masses of the great central plateau. The mean temperature to the north of that barrier varies between 50° and 54° F., whilst to the south of it it gradually rises to 59°. The contrasts are still greater if we take into account the moisture of the air, rainfall, winds, and all those other meteorological phenomena which constitute climate. We then find that the northern Atlantic slopes of France

* Bourlot, "Variations de Latitude et de Climat."

form a portion of Western Europe, whilst the southern Mediterranean slopes are almost African in their aspect.

Eastern and Western France contrast likewise, though not in so marked a manner. The Atlantic coasts are exposed to the influence of the gulf-stream and of warm south-westerly winds, and their temperature is more elevated than might be concluded from their latitudes. As we proceed inland the warm Atlantic

Fig. 4.—ISOTHERMAL LINES OF FEB
By M. Renou.



current gradually loses its power, westerly winds blow less frequently, and the mean temperature of Cherbourg is thus nearly 3° higher than that of Verdun, in spite of its lower latitude.

But this decrease in mean temperature is not the only contrast between the extreme west of France and the inland districts, for the seasons in these latter present greater differences. The climate along the Atlantic coast is essentially a maritime one, and the differences between the extremes of temperature are not

very great. In the east, where the equalising influence of the ocean is less felt, the summers are warmer, the winters more severe than on the coast. The farther we proceed inland the more will lines of equal winter and summer temperature be found to differ. Localities in Eastern France, whose mean annual temperature is inferior to that of localities on the coast, nevertheless enjoy a higher temperature than the latter during summer. The influence which these varying con-

Fig. 5.—LINES OF EQUAL WINTER AND SUMMER TEMPERATURE FOR PARIS.



ditions of temperature exercise upon vegetation is apparent, for some plants require a comparatively high mean annual temperature, whilst others, like the vine, do not suffer from frost, but require a high summer temperature.

The mean direction of the winds in France has been computed by Kaemtz and Martens at S. 88° W. ; that is to say, they blow up the lower valley of the Loire. The proportions between easterly and westerly winds is as 100 to 152, that

between northerly and southerly winds as 100 to 103. The preponderance of westerly and southerly winds would be still more marked, did not the Pyrenees oppose an obstacle to their progress. Along the Atlantic seaboard north-westerly winds prevail, on the Channel south-westerly winds. Their direction, as a matter of course, is modified by local causes and the configuration of the land; but thus much may be assumed as certain, that the atmosphere of France is being continually renewed from the west.

In the valley of the Lower Rhône, which forms almost a world of its own as regards climate, the direction of the winds is quite different: they blow up and down this narrow valley, either from the Mediterranean or from the north. Between the Spanish frontier and the Rhône, as well as to the east of that river as far as the Hyères, north-westerly winds predominate, whilst along the valley of the Rhône itself the prevailing wind blows from the north, in the direction of the Mediterranean. Thus, whilst the Atlantic slopes of France are exposed to a preponderance of sea breezes, it is the land winds which prove victorious on the Mediterranean slopes.

The configuration of the soil exercises as great an influence upon the distribution of the rain as it does upon the direction of the winds. The country, in that respect, may be divided into three zones. Summer rains prevail in the north and in the centre, as also in Germany and nearly the whole of continental Europe; autumn rains prevail in the west; and on the Mediterranean slopes two rainy seasons can be distinguished, viz. one in the beginning of the year, the other in autumn: summer rains are rare there.

The amount of rain varies exceedingly in different localities. Along the sea it is generally abundant; the quantity decreases as we proceed inland, but the mountains in the interior of the country form a second region where the precipitation is considerable, and on a map of France showing the distribution of rainfall these mountain ranges stand out very distinctly. As a general rule the quantity of rain increases from west to east, and from north to south; that is, in the direction in which the land rises. In the south, where the air owing to higher temperature is capable of holding a greater amount of moisture in suspension, the rain after storms sometimes descends in torrents. Upon the whole, however, the rainfall near the Mediterranean is less than near the Atlantic, and the air there is drier, a feature sufficiently explained by the prevalence of land winds.

There are only three stations in France at which the annual rainfall approaches eighty inches. These are the Pyrenees of Gavarnie, which intercept the moist winds blowing from the Bay of Biscay; the mountains of the Tanargue, between the sources of the Ardèche and Loire; and the Alps to the north of Gap. On the western slopes of the mountains and on the plateau of Limousin the rainfall exceeds forty inches. It is least in a district embracing Meaux, Troyes, Epernay, and Compiègne, which is remote from the sea as well as from the mountain region, is badly wooded, and consists for the most part of chalk. At Dunkirk, likewise, it rains but little, for the winds prevailing there part with

their moisture whilst passing across England. From a careful computation made by M. Delesse it appears that the rainfall throughout France averages 30·3 inches.

The number of rainy days varies quite as much as the amount of rain. At Abbeville rain falls on 175 days in the year, at Lille on 169 days, whilst Marseilles has only 55 and Hyères 40 rainy days. As a rule the number of rainy days decreases as we travel towards the south-east, and where this is the case the rains are proportionately heavy. Storms, which occur generally during summer, afflict as a rule the centre and the east of the country, and M. Becquerel has shown that they blow ordinarily along the great valleys.

Speaking broadly, France may be divided into seven climatic regions, of which that of the great granitic plateau occupies the centre. Brittany, in the north-west, is remarkable for its equable temperature, the northern region, named after its principal river the Seine, is distinguished by a paucity of rain, while in the region of the Meuse and the Vosges the extremes between cold and heat are greatest. The three southern regions are distributed in an analogous manner. The climate of the Gironde and of the Rhône is mild and humid; that of the Mediterranean is changeable; heavy rains alternate with periods of drought, and the winds are high.*

The climate of a country is reflected to a great extent in its rivers. Unless these are fed by glaciers or flow for considerable distances underground, they reflect the succession of seasons very fairly. Great is the contrast between the torrents of the Mediterranean and the rivers and rivulets of hilly Brittany. On the southern slopes of the Cévennes, scorched in turn by the sun or lashed by showers of rain, the torrent beds, dry during the greater part of the year, are converted after rains into mighty rivers, sweeping before them vast masses of débris. These *wadis* of Languedoc differ most essentially from the quiet rivulets of Normandy and Brittany, which flow steadily throughout the year, and scarcely ever overflow their banks.

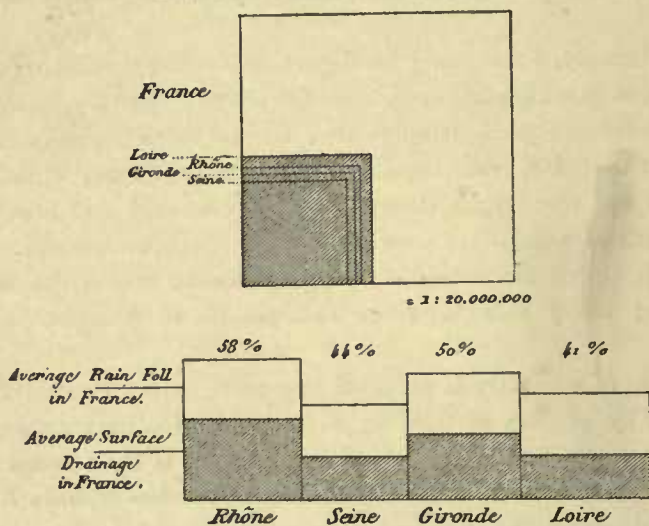
The rivers of France flow in opposite directions towards the Atlantic and the Mediterranean. The Rhône, rising in a glacier like the Rhine, and flowing through a large lake, takes its course to the south. Where it traverses the plain which formerly was merely a gulf of the sea, it receives numerous tributaries descending from the Alps and the Cévennes, and when the alluvium brought down by it shall have filled up the Lion Gulf, it will number amongst its affluents

Climatic Regions.	Mean Temperature (F.).			Mean Direction of Winds.	Rainfall in.	Days with Rain. No.	Seasons of heaviest Rains.
	Year.	Summer.	Winter.				
* Limousin (Limoges)	51·8	—	—	—	36	—	Autumn
Britany (Brest)	51·1	62·2	44·8	W.	28	208	do.
The Seine (Paris)	50·0	64·6	37·9	W.	20	154	Aut. and Sum.
Vosges (Nancy)	50·0	65·1	35·2	S.W., N.E.	31	120	Summer
Gironde (Bordeaux)	56·3	71·1	43·0	W.	32	150	Autumn
Rhône (Lyons)	53·2	70·0	37·1	N.	31	110	do.
Mediterranean (Montpellier)	58·3	71·6	42·4	N.W.	29	—	Spring & Aut.
Average for France	51·8	68·0	41·0	W.	30	140	Autumn

the Hérault, Orb, Ande, and other rivers of Roussillon, for all these, as well as the rivers rising in Provence, converge upon that gulf.

On the other hand, the rivers flowing down the Atlantic slope take a divergent course, and a line drawn through their sources is much shorter than one connecting their estuaries. As to Brittany, it constitutes a hydrographical region apart; and neither its commanding position nor its excellent harbours have countervailed the disadvantage of its lying outside the great river systems of France.

Fig. 6.—COMPARATIVE AREA OF RIVER BASINS AND AVERAGE SURFACE DRAINAGE.
Horizontal Scale 1 : 20,000,000. Vertical Scale 1 : 50.



Formerly it was supposed that the waters discharged by large rivers like the Loire or Seine far exceeded in amount what could be derived from the rains, and their sources were consequently supposed to communicate with reservoirs fed by the ocean. Bernard Palissy and Denys Papin (1669—72) first demonstrated the erroneousness of this view, and careful observations have revealed the fact that only one-third or at most one-half the rain that falls throughout France finds its way back to the sea by means of the rivers, the remainder being absorbed by the vegetation or evaporating.*

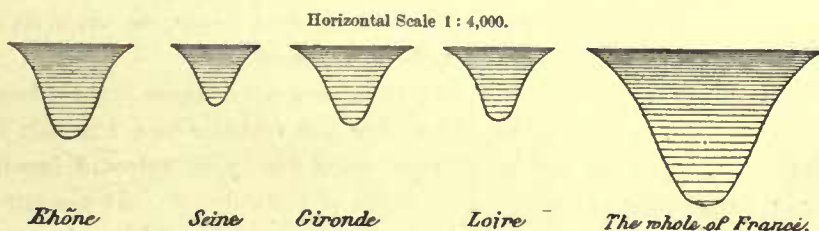
* River systems of France according to Delesse, Ch. Martins, Thomé de Gamond & c. :—

River.	Length of Course. Miles.	Area of Catchment Basin. Sq. m.	Average Rainfall. In.	Rainfall in Millions of cub. ft.	Surface Drainage in Millions of cub. ft.	Discharge per Second. Cub. ft.
Somme	133	2,144	25.2	125,443	63,500 (?)	2,013 (?)
Seine	482	30,927	24.8	1,646,380	772,160	24,510
Vilaine	143	3,707	27.6	237,327	223,600 (?)	3,880 (?)
Loire	609	44,459	27.2	2,689,356	1,096,700	34,786
Charente	224	3,860	33.4	300,190	106,000	3,354 (?)
Gironde	616	35,962	32.5	2,622,290	1,312,000	41,600
Adour	187	6,564	39.4	600,386	247,200 (?)	7,840 (?)
Aude	139	2,510	27.6	160,690	71,000 (?)	2,225 (?)
Rhône (with Saône and Doubs) }	637	38,996	37.4	3,310,340	1,915,430	63,850 (?)
Moselle (in France)	194	2,606	29.5	178,770	55,660 (?)	1,770 (?)
Meuse do.	318	2,896	28.3	190,710	88,290	2,800 (?)
Scheldt (Escaut, do.)	75	2,548	23.6	140,858	63,500	2,014 (?)
FRANCE	—	00,315	30.3	14,109,000	6,710,000	212,900 (?)

The rain which finds its way through rivers to the sea is one of the most powerful geological agents. The ravines and valleys of the Pyrenees, the Cévennes, the Alps, and the Jura exhibit its power of erosion: the layers of sand and mud deposited along the banks of the Loire after floods testify to its giving birth to new land, and at the mouths of the Rhône we may see how a river causes the land to encroach upon the sea. The fecund soil of the Limagne, Touraine, Agenais, and Bigorre, those gardens of France, is entirely a gift of the rivers.

The rivers, owing to the fertility of their banks, have proved the most powerful agents of civilisation in France, as everywhere else. In former times they alone were available for the transport of merchandise and travellers on a large scale, and most of the great towns grew up on their banks. Towns not situated on navigable rivers, such as Nîmes, Montpellier, Dijon, and Reims, were mere stages on the roads connecting these river highways. Roads and railways have to some extent deprived the rivers of the importance they enjoyed in former times, and considerable towns have sprung up far away from them, near mines, mineral springs, or fine scenery. St. Etienne, Le Creuzot, and Bagnères-de-

Fig. 7.—COMPARATIVE DISCHARGE OF THE GREAT RIVERS OF FRANCE.



Luchon are of this class. The rivers, on the other hand, are being rendered more useful to man from day to day. Canals are dug to connect them or to irrigate the fields in their vicinity, embankments are thrown up to regulate them, and their water is rendered available as a motive power. Still most of their water is allowed to run to waste, and the day is yet apparently very distant when they will be exhaustively utilised in the service of man.

THE PREHISTORIC AGE OF FRANCE.*

FRANCE had its inhabitants long before the events of history were placed on record. Human bones mixed with those of animals, rude implements of peace and war, and rudimentary works of art amply prove this. With Belgium and the basins of the Rhine it is probably richer in these prehistoric remains than any other country, and many caves and heaps of débris have become famous on account of them.

Anthropologists are generally agreed that the most ancient examples of human

* Hamy, "Paléontologie humaine;" Gabriel de Mortillet, "Tableau archéologique de la Gaule;" Lartet et Christy, "Reliquies Aquitaniques;" Broca, "Compte-rendu du Congrès intern. de Paris, 1867."

workmanship are the flint implements discovered by M. Bourgoing near Thenay, in the valley of the Cher. In the tertiary age, when the contemporaries of acrotherium and mastodon fashioned these rude implements, the aspect of France was very different from what it is now, and there existed neither the same plants nor the same animals.

Centuries passed away, and the men who dwelt in the plains bordering upon the Somme and the Seine, on the plateaux of Central France, and along the foot of the Pyrenees had learnt to fashion flint implements of a superior kind, and with these they pursued the elephants, hippopotami, rhinoceroses, and other animals which at that time roamed over the lands of the Gauls. At a subsequent period, when the rhinoceros had been exterminated, when man had expelled the bears from the caverns to dwell therein himself, and when the horse, with the mammoth, was one of the commonest animals, these stone implements began to be fashioned in greater variety, to serve the needs of hunters, fishing, and domestic labour. Later still, the bones and horns of animals were made use of, and frequently the figures of animals and even of men were engraved upon them. Artists must have lived at that time, though their names are for ever lost to us. Ornaments and figures which they engraved upon their stag-horns are the same in style as those met with subsequently on the vases dating back to the age of dolmens, on the arms of the ancient Gauls, and even on some Gallo-Roman monuments.

Once launched upon the path of invention, man never turns back. Some sort of relapse appears to have taken place after the reindeer age, but this applies only to the ornamentation, and may be accounted for by an inflow of immigrants inferior in civilisation to the older inhabitants of the country. At the same time new weapons came into use; man had acquired the art of polishing stones, and of making durable earthenware. Later still he learnt to cultivate the soil, and to train domestic animals. The old cave dwellings no longer sufficed for his wants, houses arose in the plains, and solid structures of stone were erected by the men of the neolithic age, wherein to deposit their dead. They threw up entrenchments as a defence against enemies, and those who lived along the margins of rivers or lakes erected their dwellings upon piles, thus securing themselves against unexpected attacks. In France itself these lake dwellings are scarce, but they abound in Switzerland. No written record or tradition reaches back to that neolithic age, but we know from the objects discovered in tombs and dwellings that bronze had come into use. Imported from abroad, we find it applied to the most varied uses, either cast or wrought.

A new era began with the introduction of iron, which was fashioned not only into weapons, but also into tools of every description. Thenceforth human art and industry took a rapid development. The numerous grave-hills scattered over the country abound in curious objects deposited there by the relations of the defunct. History begins to dawn, and we find ourselves in the presence of those tribes of various races formerly known as Gauls.

There can be no doubt that the most populous districts of modern France were also the centres of civilisation of the Celtic, Iberian, and Ligurian ancestors of the

modern French, although no traces of them have been discovered there. Their towns have vanished, ruins have succeeded ruins, until all remains of the ancient occupiers of the land have been reduced to dust. If we would find traces of them we must penetrate into the woods, and into those remote parts of the country where the population has at all times been thinly sown. The heaths of Brittany and the plateaux of Poitou still abound in dolmens and menhirs; in the woods of Franche-Comté grave-hills are met with in thousands; on the granitic soil of Central France we may still trace the pits which formed the underground story of the Gallic houses; whilst the pine woods of the Landes abound in vast trenches (*clotes*), which mayhap sheltered the population of a village until it was driven forth by invading Celts or Basques. But these dwellings, remote as they were from the centres of civilisation, can hardly convey an idea of the con-

Fig. 8.—DOL-ER-VERCHANT, OR MERCHANTS' TABLE, AT LOCMARIAKER.



dition of the population of ancient France, any more than an idea of our present century could be obtained from the half-obliterated ruins of our out-of-the-way hamlets.

Ever since the tertiary age the surface of France has been changing slowly through geological agencies, and without catastrophes. We may assume, therefore, that the population of modern France has in its veins some of the blood of these ancient tribes. The invading conquerors of France have become amalgamated with the tribes whom they found living there, and thus arose a race resembling a trunk with thousands of roots, and known as the French "nation." We cannot otherwise explain the astonishing variety of types met with in the different provinces of France. As M. André Sanson says, "We are the intellectual sons of the Aryans, but not their carnal sons."

The most ancient human remains hitherto discovered in France date back to the quaternary epoch, for miocene man, who wrought the tools discovered at Thenay, has left no trace. To judge from the skulls discovered under the lava of Denise, near the Puy en-Velay, in Auvergne, the men of that period were long-skulled, but towards the close of the age of the mammoth and the bear, short skulls are first met with. Archæologists are agreed that the men who dwelt in the caverns of the Pyrenees, on the Vézère and the Aveyron, were kinsmen of the Laps, Samoyeds, and Eskimos. Their mode of life, their weapons and implements, and even their style of ornamentation, all appear to support that conclusion. An invasion of barbarians destroyed the civilisation then attained, but gave birth in the end to a new era of civilisation much superior in many respects.

THE INHABITANTS OF FRANCE.*

THE Iberians are the most ancient inhabitants of Gaul known to history. They were kinsmen of those of Spain, who traded with Phœnicians and Greeks, and whom the latter looked upon as aborigines. These Iberians occupied the country between the Atlantic Ocean and the Garonne, as well as the valleys of the eastern Pyrenees. In the west they were associated with the Ligurians of the Mediterranean, and elsewhere they came into contact with Celtic or Kymric tribes. Though Latinised, they have in a large extent their race characteristics; they have even retained their ancient appellation of Gascons and Basques, and near the Pyrenees they retain their old language. Basques, Béarnais, and Gascons can easily be distinguished from other Frenchmen; they are full of natural grace, supple of limb and mind, gay when at work, brave, though boastful, talkative, and imaginative to the extent of sometimes allowing themselves to be carried beyond the bounds of truth.

The Celts, a race quite distinct from the Iberians, occupied the country to the north of the Garonne. Most modern Frenchmen look upon these as their veritable ancestors, though very little is known about them. Ancient authors can hardly assist us in elucidating this point, for they wrote about the régions beyond the Alps much as our ancestors wrote about Central Africa. Modern historians, led away by false patriotism or by a rage for classification, have still further obscured this question, which is only in recent times being cleared up by the discovery of arms, weapons, dwellings, and human remains hidden for ages beneath the soil.

Williams, Edwards, and Broca have shown satisfactorily, from a comparison of skulls and bones thus discovered, that ancient Gaul was inhabited by two distinct types of man, in addition to Iberians. The first type is met with between the Garonne and the Seine. These Gauls, or Celts, as they were formerly called, were small of stature, of a brown complexion, and short-skulled, whilst the tribes in the north-east, whether we call them Belgæ or Kymri, were tall, fair, and long-skulled.

* A. Hovelacque, "La Linguistique;" Fustel de Coulanges, "Histoire des Institutions politiques de l'Ancienne France;" Lagneau, "Bull. de la Soc. d'Anthropologie," Feb. 1868, Nov. 1874; "Revue d'Anthropologie," tome ii. 1873; Saint-René Taillandier, "Revue des Deux-Mondes," Dec. 1875.

Ancient authors only describe these latter, probably because they were the most warlike. The men described by Ammianus Marcellinus, like the Gauls represented by Roman and Greek sculptors, rather resemble Scandinavians, and they were certainly not the direct ancestors of the present inhabitants of Central France. Subjected tribes of a different type may possibly have lived amongst these Gauls of ancient authors, and been numerically superior to them. At present the physical type of the populations of Southern Europe prevails almost throughout France. We can hardly assume that a slight change in the climate, brought about by time and cultivation, should have exercised an influence sufficient to account for this southern type. Taken as a body, the French are in reality a brown-complexioned people, with heads round rather than oval, with eyes varying between black and

Fig. 9.—PRESUMED DISPERSION OF THE ARYAN RACES ACCORDING TO ANCIENT AUTHORS.



pale brown; with a stature and muscular development rather below the average, but of strong constitutions and capable of resisting fatigue and privations.

Of these ancient Gauls there now exist only geographical names and a few short inscriptions. To judge from these their language appears to have differed very much from the dialects spoken in Great Britain, and to have had more affinity with Latin. Still the Aryan nature of the language does not prove that the people who spoke it were of Asiatic origin. Omalius d'Halloy altogether denies that an exodus of Gauls took place from Western Asia, and the map of Aryan migrations prepared by Pictet, though of scientific value, cannot prove it. All we know is that the Gauls dwelt for some time in the valley of the Danube.

There can be no doubt that we must trace the existing character of the popula-

tion of France back to the tribes who inhabited the country anterior to the historic epoch. Still we must not lose sight of the influence exercised by immigrants of foreign races. The Phœnicians confined themselves to a few factories along the shore of the Mediterranean, and were succeeded by the Greeks, whose colonies—Marseilles, Nice, Agde, and others—were of sufficient importance to enable them to exercise an appreciable influence upon the surrounding populations. Many Greek expressions have survived to our day, and the Marseillais have no doubt reason on their side when they boast of their Hellenic ancestors.

The Romans, however, those merciless conquerors of the Gauls, exercised a far greater influence upon the formation of the French nation than did the Greeks. Italian colonists, many of them old soldiers, settled in the country, and this immigration, going on for six centuries, led to so considerable an infusion of Roman blood that several towns in the south could fairly be described as daughters of Rome, and the entire population as Gallo-Roman. These physical influences, however, were far surpassed by moral ones. It was the Romans who introduced the ideas and civilisation of the East, and more than all, they made Latin the tongue of the entire country. Language is the mould of thought, and must influence most powerfully the mind of a nation. The French, speaking a Latin tongue, must therefore be ranged amongst the Latin races, in spite of their most diverse origin. Though belonging geographically to the Atlantic countries rather than to the Mediterranean ones, historically France forms a member of these latter, more especially since Algeria has become a French colony.

Nevertheless, the barbarians, who after the fall of the Roman empire repeatedly invaded France, whether Franks from the Rhine, Northmen, or Huns from the plateaux of Asia, always came from the North. Scandinavian Visigoths established themselves in the south of France, and more especially in the Narbonnaise, and soon adapted themselves to their Gallo-Roman surroundings. The Germanic Burgundians, who occupied Eastern France, are described by their contemporaries as tall and strong, but at the same time good-natured. The Franks were far more harsh towards the tribes they conquered. In the end they gave a new name to transalpine France, and more particularly to that province of it which is known as Ile de France.

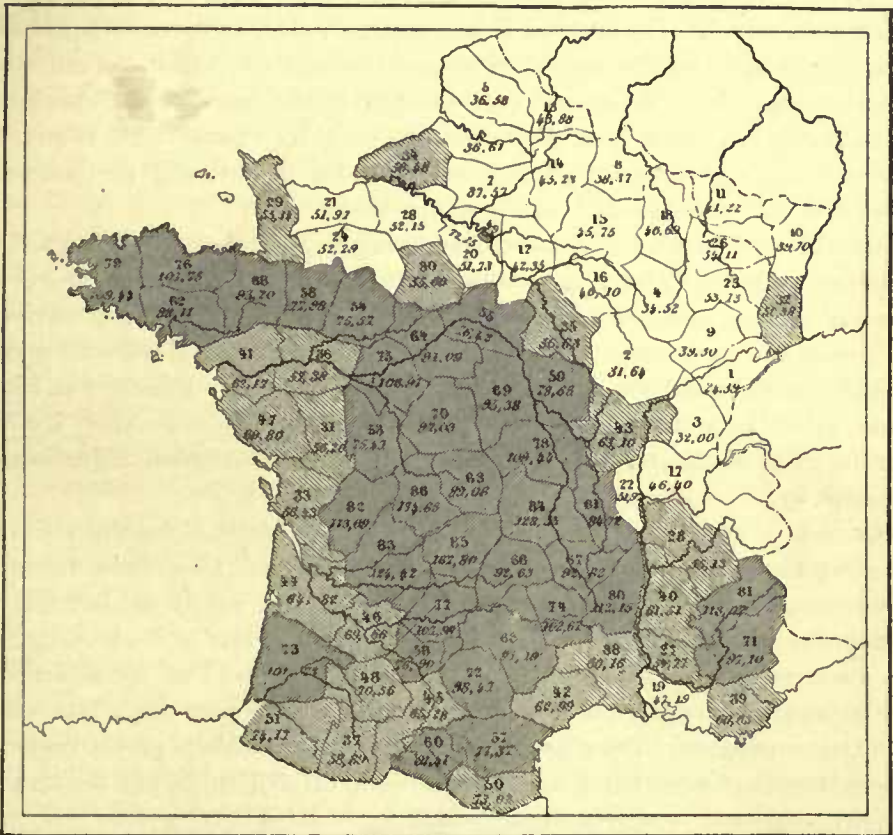
M. Fustel de Coulanges does not think that those early German and Gothic invasions sensibly affected the character of the Gallo-Roman populations. The language and religion, social usages and political institutions, remained the same. But though the Germans never arrived in bodies sufficiently large to change the character of the people, their immigration continued for centuries, and in the end their influence upon its physique became very apparent. M. Broca, in his researches on the stature of Frenchmen, has shown this very clearly (see Fig. 10).

The Normans, who settled in that portion of France now known as Normandy, likewise influenced the type of the inhabitants of Neustria. In the south of France "sea-kings" of quite a different kind put in an appearance. These were the Saracens, who maintained themselves for a considerable time on the coasts of

Provence. In the eighth century, when the Berbers invaded Europe in such overpowering numbers, these Saracens penetrated as far as the valley of the Loire, and perhaps even to Luxeuil and Metz, and the inhabitants of Verdun are said to have carried on a lucrative trade in slaves with them. Colonies of Saracens were established in many parts of France, and there can be no doubt that numbers of the Frenchmen now living in the basins of the Garonne and the Rhône are the remote descendants of Mussulmans.

Fig. 10.—THE STATURE OF FRENCHMEN.

By Broca.



□ N° 1-26 ▒ N° 27-52 ■ N° 53-86

The departments are numbered according to the stature of their military conscripts. The small figures indicate the exemptions granted per thousand on account of small stature.

Since those invasions of Normans and Moors, the ethnical character of the population of France has undergone no wholesale change, for the influence of English settlers in Guyenne, of German *lansquenets* and *reitres* who remained in the country at the close of the religious wars, and of the Spaniards in Flanders and Franche-Comté, has been quite of a local nature. On the other hand, the vast peaceable immigration which has been going on for some time past is certainly bringing about changes, and in the presence of the cosmopolitan population of some of the

large cities, a stranger may well be puzzled to tell whether it is a Frenchman he has before him or not. It almost appears as if a European type were gradually coming into existence.

In the meantime the population of France has been welded into a nation, and in certain respects this nation exhibits greater unity than any other. This cohesion is due not so much to the existence of a centralized government, but rather to historical events, community of interests and of language, and to the existence of a capital which is universally acknowledged as the common national centre.

Ancient rivalries between the provinces of France have not, however, altogether disappeared. The Bretons, Basques, and Flemish have even retained their distinct language, and the peasants of some of the more remote districts can hardly be said to have been assimilated with the rest of the population. Throughout France, however, these local diversities are of a very subordinate nature, the influence of the great towns is increasing from day to day, and the landmarks between the old provinces have almost disappeared.

Of all the inhabitants of France, those living respectively in the north and the south differ most strikingly. This difference is accounted for by the nature of the country, diversity of historical traditions, and the memories of struggles carried on in a past age. In a great portion of Southern France the Provençal and other dialects are still the dominant tongue, and about twenty years ago French was hardly known by the bulk of the population. But as a literary language these southern dialects have no future, and those even who speak them often hold them in contempt.

On looking at the map it will be found that the dialects of Southern France, including the "langue d'oc" properly so called, Provençal, Dauphinois, Lyonnais, Auvergnat, Limousin, Gascon, and Béarnais, occupy very nearly one-half the area of the country. Nearly the whole basin of the Rhône, that of the Garonne, and the upper tributaries of the Loire belong to this half, and in the direction of Switzerland it extends even beyond the French frontier and comes into contact with German dialects. The wide range of these southern dialects proves the former preponderance of Southern France in the work of civilisation, but the "langue d'oïl" is at present steadily gaining ground.

Language constitutes the strongest tie between man and man. We may fairly say that the French language, the origin of which dates back a thousand years, gave birth to the French nation. Common woes may have engendered a sort of fellow-feeling amongst the diverse populations of ancient Gaul; they nearly all combined in the time of Vercingetorix against their Roman oppressors. But Gaul was merely a geographical expression then, and modern France only dates from the time of the epic poems of the Middle Age.

In the course of centuries this language, as well as the men who speak it, has undergone many changes. We can hardly conceive such a thing as an average Frenchman. Those who maintain that the national character has undergone no changes ever since the Gauls appeared upon the stage of history are

decidedly in the wrong. There may still exist features which recall the Gauls of Cæsar and Strabo, but can it be fairly said of modern French peasants what has been said of the Gauls, that "they are a people of war and uproar, running through the world with swords in their hands, less, it appears, from avidity than from a vague desire of seeing, knowing, and acting?"

If we would meet a typical Frenchman, we must search for him in a place offering every facility for his development. Such places are the large towns, and more especially Paris, to which original minds fly from the stifling atmosphere of small towns and villages. There the natives from every province come into contact and amalgamate: the babbling Gascons, ever in motion; the men from the plateau, inured to hard work, and slow to make friends; the people from the Loire, with their quick eyes, lucid intellect, and well-balanced temperament; the melancholic Breton, always living as in a dream, but full of tenacity in all concerns of real life; the Norman, slow-speaking, circumspect, and prudent; and the men from Lorraine, the Vosges, and Franche-Comté, who are quick-tempered and enterprising. All these Frenchmen mutually influence each other, and evolve what may be called the general character of the French people.

It is no easy task to sit in judgment over a nation. Since the days of the illustrious Grimm, who denied "every truly moral sentiment" to Frenchmen, many foreigners, from envy or ignorance, have painted them in odious colours. On the other hand, there have been writers who have sought to elevate France above all other nations. As to French writers, they have been charged either with being prejudiced in favour of the nation to which they belong, or with unfairly under-estimating its merits; and, indeed, psychology is one of the most difficult subjects of discussion.

Speaking broadly, the character of the French exhibits a combination of northern and southern qualities. The country itself is intermediate between the Mediterranean and the Atlantic, and its inhabitants form a link between the Roman civilisation of the South, and modern times. The most diverse types are met with amongst the French, but, as a whole, they present a new type, in which classical features are replaced by mobility of expression, one-sided energy by varied aptitudes. As a rule Frenchmen, and more especially Frenchwomen, are most impressionable, and they are capable of fully reflecting the ideas conceived by other nations. It is thus that all the great movements of Europe have found a powerful echo in France, if they did not originate there. This explains too the universal character of the French revolutions. It was France which proclaimed the "Rights of Man," and posterity no doubt will praise her for it; it is France which does not allow its progress to be stopped by matters of detail, but always seeks for principles.

It is only natural that a nation holding the position of an intermediary of ideas should be eminently sociable. A feeling of inborn goodwill attracts the Frenchman towards his fellow-men, a spirit of equity dictates his conduct; he obliges by forethought and captivates by amiability. He is discreet in all things, pleasing in dress and manners, without outraging good taste, and excels in the

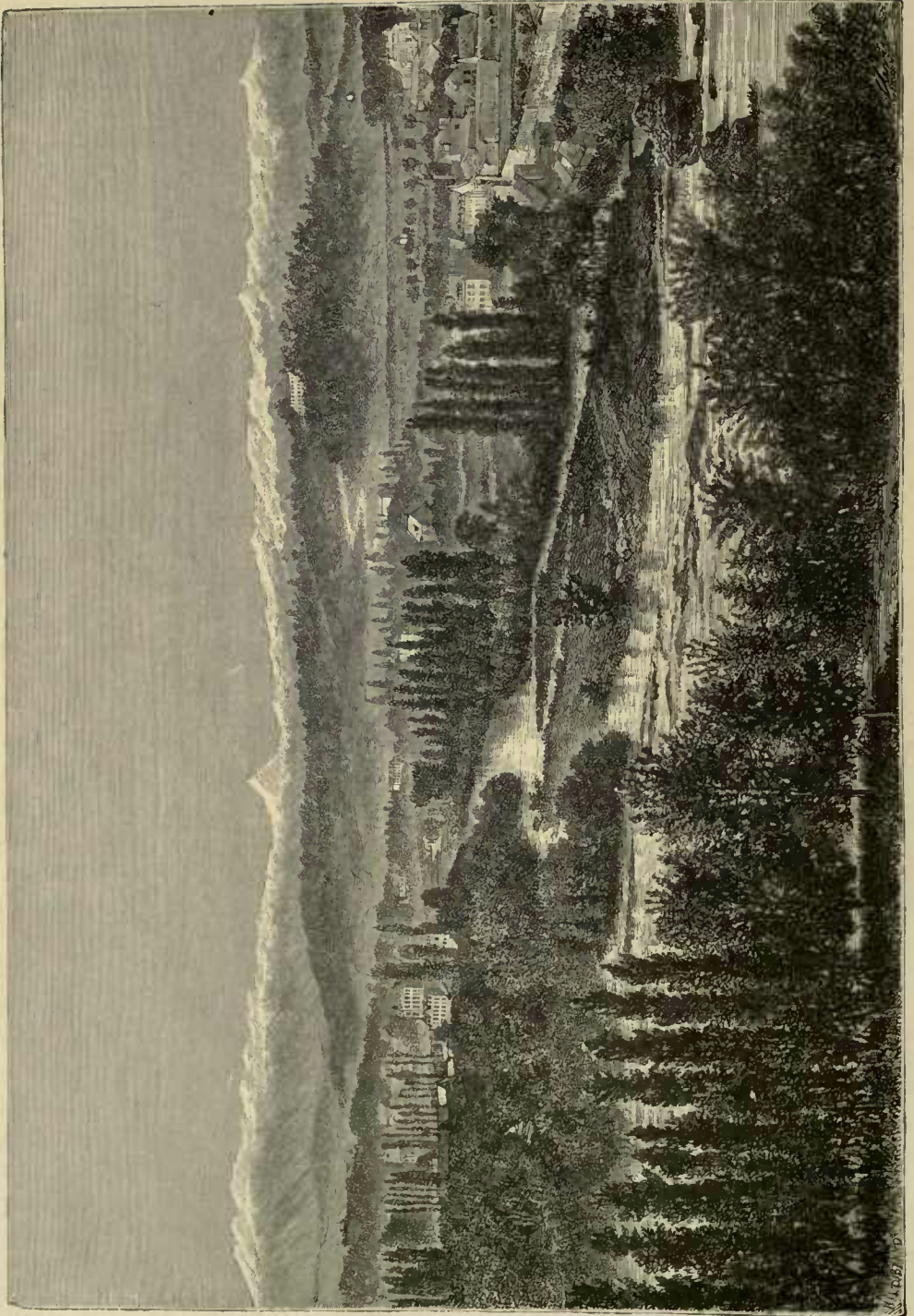
art of conversation. The Frenchwoman is in these respects even a better representative of the national character. She is not only an excellent mother and housewife, but possesses social qualities of the highest order. She delights by her conversation, and constitutes the chief attraction of French society. It seldom happens that foreigners do not enjoy themselves in France, but a Frenchman scarcely ever feels perfectly happy in a foreign land, and no one feels more cruelly than he the bitterness of exile.

The sons of Gaul are distinguished not only by quickness of comprehension and superior reasoning powers, but they are remarkable amongst all civilised nations for their tact and taste. For a long time they were looked up to as the arbiters in literature, and in certain departments of art they still stand unrivalled. Several of the neighbouring nations are indebted to them for a development of their art industries, and Paris still remains the high school of good taste.

France is a busy beehive, as is shown by the immense quantities of French produce exported to other countries. In spite of the excessive subdivision of the soil, the peasant landowners have converted France into one of the most productive countries of Europe. Activity such as this not only testifies to the strength of family ties, but also to the personal worth of the workers. Moreover, the revivals which have succeeded each national disaster prove that the nation is still full of vigour, and fully capable of taking its part in the great works of humanity.

But if Frenchmen have their virtues, they also have their faults. Their sociability often degenerates into undue familiarity; clever talkers on every possible subject, they run the risk of becoming superficial; men of taste and refinement, they are apt to sacrifice vigour and originality; too observant of social propriety, they sometimes stifle the voice of their conscience; members of society or of "parties," they have not always the courage to assert their manly independence. But in these respects how many true men do we meet with in any nation?

But, in spite of all, France has exercised a most powerful influence upon the civilised world. Numerically the influence of Frenchmen grows smaller in proportion as the area held by civilised nations extends; but moral and intellectual influences are not measured by numbers. The national life of France is as intense as that of any of her sister nations, and her past experiences will enable her to play an important part in the political and social evolution now impending. But even if France were to disappear from the world's stage, there would still remain the influence of the French language and literature. The vigour, grace, precision, and suppleness of that language have made it one of the most perfect vehicles of human thought. It has been propagated far beyond the territorial limits of the nation, and millions speak it, not only in the Latin countries, but in all other parts of the world.



THE PYRENEES, AS SEEN FROM THE TERRACE OF THE CASTLE AT PAU.



CHAPTER II.

THE PYRENEES, THE LANDES, AND THE BASIN OF THE GARONNE.

THE PYRENEES.*

THE region of the Pyrenees constitutes a distinct and separate portion of France, whether we look upon its geology or the history of its inhabitants. From the very first they differed from those inhabiting the remainder of Gaul, and even now the Catalans of Roussillon and the Basques resemble in language and manners their neighbours of the Iberian peninsula. But it is principally because the Pyrenees form the northern edge of the Iberian plateau, which is geologically bounded by the lowland of the Garonne, that they form a region apart.

The lowland referred to extends from sea to sea, and up to the tertiary epoch was occupied by a strait connecting the Mediterranean with the Atlantic Ocean. This ancient sea-bed has gradually been upheaved, and is traversed now by the Aude, the Garonne, and their numerous tributary rivers, joined more than two centuries ago by a navigable canal, affording communications between the two seas. This *Canal du Midi* may be said to form the southern limit of continental Europe, for the Pyrenees which rise beyond already belong to a world half African in its nature.

The vast depression which separates the Pyrenees from the Cévennes is one of the great natural high-roads of France, which, however, is far less important than the great northern roads, which place Marseilles and Bordeaux in communication with Paris. Still a region which can boast of towns like Bordeaux and Toulouse, which enjoys a mild climate, and possesses a fecund soil, must exercise considerable local influence.

The Pyrenees and the Albères, which bound this southern region of France, extend like a wall from sea to sea. As compared with the Alps, the geological

* H. Magnan, "Matériaux pour une Etude stratigraphique des Pyrénées;" Companyo, "Histoire naturelle des Pyrénées-Orientales," 1861; De Chausenque, "Les Pyrénées," 1854; Russell-Killough, "Grandes Ascensions des Pyrénées;" "Bulletin de la Société Ramond," 1867, 1868, 1870, 1875; "Annuaire du Club Alpin français," 1875; Calvet, "Progrès rural dans les Pyrénées;" P. Raymond, "Diet. des Basses Pyrénées."

structure of these mountains is of the simplest, and one might fancy that they had been suddenly ejected from a fissure in the earth's crust. Its mountain masses are not separated by low passes, as in the Alps, and there is no difficulty in tracing the direction of the main range, which runs almost in a straight line from Cape Creus to the lower mountains of the Basque countries.

The geological features are equally simple. Granites, apparently not of eruptive origin, occupy the centre of the chain, and form many of the summits of the main range. Schists and other ancient rocks connect these crystalline masses, whilst sedimentary strata succeed each other in regular order on both slopes, from triassic sandstones down to the alluvial soil deposited by the rivers.

In spite of this general regularity, the chain of the Pyrenees presents a great amount of diversity if studied in detail. About its centre, where the head-waters of the Garonne take their rise, the main range consists of two parallel ridges joined together by a transversal chain. The northern ridge extends to the east, and forms the Mediterranean Pyrenees, whilst the southern stretches west towards the

Fig. 11.—PROFILE OF THE PYRENEES.

Horizontal Scale 1 : 4,000,000. Vertical Scale 1 : 400,000.



Bay of Biscay, and constitutes the Atlantic Pyrenees. Of these two chains the eastern is the least elevated, and the granite there is nearly always exposed; whilst the more elevated summits of the western Pyrenees consist of schists and limestones. This shows that denudation has been going on more actively in the former, and in a large measure accounts for the striking contrasts in the aspect of the two extremities of the chain, and for the great variety of landscape met with when travelling along their northern foot from the Mediterranean to the Atlantic.*

The Pyrenees rise steeply from the Mediterranean, which, at a distance of only twenty-five miles from Cape Creus, has a depth of over 500 fathoms. Close to that cape rises the group of San Pedro de Roda, resembling a detached outwork connected with the frontier range of Albères by a rugged ridge. The frontier range named gradually increases in height from 660 to 5,000 feet, as we proceed from Cape Cerbère to the mountains of Prats de Mollo and Campredon, and is indebted

* Length of Pyrenees from Cape Creus to Cape Sainte-Anne, near Hendaye, 266 miles; average breadth, exclusive of Spanish foot-hills, 51 miles; area occupied, 13,563 sq. miles; average height, 3,940 feet (f); volume, 1,650 cubic miles.

for its name to the whiteness of its barren rocks. It rises steeply on the French side, but slopes down gently towards the south. Many roads lead across it, and have been used from the most ancient times. Near Amélie-les-Bains a wall most erroneously ascribed to Hannibal is pointed out; at the Col de Pertus (951 feet) Pompey erected a trophy in commemoration of his victories, and Visigoths, Franks, and Moors crossed there after him. Numerous fortifications bear witness to the strategical importance of these passes of the Albères. Collioure in France, and

Fig. 12.—MONT CANIGOU.

Scale 1 : 240,000.



5 Miles.

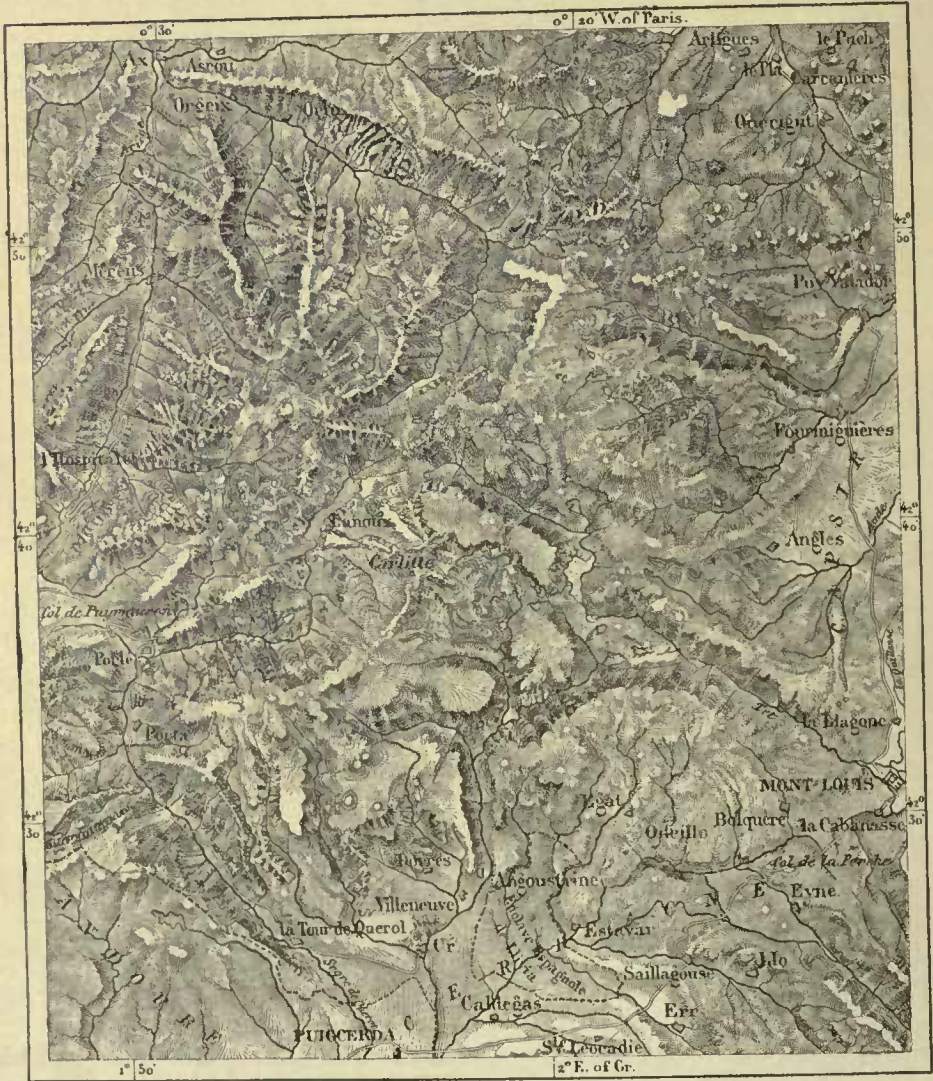
Rosas in Spain, defend the road along the coast. Perpignan and Figueras defend the outlets of the defiles, and the French fort of Bellegarde secures the important gorge of Pertus. At the present time these passes across the eastern Pyrenees are no longer as important as they were when the Mediterranean was the centre of the civilised world, and must yield to the road in the west which joins Lisbon and Madrid to Paris.*

* Altitudes in the Albères:—Pic des Termes, 3,618 feet; Col des Balistres, 853 feet; Col de Banyuis, 1,182 feet; Col de Pertus, 951 feet; Coustouges, 2,724 feet; Col d'Arcs, 4,920 feet.

Mountains of considerable elevation attach the Albères to the main range of the Pyrenees, which is hidden behind the bold mass of Mont Canigou (9,141 feet). With its spurs and foot-hills this majestic summit occupies the entire area between the upper valleys of the Tech and the Têt. It is perfectly isolated on three sides,

Fig. 13.—PUY DE CARLITTE.

Scale 1 : 240,000.



and the summits which attach it to the main chain in the south are inferior to it in height. Its bold pyramid does not yield in grandeur to that of Mount Etna; it is seen as far as Barcelona and Montpellier, and the astronomer Zach even claims to have seen its dark profile projected against the disc of the setting sun from Marseilles, a distance of 180 miles. Until recently it was held to be the

highest summit of the Pyrenees. As a trigonometrical station it offers many advantages, and its slopes have proved a fertile field of exploration to botanists.

The Pyrenees, to which is attached the Canigou, form one of the most barren and inaccessible mountain systems in the world. The passes leading across them are mere notches, cut to a depth of 600 to 900 feet at an elevation of about 8,200

Fig. 14.—THE DEFILES OF THE AUDE.

Scale 1 : 140,000.



feet, and the mountains near them are almost devoid of individual features. Even the Puigmal (9,542 feet) rises but little above the extended rampart formed by the mountains. A deep depression, excavated in the granitic rocks by mountain torrents, separates it from another mountain mass farther north. This is the Col de la Perche (5,322 feet), guarded on the French side by Montlonis (3,940 feet), and on that of Spain, by Puigcerda (Puycerda, 4,074 feet), built on a knoll of

glacial origin; and from it flow the rivers Têt and Sègre, the latter a feeder of the Ebro. The sources of both these rivers lie on French soil, and the political boundary has been drawn in the most arbitrary manner. Some of the mountain valleys near the pass fairly deserve their cognomen of "paradise of botanists," for curious plants found nowhere else in the Pyrenees may be gathered there.

The granitic mountains to the north of the fertile district of La Cerdagne, on the Upper Sègre, rise from a huge quadrangular plateau which gives birth to the head streams of the Têt, Sègre, Ariège, and Aude, and is separated in the west from Andorra by the much-frequented Pass of Puymaurens (6,293 feet). The highest of these summits is the Puy de Carlitte (9,561 feet). At its foot detached masses of rock are piled up in chaotic confusion, covered in places with moss, but for the most part still bare of vegetation. Lakes and lakelets are scattered over the plateau, and amongst these the Lanoux (black lake?), 7,068 feet, is the largest, though by no means the most beautiful; for its dark waters only reflect naked rocks and snows, whilst the lakes on the lower slopes are surrounded by verdant meadows and woods. Another lake, at the head of the Têt, emptied itself in the ninth century, and caused a fearful inundation. The mountaineers formerly looked upon the many lakelets scattered over the Carlitte as so many remains of the Flood, and Noah's ark they supposed to have stranded on the Puy de Prigue.

The ground to the north and east of this granitic plateau descends gradually, sometimes forming terraces intersected by bold precipices. Some of these terraces are still covered with woods of beech-trees and firs, but elsewhere the forests have been destroyed, and the aspect of the mountains is forbidding. As in the French Alps, we meet with formidable defiles, or *clus*, excavated by mountain torrents to a depth of many hundred feet. The most famous of these is the defile of the Aude, which even impresses persons accustomed to mountains. If we descend from the Baths of Carcanières into this abyss, we almost fancy we have penetrated into the very bowels of the earth.

Various passes lead across the spurs of Mont Carlitte. The Quillanne (5,644 feet), thus named after the town of Quillan, connects the valley of the Têt with that of the Aude. Another pass farther east is dedicated to Jau, or Jupiter (4,964 feet), but is hardly used now. Lower still is the Pass of St. Louis (2,254 feet), which joins the valley of the Aude to that of the Agly, and through which the road leads from Perpignan to Carcassonne. With it the Pyrenees terminate, for with the scarped Puy de Bugarach (4,038 feet), to the north of it, begins the region of the Corbières, so remarkable on account of its geological formation, its coal beds, and bone caves, but deprived of verdure and running water, and difficult to traverse in summer, when its bleached rocks reflect the rays of the sun. These hills long formed the boundary between France and Spain, and the fort of Salses, which defended the road leading along their eastern foot, as well as the ruins of many castles, recalls the struggle for the possession of this country, which only terminated in the seventeenth century. Mount Alaric (1,970 feet), to the north of them, and close to the Aude, bears witness to the still more ancient contests

between Romans and Visigoths. It is one of the few remaining links of the transversal chain which formerly joined the Pyrenees to the Cévennes.

The Pyrenees of Ariège, occupying the country of the ancient Sabartès, are far more regular in their structure than the eastern extremity of the range. From the Pass of Puymaurens (6,336 feet) to the gorge of the Garonne—a distance of 110 miles—the main chain extends without a break. Its summits, amongst which the Pique d'Estats (10,305 feet) and the Montcalm (10,102 feet) are the most elevated, occupy in nearly every instance the axis of this sierra. Mont Vallier (9,312 feet), which forms so striking an object when seen from Teulouse, is no exception to this rule. Huge blocks of weather-worn granite cover the

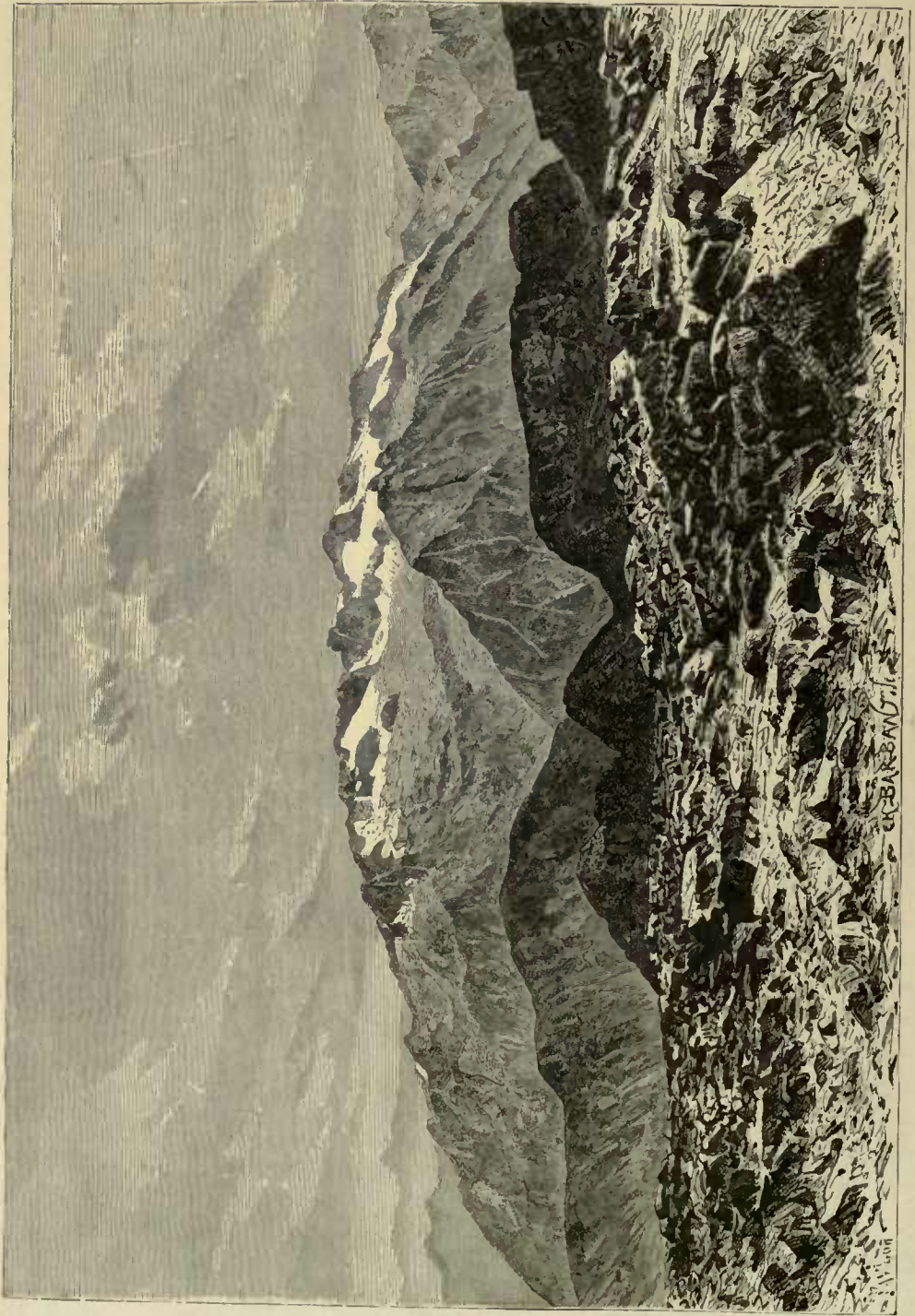
Fig. 15.—THE ISTHMUS BETWEEN THE CORBIÈRES AND THE CÉVENNES.

Scale 1 : 1,100,000.



western slope of this mountain. From a distance these look like grazing sheep turned into stone by some sorcerer, as the legends have it.

The lakes which formerly lent a charm to this portion of the Pyrenees have long ago been drained. Only a few swamps are now left, and near these M. Garrigou has discovered the remains of pile dwellings dating back to the age of polished stone implements. But even without their ancient lakes these Pyrenees, with their simple profile, terraces, and verdant slopes, are a noble sight. They are typical of the entire chain, and hence the name *biren* or *piren*, which in the valley of the Ariège was formerly applied to a sheep-walk in the mountains, transformed into Pyrenees, became general.



THE MALADETTA, SEEN FROM THE SUMMIT OF THE POSETS.

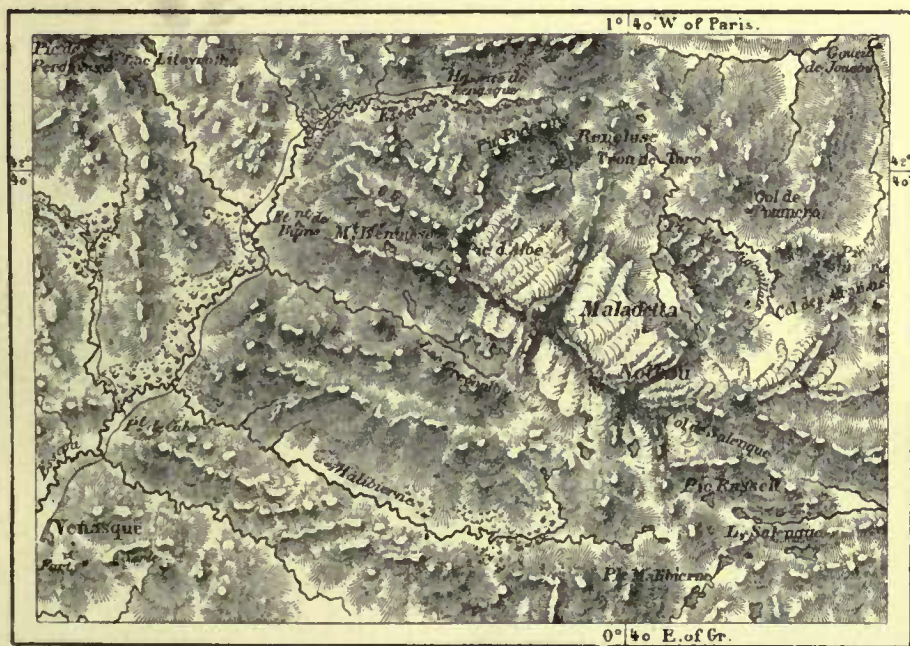
man, have been discovered in them. Until recently many of these galleries were used as places of refuge. That of Orniac, near Ussat, gave shelter to several hundred Albigenes, but the soldiers of the Inquisition built a wall across its entrance, and they all perished, as did the Greeks in the cavern of Melidhoni.

To the zoologist these caves of the chalk mountains of the Ariège are more especially interesting, on account of the insects without eyes which have been discovered within them.

The Central Pyrenees.—The gorge of Pont-du-Roi, through which runs the Garonne, separates the Eastern or Mediterranean from the Western or Atlantic

Fig. 17.—THE MALAÏETTA.

Scale 1 : 100,000.



Pyrenees. Geologically this is the centre of the entire chain, which here consists of metamorphic rocks. The valley of Aran forms the marked feature of this central chain of the Pyrenees. Geographically this valley is part of the basin of the Garonne, but politically it belongs to Spain. To the west it is bounded by the giants of the entire range. From the hills around Bagnères-de-Luchon we are able to admire these mountains, with their forests, pastures, snow-fields, and glaciers. The latter resemble in every respect those of the Alps, but do not descend so far into the valleys.

In the "amphitheatre," or Cirque d'Oo (9,850 feet), we even meet with floating icebergs similar to those of Spitzbergen or Greenland. Formerly the glacier of Oo was far more extensive than it is now, and its ancient moraine, 5,900 feet lower

than the terminal face of the existing glacier, is 4,400 yards in length, on an average 1,640 yards wide, and 790 feet in height.

The most elevated mountains of the Pyrenees rise within the Spanish frontier. The group of the Maladetta, or "cursed mountain," thus called on account of its desolation, terminates in a serrated crest, the principal "needle" of which still bears its ancient Iberian name of Néthou (11,170 feet). This peak was first ascended in 1842, but the region to the south of it was only revealed recently by an Englishman, Mr. Packe, who discovered there the largest lake of the Pyrenees, that of Gregonio, and the delightful meadows of the Malibierne. Mont

Fig. 18.—MONT PERDU.

Scale 1 : 100,000.



Posets (11,048 feet), on the west of the valley of the Esera, rivals its neighbour in height. It was first ascended in 1856. From its summit may be enjoyed what is probably the grandest panorama in the Pyrenees.

Mont Perdu, the "lost mountain," the third great mountain mass of the Pyrenees, rises likewise on Spanish soil. It was first ascended by the illustrious Ramond in 1802, and since then its amphitheatres or cirques have become the haunt of tourists. The limestone pyramid of Mont Perdu rises from an irregular plateau, cut up into terraces bounded by precipices, and dotted over by curiously shaped masses of rock. To the west the group is bounded by the famous "Breach of Roland" (9,197 feet), said to have been cleft by the paladin's sword (Fig. 19).

Glaciers occupy the area enclosed between the rocky precipices. That between Mont Perdu and the crest of Estaubé, to the north of it, covers an area of 1.5 square miles, and within it is enclosed a lake, frozen almost throughout the year.

The waters descending from the plateau have excavated immense cavities, locally called *oules*, or "porridge pots," but more generally known as *cirques*. The largest of these amphitheatres is that of Troumouse, but the most admirable, the glory of the Pyrenees, is that of Gavarnie (Fig. 20), bounded on the one side by a perpendicular precipice 5,500 feet in height, on the other by rocky

Fig. 19.—THE BREACH OF ROLAND.



terraces. A magnificent waterfall, 1,384 feet in height, plunges down from the glaciers when the snow melts, but in winter this and the numerous minor cascades are converted into pillars of ice, which surround the amphitheatre like a colonnade of marble.

The granitic peaks in this portion of the range are inferior in height to those formed of limestone. That of Néouvielle (Pic d'Aubert), the most remarkable of the former, only attains 10,144 feet, whilst the limestone masses of Pic Long (10,479 feet), and Campbieil to the south of it, almost equal Mont Perdu in

elevation, and are joined in the east to the Pic d'Arbizon (9,286 feet, and other summits looking down upon the valley of the Aure, which rival the Pic du Midi of Bigorre (9,437 feet) in beauty. This latter is separated from the main range by a low saddle, over which runs the road of the Tourmalet, and being thus isolated, the prospect from its summit is one of the most magnificent, extending from the Pic du Midi of Pau (9,463 feet) to the pyramid-shaped Mont Vallier.

Fig. 20 —THE AMPHITHEATRE OF GAVARNIE.



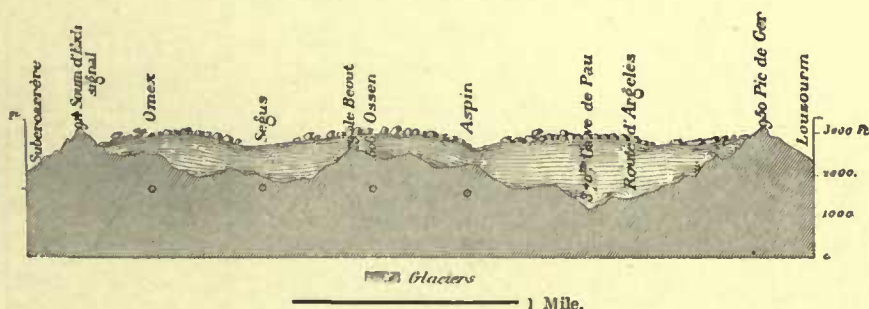
Néouvielle and the mountains in its vicinity are covered with boulders; and the moraines of ancient glaciers bound the "lakelets" which fill depressions in the valleys. These glaciers have shrunk now to small proportions, but during the glacial epoch they covered a vast extent of country. The most important of them occupied what is now the valley of the Gave of Pau, as far down as Lourdes. Anciently it appears to have extended beyond Tarbes, but even if we credit it only with the dimensions given to it by MM. Martins and

Collomb, it had a length of 33 miles, and spread over 500 square miles. It covered the site of the modern village of Gavarnie to a height of 4,430 feet, was 2,590 feet thick in the basin of Argelès, and 1,180 feet above the site of Lourdes. In comparison with this gigantic river of ice, the *serneilles* of Mont Perdu and the Maboré, the glaciers descending from the dark flanks of the Vignemale (10,795 feet), the most elevated summit of the French Pyrenees, and the patches of ice to the east of formidable Balaïtous (10,421 feet), are of little note, for the whole of the existing glaciers of the Pyrenees hardly cover 20 square miles, and in no instance do they descend beneath 7,200 feet above the sea-level.

To the west of the Balaïtous the height of the Pyrenees decreases rapidly, and the Pic du Midi of Pau is the last of the great granitic peaks. With the pyramid-shaped Pic d'Anie (8,213 feet) begins the country of the Basques, who formerly believed that mountain to be inhabited by an evil spirit. Beyond Mont Orhy (6,618 feet) we only meet with hills traversed by numerous passes, amongst which the "Gate" of Roncevaux (3,600 feet) is the most famous. At the saddle

Fig. 21.—SECTION OF THE ANCIENT GLACIER OF ARGELÈS.

Scale 1 : 50,000. According to MM. Martins and Collomb.



of Aldudes the political boundary turns abruptly to the north, leaving to France only low spurs and outlying hills. One of these latter is the Rhune (2,950 feet), or "angular rock," affording a magnificent prospect over the Bay of Biscay.

Although the difference of latitude between the two extremities of the Pyrenees does not exceed 1° , they differ strikingly in climate and aspect. Near the Atlantic the mountains are almost wholly covered with mould, and, where trees are not met with, the soil is at all events thickly covered with shrubs and furze. Towards the Mediterranean, on the other hand, the rocks are barren. In the Western Pyrenees we might fancy ourselves in Scotland, whilst the *aspres* of Roussillon and the *secanos* of Catalonia resemble the arid hills of Greece. The granitic rocks which prevail in the east partly account for these contrasts, but the principal cause must be looked for in the rains. In the Basque country it rains abundantly, near the Mediterranean hardly at all, the boundary between the two districts being formed by Mont Carlitte. The snow-line descends rapidly as we proceed to the westward, and in the Mediterranean Pyrenees we meet

neither with glaciers nor with perennial snows. The snow that falls there soon disappears before the rays of the sun, the winds, and a hot south wind resembling the *foehn* of Switzerland, and locally known as *autan*.

Fig. 22.—THE ANCIENT GLACIER OF ARGELES.
Scale 1 : 400,000. According to C. Martins, and Ed. Collomb



The contrast between the two slopes of the mountains is even more striking than that between their extremities. On the French slope we meet with snow,

ice, running streams, luxuriant meadows and forests, with numerous villages scattered over the plain; on the opposite slope the eye alights upon naked rocks, poor pasturage, and heaps of stone serving as human habitations. To the mountaineers the French slope is known as *bach* or *batch*—that is, “lower” or “shady” side; the Spanish slope as *soulane*, or “sunny side.” On the latter the sun is more powerful and the rainfalls are less; but man, by destroying the forests, has made himself an accomplice of a hostile nature. Wild beasts are more numerous there. The chamois (*isard*) abounds there; wolves are plentiful, as likewise on the French slope; and sometimes one hears of the mischief done by a bear. In the district of Capsir, in Roussillon, the lynx, the genet, and the marten are still seen, but several animals, including the stag, which were common in the Middle Ages, have disappeared. A few wild goats still inhabit the valleys of Ordesa and Malibierne, in Spain, but in France the last animal of the kind was killed in 1825.

The geographical nomenclature of the French Pyrenees is Basque and Latin, but not Celtic, and we may conclude from this that the whole of the country was formerly inhabited by men of Euskarian race. The ancient language is still spoken, not in the less accessible portions of the Pyrenees, but in the open valleys of the west, where we meet likewise with gipsies, *cagots*, and *cascarots* living in separate communities. There are three dialects, viz. those of Labourd, of Lower Navarre, and of Soule. The Basque does not appear to have lost ground since the beginning of the Middle Ages; but what the uncouth dialect of Béarn failed to accomplish, French will no doubt succeed in, and no sooner will the Basques have learnt to speak two languages than they will neglect that one which proves least serviceable to them. Up to the present it was ignorance which protected Basque against the inroads of French, for one-half of the men and two-thirds of the women of the country are illiterate.

Thousands of Basques migrate to the neighbouring towns of Bayonne, Bordeaux, and Toulouse in search of employment, or seek a home in the New World, where their number is probably greater than that of those who remain behind in the old country. Hostility to the conscription is one of the great motives of emigration, for the Basque, though fond of adventure, is averse to military service, and more than half the young men called out annually fail to put in an appearance.

The Pyrenees to the east of the Pic d'Anic are inhabited by Frenchmen and Spaniards. The crest of the mountains does not, however, constitute the ethnological boundary, for in numerous instances the Spaniards have encroached upon the northern slope. Various circumstances account for this. The luxuriant pastures on the northern slopes naturally attracted the Spanish herdsmen inhabiting a sterile plateau, whilst the French agriculturists preferred remaining down in the plains. The political boundary, for the most part, conforms to these ethnological eccentricities, and the valleys of the Bidassoa, Carlos, and Aran have been assigned to Spain, though situated upon the northern slope. Nevertheless the Pyrenees constitute one of the most perfect political boundaries in the world.

Between the two railways which skirt the extremities of the chain, the one connecting Bayonne with Madrid, the other Perpignan with Barcelona, the mountains, for a space of 280 miles, are crossed only by two roads practicable for carriages. One of these runs over the Col de la Perche, to the east of Mont Carlitte; the other through the Somport ("summit gate"), to the west of the Pic du Midi of Pau. All other passes are practicable only during a part of the year, and that for mules alone.

The distribution of centres of population in the region of the Pyrenees is singularly regular. In the upper valleys, from the Albères to the Rhune, we only meet with small villages, military stations, or watering-places like Bagnères-de-Luchon. Along a line connecting the outlets of these valleys have been

Fig. 23.—THE BASQUES ON THE FRENCH SLOPE OF THE PYRENEES.
According to Broca.



built the secondary towns of these regions, such as Oloron, Lourdes, Bagnères-de-Bigorre, Montrejeau, St. Giron, Tarascon, Prades, and Céret, where the mountaineers procure their necessaries. Another twelve miles farther to the north, and along a line running parallel with the former and with the crest of the Pyrenees, we reach the more considerable towns, such as Bayonne, Pau, Tarbes, St. Gaudens, Foix, and Perpignan, all of them situated either in the plain or on low spurs readily accessible. No mining industry has caused towns to spring up in the very centre of the mountains, for mineral waters, forests, and pastures constitute the sole wealth of the Pyrenees. Breeding of mules and horses is carried on successfully in the Cerdagne and elsewhere, and the cattle of some of the eastern valleys enjoy a certain reputation, but as a rule the resources of the country are allowed to lie neglected, and an acre of meadow

land in the Pyrenees does not yield one-tenth, nay, one-twentieth, of what it is made to yield in the Swiss Alps.

The low hills and plains to the north of the Pyrenees are covered with débris and boulders transported thither by the ancient glaciers. These boulders diminish in size in proportion as we travel away from the mountains. At Pamiers, Tarbes, and Pau they are still as large as a child's head, but farther north we only meet with small pebbles and gravel, and finally enter a region covered with clay and sand, which heavy rains convert into mud. The quagmires of Lauraguais, between the Hers and the Aude, and of Armagnac, between the Garonne and the Upper Adour, have hardly their equal in France.

THE LANDES.

THE vast plain of the Landes stretches westward of these deposits of glacial drift. Bounded by the ocean, the Adour, the cultivated heights of Lot-et-Garonne, and the vineyards of Bordeaux, this plain covers an area of 5,400 square miles. It is evidently an ancient sea-bottom covered with sands of pliocene age, sometimes to a depth of 260 feet. At a short distance beneath the surface we meet with a layer of compacted sand, formed by infiltration, and sometimes as hard as iron, which is occasionally associated with it. This *alios*, as it is called, prevents the growth of trees, and being impermeable, after rains the whole of the plain would be converted into a swamp if *evastes*, or drains, had not been dug to carry off the water. There are several "sinks" (*entonnnoirs*), the most remarkable being that of Hucaou, on the water-shed between the Leyre and the Garonne.

Formerly, before the Landes had been drained, the Landescots, or Lanusquets, could only traverse these solitudes on stilts, instruments supposed to have been introduced from England. Mounted on his stilts, the shepherd was able to cross swamps with impunity, and to look after his flock, a long wand serving him simultaneously as a balancing-rod, a weapon, and an organ of prehension. This mode of locomotion is confined now to the more remote districts.

In the beginning of this century the value of land in this region was ridiculously small, and for a few francs a shepherd might purchase all around him as far as his voice could be heard. At the present time, however, the Landes have kept their original aspect only in a few places. Shrubs, ferns, and golden-flowered broom are rapidly being replaced by fields and forests of Bordeaux pines. These trees are admirably adapted to the Landes, and have been cultivated there from the most ancient times, trunks of them having been found beneath thick layers of turf. In Maransin—that is, the southern portion of the Landes—the cork-oak is the favourite tree, and near Bordeaux we meet with woods equal to any park of Western Europe as to variety of foliage. These forests gradually prepare the soil for agriculture, but the shepherds, whose pastures they encroach upon, hold them in aversion.

The *dunes* skirting the shore of the Atlantic formerly threatened to overwhelm

the whole of this region, for towards the close of last century they advanced to the east at a rate of 60 or 80 feet a year. This danger was created by man himself, who destroyed the forests which had spontaneously taken root upon these hills of sand. The prevailing westerly winds then again drove the sand inland, and it encroached upon Landes and swamps, and even overwhelmed entire villages. The village of Lège twice retired before this invasion of sand, viz. 4,300 yards in 1480, and 3,300 yards in 1660. Mimizan retreated likewise, and when

Fig. 24.—VIEW IN THE LANDES.

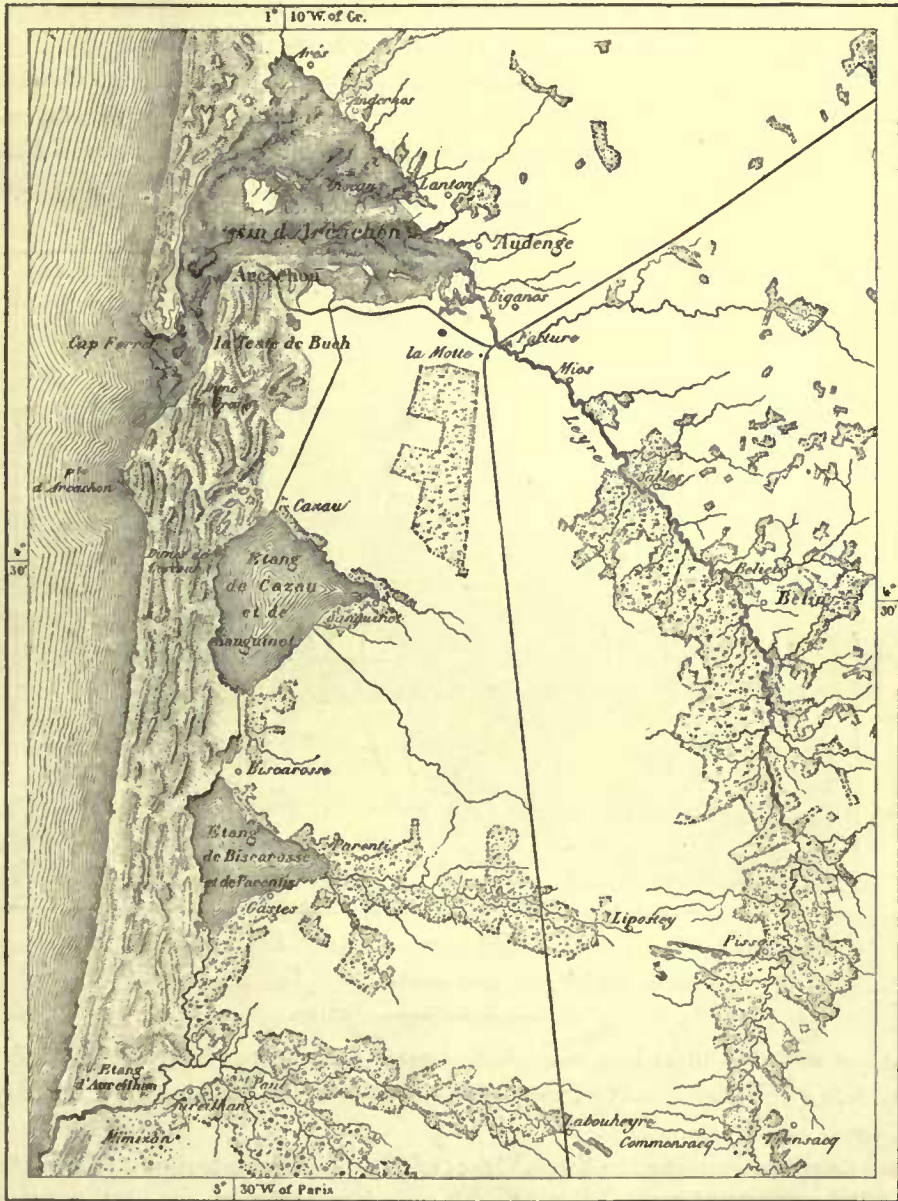


measures were at length taken to stop the invasion of the dunes, these latter had again approached within a few yards of its houses.

The first experiment to stop the advance of the dunes was made in the beginning of the eighteenth century. It succeeded, but it was only after M. Brémontier had overcome the resistance of the inhabitants, whom he desired to enrich, that any serious progress was made. Seven hundred and twenty acres were planted between 1787 and 1793, and since then the whole of the region of the dunes, extending from the Gironde to the Adour, and covering 222,400 acres, has been converted into a pine forest. These plantations have exercised a happy

influence upon the climate, if it were only by facilitating regulation of the sheets of water in the rear of the dunes. Swamp fevers (*médoquines*), which formerly

Fig. 25.—THE DUNES AND LANDES IN THE PAYS DE BORN.
Scale 1 : 400,000.



decimated the population, have disappeared, and the general health has improved in consequence of the increased wealth of the country.

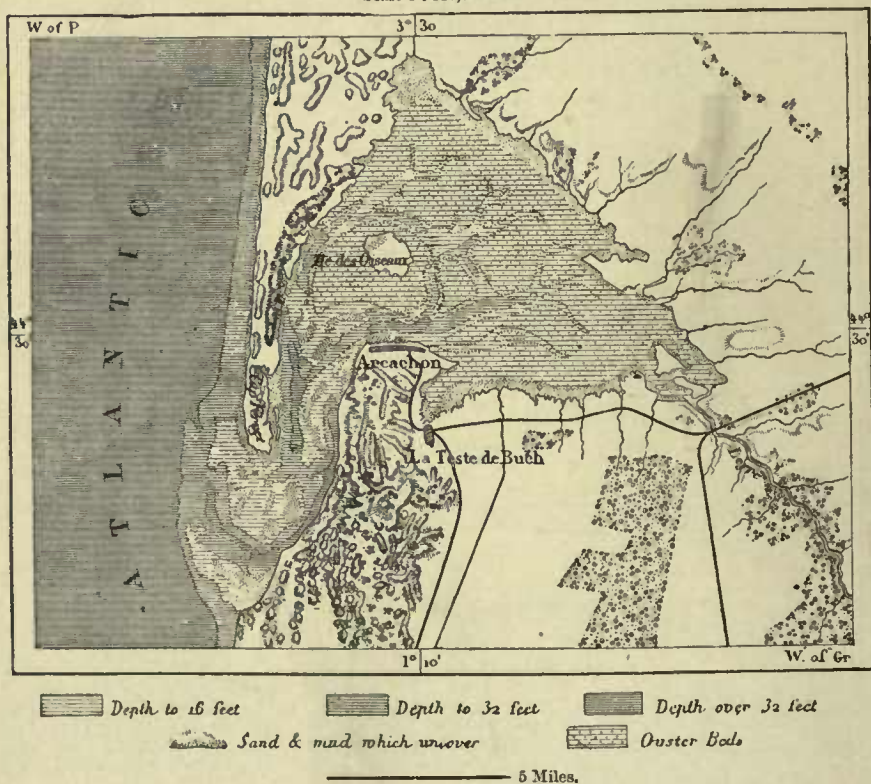
The ponds or lagoons which extend in rear of the dunes must be looked upon

as ancient bays of the sea, from which they became separated by a bar of sand. The salt water which they originally contained escaped through drains, and they became filled with fresh water. The largest of these lakes, that of Cazau, covers 15,000 acres, and its surface lies at an elevation of between 62 and 66 feet above the sea-level, according to the season. By means of a canal running parallel with the coast the level of this as well as of the other lakes might be lowered, and a safe water-way obtained connecting the Garonne with the Adour.

The basin of Arcachon, about half-way between the Adour and the Gironde, is the only lagoon which still communicates freely with the ocean, but the time is not far distant when it too will be disconnected by a bar of sand. This ever-shifting

Fig. 26.—THE BASIN OF ARCACHON.

Scale 1 : 325,000.



bar, as well as the violent tides, is the great obstacle to the conversion of this bay into a harbour of refuge, so much needed on the perilous coast of the Bay of Biscay.

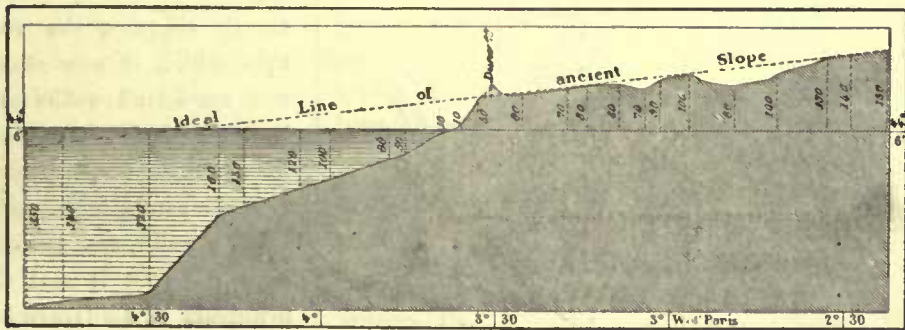
The rivers draining the littoral lakes of the Landes are turned to the south on entering the sea, for the coast current runs in that direction, and throws up a tongue of sand running parallel with the coast from north to south. The course of the river being thus virtually increased to the extent of several miles, its current grows sluggish, it performs its work of drainage less efficiently, the level of the lakes grows higher, and they encroach upon their banks. The efforts of engineers to remove the obstruction to the unimpeded discharge of the rivers have

not generally proved successful. The drainage of lakes and swamps has been attempted, though not on the same scale as in the Netherlands. The most important instance is that of the Lake of Orx, near Bayonne, which was emptied in 1864.

Man and nature thus combine to modify the physical aspect of the coast of the Landes, but the submerged portion of the coast has been subjected to changes on a much vaster scale. A sand-bank marked on charts of the last century as being situated 15 miles to the west of the basin of Arcaehon has completely disappeared. Floating ashes and seaquakes noticed by mariners point to the Bay of Biscay as a seat of submarine eruptions. Thus much is certain, that the sea has been eneroaching extensively upon the land, and if we extend the slope of the Landes, as shown in Fig. 27, it will be found that the ancient coast-line must have lain 12 miles farther to the west than the existing one.

In the time of Brémontier the sea gnawed away nearly 7 feet of the beach of

Fig. 27.—THE SLOPE OF THE LANDES.



The figures express the height or depth in mètres (10 m. = 32·8 feet).

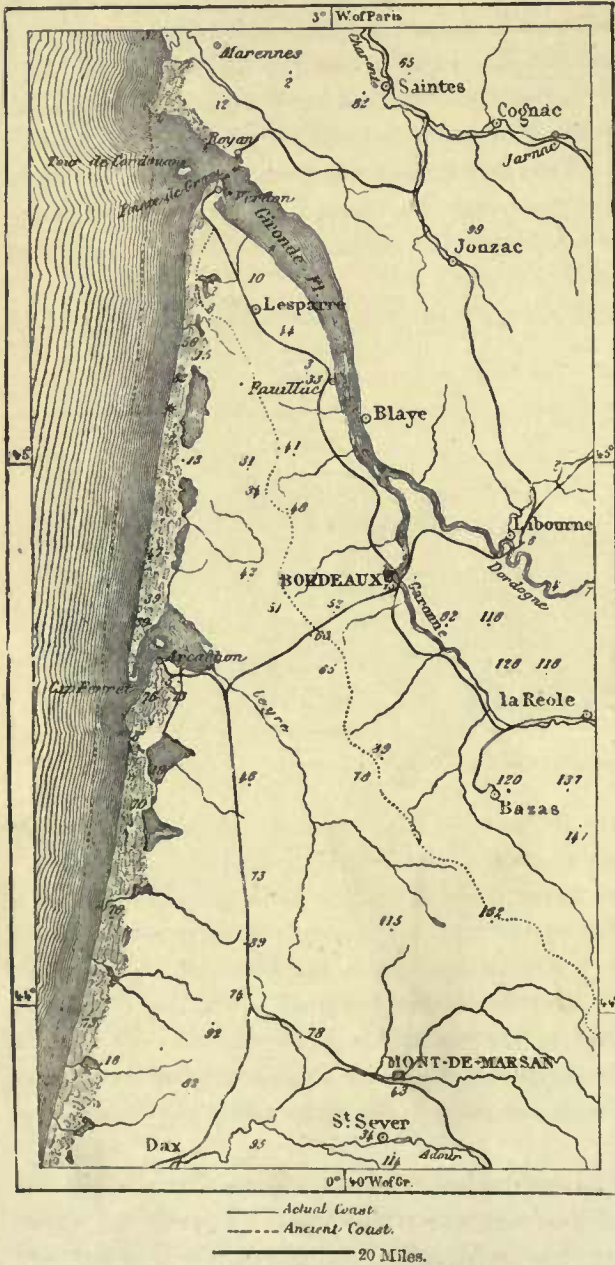
Hourtin annually, and elsewhere its invasion was even more considerable, though there were not wanting localities where the land actually gained upon the sea.

On first looking at the dunes facing the sea, it might be imagined that it is the land which is advancing. The waves and the winds are supposed to throw annually nearly 8,000,000 cubic yards of sand upon the beach of the Landes; but this sand is derived neither from the hills to the south of the Bay of Biscay, nor from the coast of Saintonge, to the north. It is furnished by the Landes themselves, and by the submarine plateau upon which they rise, and in its mineralogical composition is identical with the pliocene formation occupying the interior of the country.

Further proofs pointing to an eneroachment of the sea are furnished by the remains of the ancient vegetation of the country and the traces of man which have been discovered on the narrow ledge bounding the eastern foot of the dunes. Nowhere are these traces more conspicuous than on the beaches of La Grave and Mateo, to the south of the basin of Arcaehon, for we meet there with layers of *alios*, with turf-pits, and the trunks of trees still bearing the marks of axes, with bricks and broken pottery.

But not only is the coast being gnawed by the sea, it is also slowly subsiding, for traces of human residence have been discovered below high-water mark. The

Fig. 28.—THE ANCIENT COAST OF THE LANDES.
Scale : 1,500,000.



The figures express the height above the sea in metres
(10 m. = 32·8 feet).

coast to the north of the Gironde participates in this movement of subsidence, and not only sandy beaches have disappeared there, but also rocks. One of the best examples of this kind is furnished by the rock upon which stands the fine lighthouse of Cordouan, which illuminates the entrance to the Gironde. When Louis de Foix erected that building at the close of the sixteenth century, the rock upon which it now stands was an island sufficiently large to admit of dwellings for the workmen employed. It is now completely covered at high water, and the distance between it and the peninsula of La Grave has increased from 3·1 miles in 1630 to 4·3 miles. Numerous villages named in old chronicles have been swallowed up by the sea or overwhelmed by the dunes marching before it. Soulac was an important town on the Gironde, below Bordeaux, whilst the English held the country, but the Gothic church and the few walls which alone remain of it now stand upon the shore of the ocean, the dunes having passed right over them (see Fig. 35). The Gironde

itself would probably by this time have changed its bed had not the engineers prevented it by the construction of costly embankments. Nowhere else on the

coast of France does man struggle so arduously against the assaults of the ocean, and sometimes the issue is doubtful. Between 1818 and 1846 the Pointe de Grave, at the mouth of the Gironde, receded 236 feet towards the south-east, but the coast now is efficiently protected by embankments.

THE ADOUR.

THE geological history of the Lower Adour is connected with that of the Landes, but the two Gaves, with their principal tributaries and head-streams, belong to the region of the Pyrenees.

The Adour rises between the Pic d'Arbizon and the Pic du Midi of Bigorre, about 12 miles to the north of the crest of the Pyrenees. Though fed by abundant rains and melting snow, the drought of summer would cause it to shrink into a rivulet insufficient even for purposes of irrigation if it were not for the Blue Lake (*Lac Bleu*), a natural reservoir, the outflow from which is regulated by means of a submarine tunnel, and from which 71 cubic feet of water are discharged every second, a quantity sufficient for irrigating the valley and supplying the manufactories of Bagnères and Tarbes. This is a work of our contemporaneous engineers, but the canal of irrigation, which leaves the river where it issues from the mountains to rejoin it 25 miles lower down, dates back to the time of Alaric, the Visigoth. The island lying between this canal and the river forms one huge garden, in which maize grows to a height of 15 feet.

On approaching the region of the Landes the river sweeps round to the west, skirting the hills of Béarn, the cultivated slopes of which contrast strikingly with the desolate plain on its right bank. At Dax, instead of flowing directly to the sea, the Adour turns towards the mountains, and, as far as its confluence with the Gave, winds between hills.

The volume of the Gave is superior to that of the Upper Adour, but its current being rapid and its slope steep, the tide only ascends for a short distance, and is of very little service for purposes of navigation. The name Adour is therefore with justice applied to the lower part of the river.

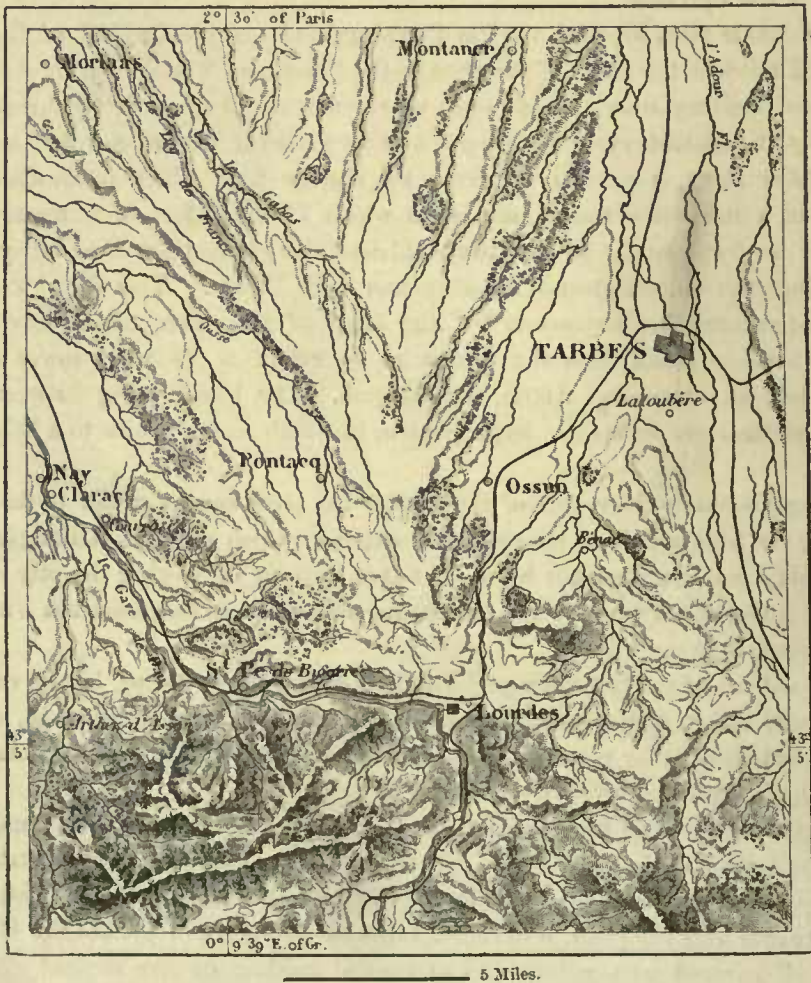
The Gave of Pau, in its upper valley, alternately forms cascades, flows tranquilly along the bottom of deep ravines, or spreads out over emerald meadows contrasting strikingly with rugged defiles. At Lourdes it leaves the mountains, but, instead of flowing north over the plain, it abruptly turns to the west, and pierces the hills of Béarn, all covered with erratic blocks carried thither by the ancient glaciers from the high mountains in the south. Below the graceful bridge of Bétharram it winds across a plain, but at Pau it again flows amongst hills, from which it finally emerges only 12 miles above its confluence with the Gave of Ossau. Throughout the whole of its course it retains the character of a torrent, and is useless for purposes of navigation.

The débris piled up by glacial action at the mouths of the Pyrenean valleys have forced the Gaves repeatedly to change their course. The Gave of Pau

originally flowed in the direction of Tarbes; it then passed by way of Pontacq, and this outlet having been blocked up by the débris deposited there, the river opened itself a new passage through the defile of St. Pé. The bed of the Gave of Ossau has undergone similar changes. At first it joined that of Pau near the town of Nay; subsequently it flowed north through the valley of Nééz, and even now a portion of its waters finds its way to that valley through an underground channel 5 miles in length.

Fig. 29.—SUCCESSIVE CHANGES OF THE BED OF THE GAVE OF PAU.

Scale 1 : 320,000.



The estuary of the Adour, below Bayonne, has undergone similar changes. In the fourteenth century its mouth was 12 miles farther north, where the Boudigau now enters the sea, and the geological boundary between the regions of the Pyrenees and the Landes must still be sought for at that spot. There are no cliffs to the north of the Adour, but the nummulitic limestones of Biarritz extend north, beneath the waves of the ocean, as far as a spot lying off the "Fosse" of

Capbreton, anciently an important seaport, which gave its name to the island of Cape Breton, in North America.

The first change in the course of the river took place towards the close of the fourteenth century, when a violent storm threw up a formidable bar, the river

Fig. 30.—THE MOUTH OF THE ADOUR.

Scale 1 : 250,000.



flowing along the rear of the dunes as far as the hamlet of Vieux-Boucau, or "old mouth," 22 miles to the north of Bayonne. The present channel of the river was excavated by human hands, aided by a great flood which occurred in 1571, and swept away the last remaining obstacles.

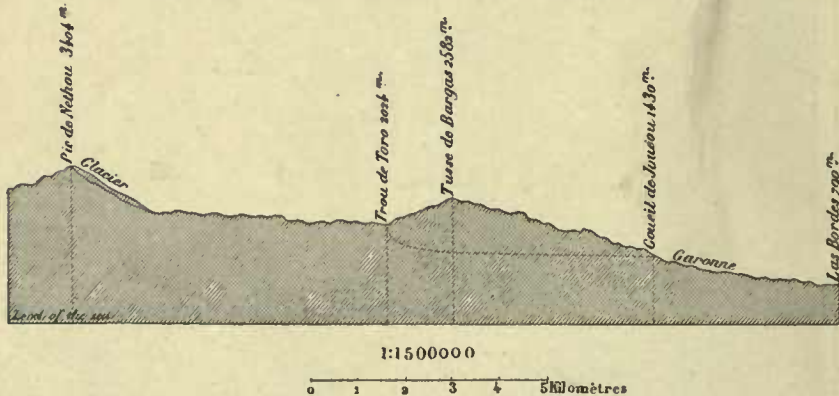
The ever-shifting bar at the mouth of the Adour is justly dreaded by mariners, and, in spite of the jetties which have been constructed, the narrow entrance to the river is occasionally obstructed.

THE GARONNE.

THE Garonne rises on Spanish soil, on the southern slope of the Pyrenees. Its head-stream, fed by the snow and ice of Pic Nethou, is swallowed up by a sink known as Trou du Taureau ("bull's hole"), and after a subterranean course of $2\frac{1}{2}$ miles, reappears again as a gushing spring at the Goueil de Joucou ("God's eye"). At the hill of Castelleon this head-stream of the Garonne is joined by a second river of that name, which traverses the Spanish valley of Aran, and when it enters French territory, at the marble defile of St. B at, it is already a formidable river.

The glacier-fed Pique of Luchon is the first considerable river which joins the

Fig. 31.—THE SUBTERRANEAN COURSE OF THE GARONNE.



Garonne on the soil of France. Lower down it receives the Neste, which flows through the delightful valley of Aure, and its direct northern course being stopped by the masses of d bris deposited by ancient glacial action, it turns abruptly to the east, and flows in a huge curve around that wonderful accumulation of shingle and gravel traversed by the radiating courses of the Gers, the Bayse, and numerous other rivers, all having their sources close to each other, as shown in Fig. 32. These rivers are gradually washing away the sediment deposited by glaciers, and nowhere else are we better able to study the influence which the earth's rotation exercises upon the formation of valleys. Almost without exception the western slopes of the valleys are gentle, whilst the rivers gnaw away the foot of the hills on the east, and a traveller who crosses over from one valley to the other in a westerly direction ascends by a gentle slope, but descends by a steep one.

Very different from these divergent rivers are the eastern or exterior tributaries of the Garonne, for their sources are far apart, they flow generally parallel with the equator, and, draining vaster areas, are more voluminous. One of them, the Salat, is thus named on account of the brine springs near its banks. Another, the

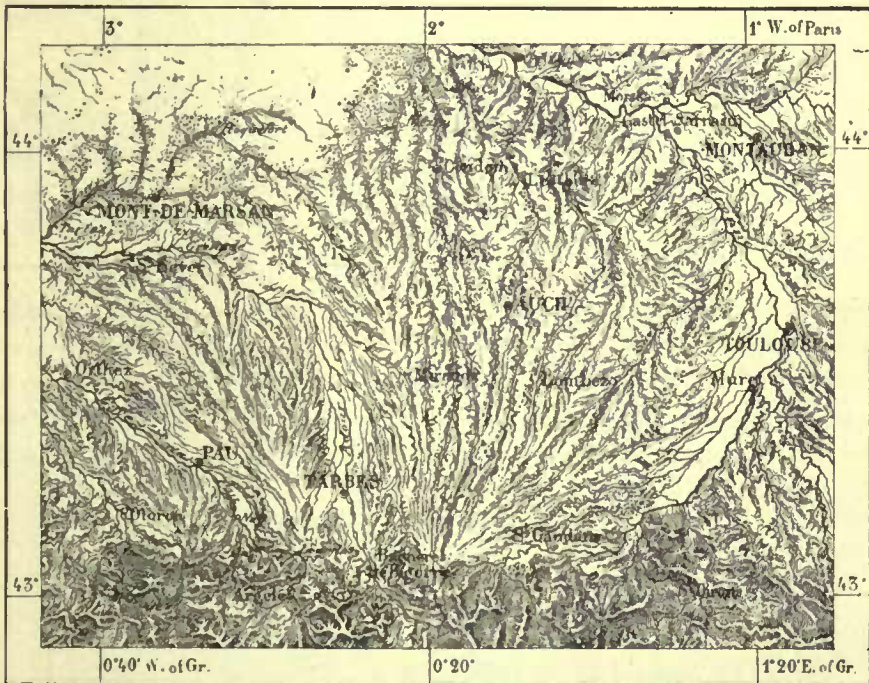
Ariège, is not named thus because it carries gold (*Aurigera*), for its name is synonymous with Arega, Aregia, Ereya, and Arize, all of which simply mean river.

Though draining a basin inferior to that of the Loire, the Garonne nevertheless is a more voluminous river, thanks to the greater rainfall, the geological nature of the soil, and the snows of the Pyrenees, which feed many of its tributaries during summer. There are no torrent beds, as on the southern slope of the Cévennes, and the hills of Auvergne and the Pyrenees are amongst the best watered of all France. Floods, unfortunately, occur frequently, generally in May or June, when the snow melts and rain falls abundantly.

At an epoch anterior to history the flow of the river was regulated by lakes,

Fig. 32.—RADIATING RIVER COURSES OF GERS.

Scale 1 : 1,875,000.



one of the most important of which occupied the fertile plain of Rivière. But these lakes have been silted up and drained, and the floods occur now very suddenly. One of the most disastrous happened in 1875, when the river rose 40 feet above its ordinary summer level, sweeping away bridges, destroying nearly 7,000 houses, and doing damage to the extent of £3,400,000. These floods might perhaps be prevented if forests were planted upon the hills, but to this the pastoral inhabitants of the Pyrenees have a deep-rooted objection.

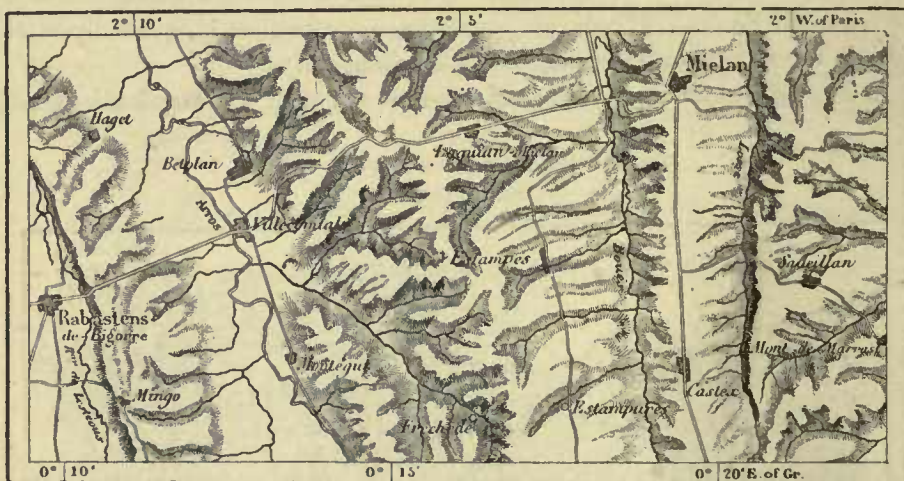
The waters of the Garonne are not employed for purposes of irrigation, as they might be, and there exist no canals comparable with that of Alarie, in the valley of the Adour. M. Duponchel, however, has conceived the grand project of construct-

ing a system of canals or drains, by means of which the hills of Gers might be levelled, and a portion of the fertile soil of which they consist spread over the barren Landes of Gascony.*

A navigable canal, communicating with the Canal du Midi, follows the course of the Garonne from Toulouse downwards as far as the head of the tide, whence

Fig. 33.—VALLEYS OF GERS.

Scale 1 : 1,150,000.



the river is navigable throughout the year. Below Bordeaux, its great commercial port, the Garonne rapidly increases in width, and the triangular peninsula which lies between it and its twin river, the Dordogne, is known as *Entre-Deux-Mers*, with reference to the sealike expanse of these great tidal rivers. Sea-going vessels ascend the Dordogne as far as Libourne, at the mouth of the Isle. The bore

Fig. 34.—THE PLAIN OF RIVIÈRE.

Scale 1 : 320,000.



which rushes up that river is said to have become more intense since the Garonne has been confined within narrower limits.

The united waters of the Garonne and the Dordogne form a vast estuary, known as *Gironde*, varying in width between two and six miles, and dotted

* "Création d'un sol fertile à la surface des landes de Gascogne." Montpellier, 1864.

over with numerous islands. There are many mud-banks, which interfere with navigation, but the depth of the channel is nevertheless very considerable, and at the mouth of the river, between Royan and the Pointe de Grave, it is no less than

Fig. 35.—THE ESTUARY OF THE GIRONDE.
Scale 1 : 640,000.



105 feet. This estuary is in reality an arm of the sea, and at Méchers, 6 miles above its mouth, there are salt ponds and oyster beds. Cetacea and sea-fish ascend the river with each tide, and porpoises gambel around the vessels as in the open sea. Among these visitors from the Atlantic the maigre (*Sciæna aquila*), a singing

fish, is one of the most curious, and the crews of many a vessel have been frightened by the sound it emits.

The banks of the Gironde exhibit many traces of geological action still going on. The hills on the right bank terminate in cliffs, the foot of which is continually

Fig. 36.—THE "PASSES" OF THE GIRONDE.

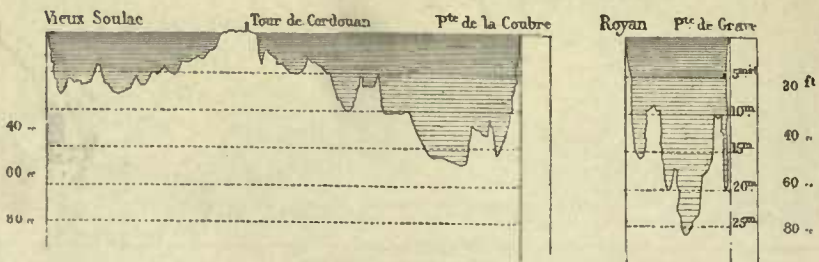
Scale 1 : 350,000.



being gnawed by the waves, and several villages have disappeared there, including Gérioset, which occupied the summit of a hill to the east of Royan, and Talmont, which stood at the extreme point of a peninsula.

Swampy plains of recent origin, such as the "polders" of Little Flanders,

Fig. 37.—SECTION OF THE PASSES OF THE GIRONDE.

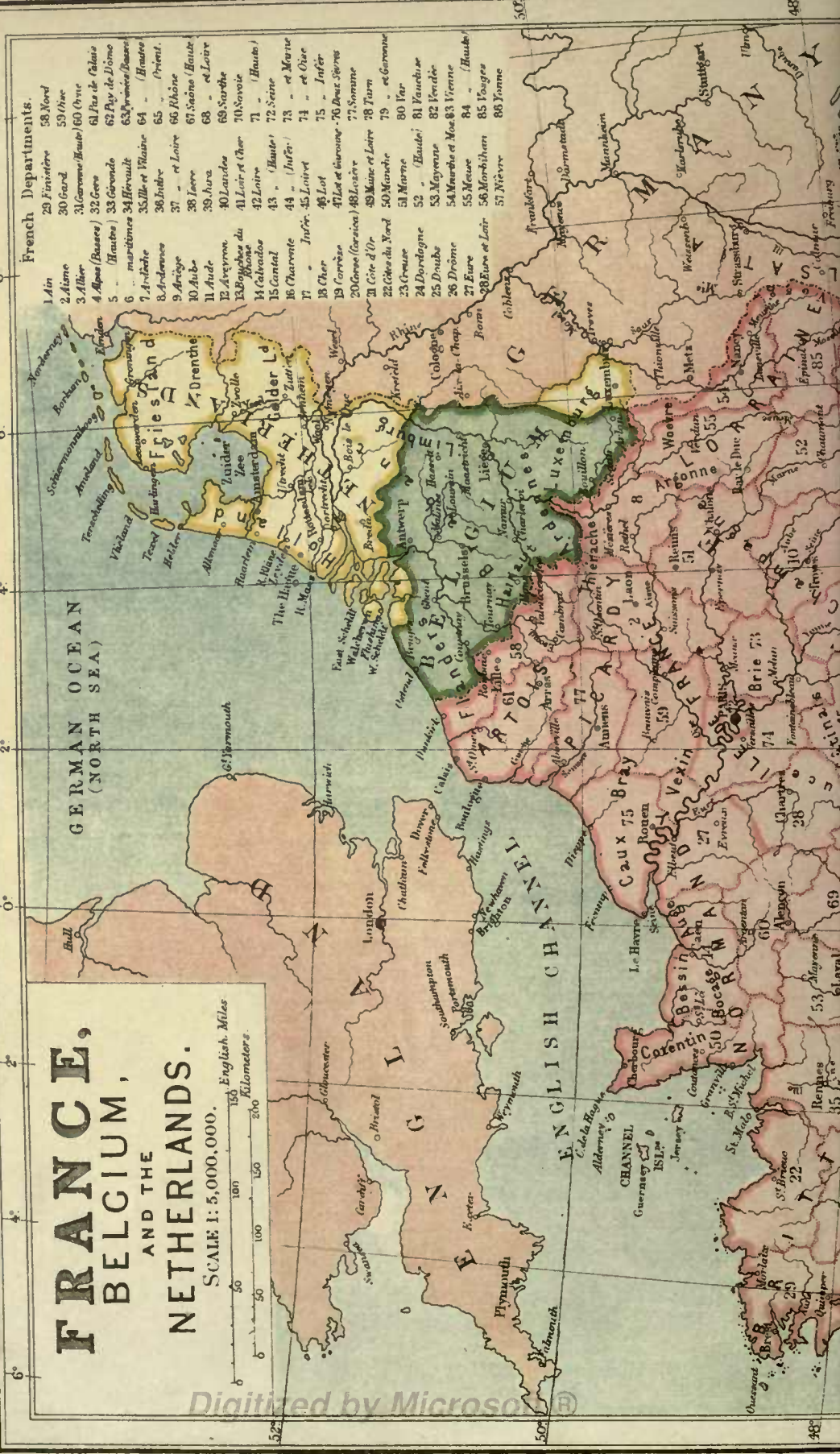


drained in the seventeenth century, and the old salt marshes of the Verdun, extend far into the peninsula of Médoc. The culminating point of the whole of this region, the hill of Jau or Jupiter, scarcely rises to a height of 40 feet, and a couple of centuries ago was an island. Ancient river beds can still be traced, and

FRANCE, BELGIUM, AND THE NETHERLANDS.

SCALE 1: 5,000,000.
English Miles
Kilometers.

- French Departments.**
- 1 Ain
 - 2 Alsace
 - 3 Alpes
 - 4 Alpes (Basses)
 - 5 Hautes
 - 6 Ardennes
 - 7 Artois
 - 8 Aube
 - 9 Ardèche
 - 10 Aude
 - 11 Ariège
 - 12 Aveyron
 - 13 Bouches du Rhône
 - 14 Cantal
 - 15 Charolais
 - 16 Cher
 - 17 Côte d'Or
 - 18 Corrèze
 - 19 Creuse
 - 20 Dordogne
 - 21 Doubs
 - 22 Drôme
 - 23 Eure
 - 24 Eure-et-Loir
 - 25 Finistère
 - 26 Gironde
 - 27 Haute-Garonne
 - 28 Gers
 - 29 Gers (Hautes)
 - 30 Gers (Basses)
 - 31 Gers (Hautes)
 - 32 Gers (Basses)
 - 33 Gers (Hautes)
 - 34 Gers (Basses)
 - 35 Gers (Hautes)
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 - 89 Gers (Hautes)
 - 90 Gers (Basses)





Engraved by T.H. Johnson & Son

NEW YORK, D. APPLETON & CO.

what is now the Pointe de Grave was formerly an island near the northern bank of the river.

The submarine relief is likewise undergoing continual changes, which endanger navigation. The channel, or "pass," of the Mastelier, which was the principal one about the middle of the eighteenth century, is now occupied by a formidable sand-bank known as La Mauvaise. The contours of the banks and the direction of the currents are for ever changing, and in the course of less than a century the bank of La Mauvaise has shifted 5 miles to the west, whilst that of La Cuivre moves in an opposite direction. Still, thanks to lighthouses, buoys, and beacons, vessels can at all times enter the Gironde with safety, and even at low water the depth of the northern pass is nowhere less than 40 feet. At each tide no less than 265,000 tons of water penetrate into the estuary of the Gironde, a quantity in comparison with which the discharge of the Garonne and Dordogne combined is almost inappreciable, even during floods.

TOPOGRAPHY.

PYRÉNÉES ORIENTALES.—This department is almost a portion of Catalonia as far as its climate, its productions, and the language of its inhabitants are concerned, but has formed part of France since the middle of the seventeenth century. It includes the valleys of the Tech, the Réart, the Tet, and the Agly, all of which debouch upon the plain of Roussillon. Each of these valleys is well watered, but, upon the whole, naked rocks form the predominant feature of the department, which is therefore able only to support a small population.

The valley of the Tech or Vallespir—that is, "austere valley"—is the southernmost of continental France. Its scenery is delightful, and the customs of its Catalan inhabitants full of interest. At its head are the pastures of Costabona, and on descending it we pass the sulphur springs of Preste, the old town of *Prats-de-Mollo* (1,320 inhabitants), formerly famous for its cloths; *Arles* (1,871 inhabitants), the commercial centre of the valley, where rude cutlery is manufactured; *Céret* (3,063 inhabitants); and the hot sulphur springs of Amélie-les-Bains.

Across the naked range of the Albères, defended by the fort of Bellegarde, the great Spanish high-road leads through the Pertus. This road is far easier than the one leading along the coast of the Mediterranean, through *Collioure* (3,446 inhabitants), frequented by fishermen, and *Port-Vendres* (1,910 inhabitants), which boasts of an excellent harbour, much frequented by vessels in distress. Some wine is exported from here, including the sort known as "rancio," which only attains maturity after having been kept for ten years, and possesses tonic properties almost equal to those of quinine.

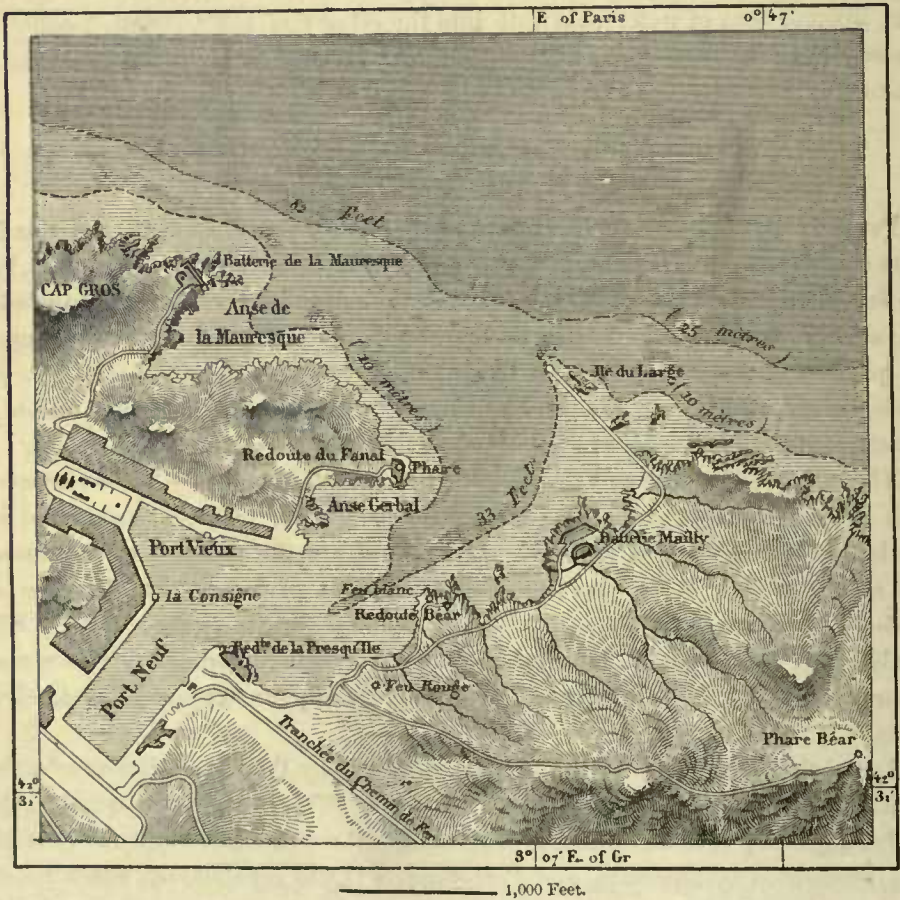
The district of Aspres, which extends east of the Canigou in the direction of the Mediterranean, is sterile, as its name implies, but excellent wine grows upon its hills, and the lowlands, irrigated by the Réart, are of wonderful fertility. *Elne* (2,463 inhabitants), the ancient Illiberri, subsequently named Helena in honour of

the mother of Constantine, is the only town of importance there; its cathedral dates back to the eleventh century.

The most important valley of the Eastern Pyrenees is that of the Têt; the Col de la Perche at its head, and the roads to Perpignan, are defended by the fortress of *Montlouis*, constructed by Vauban. Lying at an elevation of 5,250 feet above the sea, the climate of this place is most rigorous. Hot mineral springs abound in this portion of the Pyrenees, but only those of *Vernet*, on the northern slope of Mont Canigou, enjoy a world-wide reputation. Iron ores, suited to the

Fig. 38.—PORT-VENDRES.

Scale 1 : 15,000.



manufacture of steel, likewise abound. There are iron works at Ria, between the small fortified town of Villeneuve de Conflant and Prades, but most of the ore is exported to Germany. *Prades* (3,725 inhabitants), *Vingà* (2,093 inhabitants), *Ille* (3,222 inhabitants), and all the villages of the Rival, to the very gates of Perpignan, are indebted to the fertilising waters of the Têt for their prosperity.

Perpignan (24,379 inhabitants) is a fortress of the highest importance, for it commands all the passes over the Pyrenees from the sea to the Pass of La Perche.

Traces of Moorish architecture may be discovered in its huge citadel, in the Castillet, or little castle, and the "Loge," or old exchange of the Majorcans, but it is not in other respects a fine city. Its ancient industries have declined since Charles V. converted the town into a fortress, and its university, founded in the fourteenth century, only exists in name. The climate, however, is delightful, sub-tropical plants grow most vigorously, and the whole country might easily be converted into a huge garden of acclimatization.

Wine is the great source of wealth of the country. Though ordinary roussillon is used merely for blending the lighter wines of Central France, first-rate wines are produced at *Rivesaltes* (6,077 inhabitants), on the Agly; at *Estagel* (2,678 inhabitants), higher up on the same river, and the birthplace of Arago; and at *Salses*, the *Salsulæ* of the Romans. Most of these wines are exported through *Barcarès*, a port near the town of *St. Laurent de la Salanque* (3,990 inhabitants). The country likewise produces olives. The tract along the coast, known as "Salobres," is impregnated with salt, and hardly produces anything, but fair harvests of cereals are gathered in the tract known as "Salanque," which bounds it inland, the vine and olive being restricted to the hilly districts.

ARIÈGE.*—This department includes the old district of Couserans, the basin of Salat, and the county of Foix, comprising the basin of the Ariège. Nearly the whole of it is mountainous, and the main range of the Pyrenees forms the boundary towards Spain for a distance of 136 miles. The only plain is that of Paumiers. The population is thin and exceedingly ignorant.

The small canton of Quérigut or Donnèzan, on the Upper Aude, which is only accessible to the rest of the department by the difficult Pass of Pailiers, sheltered the fugitive Protestants after the revocation of the Edict of Nantes, but is now visited only on account of its sulphur springs at *Caramières*. The upper valley of the Ariège likewise attracts strangers on account of its hot springs, amongst which those of *Ax* (Aquæ) are the most famous. Hematite iron ores, lead, copper, and manganese abound at *Vie de Sos*, in a side valley of the Ariège, but owing to the difficulties of access, the want of fuel, and the restrictions imposed by mediæval guilds, the metallurgical industry is not very important.† At *Taraseon* there are gypsum quarries, and travelling still 10 miles lower down the valley, we arrive at *Foix* (5,127 inhabitants), with its famous old castle, the capital of the department. Below that town the Ariège passes through a series of gorges, and then enters upon a vast alluvial plain, where stands *Pamiers* (7,837 inhabitants), the most important town of the department. Lower down still is *Saverdun* (2,596 inhabitants).

The valley of the Hers joins that of the Ariège beyond the limits of the department. It is one of the most charming of the Pyrenees, the pine woods of Bélesta, the intermittent spring of Fontestorbes, and the ruined castle of Montségur constituting some of its principal attractions, whilst *Lavelanet* (2,792 inhabitants) and *Mirepoix* (3,102 inhabitants) are noted for their manufacture of cloth. On

* Bergès, "Description du dép. de l'Ariège;" Bordes-Pagès, "Notice sur le Couserans;" Astruc, "Mém. pour l'hist. naturelle du Languedoc."

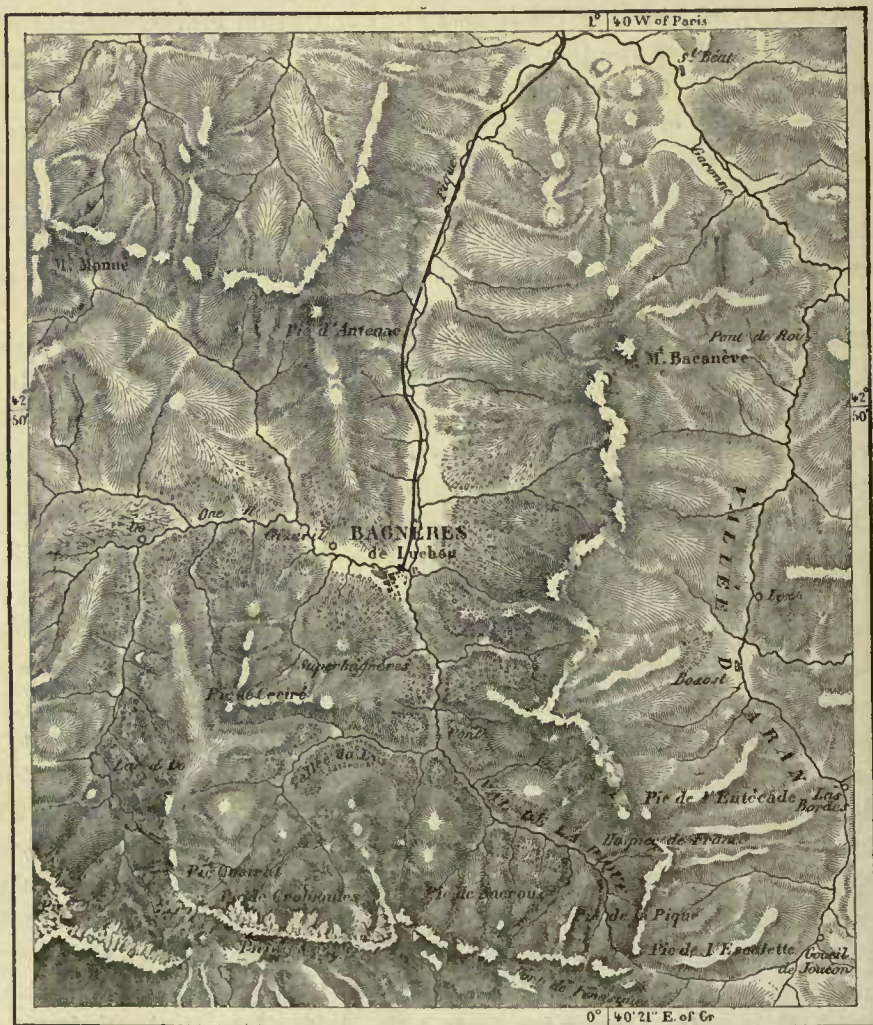
† In 1873, 6,040 tons of cast iron, 5,045 tons of wrought iron, and 889 tons of steel were produced.

the Arize, which flows direct to the Garonne, stands the busy little place of *Mas d'Azil* (1,278 inhabitants), near which the river flows through a subterranean channel.

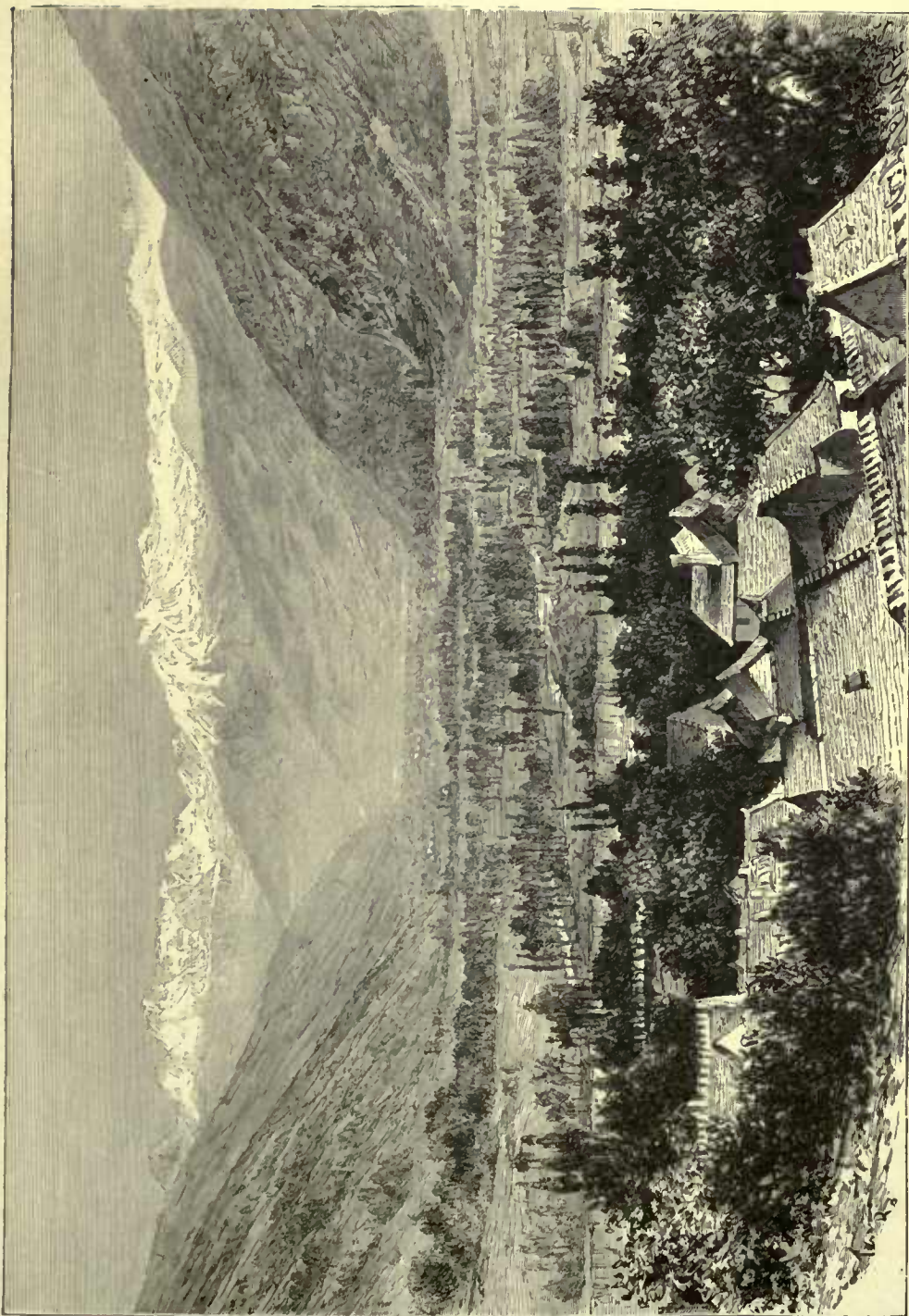
The western portion of the department, ancient Couserans, is drained by the Salat and its tributaries. The upper valleys of this region formerly constituted as many self-governing communities, and the inhabitants, until quite recently,

Fig. 39.—BAGNÈRES-DE-LUCHON.

Scale 1 : 215,000.



retained their ancient dress and customs. In winter they leave their inhospitable mountain homes in search of work in the more favoured plains; and when bears were still numerous in the Pyrenees, many of them travelled as bear-leaders. Hot springs abound in these valleys, the most renowned being those of Aulus, accidentally rediscovered in 1823, and deservedly popular on account of the delights of the surrounding scenery. *St. Girons* (3,993 inhabitants), the capital



PANORAMA OF CIER AND THE VALLEY OF LUCHON.

of the district, occupies a site at the confluence of the Lez with the Salat. It carries on a lucrative commerce with Spain, the road leading through the Port de Salau, and boasts of various manufactures. At *St. Lizier*, which was the ancient capital, may still be seen the ruins of Roman walls and of a Gothic cathedral. The old episcopal palace has been very appropriately converted into an asylum for lunatics.

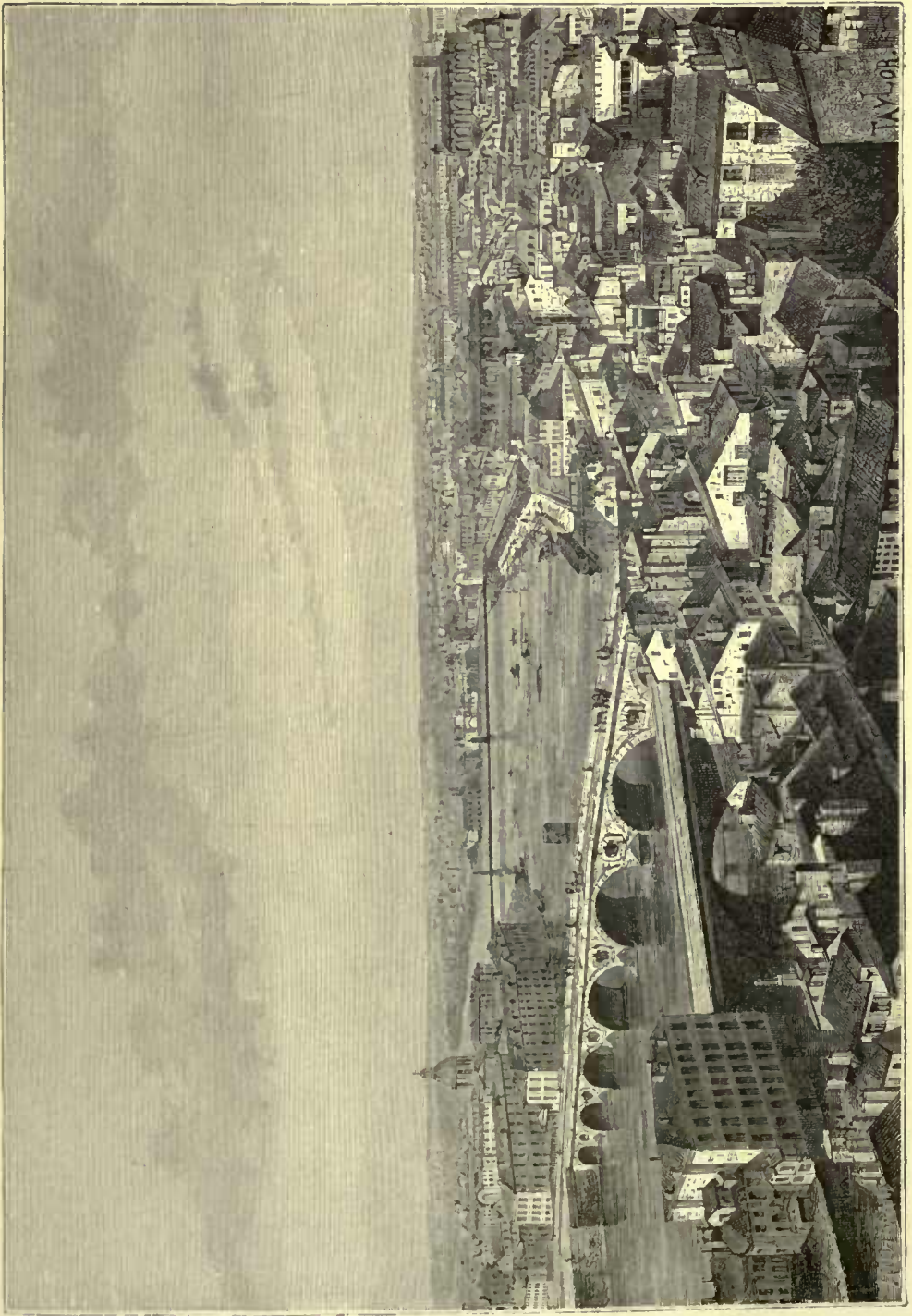
HAUTE-GARONNE.—This department includes portions of the ancient provinces

Fig. 40.—THE CONVERGENT VALLEYS OF THE GARONNE, THE ARIÈGE, AND THE HERS.
Scale 1 : 600,000.



of Gascony and Languedoc, and is intersected from south to north, for a distance of 150 miles, by the river Garonne, which has given it a name. It extends from the crest of the Pyrenees to the foot-hills of the central plateau of France, and thus exhibits a great variety in its scenery, climate, and natural productions.

In the very heart of the mountains lies the most famous hot spring of the Pyrenees, that of *Bagnères-de-Luchon* (3,982 inhabitants), the surrounding scenery



TOULOUSE.

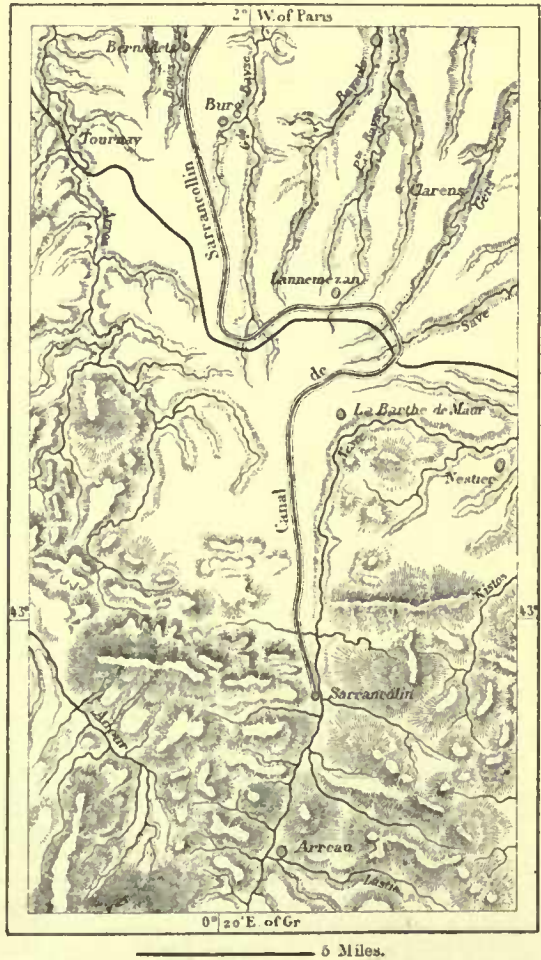
inhabitants), and other places in the north, are mainly dependent upon agriculture; whilst *Villemur* (2,367 inhabitants), on the Tarn, and *Revel* (3,782 inhabitants), have some manufactures.

Toulouse (120,208 inhabitants), the entrepôt of the fertile plain of the Garonne, is one of those cities which cannot be dispensed with. Its favourable position for war and commerce at all times insured its prosperity, and when the Romans captured it they discovered in a sacred pond treasure valued at 15,000 talents, or £3,000,000. This

prosperity is perhaps greater now than ever it was before; but though *Toulouse* has been the capital of the Visigoths for nearly a century (418—507), it carries on no direct commercial transactions with the Iberian peninsula, but is the great intermediary between the Mediterranean and the Atlantic. Including the suburbs, the red-brick buildings of the town cover an area of over 3 square miles. The town-hall or Capitol, with its busts of illustrious Languedocians, occupies the centre of the ancient city, which was superior to the towns of Northern France in wealth and intelligence, until the henchmen of the Inquisition caused its streets to flow with blood, and instilled a spirit of ferocious orthodoxy into the minds of its inhabitants, who burnt Vanini at the stake in 1619, and in 1762 broke the limbs of Calas, the Protestant, upon the wheel. The church of St. Servan, the cathedral of St. Étienne, and the ancient monastery of St. Augustine, now converted into a museum, are amongst the most interesting buildings of the town. The library, far inferior to what one might expect to find in an ancient university city, occupies another old monastery. Commerce and industry flourish. There are manufactures of paper, starch, tobacco, and textile fabrics, as well as foundries and saw-mills. The environs are almost bare of trees, and there exists no park deserving the name.

HAUTES-PYRÉNÉES.—This department includes the whole of ancient Bigorre,

Fig. 42.—THE CANAL OF THE NESTE.
Scale 1 : 320,000.



with portions of adjoining districts. More than half of it is filled with high mountains. Its principal rivers are the Neste in the east, the Adour in the centre, and the Gave in the west. The alluvial bottom-lands are of exceeding fertility; hot springs abound in the mountains; there are famous marble quarries and busy manufactories; but the population is still far from numerous.

The valley of the Aure, or Upper Neste, is one of the most renowned of the Pyrenees, on account of its pretty scenery and grand perspectives. Arreau, its capital, is merely a village, and Sarracolin is only better known because it lies at

Fig. 43.—BAGNÈRES-DE-BIGORRE.

Scale 1 : 280,000.



the head of the canal of the Neste, and boasts of marble quarries. The population, however, is more dense than might be expected, for hamlets and homesteads lie scattered in all directions.

The valley of Campan, on the Upper Adour, is looked upon as typical of the beauties of nature; but the men who inhabit it are repulsive, as most of them are subject to wens. At its mouth lies *Bagnères-de-Bigorre* (7,598 inhabitants), which has paper and saw mills, marble works, and manufactures of fancy hosiery, these latter giving employment to more than 2,000 women. The town is likewise the

seat of the Société Ramond, which has undertaken the scientific exploration of the Pyrenees and established an observatory on the Pic du Midi of Bigorre.

Turbes (11,080 inhabitants), the capital of the department, lies quite beyond the hills, and from the windows of its museum an unrivalled prospect over a

Fig. 44.—THE TUMULI OF OSSUN.

According to Bourbier and Letrone. Scale 1 : 62,000.



verdant plain, bounded by blue mountains in the distance, may be enjoyed. There are foundries, woollen-mills, and manufactories of felt, as well as a Government factory of small arms and a cannon foundry. The surrounding country is famous for its breed of saddle horses. Corn and wine are the leading agricultural productions.

The hilly country to the east of this smiling plain of the Adour, including the plateau of Lannemezan, consists to a great extent of heaths. The best-known village there is *Capvern*, with hot mineral springs. Heaths also occur to the west of the Adour, and one of them, near *Ossun* (2,400 inhabitants), is remarkable on account of its ancient entrenchments and tumuli.

The basin of the Gave, in the west of this department, is perhaps more frequently visited by tourists than any other portion of the Pyrenees, and deservedly so, for it abounds in sublime scenery and natural curiosities. Its many thermal springs form one of its greatest attractions. The sulphurous waters of *Barèges* are efficacious in case of wounds, those of *St. Sauveur* are available against nervous disorders, but the various springs of *Cauterets* cure almost every disease that human flesh is heir to, and attract as many as 16,000 sufferers in a single year. The mouth of the valley of the Upper Gave is commanded by the old fortress of *Lourdes* (4,577 inhabitants), become famous in our days through a miracle-working spring near which quite a town of churches and convents has sprung up.

BASSES-PYRÉNÉES.—This department includes Béarn and the old “kingdom” of Navarre, with the districts of Soule and Labourd in the Basque country. For the most part it is hilly rather than mountainous, though the Pyrenees to the south of the valleys of Ossau and Aspe still pierce the region of perennial snows. The ravined plateau to the north of the Gave of Pau consists of glacial drift. There are mines of iron, coal, and salt, many manufactories, and a great commercial port; but upon the whole this is an agricultural department, the resources of which have not hitherto been developed as they might be. The *touyas*, or heaths, which cover 783,000 acres of the Pyrenean foot-hills, are quite capable of cultivation, but the peasants prefer to use them as pasture ground. It is only natural, under these circumstances, that the population should decrease.

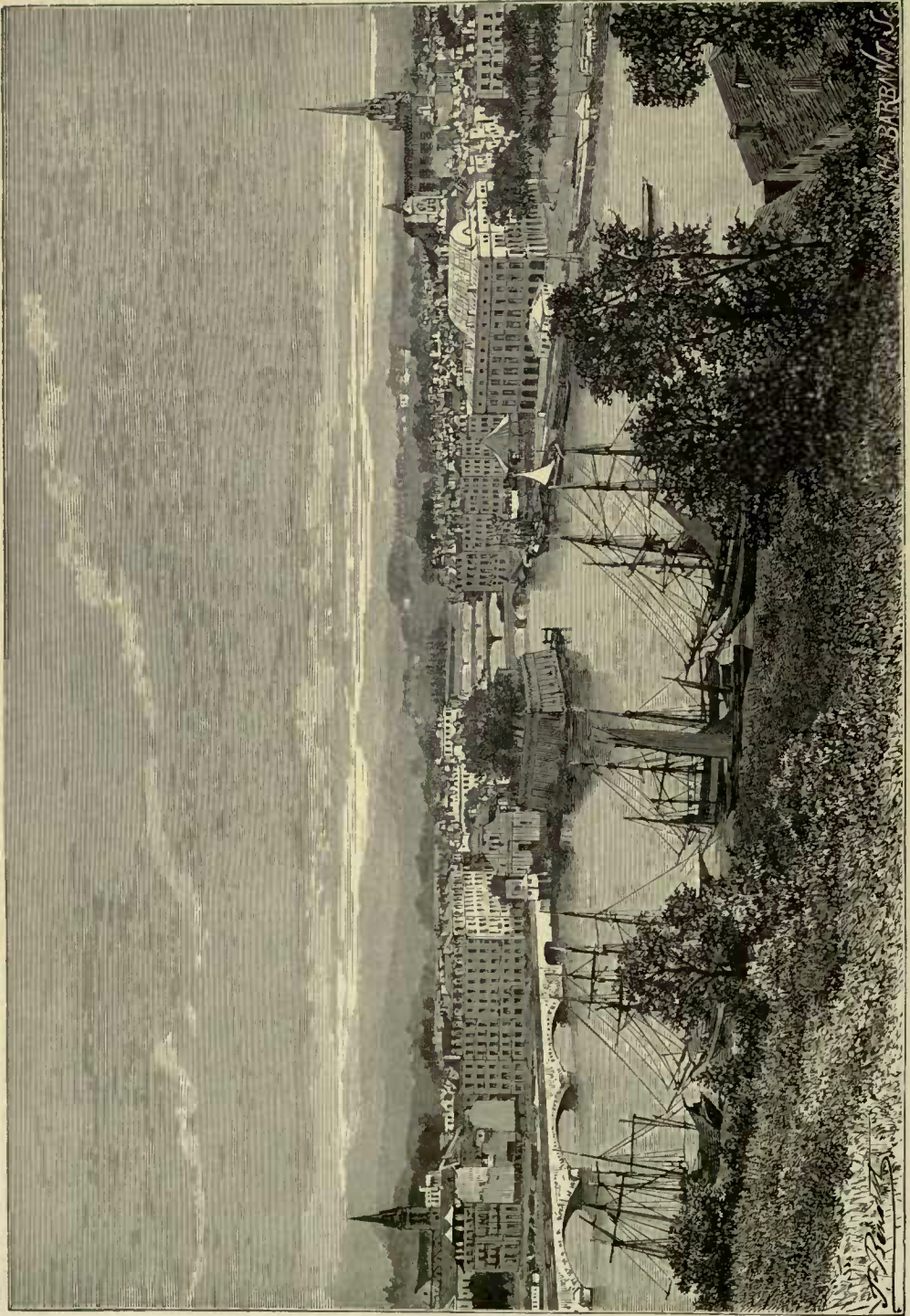
The Gave, on entering the department, flows past the church of Betharram, an old place of pilgrimage, and then irrigates the fields of numerous villages, the centre of which is *Nay* (3,093 inhabitants), which boasts of numerous manufactures. Still following the river, we reach *Pau* (27,553 inhabitants), the ancient capital of Béarn. It is built upon a terrace, and owing to the mildness of its climate has become a great resort of invalids. The terrace of its ancient castle commands a magnificent panorama of the Pyrenees. The entertainment of visitors is the great business of Pau, but there are also some manufactures of linen. *Morlaas*, the first capital of Béarn, now an inconsiderable village, lies in the Landes, to the north-east; and, proceeding still farther in the same direction, we reach the castle of Montaner, one of the strongest fortresses built by Gaston Phœbus.

Orthez (4,727 inhabitants), on the Gave, below Pau, was formerly the seat of a university, and is noted for its ancient bridge and the donjon of the old palace of the Dukes of Foix. There are numerous tanneries and other industrial establishments, and amongst the exports of the town figure “Bayonne hams.”

The mountainous portion of the department belongs to the basin of the Gave



PEASANTS FROM THE VALLEY OF OSSUN.



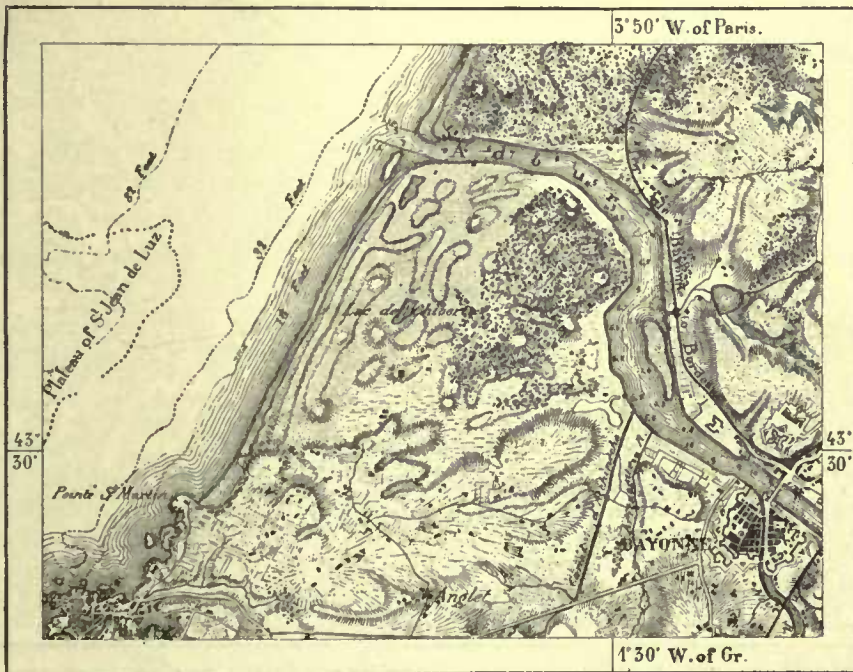
BAYONNE

of Oloron, the capital of which is *Oloron Ste. Marie* (7,223 inhabitants), at the foot of the only Pyrenean pass available for wheeled traffic, viz. that of Somport. There are cloth and cotton factories, and smuggling is carried on extensively. High up in the hills, at the foot of the *Pic du Midi* of Pau, lie the sulphur springs of *Eaux-Bonnes* and *Eaux-Chaudes*, and the valley of Barétous, in the south-west, is famous for its cattle.

In descending the Gave we successively pass through *Navarreux*, an old fortress, and *Sauveterre*. At Oraas, near the latter, and at *Salies* (2,494 inhabitants), there are salt works, now carried on by Government, but they are far less productive than formerly.

The villages in the interior of the Basque country are remarkable only on

Fig. 45.—BAYONNE AND THE MOUTH OF THE ADOUR.
Scale 1 : 80,000.

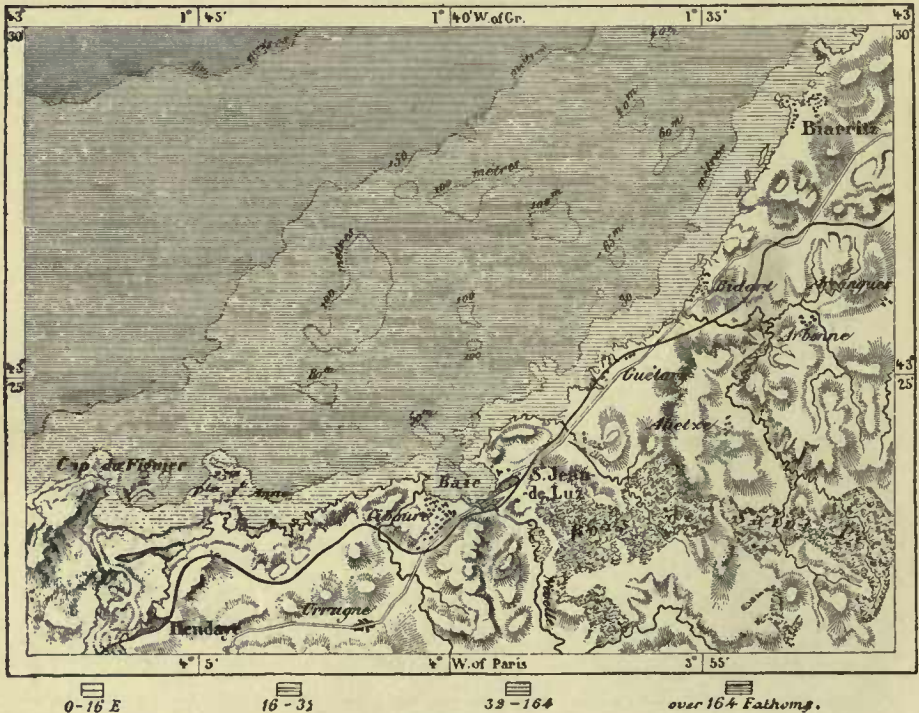


account of their picturesque position. At *Mauléon-Licharre*, the old capital of Soule, are the ruins of a castle; *Hasparren* (1,573 inhabitants), a very ancient village, has shoe and cloth manufactures; the fort of *St. Jean-Pied-de-Port* commands the Pass of Roncevaux and two others. Near it is a colony of *cagots*, a despised race formerly, but nevertheless intelligent, and superior in physique to their neighbours. Most writers now look upon them as descendants of the Visigoths.

Bayonne (22,307 inhabitants), though slightly inferior to Pau in population, is by far its superior in commerce and industry. It is a fortress, but gaily painted houses, open squares, and fine promenades give it the appearance of an open city. Its Gothic cathedral is one of the finest edifices in the south of France. Its

position at the bottom of the Bay of Biscay and on the most frequented road between France and Spain marks it out as a great place of commerce; but owing to the bar which closes the mouth of the Adour, it has not attained a position amongst the great commercial ports of France such as might have been expected, and the numerous Spanish and Portuguese Jews are intent rather upon bourse speculation than upon legitimate commerce.* As to the other harbours along the coast of Gascony, such as Guethary and St. Jean-de-Luz, they are at present of no commercial importance whatever. And yet the mariners from this coast frequented America long before Columbus, though not before the Normans. Great efforts are now being made to improve the harbour of *St. Jean-de-Luz*

Fig. 46.—ROADSTEAD OF ST. JEAN-DE-LUZ.
Scale 1 : 200,000.



(3,131 inhabitants), though that town can never again become a great place of commerce. Indeed, such importance as these coast towns possess is due entirely to their having become favourite seaside resorts; it is this which has transformed the village of *Biarritz* (3,348 inhabitants) into a cosmopolitan watering-place, and is preparing a similar fate for *Hendaye*.

GERS.—This department is named after a yellowish river which traverses it from north to south, and occupies the greater portion of the plateau of glacial drift piled up at the mouths of the Upper Adour and Neste, and cut up by torrents into numerous ridges of hills (see Fig. 32). It lies outside the usual

* In 1872 there were 1,320 Jews. In 1875 1,460 vessels, of an aggregate burden of 164,324 tons, entered and cleared.

roads of traffic, but its valleys are fertile, and a fair wine grows upon its hill-sides.

The most fertile portion of Gers lies on the south-west, and is watered by the Adour. Immediately to the east of this valley rises the plateau of Armagnac, the wines of which are to a great extent converted into brandy, ranking next to Cognac. *Cazaubon* (760 inhabitants), *Eauze* (2,062 inhabitants), *Montréal* (690 inhabitants), and *Vic-Fezensac* (3,000 inhabitants), are some of the more important places in Lower or Western Armagnac, separated from Upper Armagnac by the valley of the navigable Bayse or Baise, the more important towns of which are *Condom* (4,933 inhabitants) and *Mirande* (3,230 inhabitants), the capital of Astarac.

Auch (12,145 inhabitants), the name of which recalls the ancient Ausques or Eskuaras who founded it, lies in the valley of the Gers. It is a fine town, with one of the most majestic cathedrals of France, an immense flight of stairs, leading to the terrace upon which it is built, and a mediæval tower dedicated to Cæsar. Higher up in the valley lies the village of *Sansan*, which has become known through the palæontological explorations of M. Lartet and others. The lower valley of the Gers is well cultivated, and the fields surrounding *Fleurance* (3,737 inhabitants) and *Lectoure* (2,963 inhabitants) are of great fertility. The patois spoken at the latter place is said to contain Greek words, and the rivulet formed by the fountain of Houndélie bears the Greek appellation of Hydrone.

The towns in the extreme east of the department are in nowise remarkable, except for the ruins of mediæval castles and abbeys. *L'Isle-Jourdain* (2,248 inhabitants) and *Lombes*, both on the Save, are the principal centres of population, and carry on some trade in cattle and geese.

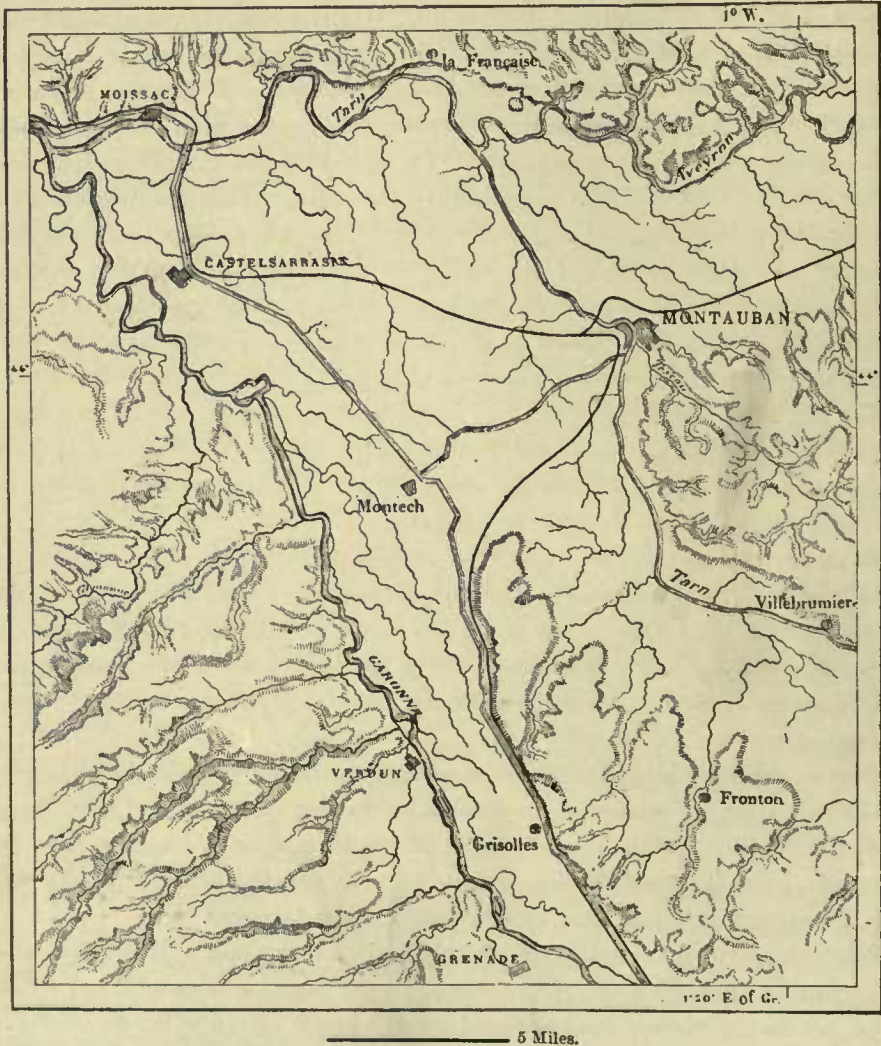
TARN-ET-GARONNE.—This department, one of the smallest of France, includes the hills of Eastern Lomagne, the alluvial valleys of the Garonne, the Tarn, and the Aveyron, and a hill region in the north and east which forms part of Quercy and Rouergue. Some of the soil is exceedingly fertile, and there are manufacturing establishments at Montauban and elsewhere, but the population is nevertheless on the decrease.

Beaumont (3,608 inhabitants), the capital of Lomagne, as well as all the places on the left bank of Garonne, is decreasing in population, and *Castel-Sarrasin* (3,547 inhabitants), on the opposite bank of the river, does so likewise, but nevertheless carries on a considerable commerce in wine and the products of the fertile plain, too frequently devastated by the waters of the Garonne.

Montauban (19,790 inhabitants) stands majestically upon a lofty bluff of the Tarn, spanned there by a fine old bridge. Its position is a favourable one for commerce, but its greatness as a city passed away when it ceased to be one of the four towns of refuge granted to the Calvinists. It gloriously withstood the armies of Louis XIII. (1620), but twelve years later it yielded to Richelieu, and its civil liberties and industries were annihilated. Linen and muslin, earthenware and leather, are manufactured, but a spirit of enterprise capable of striking out new paths is altogether wanting. The town-hall contains a fine library and a collection of paintings, many of them by Ingres, a native of the place.

Moissac (5,675 inhabitants), in the alluvial plain and near the confluence of Garonne and Tarn, is one of the great grain markets of France, and possesses a mediæval church and cloisters, which contrast strangely with a modern aqueduct and an iron railway bridge. *Valence d'Agen* (2,926 inhabitants), lower down in the valley, is wealthy and industrious. An old house is still pointed out there in which sat the inquisitors who condemned forty-three heretics to the stake.

Fig. 47.—THE ALLUVIAL PLAIN OF THE GARONNE, THE TARN, AND THE AVEYRON.
Scale 1 : 320,000.



The plateau to the north of the Aveyron is but thinly populated, and the only town of any importance there is *Caussade* (2,438 inhabitants). The Aveyron, on entering the department, passes through a series of picturesque gorges, bounded by limestone cliffs, the caverns in which have yielded numerous implements of palæolithic age. *St. Antonin* (2,520 inhabitants), the most considerable town in that

part of the country, boasts of a town-hall built in the twelfth century, and of numerous private dwellings dating back to the thirteenth.

LOT-ET-GARONNE.—This department is named after the two rivers which effect their junction within its limits. The hills of Lomagne form a steep escarpment towards the vale of the Garonne, and a considerable portion of the south-west consists of Landes, but the northern half is occupied by tertiary hills of great fertility. As a whole, the department is one of the most productive of all France; its race of cattle is highly esteemed, and poverty is unknown.

Agen (17,806 inhabitants), the capital, lies on the right bank of the Garonne, at the foot of a hill covered with gardens and villas. It is famous for its cattle markets and prunes, the latter grown in the valley of the Lot. Three bridges and an aqueduct cross the river.

Descending the Garonne, we first reach *Port Ste. Marie* (1,699 inhabitants), near which the valley of the Bayse joins from the south, and up which leads the road to *Nérac* (4,975 inhabitants), an old Roman town, with the ruins of a royal palace. *Nérac* has recovered from the injury inflicted through the revocation of the Edict of Nantes, and now carries on a considerable commerce in wine and brandy. Higher up on the Bayse is *Moncrabeau* (681 inhabitants), the Gascon "head-quarters of liars, babblers, and boasters." *Mézin* (1,939 inhabitants), which has exported wines to London since the fourteenth century, stands on the Gelise, a tributary of the Blayse; and lower down, near the same river, rises the castle of *Barbaste*, now converted into a factory. Farther to the north-west, beyond the forests recently planted in the Landes, lies *Casteljaloux* (2,074 inhabitants), with a mineral spring and some manufactures.

Aguillon (1,993 inhabitants), near the junction of the Garonne and Lot, is but a small place. Ascending the latter river, we pass *Clairac* (2,388 inhabitants), known for its "rotten" wines, which are made from overripe grapes; *Castelmoron* (1,028 inhabitants), *Ste. Livrade* (1,404 inhabitants), and *Villeneuve-sur-Lot* (9,681 inhabitants), a busy place, with an old abbey, now used as a prison, the ruins of the castle of Pujols, and several mediæval buildings, including a bridge. *Penne* (1,272 inhabitants), *Fumel* (2,229 inhabitants), and *Bonaquil* were known in former times for their citadels, that at the latter place having been one of the first constructed to resist artillery.

Returning to the valley of the Garonne, we pass *Tonneins* (5,803 inhabitants), entirely rebuilt since the Calvinistic wars, and *Marmande* (6,037 inhabitants), both of them driving a busy trade. *Le Mas d'Agenais* (1,245 inhabitants), and *Meilhan* (639 inhabitants), on the left bank of the Garonne, are mere villages. Nor are the few towns in the north of much importance, except, perhaps, *Miramont* (1,416 inhabitants), with its orchards of prune-trees.

LANDES.—This department does not include the whole of the Landes of Gascony, though, on the other hand, it comprises, in the south and south-east, some of the foot-hills of the Pyrenees and of Armagnac. The resources of the department are small; there are no extensive tracts of fertile land, nor harbours along the coast, and the population is therefore very thinly sown.

Dax (9,085 inhabitants), on the Adour, is the natural centre of Chalosse, the most fertile district of the Landes. It is an old town, with remains of Roman walls and baths. The steam arising from its famous sulphur springs is seen from afar. Thermal springs abound throughout the region, as at *Pouillon* (250 inhabitants), *La Gamarde*, *Tercis*, and *Préchaac*; rock-salt abounds; asphalt is found in the valley of the Luy; and the iron in the western Landes is utilised in the forges of *Castets* (937 inhabitants). *Peyrehorade* (1,786 inhabitants), on the Gave, at the head of navigation, is likewise a busy place.

Cap-Breton, in former ages one of the most famous seaports of France, has

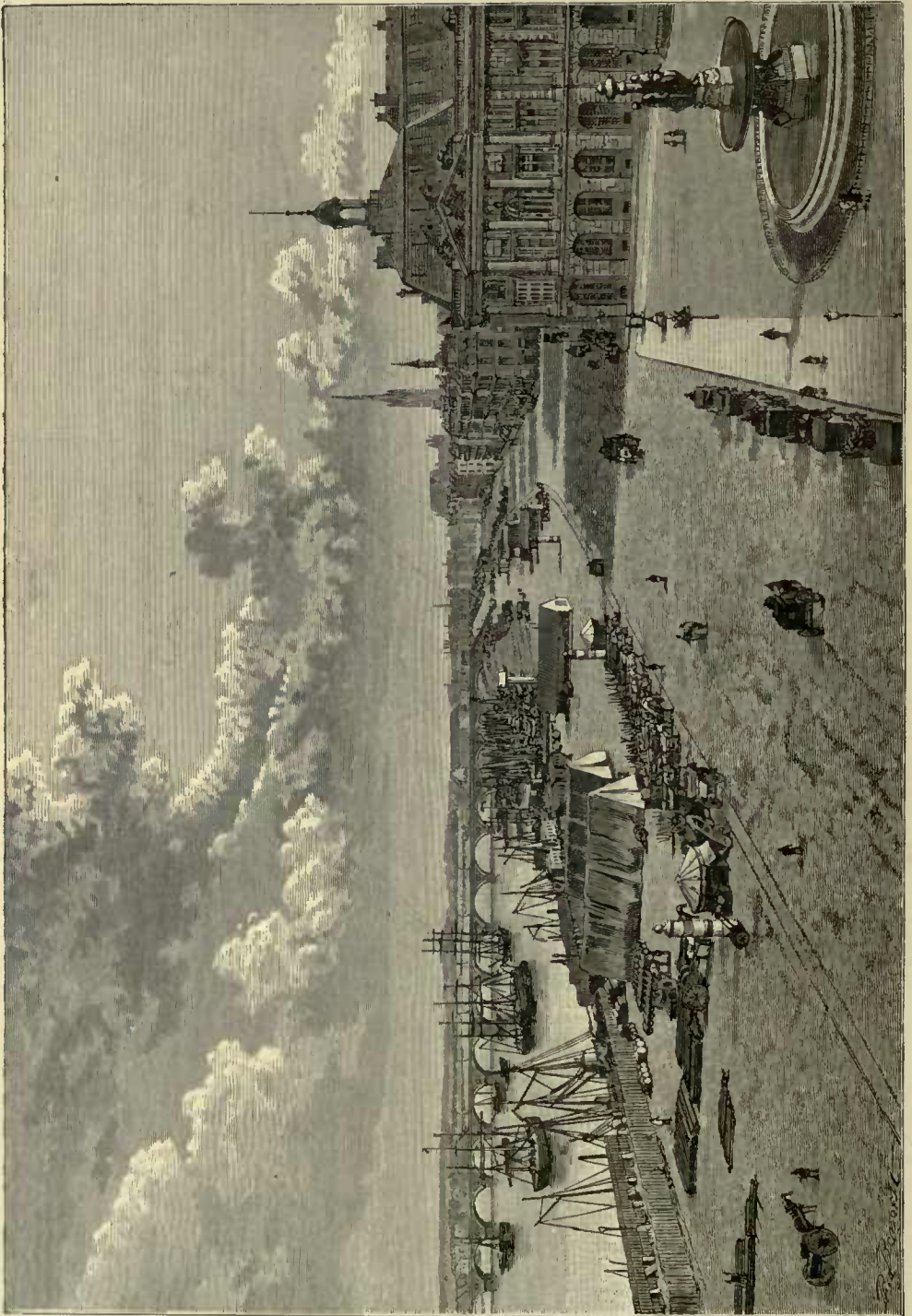
Fig. 48.—CAP-BRETON (1872).

Scale 1 : 33,614.



dwindled down into a poor village, but the harbour of refuge now constructing there may bring back some of its ancient prosperity.

St. Sever (2,225 inhabitants) and *Aire* (2,906 inhabitants), both on the Adour, are quiet country towns, though the latter is the seat of a bishop; but *Mont-de-Marsan* (8,328 inhabitants), to the north of them, the capital of the department, is a busy commercial centre, from which are exported the brandies of *Villeneuve* (1,155 inhabitants) and *Gabarret* in Armagnac, the rosin of *Roquefort* in the Landes, and the wines and manufactured goods of Chalosse. *Labrit*, the ancient capital of a duchy, is now merely a village, with the ruins of a castle built by Henri IV.



BORDEAUX.

Some of the stations along the railway which connects Bordeaux with Bayonne are rising into importance. *Ichoux* has iron works, *Labouheyre* (La Bouverie) is famous on account of its cattle fairs, and *Morceux* promises to become a place of commerce. The ancient towns of the littoral region of Born, however, which were joined formerly by a Roman road, have dwindled into insignificance. *Mimizan*, the most important amongst them, attracts a certain number of seaside visitors during the season.

GIRONDE.—The Landes occupy fully one-half of this department, as far as the Garonne and the estuary of the Gironde, and even extend beyond that river, but the whole of the district known as *Entre-Deux-Mers*, as well as the hills of the *Fronsadais* and *Périgord*, is an outlying portion of the plateau of Central France. Bordeaux, so happily situated at the mouth of the Garonne, and on the great high-road which connects Paris with Spain, is the natural centre of the department, and would insure it a pre-eminent position, even though its agricultural productions, its early vegetables, and wines had no existence.

Bazas (2,859 inhabitants), the ancient *Novem Populana*, and the seat of a university at the time of Charlemagne, is an unimportant place now, but the tumuli, the *cloles*, or remains of Gallic habitations, and the castle of *Roquetaillade* near it, are full of interest to the antiquarian. The *arrondissement* of *Bazas* lies completely within the region of the Landes, but its inhabitants have made considerable advance in agriculture, they breed a highly esteemed race of cattle, and at *Villandraut*, in the valley of the *Ciron*, they grow excellent wines. The names of *Preignac*, *Barsac*, *Bomme*, and *Sauterne* are known throughout the world, and there are certain growths, such as *Château-Yquem*, which are appreciated by every connoisseur.

The towns along the Garonne and the Gironde know no other trade or industry except what is connected with wine and agriculture. *Castets*, at the head of the tide, is a busy port; *Langon* (3,903 inhabitants) and the old city of *St. Macaire* (2,252 inhabitants), opposite, are still more busy. *La Réole* (3,498 inhabitants), higher up on the river, is a curious mediæval place. Near *Monségur*, to the north-east, is a district formerly known as that of the scoundrels (*Gavaeherie*), because it was re-peopled, after the great plague of 1524-25, by colonists from *Poitou* and *Angoumois*, who were at that time very much despised by the men of *Gascony*.

Descending the Garonne, we pass *Cadillac* (2,257 inhabitants), with an old castle now used as a refuge for women, and *Cérons*, well known on account of its quarries and white wines. Villas and gardens tell us that we are approaching *Bordeaux*. Soon we find ourselves facing the Maritime Railway station and the busy suburb of *Paludate*, we pass beneath the iron railway bridge, and land at the quays of the town. Towers rise above the multitude of houses, in front we look upon a fine stone bridge, and beyond appear the masts of innumerable vessels filling the crescent-shaped harbour.

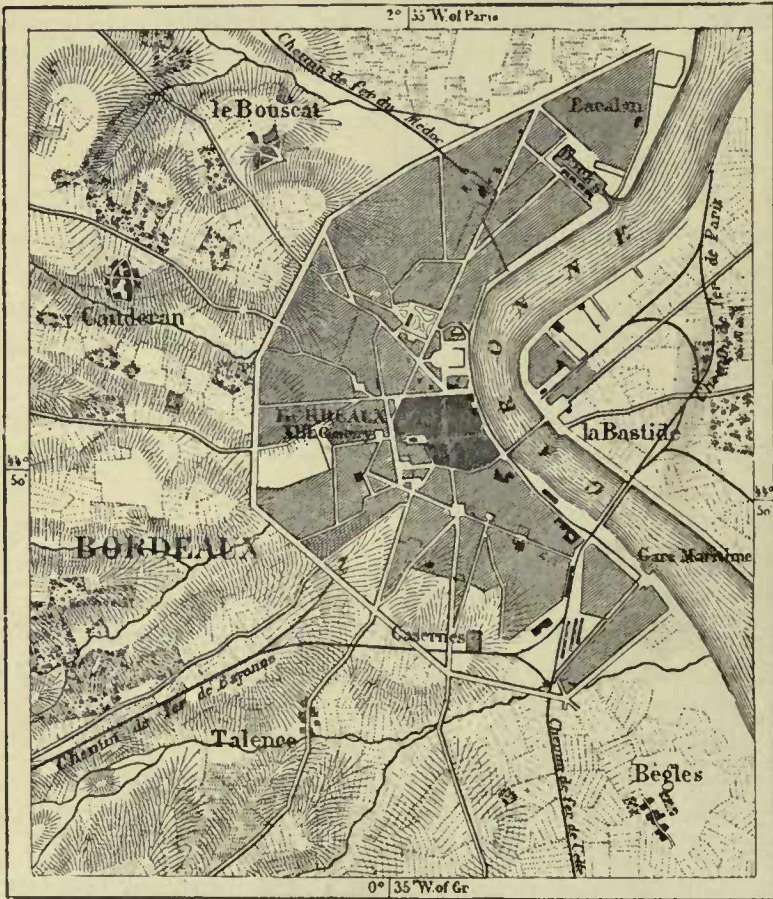
Few other cities can rival this capital of Aquitania. Founded by the Celtic *Bituriges*, but peopled for the most part by Iberians, the ancient *Burdigala* was already a great town during the dominion of the Romans; but of the many monu-

mental buildings which existed at that time only a few ruins remain. The Middle Ages are represented by numerous churches, one of which, that of St. Michael, has a steeple of 350 feet in height, and a crypt with mummified corpses: the Gothic cathedral has a belfry erected by Archbishop Pey-Berland. Amongst modern public buildings the theatre and the town-hall are the most remarkable, but it is principally the magnificent private houses in the streets radiating from the Place des Quinconces which impart a monumental character to the city.

The quays are far from sufficient for the hundreds of vessels which crowd the

Fig. 49.—BORDEAUX.

Scale 1 : 95,000.

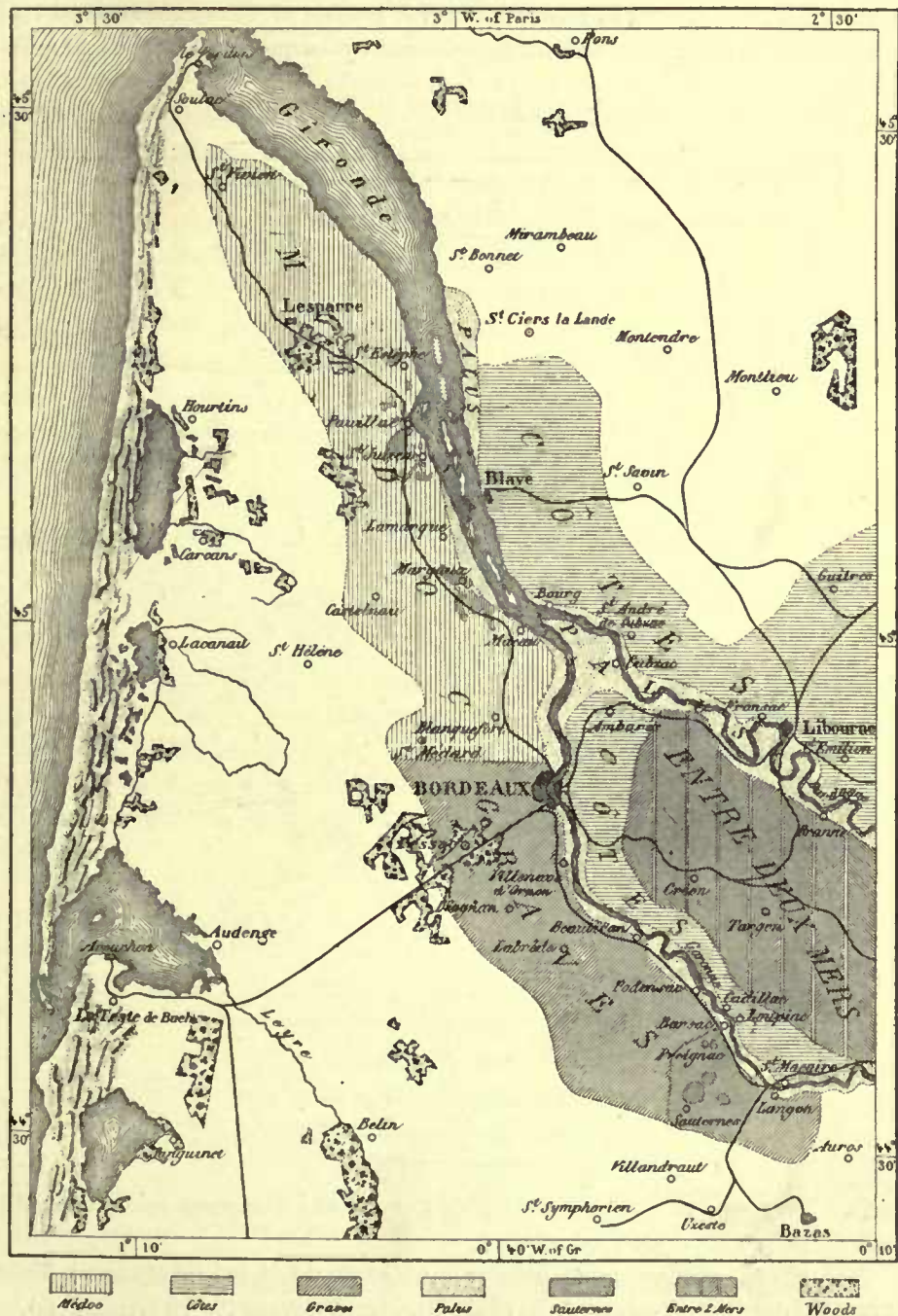


river, nor can vessels having a considerable draught lie alongside them. In order to remedy this inconvenience capacious docks are now being constructed in the suburb of Bacatan. But even these will not always be accessible to the larger steamers, which are frequently compelled to discharge a portion of their cargo at Pauillac before they are able to come up to the city. But, in spite of all these drawbacks, Bordeaux is the third port of France, and about 12,000 vessels of over a million tons burden enter annually.

The exportation of wine (28,000,000 gallons in 1874) is the great business of

Bordeaux. For centuries the wines of Bordeaux were more highly appreciated abroad than in France itself, and as early as the thirteenth century they were

Fig. 50.—THE WINE DISTRICTS OF THE GIRONDE.
Scale 1 : 800,000.



exported to London. It is only since the middle of last century that they have come into fashion throughout France. The town has dockyards and other esta-



blishments connected with shipping, sugar refineries, potteries, foundries, steam mills, and establishments for the preservation of provisions.

Bordeaux, between 1206 and 1451, was virtually a free city, and an English soldier was hardly ever seen there, except in time of war. It is only since 1789 that the town can be said to form an integral portion of France. Its local traditions, however, are strong, and its citizens are by no means ambitious to imitate

Fig. 51.—THE INVASION OF THE PHYLLOXERA.

Scale 1 : 460,000.



Paris. They support a museum, a public library, and numerous scientific institutions and educational establishments.

Not only the villages near Bordeaux, such as *Bègles* (4,161 inhabitants), *Talence* (3,578 inhabitants), *Mérignac* (2,030 inhabitants), *Caudéran* (3,816 inhabitants), and *Le Bouscat* (3,226 inhabitants), but also more distant places, share in the prosperity of the great city. *Arcachon* (4,934 inhabitants) is one of these, for most of its

villas have been erected for the accommodation of visitors from Bordeaux. Arcachon and *La Teste de Buch* (4,596 inhabitants), near it, are moreover famous for their oyster parks, which in 1874 yielded 84,000,000 of these delicious molluscs, valued at £120,000. The basin of Arcachon (see Fig. 26) likewise abounds in fish, and leeches are bred in the surrounding swamps.

Both banks of the Garonne and Gironde, below Bordeaux, must be looked upon as dependencies of that city. *Pauillac* (2,044 inhabitants) is the advanced port of Bordeaux. *Le Verdon*, at the mouth of the river, is a roadstead, where a hundred vessels may sometimes be seen at anchor, waiting for the tide or a favourable wind. The narrow slip of land below *Blanquefort* (2,294 inhabitants), known as *Médoc*, produces annually some 2,000,000 gallons of superior wine, including such growths as *Château-Margaux*, *Château-Lafitte*, and *Château-Latour*. The dreaded phylloxera, which has committed such ravages in other parts of the department, has hitherto spared the vineyards of *Médoc*, owing, perhaps, to the sandy nature of the soil and the prevailing westerly winds. *Lesparre* (2,442 inhabitants), in the Lower *Médoc*, has a curious old tower; and *Old Soulac*, at the mouth of the river, boasts of an ancient Byzantine church, now surrounded by hotels for the accommodation of seaside visitors.

Blaye (3,801 inhabitants) is the chief town of that portion of the department which lies to the east of the Gironde, defended there by Forts *Pâté* and *Médoc*. *Blaye* as well as *Bourg* (1,494 inhabitants), on the *Dordogne*, has important quarries, but its chief trade, like that of all the towns of the valley of the *Dordogne*, is in wine. The most important of these towns is *Libourne* (12,872 inhabitants), very favourably situated at the mouth of the *Isle*; others are *Ste. Foy-la-Grande* (3,916 inhabitants) and *Castillon*. The "Côtes," or hill wines, which grow to the north of the *Dordogne*, enjoy a high reputation, those of *St. Émilion* being among the most famous. The great wine districts of the *Gironde* are shown on Fig. 50. They yielded, in 1875, 116,160,000 gallons of wine, valued at £3,600,000.





CHAPTER III.

THE ALPS, THE RHÔNE, AND THE COAST OF THE MEDITERRANEAN.

GENERAL ASPECTS.—MOUNTAINS.*



WHEN the Phœnicians first navigated the Lion Gulf and established their factories near the mouths of the Rhône, that portion of France which lies at the back of the mountains sloping towards the Mediterranean was still wrapped in mystery. At a later date, when Greek art and poetry flourished in the Hellenic settlements on the Mediterranean, the barbarous populations in the interior still practised human sacrifice. The Greeks sought to civilise the tribes which surrounded them, and the youthful Euxenos married the fair daughter of a barbarian king; but when the Roman succeeded to the inheritance of the Greek, the work of civilisation had made but little progress. The Roman, however, was not content with merely holding the seaboard, and Cæsar, by availing himself of the almost unbounded resources of a wealthy empire, succeeded in conquering the whole of Gaul.

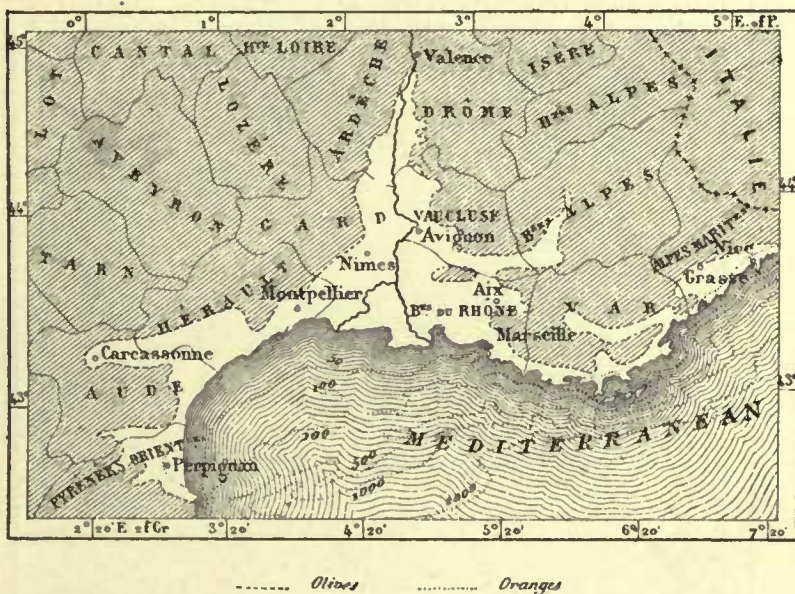
The boundaries of Mediterranean France are not as well defined as are those of Italy and the Iberian peninsula. True it is almost entirely enclosed by mountains—by the Cévennes in the east, by the Alps in the west; but two huge gaps in these barriers have enabled nations and armies to overcome these obstacles. One of them opens out between the Pyrenees and the Cévennes, and leads into the basin of the Garonne; the other is reached by travelling up the Rhône, and opens a way, on the one hand, into Burgundy and the valley of the Seine, on the other to the Lake of Geneva and the basin of the Rhine.

The valley of the Rhône is, indeed, the great historical high-road of France. When Rome was still the mistress of the world, it was through this valley that her legions marched to Northern Gaul. At a subsequent date, when Rome had fallen from her high estate, a movement in a contrary direction took place,

* Marion, "Géologie de Provence" (*Revue Scientifique*, 21st of December, 1871); Whympcr, "Scrambles amongst the Alps," 1860—69; Ladoneette, "Hautes-Alpes;" "Annuaire du Club Alpin-Français;" Surell, "Étude sur les torrents des Hautes-Alpes;" Ch. Lory, "Alpes de la Savoie et du Dauphiné;" A. Favre, "Recherches géologiques sur le Mont Blanc."

and the fair regions of Languedoc and Provence fell a prey to the powerful military nation which had established itself in the north of France. This conquest was not accomplished without much bloodshed, but it finally gave France her true geographical limits, with a seaboard on the Mediterranean, and enabled her to play the part of mediator between the North and the South. The countries watered by the Rhône and its great tributary the Saône differ widely as regards climate, geological formation, and inhabitants. Great are the contrasts between Burgundy and Provence, Franche-Comté and Savoy. Nevertheless these countries, belonging to the same river basin, form a geographical unit, and this fact is reflected in their history. Geographically this basin consists of two regions, viz. the southern province, through which runs the

Fig. 52.—ZONES OF ORANGES AND OLIVES.



impetuous Rhône, and the departments of Central France, which are drained by the tranquil Saône and its affluents.

Provence.—The coasts of Provence remind us oftentimes of Tunis or Algeria. The promontories of limestone, porphyry, or granite, the sub-tropical vegetation, the glittering villas embosomed in thickets of olive-trees, and the radiant sky are the same as on the opposite coast of Africa, and it is therefore not without reason that naturalists include the coasts of Provence and Southern Spain within a region which embraces likewise the African countries to the north of the Atlas. Moreover, the most advanced group of mountains between the Lion Gulf and Genoa, that of the Moors (2,556 feet), is quite distinct from the Alps, and rather resembles the mountains of Corsica. This group of granitic hills is named after the Moors or Saracens, who maintained themselves in its recesses during the ninth and tenth centuries. There are here vast forests of chestnut-trees, pines, and cork-trees, but the soil, as a rule, is sterile, and the

number of inhabitants small. Yet, on account of its delicious climate, its orange groves, its palms, its fine beaches and bold promontories, it is one of the most attractive districts of all Provence. The islands of Hyères rise to the south of these hills, that of Porquerolles, named after the wild bears which formerly roamed over it, being nearest to the peninsula of Giens, which was formerly an island, but is now attached to the continent by a neck of land, enclosing brackish ponds abounding in fish.

Another small group of mountains, that of Esterel, rises to the north of the

Fig. 53.—THE MOUNTAINS OF THE MOORS.

Scale 1 : 600,000.



valley of Argens and the Bay of Fréjus, and, like that of the Moors, is completely severed from the Alps. An old Roman road leads across these hills, which are barren and rugged, but form a succession of porphyry and red sandstone promontories, amongst which Cap Roux is one of the most magnificent on the Mediterranean.

The mountains which rise immediately to the north of these two groups show by their strike and geological formation that they, too, do not belong to the

Alps. Amongst them are the heights of Ste. Baume (3,421 feet), which terminate between Marseilles and Toulon in the superb promontories Bec-de-l'Aigle, Cap Canaille (1,364 feet), and Cap Tiboulen, and the Chaîne de l'Étoile, with a miniature Mount Olympus (2,605 feet). Other ranges rise to the north of the valley of the Arc, which was a gulf of the sea at the commencement of the tertiary epoch. The eastern extremity of this valley forms a magnificent amphitheatre, bounded in the north by the wooded heights of Ste. Victoire (3,283 feet). It was here Marius destroyed the Teutonic hosts, and the village of Pourrières recalls the *Campi Putridi* upon which thousands of the slain were left to putrefy. All these limestone ranges exhibit a line more or less parallel

Fig. 54.—THE VALLEY OF THE ARC AND THE HEIGHTS OF STE. VICTOIRE.

Scale 1 : 240,000.



with the granitic nucleus of the mountains of the Moors; but the serrated chain of the Alpines or Alpilles (1,614 feet), which farther east rises above the stony pasture lands of La Crau, already belongs to the system of the Alps, being in reality only a prolongation of the chain of the Léberon, from which it is separated by the valley of the Durance. A small volcano, now extinct, rises in the midst of these hills.

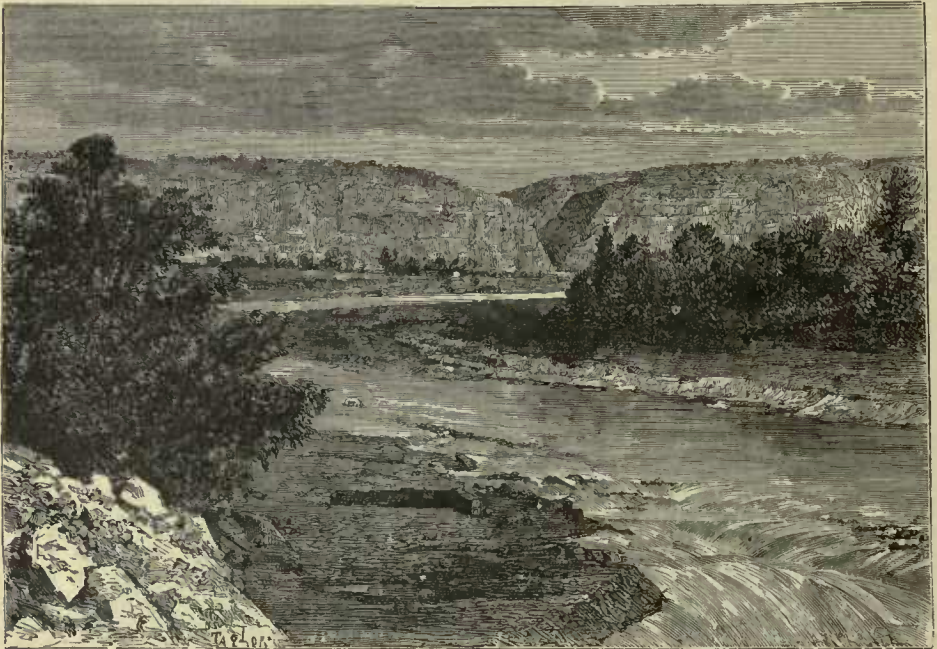
The parallel ranges stretching towards the valley of the Var, in Eastern Provence, are also ramifications of the Alps. Some of these Jurassic ranges resemble the interior slope of a bastion; others contrast by their barrenness with the smiling gardens of the Hesperides at their feet, irrigated by the fertilising

waters of the Siagne. The highest summit of these ranges is Mont Cheiron (5,834 feet).

The Maritime Alps.—The promontories which are reflected in the blue waters of Nice and Mentone, to the east of the Var, belong to the Maritime Alps. The bold terrace of the Tête-de-Chien, or “dog’s head,” at Monaco, with its steep precipices, bears a high tower dedicated to the Emperor Augustus, the “conqueror of all the nations of the Alps,” and forms a good natural boundary between French and Italian Liguria. The political frontier between these two countries, however, as drawn in 1860, lies farther to the east, and follows an arbitrary direction.

The Maritime Alps extend from the Pass of Tenda in the east to the Pass of

Fig. 55.—THE VERDON AT QUINSON.



Larche (6,480 feet) in the north. Their most elevated summits are covered with perennial snow. The torrents to which glaciers and numerous small lakes give birth on the Mediterranean slope, force their way through narrow defiles cut through lime and sandstones. Similar gorges, or *clus*, are met with in the limestone hills extending westward to the Durance, one of the most remarkable being that of the river Verdon, above Quinson.*

The Cottian Alps.—Monte Viso (12,586 feet), which was looked upon for a long time as the highest summit of the Alps, and has only recently been ascended by Mr. Mathews, an Englishman, forms a connecting link between the Maritime Alps and the Alps of Dauphiné. The geological features of these mountains differ widely from what we meet with in other parts of the Alps.

* Highest summits in the Maritime Alps:—Clapier de Pagain, 9,994 feet; Mercantourn, 10,391 feet.

Monte Viso itself consists of serpentine. Granite is met with on the Italian slopes, but schists and limestones predominate on those of France as far as the valley of the Durance. This district, with its gorges and piles of rock, has not inappropriately been termed Queyras, or "land of stones."

The roads which connect the valley of the Durance and Provence with the valley of the Po lead across these Alps of Queyras and Monte Viso, collectively known as Cottian Alps. One of these paths crosses immediately to the north of Monte Viso at an elevation of 9,824 feet. A tunnel, or *traversette*, excavated as long ago as the fifteenth century, renders its passage practicable at all seasons, in spite of avalanches, mists, and storms. The Pass of Mont Genève (6,067 feet),

Fig. 56.—THE GORGE, OR "CLUS," OF THE VERDON.

Scale 1 : 150,000.



now practicable for carriages, was first used by Hannibal and his army. These and other passes, however, are only of local importance now, and are frequented almost exclusively by Piedmontese who cross over into France in search of work. During the Middle Ages they were important, too, as military highways, and the mouths of the valleys leading up to them were guarded by fortresses, some of which are still maintained—as, for instance, Embrun (2,809 feet), Mont Dauphin, and Briançon (4,333 feet), on the Durance. The inhabitants of these remote valleys might have maintained their independence if the country had not so frequently been overrun by armies. On both slopes of the Alps they speak the same dialect, and long before the Reformation they separated from the Roman

the upper valley of Vénéon, passing the glacier of La Grave and the Aiguille of Olan (12,740 feet), we walk for a distance of 35 miles over ice and snow fields. The most remarkable of these glaciers are, perhaps, those which descend from the slopes of Mont Pelvoux and the Pointe des Arsines, and meet in the upper valley of the Vallouise. One of them, the "Black Glacier," is covered completely with rocks and earth so as to almost resemble a stream of mud, whilst the other, the "White Glacier," is of dazzling whiteness, and gives birth to a torrent of bluish water. None of these glaciers reach very far down into the valleys, and we are

Fig. 58.—AIGUILLE OF THE MEDJE.



not, consequently, charmed by the contrasts between verdant woods and ice, such as delight the eye in Switzerland. Indeed, there are but few trees left in these mountains, though there exist luxuriant pasture grounds, notably near the wealthy village of Vénose, the inhabitants of which export rare Alpine plants as far as Russia and America.

A few Protestant congregations still remain, but the Waldenses, who formerly inhabited the fine valley of Vallouise, have been wholly exterminated. The present population of the country is wretchedly poor, and cretinism prevails. The famous

church of La Salette stands high above the valley of the Drac, in the midst of luxuriant pastures; and near it, in the narrow valley of Godemar, there existed until recently traces of a more ancient worship. In spring, when the sun first appeared above the crest of the mountains opposite, the villagers of Andrieux used to walk there in procession, and sacrifice pancakes in honour of the conqueror of winter.

Chaotic masses of mountains occupy the whole of the region bounded by the

Fig. 59.—THE GLACIER OF LA GRAVE.



Durance and the Isère, and extend down into the valley of the Rhône. Going west from Mont Pelvoux, we reach the plateau of Matheysine (3,050 feet), covered with small lakes, pierced by crystalline mountains, and bounded by the precipices overhanging the waters of the Romanche and the Drac. Crossing the latter, we reach the Quatre-Montagnes, or "four ranges," separated by affluents of the Isère, and running parallel with the Pennine Alps. In the north, beyond the Isère, the mountains of the Grande Chartreuse (6,847 feet) extend in the same direction, and

in the south they are joined to the mountains of Vercors (7,695 feet), all three having the same geological formation. The latter are hardly Alpine in their character, their great beauty consisting in the contrasts afforded between open valleys and sombre gorges through which torrents escape in picturesque cascades, in the southern aspect of their sunny slopes, and the bold outline of some of their rocky declivities.

The formidable Pass of Lus-la-Croix-Haute (4,920 feet) separates the Vercors from a mountain group known as Dévoluy, a name which etymologists derive from the Latin *devolutum*, with reference to the immense masses of rock which have "tumbled down" into the valleys and gorges. The base of the great Peak of Aurouze (8,905 feet) is completely surrounded by mounds of detritus, which, seen from afar, have the appearance of white marble buttresses. Other mountains resemble huge piles of rocks. Of this kind are the Obiou (9,160 feet) and Faraud, which a local legend transforms into hostile giants who hurled huge rocks at each other. This excessive weathering of the mountains is accounted for by their geological composition. As a rule, strata of hard rocks alternate with deposits of soft earth, and no sooner have rains, torrents, and frosts disintegrated or carried away the latter than the superimposed rocks slide down into the valleys, together with the villages which are built upon them, or tumble into fragments. To a great extent, however, the improvidence of man is responsible for this rapid disintegration of the mountains, for it was he who destroyed the forests which formerly covered and sheltered them. These forests, however, are gradually being replanted.*

The mountain ranges which ramify to the south, towards the confluence of the Rhône and the Durance, resemble those just noticed in geological composition, and present the same white rocks and barren slopes. The forest of Saou (5,223 feet) has long since succumbed to the woodman's axe. Farther south rise the rampart-like mountains of Lure (5,995 feet), attached by a transversal chain to the rugged Léberon (3,690 feet), the reddish flanks of which are covered with patches of copse. Atmospheric influences acting upon rocks possessing such different degrees of resistance have resulted in some curiously grotesque formations. Thus to the north of Forcalquier may be seen a group of mushroom-shaped rocks known as *Leis Mourré*, the tops of which consist of blocks of compact limestone supported upon stalks composed of clay marl.

Farther west rises a mountain appropriately called Ventoux, or the "windy" (6,273 feet), which, owing to its isolated position, impresses the spectator more than its height would warrant. Its lower slopes are covered with a belt of verdure, and an ascent to its summit affords an opportunity for studying successive belts of vegetation. The palæontological discoveries made in this part of France shed much light upon ancient flora and fauna. The miocene strata of the Ventoux and Léberon abound with the remains of lions, gazelles, hipparions, and other animals now extinct. The miocene gypsum near Aix, on the other bank of the Durance, has yielded fish, insects, plants, and even feathers of fossil birds.

* Between 1861 and 1871 234,700 acres were planted with forest in the French Alps.

The fossil fish discovered there prove conclusively that the Mediterranean formerly communicated with the Indian Ocean.

Thanks to an agricultural discovery of great importance, the districts of the Ventoux and Léberon are now being rapidly planted with woods. Joseph Tulon, a poor mushroom gatherer, discovered in the beginning of this century that this coveted fungus grew more luxuriantly in the vicinity of oaks. He quietly planted acorns in the retired spots to which he was in the habit of resorting, and for many years he kept his secret. It is only since 1856 that this new industry has spread, and since that year no fewer than 148,000 acres have been planted with oak in the department of Vaucluse alone. This department and the adjoining one of the Basses-Alpes now supply nearly one-half the mushrooms gathered throughout

Fig. 60.—THE "FOREST" OF SAOU.

Scale 1 : 100,000.



France, and exported under the deceptive appellation of "truffles of Périgord." The indirect advantages which have accrued to the country through the introduction of this industry are very great, for the flinty slopes and marls which are best suited to the growth of these mushroom oaks are not adapted to agriculture, and the newly planted forests cannot fail to exercise a happy influence upon the climate, and put a stop to the ravages caused by torrents.*

The Alps of Savoy.—The famous chain of Maurienne, across which lead the principal roads that connect France with Italy, separates Mont Pelvoux and the

* In 1875 32,000 cwts. of mushrooms were gathered throughout France, valued at £640,000. Vaucluse yielded 8,000 cwts., the Basses-Alpes 7,000 cwts., and Lot 6,000 cwts.

upper valley of the Durance from Savoy. The Romans availed themselves of the easiest passes of that region, and on the summit of that of the Little St. Bernard may be seen a cromlech which they dedicated to Jupiter, and which is still known as the column of Joux (Jove). At a subsequent date the Pass of Mont Cenis (6,885 feet) became the great highway between France and Italy; but the fine carriage road which connects Lans-le-Bourg with Susa has been very little used since 1871, in which year the great railway tunnel constructed by Messrs. Grattone, Grandis, and Sommellier beneath the Pass of Fréjus was thrown open for traffic. That tunnel connects Modane with Bardonnèche; it has a length of 40,092 feet, and its summit lies at an elevation of 4,380 feet above the sea-level.

The mountains of Maurienne hold an intermediate position between the fine summits of Switzerland, with their forests and luxuriant pastures, and the arid

Fig. 61.—LEIS MOURRÉ.



slopes of the Dévoluy and the Alps of Dauphiné. In some of the valleys, and notably in that of the Arc, which constitutes the district of Maurienne proper, we meet only with arid slopes. The ancient forests have been destroyed there, and the upper limit of vegetation seems to have retired in consequence. Man will have to struggle hard if he desires to reconquer the ground that has been lost through his own improvidence.

Though very inferior in height to Mont Blanc, and even to the group of Oisans, this chain of Maurienne, with its numerous ramifications, is of very great importance. Vast masses of ice have accumulated in its rock-surrounded amphitheatres, and give rise to four considerable rivers, the Isère, the Oreo, the Stura, and the Arc. Formerly, when these mountains were yet unexplored, it was thought, on account of these snows, that Mont Iseran, in their centre, must attain

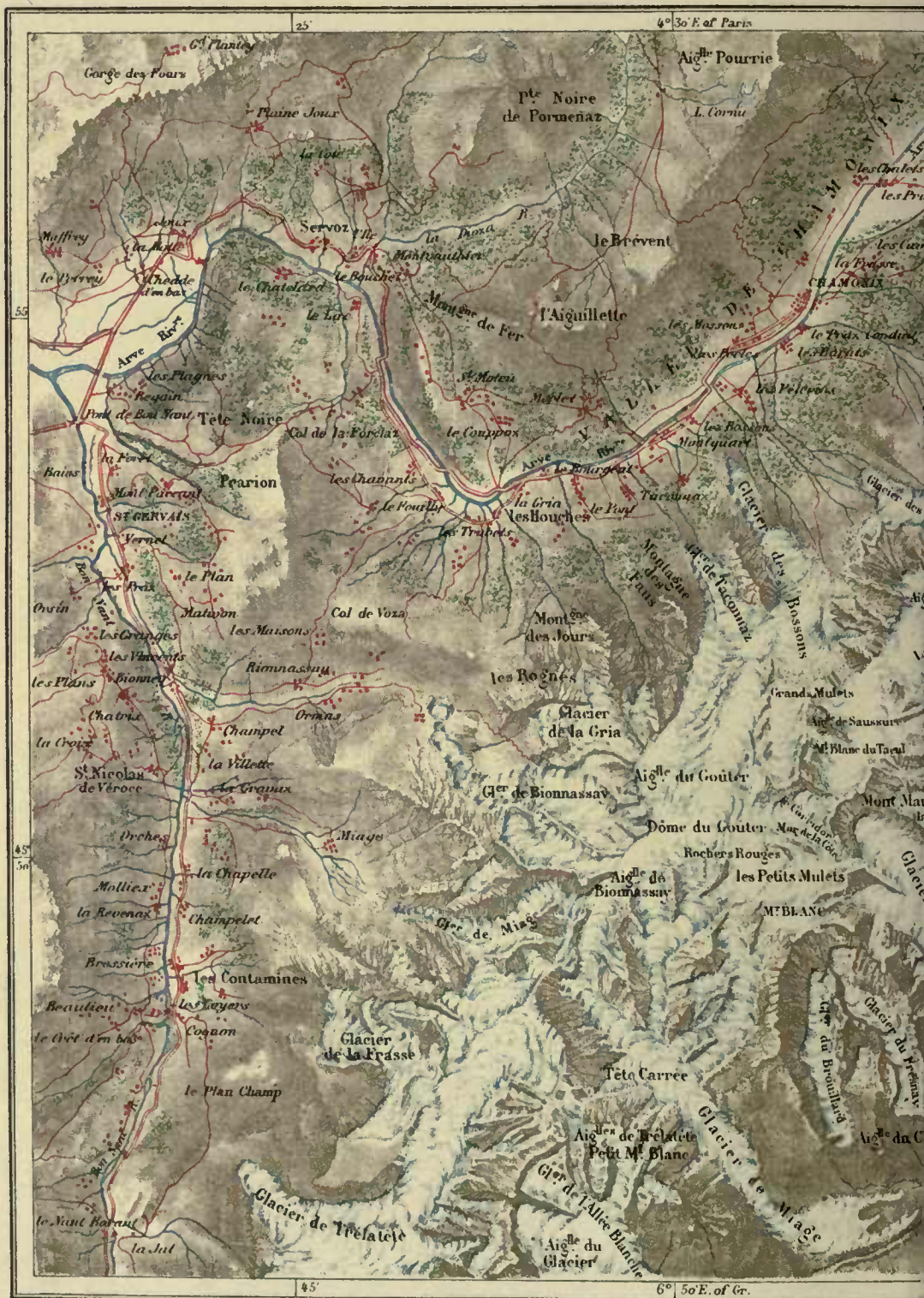
a very considerable height ; but *mont*, in the patois of the country, simply means "pass," and that of Iseran lies at an elevation of only 8,034 feet. The Grande Casse (12,740 feet) and the Aiguille of Vanoise (12,675 feet) are culminating summits on French, and Mont Paradis (13,271 feet) on Italian soil.

Valleys penetrate deeply into these mountains, and some of the more sheltered amongst them are permanently inhabited to a height of nearly 6,000 feet. The half-buried houses of Bonneval (5,900 feet), at the foot of Mont Iseran, are cut off

Fig. 62.—MONT BLANC AS SEEN FROM CHAMONIX.



from the rest of the world for several months in winter, and barley and rye take fourteen or fifteen months to ripen there. The want of pure air in these valleys, the long and severe winter, and the deep shadows thrown by the mountains during summer are popularly supposed to produce goître and idiocy, which Dr. Grange ascribes to the magnesian limestone of the country. He estimates the number of persons suffering from goître in Maurienne at 30 per cent. of the total population, and in certain localities of the Tarentaise the proportion is still higher. The long





winters, however, enable these mountaineers to acquire some education; and formerly many Savoyard teachers were to be found in the towns of the Rhône valley.

The granitic ranges to the west of Maurienne run in a direction conformable to that of the Jura, and are intersected by the rugged gorges through which the Isère, the Romanche, and the Arc find their way to the west. The group of the Grandes Rousses (11,910 feet) is the highest summit here. Farther west, above Grenoble, rises the three-peaked Belledune (9,778 feet), from the summit of which we look down upon the verdant valley of Graisivaudan and the limestone mountains which bound it on the west.

From a geological point of view the mountain mass of which Mont Blanc (15,777 feet) is the centre is but a northern continuation of these western ranges of Savoy. Its relief, however, marks it off very distinctly. The enormous mass of talcose granite or protogine of which it is formed is separated by the Passes of the Little St. Bernard (6,897 feet) and Bonhomme (8,151 feet) from the other mountains of Savoy in the south; sinks down steeply into the valley of the Rhône on the north; presents steep, glacier-covered slopes towards Italy; and descends more gently towards the French valley of Chamonix. At an anterior period, when Mont Blanc was several thousand feet higher than it is now, it formed but a single mountain mass with the Aiguilles-Rouges, now separated from it by the valley of Chamonix.

The area occupied by Mont Blanc and its buttresses cannot compare with certain mountains of Switzerland, nor does it give rise to any great rivers, for only the Arveiron, or Arve, and the Dora Baltea rise on it, the one flowing to the Rhône, the other to the Po. Its glaciers and snow-fields, however, are without a rival in Europe. They cover 104 square miles, of which 64 drain into the valley of Chamonix. The most famous of these glaciers is the Mer de Glace, or "sea of ice," which slides down the valley at a rate of 328 feet annually, and gives birth to the Arve.

Discovered as it were by two Englishmen, Pococke and Wyndham, about the middle of the eighteenth century, and ascended for the first time by Jacques Balmat in 1786, Mont Blanc has since become one of the great attractions of all admirers of nature. Chamonix (3,444 feet), at its foot, has grown into a town of hotels; and other villages in its vicinity, such as St. Gervais and Cormayeur (4,067 feet), participate in the profits derived from tourists.

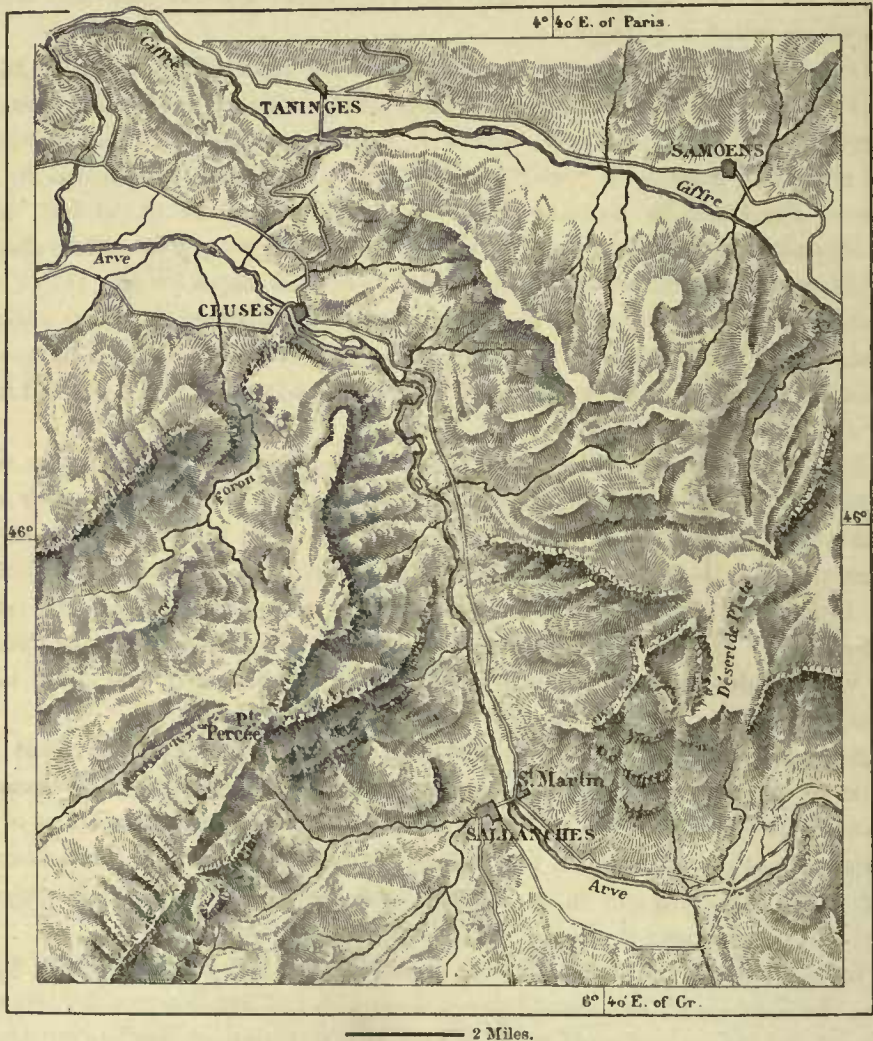
The mountains in Northern Savoy, which occupy the region between Mont Blanc, the Rhône, and the Lake of Geneva, form a sort of link between the Alps and the Jura, and from a geological point of view it is sometimes difficult to determine of which of either of these systems a certain mountain may be assumed to form a part. The cretaceous and Jurassic ranges generally run from the south-west to the north-east; that is, parallel with the Jura. Such is the direction of the pine-clad ranges of the Grande Chartreuse (Chamechaude, 6,847 feet), of the parallel ridges of the Beauges (4,996 feet) to the north of Chambéry, and of the ranges of Salève (4,523 feet) and Voiron, near Geneva.

Most of the valleys of this region are of considerable width, and not mere gorges as in the Jura. There still exist, however, many defiles bounded by steep precipices, as if they had been cut by a sword, and amongst these none are more striking than those cut by the Rhône and its tributaries, Usses and Fier, through rocks belonging to the lower cretaceous formations.

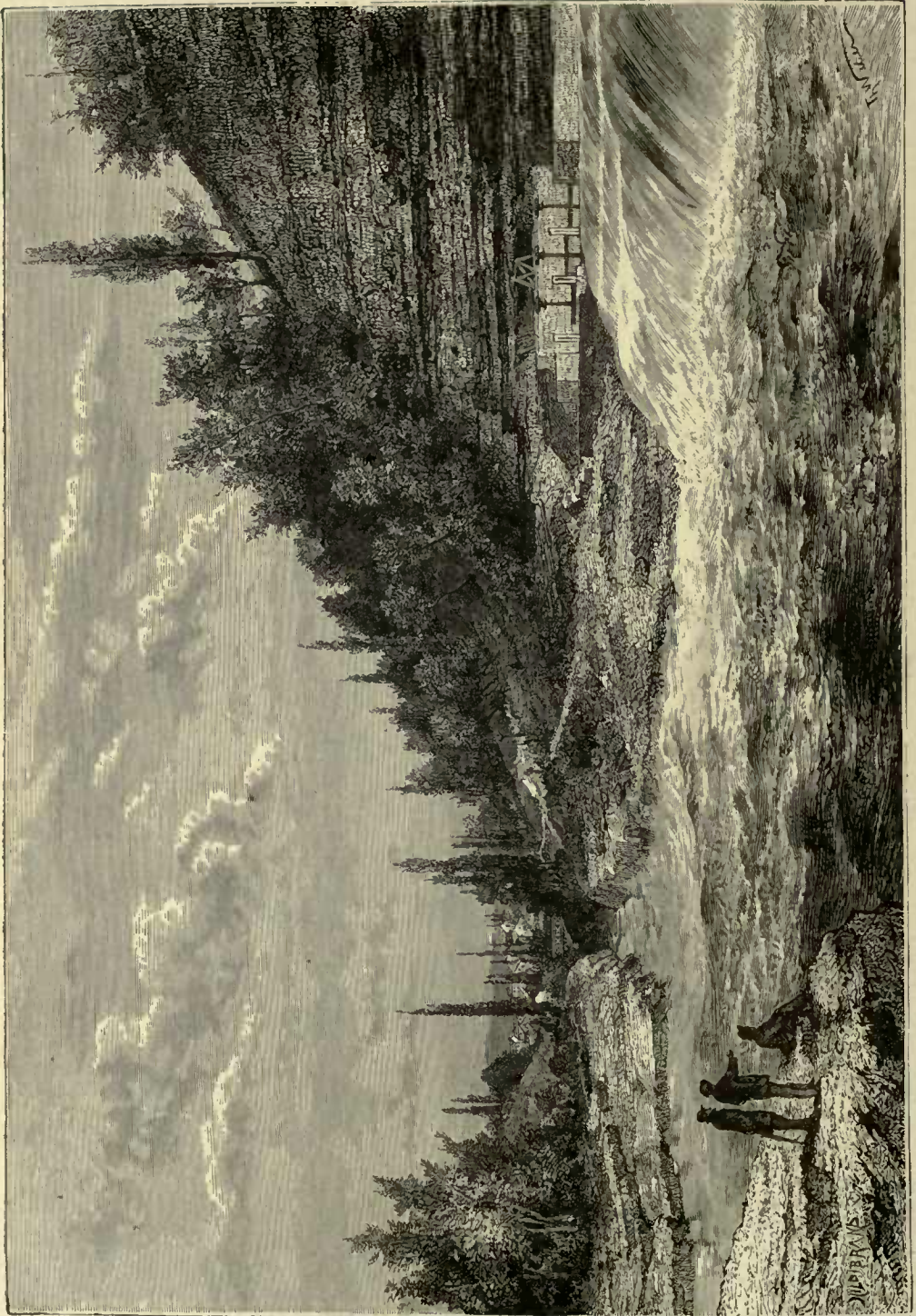
The transversal disposition of the mountain ranges of Western Savoy naturally

Fig. 63.—ANCIENT LAKE BEDS IN SAVOY.

Scale 1 : 200,000.



led to the formation of numerous lakes. But most of these pent-up sheets of water have long since disappeared, and there now exist only three of any extent, viz. the Lakes of Annecy, Bourget, and Aiguebelette. In the valleys of the Arve, the Giffre, and elsewhere, however, many old lake basins can still be traced. The agency of water likewise accounts for the numerous caverns which pierce the mountain sides of Savoy, as well as for frequent landslips. That of the Granier,



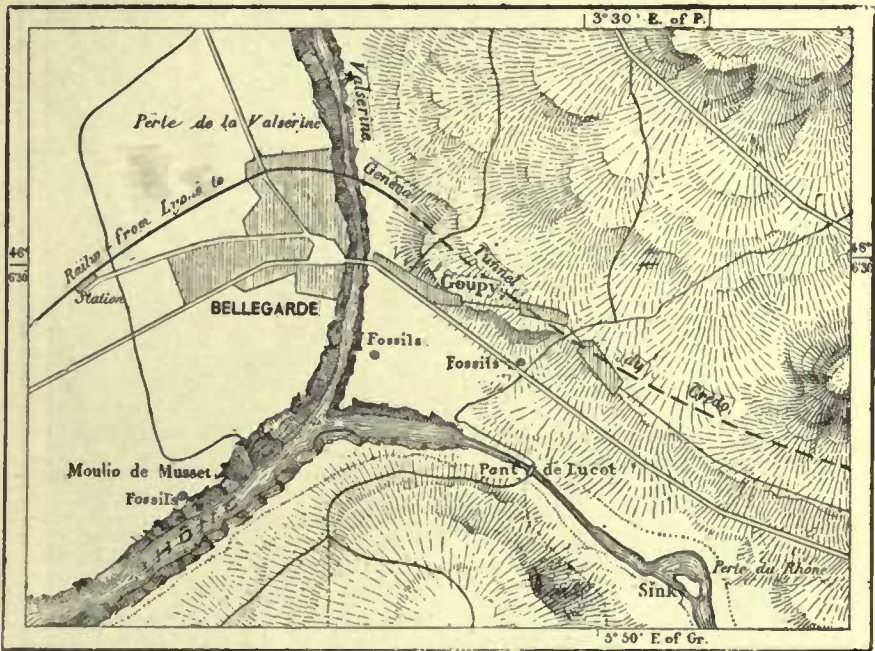
LA PERTE DU RHÔNE AT BELLEGARDE.

in 1248, buried a town and five villages near Chambéry. Earthquakes, too, are frequent, and may be due to subterranean strata settling down.

THE RHÔNE AND OTHER RIVERS.*

Most of the heavy rain and snow which descend on the French slope of the Alps find their way into the Rhône. Where that river leaves the Lake of Geneva it is already of considerable size. Gliding along slowly at first, it gradually accelerates its course, and at the mouth of a picturesque gorge it is joined by the Arve, fed by the glaciers of Mont Blanc. This latter, when in flood, is superior in

Fig. 64.—PERTE DU RHÔNE AND BELLEGARDE.



Scale 1 : 10,000.

volume to the Rhône, the flow of which is regulated by the Lake of Geneva. When the snows melt in the Alps no less than 38,850 cubic feet of water are discharged into that lake in the course of a minute. But this water spreads over the

* Surell, "Étude sur les torrents des Hautes-Alpes;" Ch. Martins, "Aigues-Mortes;" E. Desjardins, "Aperçu historique sur les embouchures du Rhône, 1866;" Adrien Germain, "Rapport sur l'état de l'embouchure du Rhône en 1872;" Ch. Lenthérie, "Les villes mortes du golfo de Lyon."

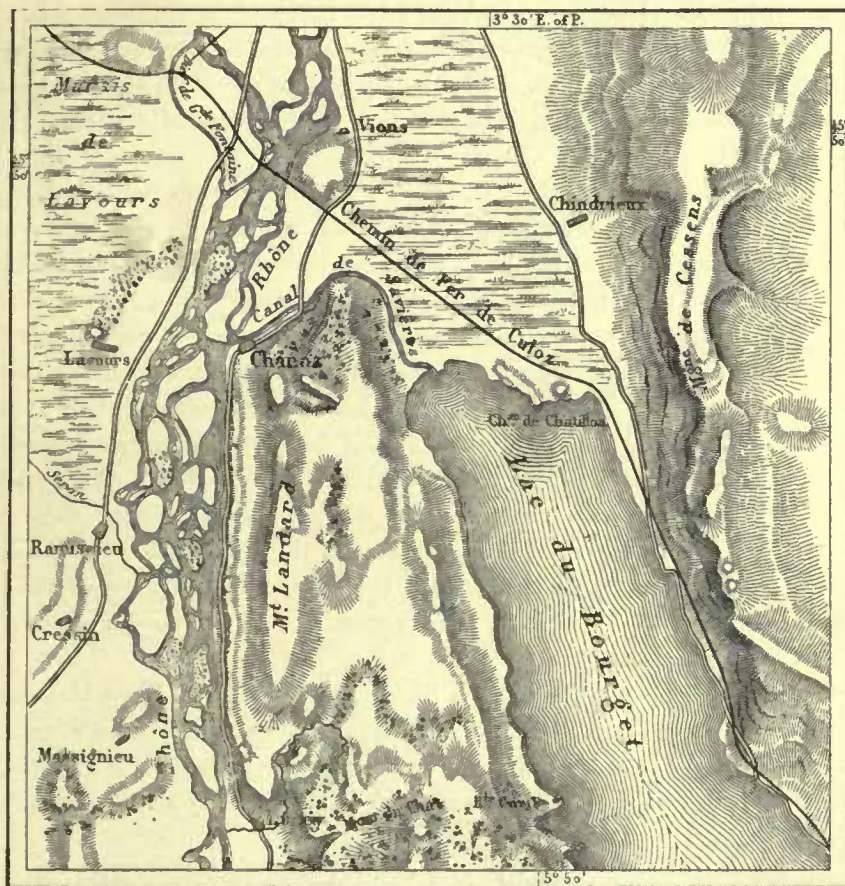
	Leneth. Miles.	Area of Basin. Sq. m.	Discharge in Max.	Tone Min.	Average per sec.	Average rainfall. In.	Surface drainage. In.
Rhône (with Saône- Doubs)	637	38,096	117.50	5.39	16.85	37	22
Aude	138	2,062	29.43	4.9	61	29	15
Orb	90	591	24.53	2.4	25 (?)	35	20 (?)
Hérault	122	1,119	36.30	(?)	50 (?)	39	22 (?)
Argens	63	1,243	(?)	12.8	50 (?)	31	19 (?)
Var	75	880	39.23	27.4 ?	42 (?)	35	24 (?)

Valserine, close to the confluence, and these wheels set in motion iron cables communicating with the mills of Bellegarde, built several hundred feet above. Thousands of tons of fossils are being ground there into dust, to be used as manure.

At Bellegarde the Rhône abruptly turns to the south, flowing along the eastern foot of the mountain chain which terminates in the Grand Colombier (5,033 feet), overlooking the dried-up lake basin of Culoz. Within this portion of its course

Fig. 66.—THE LAKE OF BOURGET.

Height 770 feet, area 16 square miles. Scale 1 : 100,000.



— 1 Mile.

it is joined by two rivers, the Usses and the Fier. The former, having passed beneath the famous high-level bridge of La Caille, enters the Rhône near Seyssel, a place well known on account of its beds of asphalt. The Fier, rising in the neighbourhood of Mont Blanc, receives from a side valley the water discharged by the Lake of Annecy. This lake consists of two distinct cavities or basins, and its depth nowhere exceeds 100 feet. In many places its banks slope down gently, a circumstance favourable to the construction of pile dwellings, the remains of

many of which have been discovered. Elsewhere, however, they are steep, and on the west the lake is commanded by the Semnoz (5,572 feet), or Rigi of Savoy. The existing emissary of this lake appears to be of artificial formation. The old outlet took its course farther east through a swampy plain.

At Seyssel the Rhône becomes navigable, and soon afterwards spreads out in numerous channels enclosing sand-banks and willow-covered islands. It crosses, in fact, the bed of an ancient lake, of which the Lac du Bourget is the last remnant. Anciently the great glaciers of the Rhône and the Isère met in this depression, which subsequently was converted into a huge lake, fed by the Drac, the Romanche, the Isère, and the Rhône. The glacial drift and erratic blocks, which cover the mountain slopes to a height of 1,600 feet, sufficiently prove this. The Lake of Bourget has been immortalised by Lamartine's verse, and although its shores are comparatively barren, the bold grey wall of Mont du Chat reflected in its blue waters when the sun is about to set, and its wooded peninsulas, afford superb contrasts.

On leaving the swampy plain of Chautagne and Lavours, with its sluggish ditches and coveys of wild ducks, the Rhône for the last time takes its course through a narrow gorge, overlooked in the north by the old Chartreuse of Pierre-Châtel, perched on the summit of an isolated limestone rock. Having received the Guiers from the south, the river turns abruptly to the north-west, and as far as the plain of the Ain flows along the western foot of the Jura. Throughout this portion of its course the Rhône has frequently changed its bed, and there is reason to believe that it formerly flowed west across the shingles and gravels deposited by ancient glaciers, and joined the Saône to the south of Lyons. The relief of this portion of France has undergone a rapid transformation ever since these glaciers retired from the vicinity of Lyons. In the valley of the Drac erratic blocks are scattered over the hillsides to a height of 4,260 feet above the river, and near Lyons up to 1,150 feet. Rock-groovings, locally known as *marcs*, or mud terraces, abound throughout these hills.

Below its junction with the Ain the Rhône spreads out and forms innumerable islands, its bed near the hills of Miribel being no less than 2 miles wide. But soon after it loses its lacustrine character; its waters are confined to a single bed; and at Lyons it joins the Saône, and thence flows majestically southwards towards the Mediterranean.

A sail down the Rhône from Lyons is a source of great delight to the traveller. Swiftly carried along,* he passes ever-varying scenes of beauty. Without much swerving to the left or right, the Rhône, overcoming every obstacle, flows due south, and Michelet aptly likens it to a "furious bull rushing from the Alps to the sea." Rapidly do we pass black rocks and willow-clad islands, woods, crumbling ruins perched upon bold promontories, and populous towns. Looking up the tributary valleys, we now and then get a peep at the distant mountains, the white summits of the Alps on the left, the burnt-out volcanoes of Central France on the

* Length of the Rhône, from the confluence with the Saône to the sea, 204 miles; total fall, 532 feet, or 32 inches per mile.

right. In front the powerful mass of the Ventoux gradually grows in size until it shuts out one-half of the horizon. We are approaching a southern clime. Olive-trees appear in the vineyards, and the rocks assume that calcined appearance

Fig. 67.—ANCIENT GLACIERS OF THE RHÔNE AND THE ISÈRE.

Scale 1 : 388,000.



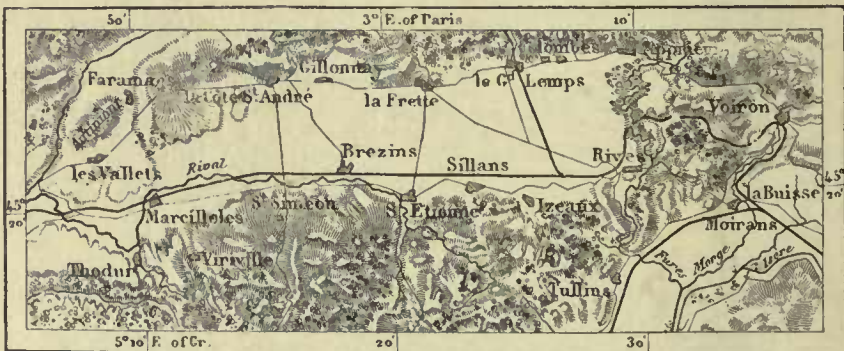
which is so characteristic of Greece and Sicily. At length the wide plain bounded by the Cévennes and the foot-hills of the Alps stretches out before us, only a few isolated hillocks rising above it like islands.

The glacier-born Isère is the first great tributary which joins the Rhône below

Lyons. Where it leaves the valley of Tiges it is a considerable torrent, which the accession of the torrents of the Tarentaise and of the Arc convert into a powerful river. Formerly the Isère fed a huge lake, but now it takes its course through the valley of Graisivaudan, the bed of an ancient glacier river wide enough to accommodate a Nile or a Ganges. Formerly the Isère, when in flood, could spread itself over this valley, but embankments now confine its bed to a uniform width of 367 feet. These embankments sufficiently protect the country on ordinary occasions, but inundations, when they do occur now, prove all the more formidable to Grenoble. Close to that town the Drac joins from the south, its principal tributary, the Romanche, rising in the glaciers in the west of the mountain mass of Oisans. In the twelfth century a landslip converted a portion of the valley of the latter into a lake, and when the barrier broke in 1219, the freed waters carried destruction before them, and even the inhabitants of Grenoble had to flee for their lives. Among the smaller rivers which join the Isère lower down, the Fure is the

Fig. 68.—PLAIN OF LA VALLOIRE.

Scale 1 : 400,000.



most important. It rises in the Lake of Paladru, famous for its pile dwellings. As to the rivers which disappear in the swallows (*avaloirs*) of the plateau of Bièvre, and passing beneath the huge moraine of Antimont, reappear again through the "eyes" (*chaîres*) near St. Rambert, they flow direct to the Rhône. The discharge of the Isère varies exceedingly according to the seasons, and, owing to the grey tint imparted to its water by the triturated rocks suspended in it, can be traced for several miles below the confluence. A few barges navigate this large river, but the traffic is of no importance whatever.

The Drôme traverses several small lakes formed in the fifteenth century by landslips, or *clapiers*, but not being fed by glaciers, its volume varies much according to the seasons. And the same may be said of the other rivers rising in the foot-hills of the Alps; they are mere torrents, almost dry in summer, but carrying destruction before them after heavy rains.

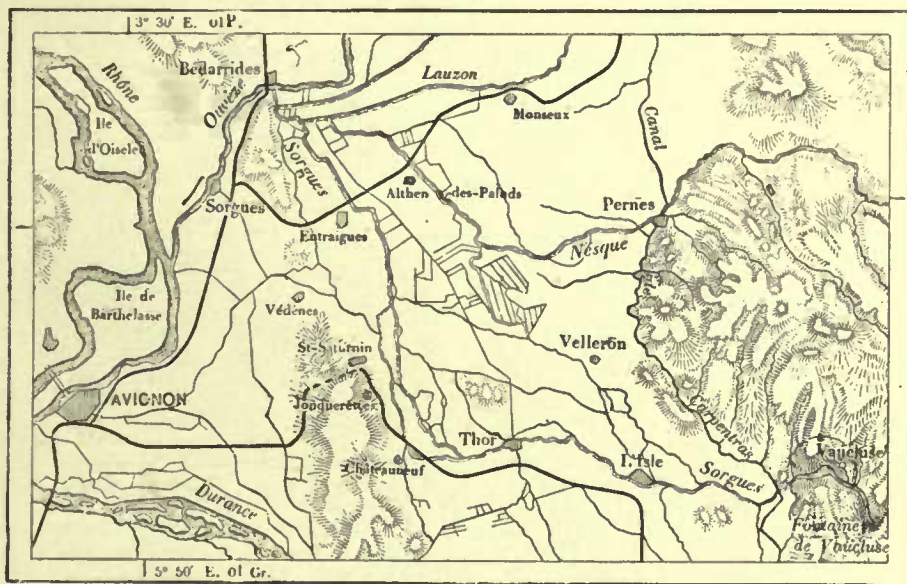
Very different from these are the rivers which cross the fertile plains of Carpentras and Avignon, for they are fed from subterranean reservoirs in the lime-

stone hills, and their springs do not dry up, even in the height of summer. Foremost amongst these rivers is the Sorgues of Vaucluse, which rises a considerable river from a cavern surrounded by barren precipices. Flowing past a monument dedicated to Petrarch, it debonches upon the plain, and ramifies into numerous canals, which carry fertility wherever they go. Formerly the plain lying between the mountains and a range of limestone hills separating it from the Rhône valley was covered with lakelets and swamps, but drainage works have transformed it into a most productive district.

The proximity of the mountains of Vivarais and of the Cévennes to the western bank of the Rhône has prevented the formation of long rivers, but the torrents which rise in these mountains rival even the Mississippi in volume when flooded.

Fig. 69.—THE SORGUES OF VAUCLUSE.

Scale 1 : 260,000.



M. Marchegay has calculated that on the 10th of September, 1857, the Doux, the Érieux, and the Ardèche, all of them lying within the limits of a single department, discharged every second 494,000 cubic feet of water into the Rhône. This is more than the discharge of the Ganges and Euphrates combined. Fortunately the floods occurring on both sides of the Rhône valley never coincide, for the western slope of the Alps is sheltered from the moisture-laden winds which precipitate torrents of rain upon the Mediterranean slopes of the Cévennes. If this coincidence existed the lower valley of the Rhône would be converted into a pestilential swamp. As it is, the damage done by inundations sometimes amounts to millions, and in 1840 the whole of Camargue and the plains on both banks of the Rhône were converted into a fresh-water lake 25 miles wide.

The erosive power of these torrents is wonderfully great. The Ardèche more

especially, rising seventy and more feet when in flood, has done marvels in that respect. At one spot it has abandoned its ancient bed, forcing itself a fresh passage through a wall of rock. This is the famous Pont d'Arc, or the "Arch," one

Fig. 70.—PONT D'ARC (ARDÈCHE).

Scale 1 : 400,000.



1 Mile.

of the curiosities of the valley, which boasts, moreover, of columns of basalt and of remarkable cañons.

The valleys of the Cèze and the Gard, or Gardon, likewise abound in natural beauties. The latter disappears for a short distance between the rocks. Where it debouches from its gorge it is spanned by a beautiful Roman aqueduct, which formerly supplied Nîmes with water. It is a work of imposing grandeur, but the modern railway bridges and viaducts, close by, need not dread comparison with it.

The Durance, which joins the Rhône a short distance below Avignon, is supposed by geologists to have formerly emptied itself into the Bay of Fas, to the east of the mouths of the Rhône. Subsequently it excavated itself a passage, severing the Léberon from the Alpines; and this much is certain, that the canal of the Alpines is an ancient bed of it. The Durance, like the Isère, is a son of the Alps, and though its head-stream, the Clairée, is not fed by glaciers, several of its tributaries are. These glaciers, however, are not very extensive, and the river,

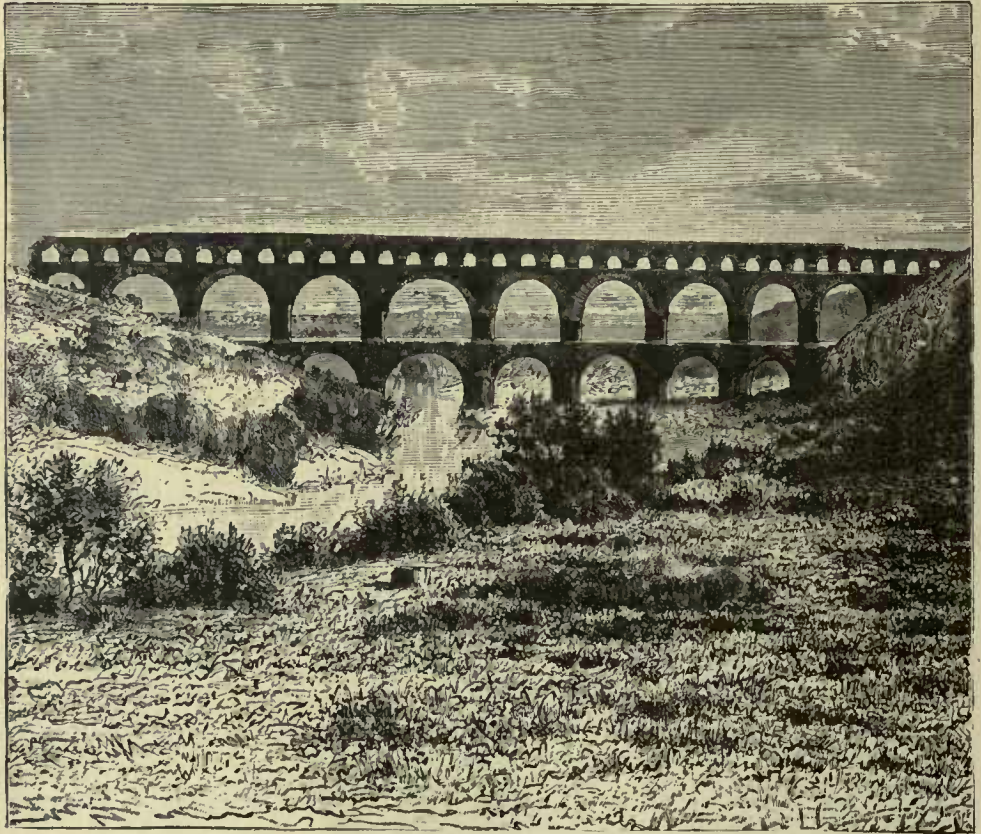
Fig. 71.—PONT D'ARC (ARDÈCHE).



down to its mouth, has the character of a torrent, reduced at one time to a thin thread meandering amongst *crans*, or fields of shingle, at others more voluminous than all the rivers of France together. The geological work performed by this river has been immense. Amongst the ancient lake beds now silted up, that extending from Sisteron to the mouth of the Verdon is one of the most remarkable, because of its earthy slopes of *Mées*, curiously carved into obelisks and pillars. In spite of its length of 235 miles and an average discharge of 12,260 cubic feet per

second (maximum 326,000, minimum 1,906 cubic feet), the Durance is not navigable. During the Middle Ages vessels were able to proceed up to Pertuis, and we may conclude from this that there then existed lakes or barriers in its upper course which regulated its flow. But though not navigable, the Durance is invaluable for purposes of irrigation. The 18,000,000 tons of mud annually carried down it are computed by M. Hervé-Mangon to contain as much assimilable nitrogen as 100,000 tons of the best guano, and as much carbon as could be supplied annually from a forest 121,100 acres in extent. On leaving the gorge of Mirabeau, where it is spanned by a bridge only 490 feet in length, the Durance enters upon a broad

Fig. 72.—THE ROMAN AQUEDUCT OVER THE GARD.



valley, which would be scorched by the sun if it were not for the fertilising waters derived from it.

One canal, that of Marseilles, taps it near Pertuis, and crossing the valley of the Arc at Roquefavour on a magnificent aqueduct, irrigates the gardens of Marseilles before entering the Mediterranean. Another canal, that of Craponne, leaves the river lower down, and ramifies into numerous branches. It was excavated in the sixteenth century, and has converted the whilom barren tracts through which it leads into one of the most productive districts of France. A third canal skirts the Alpines on the north, and a fourth extends north in the direction

of Carpentras. On an average these four canals absorb about 2,440 cubic feet of water every second. Quite recently, in 1875, the Verdon, one of the principal tributaries of the Durance, was tapped, and now supplies Aix with 210 cubic feet of water every minute. It passes through two tunnels, the one 13,000, the other 16,000 feet in length. Several dams have been thrown across the gorges of the Upper Durance and Verdon to regulate the floods, and the conversion of the small Lake of Allos, near the source of the Verdon and at an elevation of 7,200 feet, into a huge reservoir, has been talked about. Next to the huertas of Spain and the

Fig. 73.—THE CRAU AND THE CANAL OF CRAPPONNE.

Scale 1 : 530,000.



plains of Lombardy, the valley of the Lower Durance is even now the best-irrigated district of Europe.

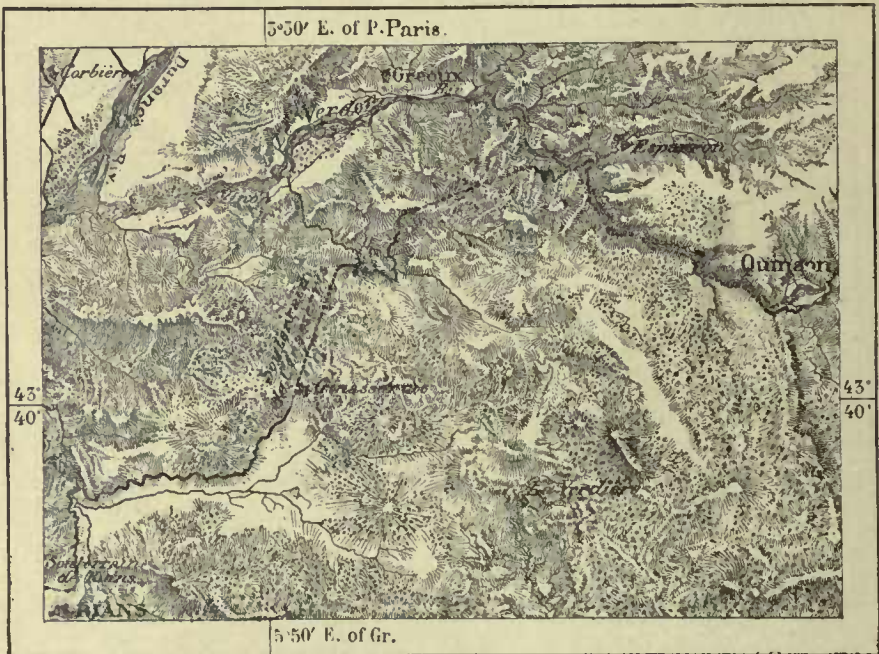
By means of these canals, planned by Adam de Craponne, the whole of the stony desert known as Crau might be converted into fertile land in the course of three hundred and twenty years. This district, about 131,000 acres, is completely covered with flints, some of them embedded in hardened mud. Six-sevenths of these flints have been deposited by the Rhône, the remainder by the Durance. The pudding-stones upon which they rest are of marine origin, and the Crau has

altogether the appearance of an ancient bed of the sea. Formerly this waterless waste was visited only by *bayles*, or herdsmen, but the canals which now traverse it are skirted by trees and cultivated fields. Some of the rain which falls upon this tract finds its way through subterranean channels to the vicinity of the sea, and there reappears again in plenteous springs. More than three hundred such gush forth to the north of the lagoon of Galéjon. They are known as *Laurons*, a name frequently given to springs in other parts of France.

At some future time the Rhône itself may be utilised for purposes of irrigation, more extensively than at present. This river, owing to its rapid current, is of but little use as a navigable high-road, and since the completion of the railway from Lyons to Marseilles the sixty-two steamers which formerly navigated it

Fig. 74.—THE CANAL OF THE VERDON.

Scale 1 : 240,000

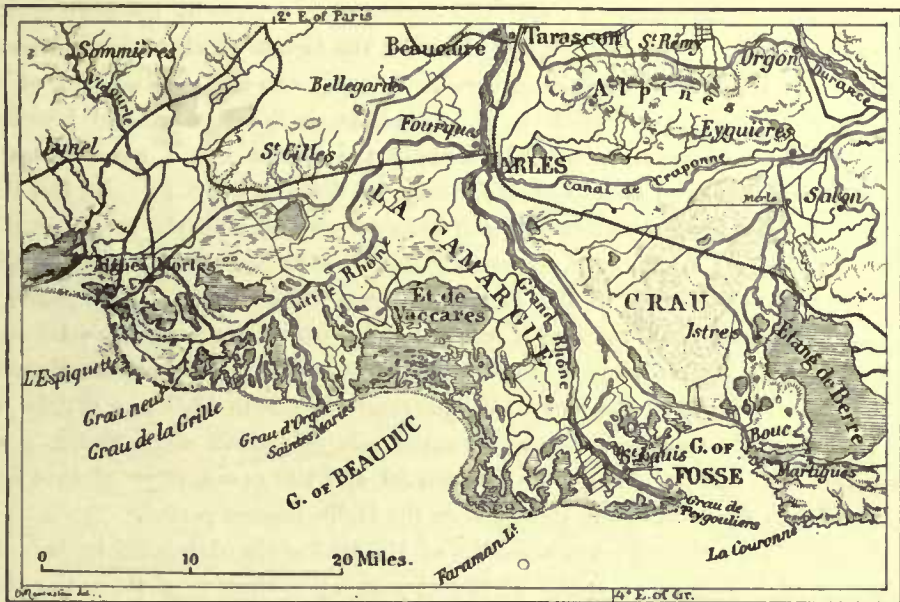


have dwindled down to six or eight. It is a pity that this great natural high-road should be thus deserted, and works to render it navigable throughout the year for steamers of 300 tons have actually been begun, and are to be completed in 1882. Vessels will then be able, by making use of canals, to proceed from Havre through the centre of France to the Mediterranean.

It has likewise been proposed to utilise the Rhône for purposes of irrigation by carrying a huge canal along the left bank of the river from Vienne to Mornas, where it would cross to the right bank by means of a gigantic siphon, and after having irrigated the districts of Nîmes, Montpellier, and Béziers, terminate at Narbonne, in the basin of the Aude. The total length of this canal would amount to 280 miles, and, besides supplying the towns and villages along it with water, it would suffice for the irrigation of 494,000 acres.

At Fourques (the Forks), 8 miles below the bridge of Beaucaire, the Rhône bifurcates and its delta commences. The Little Rhône flows south-west across the alluvial soil of the ancient Gulf of Beaucaire, whilst the Great Rhône flows straight to the south, and constitutes the principal high-road of commerce. The former is supposed to have been the main branch in bygone ages, and as far south as the saline swamps near Montpellier do we meet with flints of Alpine origin, carried thither by the river. Even during historical times the branches of the river have undergone numerous changes. Ancient authors speak of two, three, five, or even seven mouths; but if we include all *graus*, or minor channels, we may arrive at the latter number even now. Pliny enumerates three mouths, the main or Massaliotic branch being in the east, as at present. The western branch was known as *Os Hispaniense*, or "Spanish arm," because it flowed in the direction of Spain; and

Fig. 75.—THE DELTA OF THE RHÔNE.



even during the Middle Ages there existed a navigable branch which led into the lagoon of Thau. M. Émilien Dumas has pointed out that each ramification of the river led to corresponding changes in the coast-line. When the Rhône first bifurcated at the Forks the beach extended to what is now the northern part of the deltoid island of Camargue. Since that time the fauna of the Mediterranean has undergone some changes. The *Panopæa Aldrovandi*, which is now found only on the coast of Sicily, was then common on the Lion Gulf, and the *Pecten maximus*, at present very rare, abounded.

The delta formed by the two main branches of the river wholly consists of an alluvial deposit of mud. It covers an area of 185,000 acres, about one-half of which is included in the island of Camargue, dusty in summer, half drowned in winter, and almost without inhabitants. If we may judge from the Roman

ruins discovered there, the country was formerly more salubrious. The embankments which now confine the Rhône are probably the cause of this insalubrity, for they prevent the drainage of the stagnant, fever-breeding pools in their rear, besides preventing the deposition of fresh alluvium. In the northern portion of this island there are a few fields, cultivated by peasants who brave the fever, besides extensive pasture grounds, roamed over by white horses, half-wild cattle, and *manades* of buffaloes (*Bos bubalus*), which figure on the racecourses of the towns of Southern France. The "Little Sea," or lagoon of Vaccarès, in the south, with its fringe of marshes and tamarisk thickets, is an ancient arm of the sea, from which it is separated now by a chain of dunes. Near it are saline tracts (*sansouires*) void of all vegetation, and rarely visited by man, but the resort of numberless migratory birds. Even flamingoes are occasionally seen, and the beavers which have built their lodges in the embankments lining the Little Rhône are not interfered with. A beautiful tree, resembling the aspen, grows on the more elevated sites of the Camargue, and the canals that traverse its northern portion are fringed with willows, poplars, and elms, but the forests which anciently covered the whole of its interior have disappeared. Scarcely one-fifth of the area of the Camargue is under cultivation now, and although the cold mistral interferes with the success of certain plants, the delta of the Rhône might nevertheless be converted into a region equalling in fertility the delta of the Nile. No less than 27,500,000 cubic yards of alluvial soil are annually swept into the sea, instead of being utilised, and a bar closes all access to the river by large vessels. An artesian well near Aigues-Mortes, in the Little Camargue, though bored to a depth of 330 feet, only passed through such alluvial soil, without reaching the solid rock. The delta of the Rhône has gained upon the sea ever since the time of the Romans. A watch-tower built at the mouth of the Great Rhône in 1737 now stands five miles above it, thus showing that the annual rate of growth since that date has amounted to 175 feet. Altogether between 80 and 120 square miles of land have been added to the delta of the Rhône since the Gallo-Roman period.

We have seen above that the mouths of the Rhône are obstructed by bars, the formation of which is promoted by the almost entire absence of tides, the flood in the Lion Gulf only rising 16 inches. The embankments which have been constructed have failed to remove the obstacles to navigation, and vessels drawing more than 10 feet can scarcely ever venture to enter the river, even though the wind should be favourable. In the time of the Romans Arles communicated with the sea by a chain of lagoons and canals constructed by Marius, and hence known as *Fossæ Marianæ*. But the canal of Arles, which replaces this ancient water-way, is navigable only for small vessels. At length, in 1863, thanks to the persevering advocacy of M. Hippolyte Peut, a ship canal 20 feet deep was constructed between the tower of St. Louis and the Gulf of Fos. This canal leads into a huge basin covering 34 acres, by the side of which a new commercial town is springing into existence, and a railway will soon establish rapid communications between this new port and the remainder of France. In spite of the vicinity of the marshes the mortality at St. Louis is not greater than at Arles, and might be very

much reduced by a proper attention to sanitary laws; and if the place has not prospered hitherto, this is due to the jealousies of Marseilles and of the powerful railway company, the one dreading the loss of its monopoly, the other the development of an important river traffic. One danger, however, threatens the prosperity of this canal—the Gulf of Fos is gradually being silted up; but this danger might be removed by diverting the waters of the Great Rhône into the “Grau,” or lagoon, of Roustan.

The changes in the course of the Little Rhône are historically as important as those of the Great Rhône. St. Gilles, accessible now only to canal boats, was

Fig. 76 — THE CANAL OF ST. LOUIS.

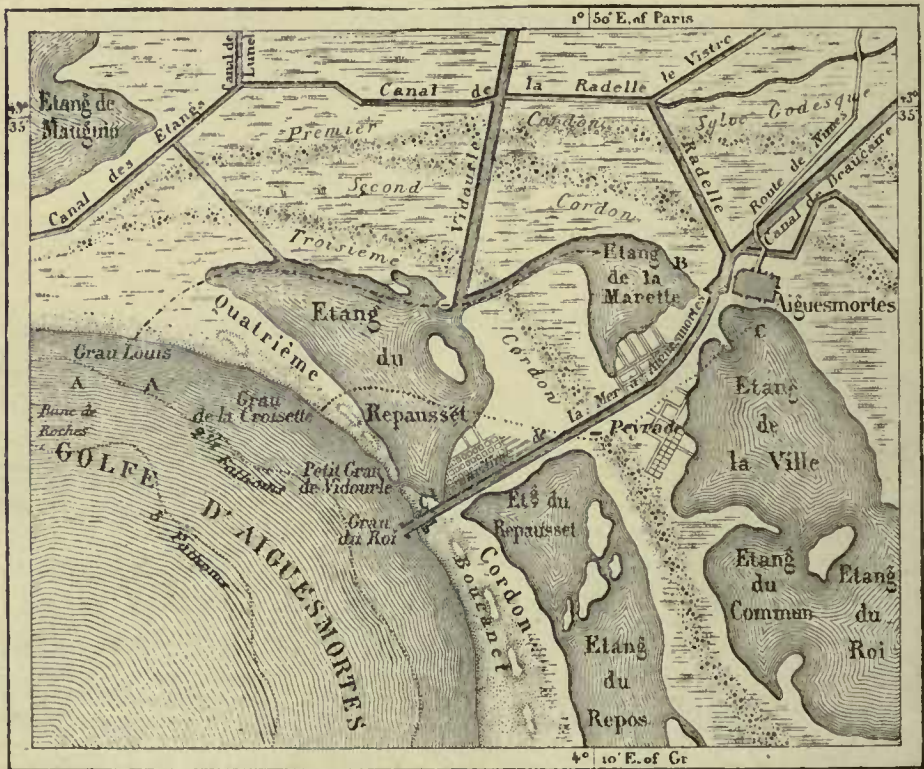


formerly one of the great ports of Southern France, at which most of the pilgrims going to Palestine embarked during the twelfth century. Aigues-Mortes, lower down on the same branch of the river, sprang into existence subsequently. But about the middle of the sixteenth century the Little Rhône took a more easterly course, and it now enters the sea through the Grau of Orgon, near which is the fishing village of Saintes-Maries, separated by vast sands and swamps from all other centres of population. There, as well as farther east, at the lighthouse of Faraman, the sea is gaining upon the land.

The town of Aigues-Mortes, thus called on account of the stagnant waters

which surround it, has frequently been cited in proof of a remarkable encroachment of the sea, but erroneously in our opinion. The local guides point out the spot at which St. Louis is said to have embarked for the Holy Land, though it has been proved conclusively that he did so at a point five miles to the south-west of the town. The vessels which were to convey the crusaders cast anchor at the spot marked A upon our plan, close to the mouth of an old canal, still known as Grau Louis. The remains of embankments and the vestiges of a crusaders' burial-ground enable us to trace the direction of this canal, which anciently connected

Fig. 77.—THE LAGOONS OF AIGUES-MORTES.
Scale 1 : 100,000.



A A. "Foreign" Roads'ead where the crusaders embarked.
B. Site of Port in thirteenth century. C. Site of Port, thirteenth to eighteenth century.

— 1 Mle.

the town with its port at Grau Louis. Since then the lagoons have undergone many changes, partly owing to the alluvium deposited by the Rhône and other rivers, partly in consequence of the construction of a new canal by Louis XV., which enters the sea at the Grau du Roi. If any further proof were wanted in support of the assertion that the sea along that part of the coast has not encroached upon the land, it would be furnished by the existence of four lines of dunes, which mark as many conquests of the land over the sea. The town of Aigues-Mortes undoubtedly occupies a site which was anciently covered by the floods of the

Mediterranean. The outermost of these lines of dunes, that of Boucanet, only supports a few tamarisks, but the innermost is covered with a forest of maritime

Fig. 78.—THE DELTA OF THE AUDE.

Scale 1 : 225,000.



pinus, which impart a character of mournful grandeur to the landscape. This Sylve Godesque, however, has been reduced to very small dimensions in our day.

A careful examination of this portion of the coast-line enables us to assert that it will remain stable for centuries to come. The Little Rhône annually carries about 5,232,000 cubic yards of sediment to the sea, but nearly all this is deposited near the lighthouse of Espiguette, to the east of the Gulf of Aigues-Mortes; and supposing this point to continue to encroach upon the sea at its present rate, no less than two thousand years will have to elapse before the gulf is converted into a lagoon. The roadstead at Aigues-Mortes is, moreover, sheltered from the dangerous south-easterly winds, and the construction of a harbour of refuge at the Grau du Roi has consequently been advocated by competent engineers. Aigues-Mortes, which now hardly imports anything but the oranges of Valencia and of the Balearic Isles, might then become an important seaport.

The rivers which flow from the slopes of the Cévennes into the Mediterranean may be considered as belonging geologically to the basin of the Rhône. Even the Aude, the first river to the north of the Pyrenees, bears a certain family likeness to the torrents of the Rhône valley, although only its northern tributaries rise in the Cévennes. Like all other Mediterranean rivers born in these mountains, the Aude presents all the features of a torrent, its volume fluctuating according to the seasons between 180,000 and 106,000 cubic feet per second. On leaving the gorges of Capsir and the forest of Sault the Aude flows due north until, below Carcassonne, it is joined by the Fresquel, when it curves round to the east. The delta of this river is proportionately more extensive than that of the Rhône, for it covers 50,000 acres, and between its two arms is enclosed the ancient mountain island of La Clape. No less than 2,224,000 cubic yards of mud are annually carried down the river, most of which is deposited upon the inland swamps, the mountain barrier at the mouth of the river preventing it from being carried into the sea. In the time of St. Louis there were salt-pans on the swamp of Capestang. It is now separated from the sea by 9 miles of solid land. The swamp of Montady has been converted into dry land since the middle of the thirteenth century. The site of Lake Rubrensis, which extended to the walls of Narbonne, is now occupied by fields; and the lagoons of Gruissan and Bages, which formerly were one, are now separated by a strip of alluvial land.

The Canal du Midi, or Great Southern Canal, with its branches no less than 339 miles in length, accompanies the Aude during the greater part of its course. Its supply of water is principally derived from the Alzau, Lampy, and other small rivers rising in the Cévennes. These are intercepted by a canal (Rigole de la Montagne) leading into the lake-like reservoir of St. Ferréol, holding 6,254,000 tons of water, whence another Rigole leads down to the navigation canal. Unfortunately, this great work of the seventeenth century, which connects the Rhône with the Garonne, has fallen into the clutches of the Great Southern Railway Company, and is but little used for the conveyance of merchandise.

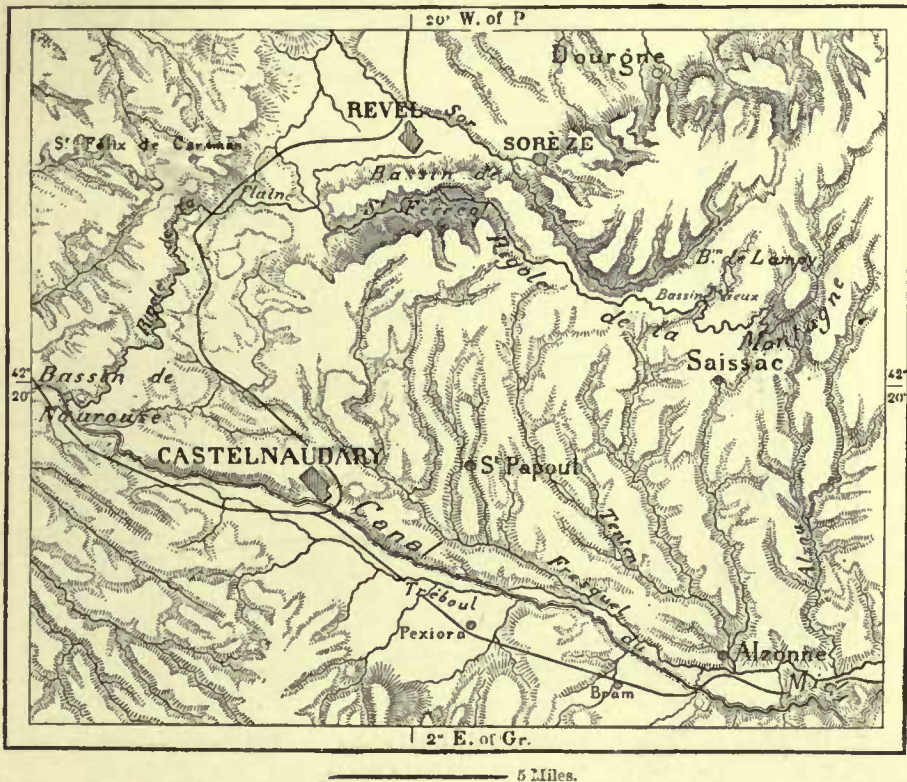
The Orb enters the sea to the east of the Aude. It discharges its waters through a single mouth now, that of Grande Maïre having almost become obliterated, and dwindles down into an insignificant stream during summer. The Hérault,

its neighbour, and the most important river between the Aude and the Rhone, on the other hand, is fed by plenteous springs rising in wild limestone gorges. The river is navigable for sea-going vessels throughout the year as far as Agde, and Richelieu began the construction of a breakwater at its mouth, which has never been completed, the engineers having since then devoted the whole of their energies to the creation of an artificial harbour at Cette.

Amongst the small rivers between the Hérault and the Rhône the Lez is the best known, because it flows past Montpellier, but the Vidourle is far more typical of the torrents descending from the Cévennes. During the dry season it does not

Fig. 79.—RIGOLES OF THE CANAL DU MIDI.

Scale 1 : 320,000.



even reach the Mediterranean, but when in flood its volume exceeds that of the Seine at Paris thirty times, and the inhabitants then utilise it for irrigating the reed-banks of the lagoon of Repausset, near Aigues-Mortes, the produce of which is converted into manure or used for covering chairs.

The Argens is the only French river to the east of the Rhône which can fairly claim that epithet. Like many other rivulets in that limestone region, for a portion of its upper course it passes underground, but long before it falls into the shallow Bay of Fréjus it becomes a placid stream, maintaining a fair volume throughout the year. There are several underground rivers along this Provençal coast, which only rise as springs beneath the waves of the Mediterranean.

Perhaps the most remarkable of these is the spring of Port-Miou, near Cassis, which originates in the ancient Lakes of Aubagne and Géménos, drained by King René, and gushes forth with sufficient violence to create a veritable current.

The Var, which for a long period formed the boundary between France and Italy, though longer than the Argens, remains a current down to its embouchure, being reduced at one time to a mere streamlet, at others rushing down with such violence as to overflow its embankments, though these are 2,600 feet apart.

Fig. 80.—THE MOUTH OF THE HÉRAULT AND CAP D'AGDE.
Scale 1 : 70,000.



COAST-LINE AND LAGOONS.

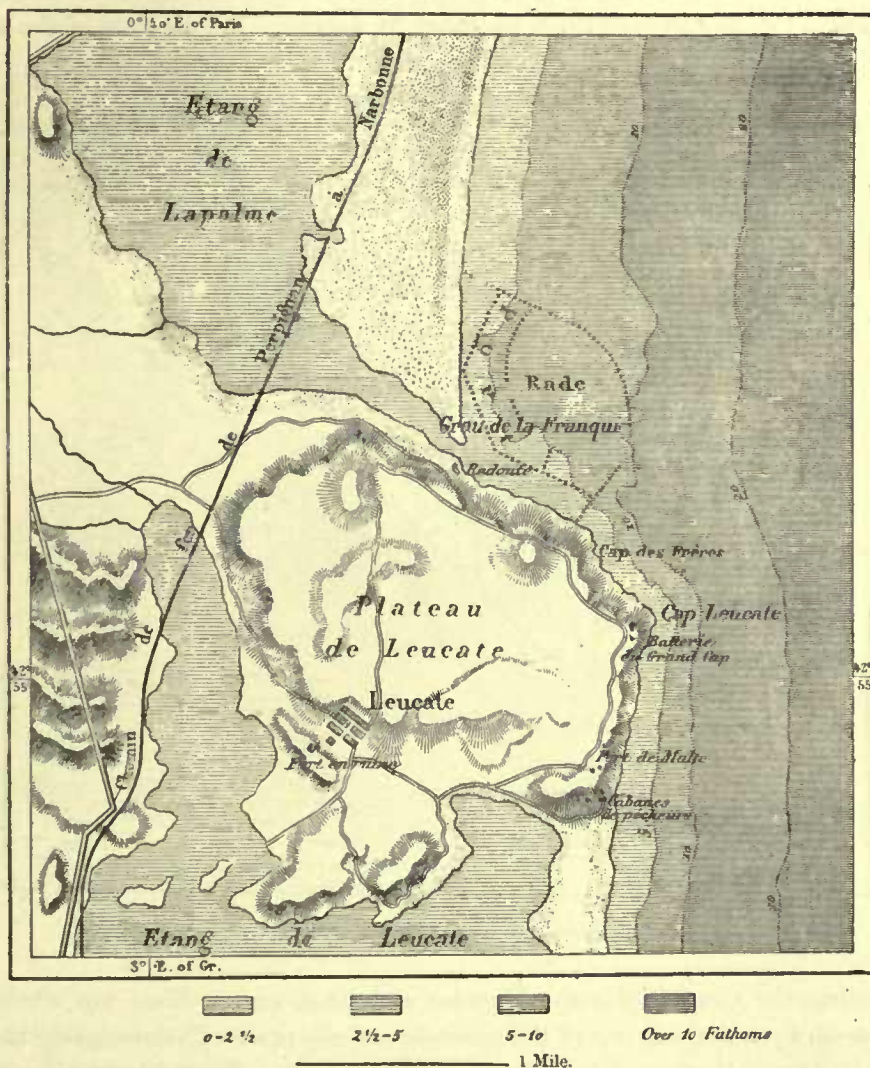
THE difference between the configuration of the coast on both sides of the Rhône delta is most striking. In Provence we meet with bold cliffs and promontories, whilst to the east of the river we find ourselves in the presence of a beach formed of sand carried down from the granitic mountains in the interior of the country. In Provence the cliffs sink down almost precipitously into the sea, and molluscs are found there only in a few sandy creeks, whilst on the coast of Languedoc the sea deepens gradually. This difference of physical configuration accounts to a great extent for the history of the two provinces. In the one case

towns were built close upon the sea, in the other they are remote from it, and Languedoc thus possesses the characteristics of an inland country rather than of a maritime one.

In its details the beach of Languedoc is not without beauty. It is broken up by mountains, hills, or masses of rock into a number of sections. One of these

Fig. 81.—LEUCATE AND THE ROADSTEAD OF FRANQUI.

Scale 1 : 45,000.



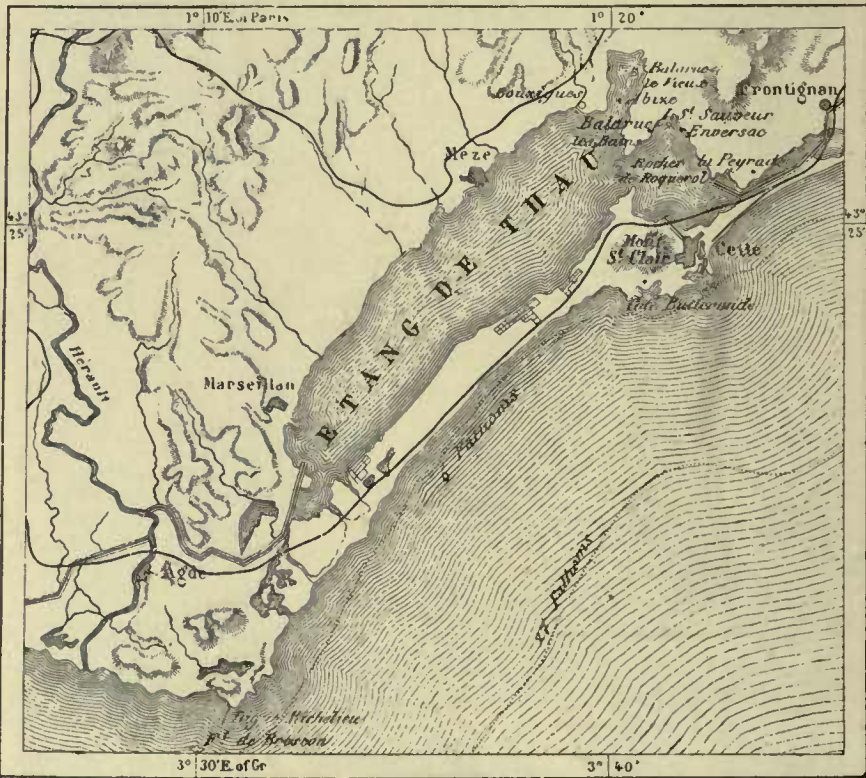
extends between the Point of Collioure and Cape Leucate ; a second sweeps round from the latter to the Cape of Agde ; a third reaches thence to Cette ; whilst the fourth and last stretches from Cette to the sandy flats of the Rhôno delta. The promontories afford some shelter to vessels endangered by the dreaded tempests of the Lion Gulf, but the most secure anchorage along that coast, that of Franqui, to

the north of the peninsula of Leucate, has not yet been converted into a port, although possessed of special facilities for the construction of one.

With the exception of the Cape of Agde, which is an extinct volcano, the ancient rocky islands along that coast, now joined to the mainland by alluvial deposits, are composed of cretaceous or Jurassic limestone. The ancient crater of Agde has been converted into a vineyard. Streams of lava extend from it in all directions. A few minor volcanoes are near it.

The ancient coast, such as it existed before the volcano of Agde had become a portion of the mainland, can still be traced by following the contours of the hills

Fig. 82.—THE LAGOON OF THAU.



5 Miles.

bounding the alluvial plains. Lagoons, or *étangs*, extend along the whole of the coast, from the very foot of the Albères; and where no sediment-bearing rivers flow into them, they are of considerable area and depth. That of Leucate is a case in point. No river flows into it, but close by, at the foot of a limestone rock, rise the remarkable springs of Salses, now known as Font-Dame and Font-Estramer, discharging streams of water having nearly the same chemical composition as that of the ocean. At the side of the Font-Estramer grows a species of reed—*Phragmites gigantea*—which is not met with anywhere else in Europe.

The lagoon of Thau (Taphrus), between the volcano of Agde and the hills of

La Gardiole (774 feet), is the most important of all, on account of its great depth and the towns which line its shores. This little sea of 18,500 acres is separated from the Mediterranean by a narrow strip of land. A narrow channel, furnished with locks, and forming the eastern termination of the Great Southern Canal, connects it with the open sea. Another canal, nearly 40 miles in length, places it in communication with the delta of the Rhône. The lagoon is thus of considerable importance to navigation. Its waters are as salt as those of the sea, except after heavy rains and near the mouths of some of the rivers which enter it. A bounteous spring,

Fig. 83.—BIOLOGICAL CONDITION OF THE LITTORAL REGION OF HÉRAULT.



The circles indicate proportionally to what extent the mean age at death is inferior to that throughout France.

The asterisk denotes a locality where the mean age is higher than the average throughout France.

known as the "Abize" (abyss), rises from the bottom of the lagoon in the north, and not far from it there is an intermittent spring which discharges fresh water during winter, up to April, but swallows up the water of the lagoon, a phenomenon similar to what has been noticed at Argostoli, on the island of Cephalonia. The lagoon of Thau is public property, and supplies annually £40,000 worth of fish and shells. Oysters are said to have abounded in it formerly, and an old bed has been discovered at a distance of 500 yards from the modern beach, but an attempt to breed oysters there has failed signally.

There can be no doubt that these lagoons might easily be drained and converted

into fertile fields. Experiments on a small scale, which were made at Narbonne and Vic, have been attended by the most perfect success. This is not merely a question of converting 60,000 acres of lagoon, at present producing only fish, willows, and reeds, into productive arable land; it is still more important in its bearings upon the salubrity of the climate. M. Régy has calculated that these swamps shorten the lives of the people who reside near them to the extent of ten, fifteen, and even nineteen years. More than half the children at Mireval and Vias die before they have attained their sixth year, and strangers who settle in the country almost

Fig. 84.—ÉTANG DE BERRE.

Scale 1 : 320,000.



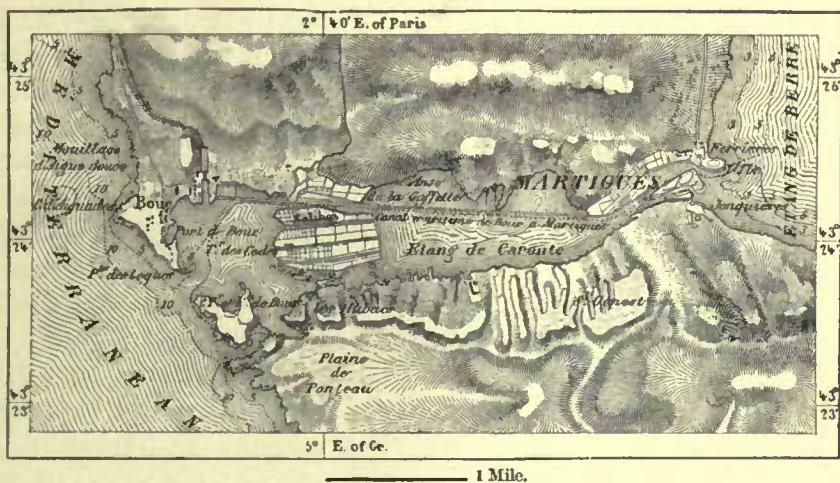
invariably suffer from marsh fever. Those lagoons which are over 3 feet in depth do not injuriously affect the health of the people who live near them, and the mortality at Cette and other places on the lagoon of Thau is hardly greater than in the rest of France. But when the water, owing to its shallowness, attains a temperature of 82° F., it becomes dangerous to health. These shallow lagoons ought, therefore, either to be suppressed, or be made to communicate freely with the open sea. In the case of the lagoon of Mauguio the latter has already been done, and the same treatment would prove efficacious with those of Vic and

Frontignan ; but M. Régy is of opinion that all others, being very shallow, should be converted into *polders* without loss of time.

The changes in the configuration of the lagoons have led, within the historical period, to a displacement of the principal towns. Astruc, more than a century ago, observed that the names of the towns on the hills were Celtic, whilst those near the coast invariably bore Greek or Latin appellations. It may fairly be inferred from this that the coast became habitable only at a comparatively recent epoch. The encroachment of the land upon the sea enabled the inhabitants to found quite a chain of new towns, including Agde, Cette, Frontignan, and Aigues-Mortes. Maguelone, however, which formerly stood upon an island, now joined to the mainland, appears to be of ancient foundation. It was a busy place of commerce as long as the Saracens held it. After their expulsion by Charles Martel it again rose from its ashes, but having become a place of refuge of the

Fig. 85.—THE CANAL OF CARONTE.

Scale 1 : 85,000.



Protestants, it was finally destroyed by order of Louis XIII., and there now only remains an ancient church, forming a prominent object in the midst of the sands.

The only lagoons to the east of the Rhône which originated in the same manner as those on the Lion Gulf are those of Valduc, Engrenier, and several others, which formerly communicated with the sea through a channel, now closed by a bar, and known as the lagoon of Estomac (Stoma-Limne). As to the lagoons of Valduc and Engrenier, they are shut off from the Mediterranean altogether, and, owing to an excess of evaporation, their level, on an average, is about 30 feet lower than that of the sea. They are miniature Caspians, and yield a considerable amount of salt.

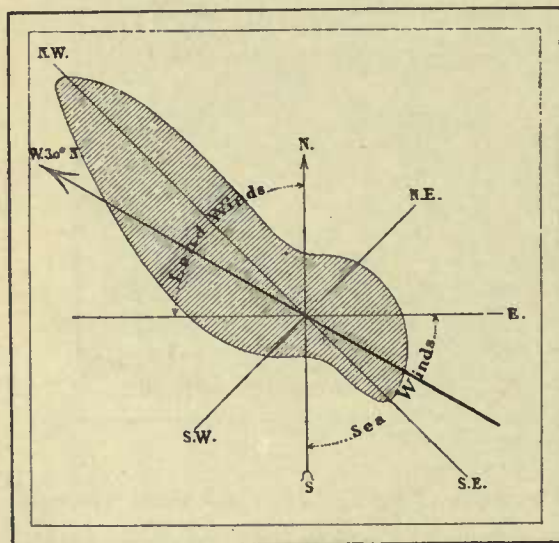
The large inland sea known as Étang de Berre is not a lagoon, but a gulf, separated from the Mediterranean by a rocky ridge. The Romans had a port on this gulf, but it is now only frequented by a few fishermen, and not a single town

rises from its shores ; and yet, by deepening the canal of Caronte, which joins it to the Mediterranean, this great natural harbour might be rendered accessible to the largest vessels. If the Étang de Berre belonged to England, it would long ago have been converted into a great commercial and naval dépôt. Vessels at anchor within it are not only beyond the reach of an enemy's guns, but, being hidden by the coast range of Estaque, they are actually out of sight. The owners of the fisheries, or *bordigues*, are bound to dredge the canal of Caronte to a depth of 39 inches. Were they to neglect doing so, it would quickly become choked, and the Étang de Berre shut off from the sea.

CLIMATE.*

HOWEVER striking the differences between the littoral regions on both sides of the Rhône, they enjoy the same climate, always excepting the fever-stricken neighbourhoods of the swamps. This

Fig. 86.—THE PREVAILING WINDS AT AIGUES-MORTES.



climate differs essentially from what is met with in the remainder of France, for land winds predominate here, whilst sea winds prevail in all the departments beyond the Cévennes and the wide valley of the Rhône. The air is drier, and it rains less frequently, though, as a rule, in heavy showers.

No visitor to the south of France can have failed to notice the gusts of north-westerly wind which blow from the Cévennes, and are produced by local causes. This violent wind is known as "mistral" (*magis traou*) or

"master," and it fully deserves that epithet, for its velocity sometimes equals that of a hurricane. Strabo tells us that this "black norther" lifted men off their cars and carried away their clothes, and in our days it has overturned railway trains. Not a tree in the plains of Avignon and on the islands of the Rhône but exhibits traces of its violence. The originating cause of this wind must be looked for in the great contrast between a sandy beach scorched by the rays of the sun and a snow-clad mountain range. The heated air above the former rises, whilst the cold mountain air rushes down the hillsides to establish an equilibrium. The greater the difference between the temperature of these two atmospheric strata, the greater the violence of the wind. In the night, when the beach has cooled down by radiation,

* On the rains in Hérault see a paper by M. Ch. Martins, in *Mém. de l'Ac. de Montpellier*, viii. 1872.

there is a lull, and at some distance from the land it is hardly felt at all. In spite of the dread it inspires, the mistral is a welcome visitor, for it purifies the air of the towns, which are not always remarkable for cleanliness.

The contrasts existing between the coast regions and the mountains, and the winds resulting therefrom, account for the frequency of thunder-storms in the low lands. As long as the mistral and the sea wind are not engaged in a conflict, the clouds drift towards the mountains, and there descend in rain. But when the mistral, blowing in the higher strata of the atmosphere, is met by the cloud-laden sea breeze, an exchange of electricity takes place between them, and the rain descends in torrents. As a rule the rainfall increases as we proceed from the coast towards the mountains, and is most copious in autumn. There are, however, many exceptions to this rule, and there have been years when it rained most heavily in February, and scarcely at all in autumn. This capriciousness of the climate appears to be reflected in the character of the "Gavaches" of the Cévennes and the "Franciaux" of Dauphiné. They, too, have their bursts of passion, but quickly calm down, being not unlike, in this respect, to the mistral or to a thunder-storm.

TOPOGRAPHY.

AUDE.—This department, named after its principal river, is eminently a land of passage, bordering upon the Mediterranean, but partly lying within the basin of the Garonne. It is almost exclusively an agricultural country, manufactures existing only in the towns and in the upper valley of the Hers. Less than one-third of its area is under cultivation, and although its vineyards are of some importance, the population is far from dense.

Castelnaudary (7,628 inhabitants), on the water-shed between the Mediterranean and the Atlantic, has played a great part during the civil wars; but the frequent sieges which it has undergone have prevented it from becoming a great commercial town. Windmills now occupy the sites of its ancient forts, it is the busiest ship-yard on the Canal du Midi, and manufactures coarse cloths, like most other towns of that part of Languedoc. *Belpech* (978 inhabitants), *Ste. Colombe*, and *Chalabre* (1,792 inhabitants), all of them to the south, on the Upper Hers, are likewise noted for their cloths and linens.

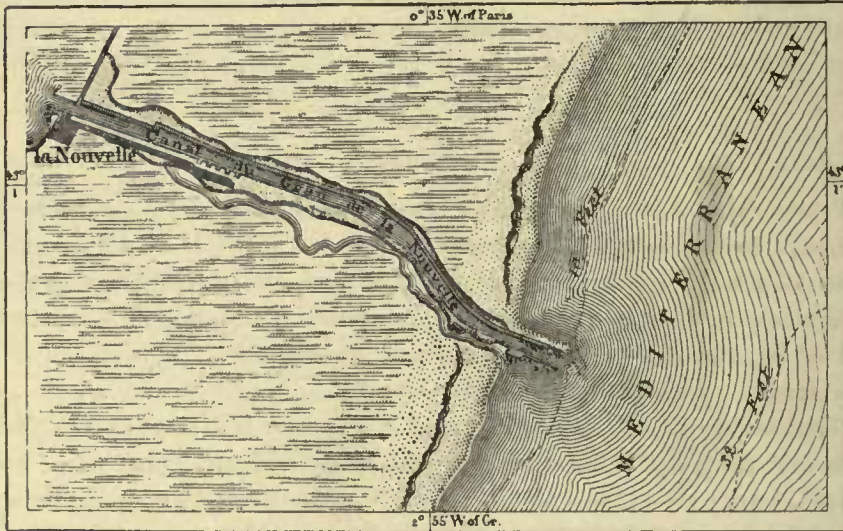
The river Aude enters the department through the terrible gorge of Carcanières. Lower down it flows past *Quillan* (2,286 inhabitants), a busy place, with saw-mills supplied with fir-trees from the forest of Sault, in the Pyrenees. There are several noted mineral springs in the vicinity, including the sulphur springs of *Ginotes*, in the south-west; the ferruginous springs of *Rennes-les-Bains*, in the valley of the Sals, to the north-east; and those of *Couiza* and *Alet*, on the banks of the Aude. Alet was the seat of a bishop during the Middle Ages, and its ancient episcopal palace still over-towers all its other houses. Still following the Aude, we arrive at *Limoux* (6,037 inhabitants), on the white hills of which is grown a wine known as *blanquette*. Its manufactures of cloth and felt are

of little importance now. *Carcassonne* (23,517 inhabitants), the capital of the department, occupies a favourable site at the elbow of the Aude, and on the high-road connecting the Mediterranean with the Atlantic. The mediæval "city" occupies a hill, and its walls and towers, erected between the fifth and the fourteenth centuries, as well as several remarkable old buildings, still remain to it. The lower town, however, is by far the most populous. Its fortifications have been razed to gain space for houses and manufactures. Carcassonne, besides manufacturing much cloth, carries on a considerable commerce with wines and agricultural produce, and also exports the fine marbles of *Caunes* (1,998 inhabitants).

Narbonne (18,325 inhabitants), the maritime capital of the department, was of far greater importance during the dominion of the Romans, when it boasted

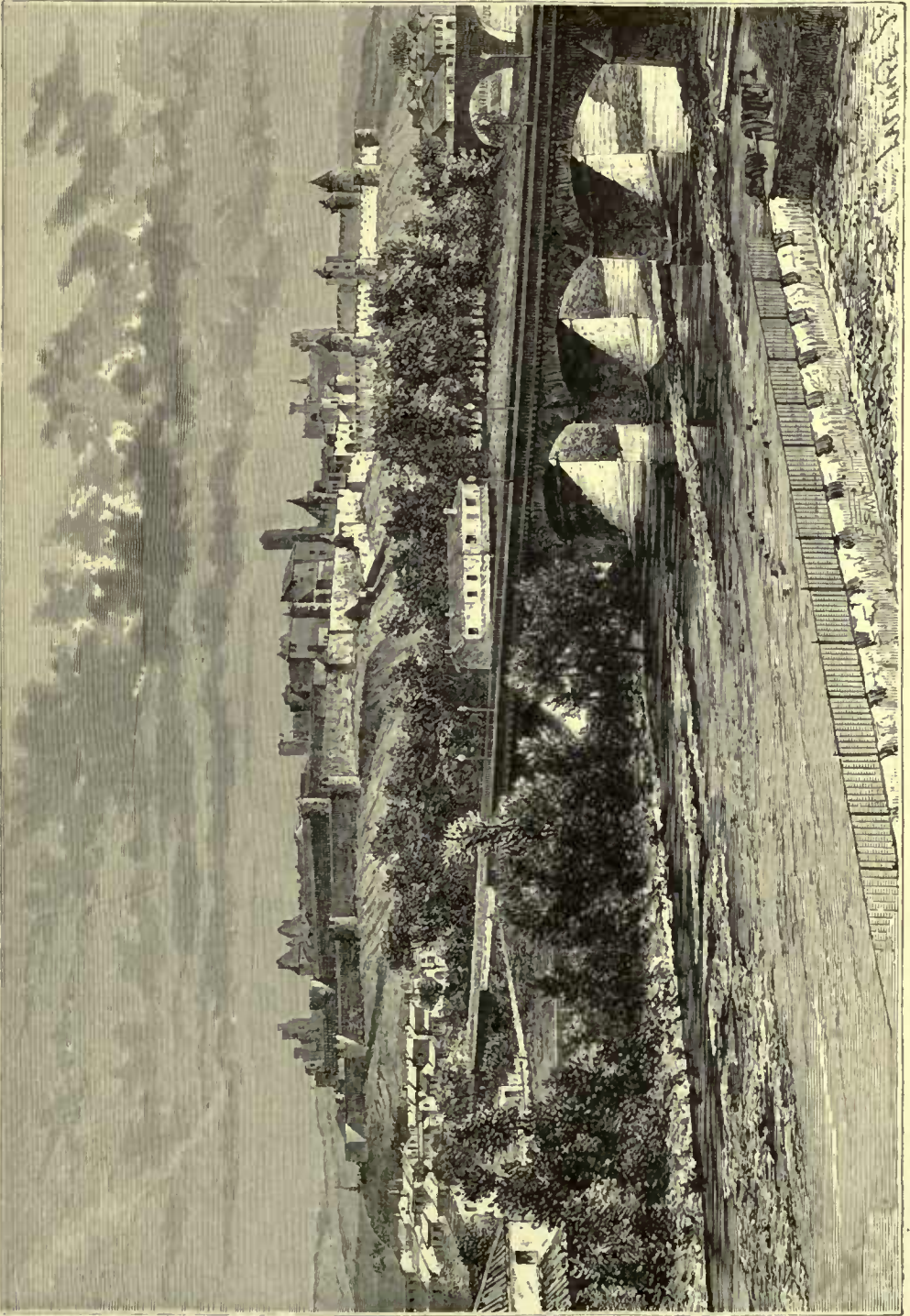
Fig. 87.—THE PORT OF LA NOUVELLE.

Scale 1 : 3,000.



of 80,000 inhabitants, and of magnificent public buildings, of which only few traces exist now. The church of St. Just is the most remarkable amongst its mediæval buildings. The geographical position of Narbonne is excellent, but, owing to the silting up of the lagoons and canals, it no longer enjoys the advantages of a maritime city. The canal which connects it with its port of *La Nouvelle* is only navigable for fishing-smacks, and possesses no importance whatever. The environs of the city, however, have been brought under cultivation, and there is a busy trade in wine.

The most important towns of the arrondissement of Narbonne are *Lézignan* (4,402 inhabitants), with numerous distilleries, and *Sigean* (3,510 inhabitants), on a hill overlooking the lagoon and its salt works. *Gruissan* (2,382 inhabitants) is hardly more than a village of salt-makers and fishermen, whilst *Coursan* (2,507 inhabitants), in the valley of the Aude, stands in the most fertile district of the



CARCASSONNE.

department. *Armissan*, in the mountains of La Clape, has limestone quarries which have yielded the fossil bones of saurians and batrachians, which lived here at an epoch when a vast lake occupied the greater portion of southern Languedoc. The village of *Bize*, in the defiles of the Cesse, has become famous through its caves, in which bones and stone implements have been found. *Durban*, in the hills of the Corbières, noted for their honey, has a few coal mines.

HÉRAULT is one of the wealthiest departments of France. Its coal mines are annually increasing in importance; its lagoons are more productive than any others along the Mediterranean; its vineyards supply between 4,000,000 and 7,000,000 gallons of wine annually; and railways traverse it in all directions. Unfortunately the ravages of the phylloxera threaten destruction to one of the great sources of wealth of the department. In some of the invaded districts the peasants have taken to the cultivation of Javanese hemp, a plant said to yield a fibre "finer than cotton, stronger than flax, and as brilliant as silk." The density of population is about equal to the average throughout France, although the barren mountains in the north are only thinly peopled by "Gavaches," who leave their homes in the autumn to assist in the vintage.

The village of *Minerve* has given its name to the entire region drained by the Cesse and by other tributaries of the Aude. The romantic spot at which the Cesse is joined by the Brian was formerly dedicated to Minerva, and although the heathen deity has since been superseded by St. Rustique, her name still lives in the village and in the castle which commands it. This castle was captured in 1210 by Simon de Montfort, who had its defenders burnt alive.

St. Pons (3,358 inhabitants), the chief town in the eastern portion of the department, lies at the mouth of a much-frequented gap of the Cévennes. Like its smaller neighbours, *Riols* (1,121 inhabitants) and *St. Chinian* (2,690 inhabitants), it carries on the manufacture of cloth, an industry which likewise forms the chief support of *Bédarieux* (7,372 inhabitants), on the Upper Orb. The latter, however, has also cotton-mills, dye works, tanneries, paper-mills, and glass works. Near it are the coal-pits of *Graissessac* (2,632 inhabitants), yielding nearly 300,000 tons a year. Copper and argentiferous lead are found in the neighbouring hills, and close to the town, in the valley of *La Malou*, there are hot and cold springs, similar to those of Vichy.

Béziers (36,928 inhabitants), on the Lower Orb, is one of the historical cities of France. Its inhabitants still call themselves "Biterrois," from *Bætterræ*, the old name of their town. The latter has frequently been burnt down, but has always risen from its ashes, and is now one of the great wine and brandy marts of France. There are scarcely any traces of Roman buildings, but amongst the mediæval churches is that of the Madeleine, in which took place, in 1209, an indiscriminate massacre of heretics, whose wives and daughters were divided amongst the Aragonese soldiery. Of modern structures the most remarkable is the aqueduct of the Canal du Midi.

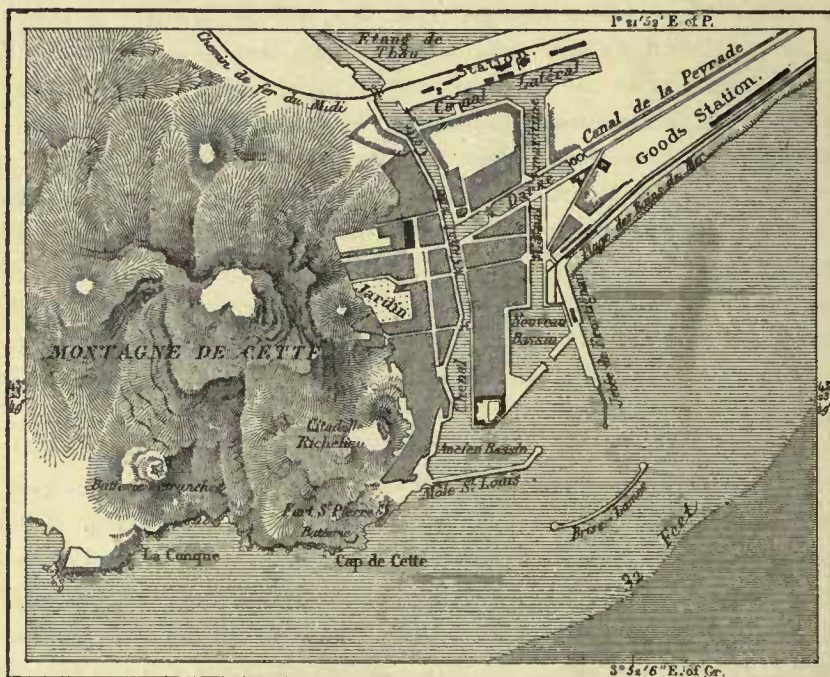
The basin of the Hérault can boast of no town the equal in population and commerce to Béziers, but it abounds in factories. *Lodève* (10,198 inhabitants), on

the Ergue, has huge cloth-mills, much of the wool used being grown on the neighbouring plateau of Larzac and on the heaths of the Cévennes.

Clermont-l'Hérault (5,685 inhabitants) and several other places lower down on the same river are likewise engaged in the woollen manufacture. *Ganges* (4,345 inhabitants), on the Hérault, and close to the frontier of the department, has silk and cotton mills. The river thence passes through a picturesque gorge abounding in natural curiosities. At *Aniane* (3,457 inhabitants), with its old abbey converted into a penitentiary, and *Gignac* (2,653 inhabitants), with an old chapel much frequented by pilgrims, we enter upon the region of vineyards. *Pézenas* (7,570 inhabitants), on the Lower Hérault, has been known from the time of the Romans for its excellent woollen stuffs, but it has also many vinegar works, distilleries, and

Fig. 88.—THE HARBOUR OF CETTE.

Scale 1 : 35,350.



cooperies, and almost monopolizes the trade in acetate of copper, a substance much used in the manufacture of colours.

Agde (7,728 inhabitants), the natural outlet of this industrial district, might have become a great emporium if its harbour had afforded better facilities. It is more remarkable now for its black houses, built of blocks of lava, than for its commerce, which has deserted it in favour of the modern town of *Cette* (28,152 inhabitants). This town stands on a channel connecting the lagoon of Thau with the Mediterranean. It is the terminus of the Canal du Midi, and although it has not realised the expectation of its founders, it has become one of the great ports of France. Its exports consist mainly of salt procured from the neighbouring lagoons, wine, coal, and ores. There are numerous factories, but not a single

building of note, and owing to the absence of trees, the aspect of the country is far from inviting. *Marseillan* (3,885 inhabitants), *Mèze* (6,501 inhabitants), *Bouzigues*, a fishing village, and *Balaruc*, with hot mineral springs, lie on the lagoon of Thau, and constitute outposts of Cette. *Frontignan* (2,910 inhabitants), famous for its muscatel grown on the slopes of Gardiole, lies to the north of Cette, and is joined to it by an embankment.

Montpellier (51,838 inhabitants), the most populous town of the department, the head-quarters of the civil and military authorities, was known in Gallo-Roman times as *Sextantio*, and then stood on the left bank of the Lez, on a site now occupied by the village of Castelnau. After the destruction of this ancient town by Charles Martel its inhabitants established themselves on the *Mons Pessulanus*, on the other bank of the river. Montpellier may justly boast of its schools, its museums and scientific collections, and its botanical gardens, the oldest in all Europe, in which Tournefort and A. de Jussieu created their systems. Its physicians became famous in the twelfth century, thanks to the influence exercised in Languedoc by the Moors. The names of Nostradamus, Rondelet, Bauhin, and De Candolle are associated with its schools, and there was a time when Montpellier rivalled Paris as a seat of learning. There is a citadel, but no enciente hems in the town, and from the delightful walks of the Peyrou the eye ranges freely over the whole of the country from the Cévennes to the sea, and looks down upon the noble aqueduct which conveys to this the waters of the springs of Bouldou. Blankets, soap, and candles are manufactured, and there is a considerable trade in wine. The town, unfortunately, has no port of its own, for the Lez is navigable only for barges, and *Palavas*, at its mouth, is accessible only to fishing-smacks. Formerly the town exported its products through *Lattes*, on the lagoon, or through *Maguelone*, on the Mediterranean, but at present it avails itself of the facilities afforded by Cette. Amongst the smaller towns near Montpellier may be mentioned *St. Georges d'Orques* and *Lunel* (8,024 inhabitants), both of which produce excellent wines.

GARD.—This department is named after the river Gard, or Gardon, which flows through its centre. It extends from the Rhône to the crest of the Cévennes, and even beyond, and borders upon the Mediterranean only for a small distance. The natural resources of Gard are very considerable. It produces coal, iron, and salt, as well as silk (about 5,000,000 lbs. a year), but its vineyards have been almost destroyed recently by the invasion of the phylloxera. The number of Protestants in the department is still very considerable, for the Cévennes afforded them a place of refuge in times of persecution. Religious animosities are not yet dead, and in periods of political excitement they still come to the surface. Even at Nîmes, where the Protestants constitute rather more than a fourth of the population—about the proportion throughout the department—they inhabit a separate quarter of the town, and Meyerbeer's *Huguenots* has never been heard there.

Le Vigan (4,340 inhabitants), the capital of that portion of the department which belongs to the basin of the Hérault, carries on the manufacture of gloves and silk caps, as does also its neighbour, *Sumène* (1,972 inhabitants), and owns

coal-pits and quarries of lithographic stones. The towns in the valley of the Vidourle and of the plains of Vaunage, which extend thence towards Nîmes—such as *St. Hippolyte-le-Fort* (3,960 inhabitants), *Sauve* (2,070 inhabitants), *Sommières* (3,588 inhabitants), and *Gallargues* (1,947 inhabitants)—are for the most part inhabited by Protestants engaged in the manufacture of woollen, cotton, and silk stuffs. *Sauve* is known for its wooden forks, and *Gallargues*, until quite recently, prepared wrappers for Dutch cheeses by a very nasty process, happily superseded through the discovery of aniline.

La Salle (1,934 inhabitants) and *Anduze* (4,250 inhabitants), on the Western Gardon, have some manufactures, but the great industrial centre of this portion of

Fig. 89.—THE PROTESTANT CONGREGATIONS IN THE SOUTH OF FRANCE.



the Cévennes lies between *Alais* (16,726 inhabitants) and *Grand'Combe* (5,342 inhabitants), where coal abounds, and iron works, foundries, lead and copper works, machine shops, glass and chemical works, have sprung into existence. Another coal-field lies to the north, in the valley of the Cèze, its centres being *Bessèges* (7,953 inhabitants), *Robiac* (4,290 inhabitants), and *St. Ambroix* (3,410 inhabitants). The coal won in these two districts is already competing with English coal in the ports of the Mediterranean. *Alais*, moreover, is one of the great raw-silk marts in France.*

The arrondissement of *Uzès*, which comprises the valleys of the Lower Cèze and Gardon, and extends in the east to the Rhône, has a few silk-mills and other manu-

* In 1875 the department produced 1,692,000 tons of coal, and 85,800 tons of pig-iron.

factories, but is chiefly noted for some remarkable buildings. *Uzès* (4,865 inhabitants) has an old cathedral; at *Remoulins* there is a remarkable Roman aqueduct over the Gard; and *Pont St. Esprit* (3,882 inhabitants) is famous for its bridge over the Rhône, which is 2,756 feet in length, and was constructed between 1265 and 1309. *Bagnols-sur-Cèze* (3,868 inhabitants) is a busy place of commerce.

Nîmes (60,804 inhabitants), next to *Marsilles* and *Toulon* the largest town of Southern France, lies in an arid plain far away from any navigable river. It arose probably around the sanctuary of *Nemausus*, a god of the ancient Celts, to whom the Romans likewise subsequently raised altars. Formerly, before a canal supplied the town with water from the Rhône, the city was dependent for its water upon a single "fountain" yielding only sixteen pints a minute, and the washerwomen then travelled every morning to the Rhône, 15 miles distant, to clean their linen. But in spite of want of water, *Nîmes*, owing to its being situated on the high-road between the Rhône valley and the western shore of the *Lion Gulf*, has at all times enjoyed a considerable amount of prosperity. It abounds in Roman remains, but with the exception of a temple of the age of *Augustus*, now used as a museum, and of a huge amphitheatre occasionally visited by Spanish *toreros*, they are in ruins. *Nîmes* is a busy manufacturing town. About the middle of last century it was noted for its silks; but most of its workmen are engaged now in the production of shawls, velvet-pile carpets, and silk pocket-handkerchiefs. The industry of the town has suffered, however, through the loss of the American market, and the competition of *Aubusson* and *Beauvais*, and living is no longer as cheap there as it used to be, mainly in consequence of the destruction of the vineyards. Efforts are, however, being made to create fresh industries. Chinese bamboos have been acclimatized with success, and are converted into fancy furniture, which already forms an article of export to *Great Britain*.

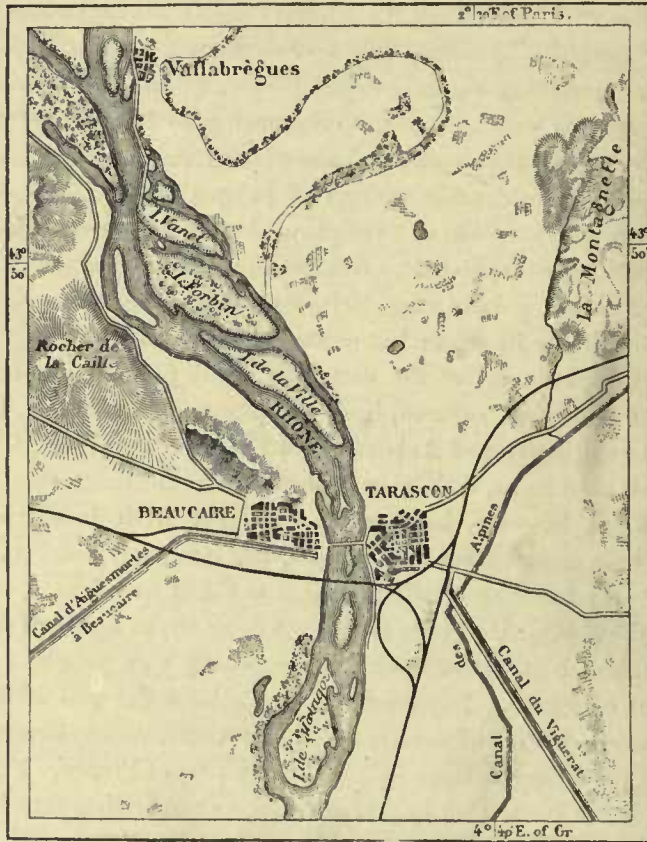
Beaucaire, the ancient *Ugernum* (7,956 inhabitants), at the head of the Rhône delta, and united with its sister town of *Tarascon* by a suspension bridge, is the commercial port of *Nîmes*. *Raymond VI.* of *Toulouse* did well when he built a fort at that place in 1217, and established a fair there, which formerly attracted as many as 300,000 strangers from *Italy* and every part of *France*. This fair is still held annually, but it is attended by pleasure-seekers rather than merchants, and its business transactions have declined from £1,200,000, in 1836, to £80,000 in 1874.

St. Gilles (5,705 inhabitants), on the Little Rhône, was a busy port during the twelfth century, but the canal which connects it with the sea is only navigable now for barges, and its streets wear an aspect of desolation. *Aigues-Mortes* (3,167 inhabitants) is actually the only maritime port of *Nîmes* and of its wealthy neighbour *Vauvert* (3,935 inhabitants), but it is even more forsaken than *St. Gilles*. On looking at its crenellated walls, we might fancy ourselves transplanted to another age. These walls, however, frequently protect the town against being invaded by the floods of the Rhône. The inhabitants of *Aigues-Mortes* depend mainly upon their fisheries, their salt works, and the cultivation of reeds, for there is hardly any foreign commerce.

ARDÈCHE lies to the north of Gard, between the Rhône and the Cévennes, and almost corresponds with the ancient province of Vivarais. Nearly all its rivers flow to the Ardèche, or direct into the Rhône, but Mont Gerbier de Jones (5,092 feet), which gives birth to the Loire, rises within its limits. Geographically the department consists of two regions, separated by the limestone range of Coiron. The basin of the Ardèche resembles Gard as to its aspect, productions, and industries, whilst the northern portion of the department, traversed by the Érieux, the Doux, and their numerous tributaries, recalls Forez and the Lyonnais. Ardèche,

Fig. 90.—BEAUCAIRE AND TARASCON.

Scale 1 : 80,000.



the native country of Olivier de Serres, the agriculturist, is one of the best-cultivated districts of France. Even its mountain slopes are laid out in terraces, whilst the high slopes are covered with chestnut forests. This department, too, has suffered from the ravages of phylloxera and from disease amongst its silkworms.

Largentière (2,374 inhabitants), the capital of the western arrondissement, has lost every importance since its silver mines have become exhausted, and *Aubenas* (5,082 inhabitants) is at present the leading town of the valley of the Ardèche. The neighbourhood produces much silk, and there are silk-mills, paper-mills, and tan-yards. About 5 miles to the north of that town, and close to the extinct

volcano of Vivarais, are the mineral springs of *Vals* (1,785 inhabitants), which have recently become very popular.

Viviers (2,053 inhabitants), on the Rhône, the ancient capital of the Vivarais, and still the seat of a bishop, has now only a magnificent cathedral and fortifications to remind us of its days of grandeur. At *Aps*, a village in the valley of the Escoutay, which debouches at Viviers, are Roman ruins, and the site has

Fig. 91.—THE INVASION OF THE PHYLLOXERA.



been identified with Alba Augusta of the Romans. *Bourg St. Andéol* (3,800 inhabitants), below Viviers, has a few mills propelled by the water of the fountain of *Tournes*, and *Freil* (1,771 inhabitants), above it, exports annually thousands of tons of hydraulic lime.

Following the Rhône upwards, we pass the old castle of *Rochemaure*, and, turning off to the left, arrive at *Privas* (5,932 inhabitants), the capital of the

department, with silk and cloth factories, tan-yards, and other manufactures. At *Chomérae* (1,131 inhabitants), close by, there are limestone quarries, and near the village of *St. Priest* most productive iron mines. The ore procured there is conveyed to the iron works of *La Voulte* (3,982 inhabitants) and *Le Pouzin* (2,611 inhabitants), both on the Rhône. Again following the river, we reach Valence, the capital of Drôme, opposite to which are the magnificent ruins of *Crussol*, as well as the vineyards of *St. Péray* (1,762 inhabitants), the growth of which is frequently sold as "Ermitage." *Tournon* (4,947 inhabitants), higher up on the river, which is there spanned by the oldest suspension bridge in France, is close to the hill which produces veritable Ermitage.

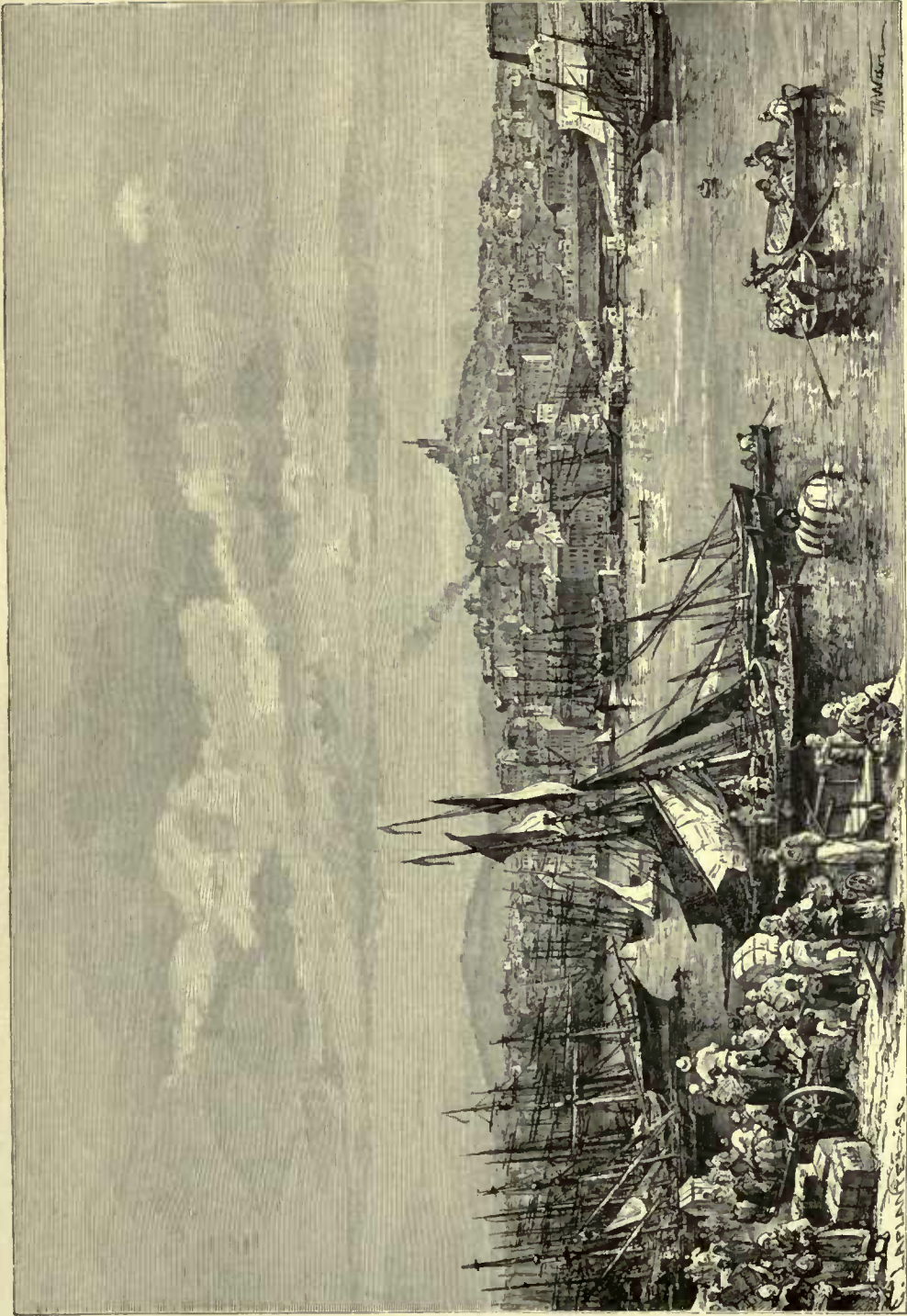
Annonay (13,738 inhabitants), in the north of the department, is one of the great manufacturing towns of France. Goat-skins are dressed there in vast numbers, and felt, silk stuffs, and paper are manufactured, the motive power being supplied by a canal fed by a huge reservoir. It was from this town that Montgolfier ascended in a balloon, and an obelisk has been erected to commemorate the event.

BOUCHES-DU-RHÔNE ("Mouths of the Rhône").—This department comprises the delta of the Rhône and the country to the west of it. It is the natural outlet of the entire Rhône valley, and Marseilles, its capital, has thus become one of the great commercial centres of the world. In other respects, however, the department is not favoured by nature. There are extensive stony wastes, the hills are for the most part barren, and about one-third of the area is unproductive. Irrigation, however, is carried on successfully, and in addition to olives, grapes, and other products of horticulture, the department yields salt, coals, and lignite, engages successfully in manufactures, and carries on a most extensive commerce. These sources of wealth account for the relative density of its population.

Marseilles (234,690 inhabitants), the leading commercial port of the Mediterranean, has during all periods of its history maintained its pre-eminent position. Greek and Roman authors credit the Phocians of Asia Minor with having founded the city, though ancient remains prove that the Phœnicians preceded them. Marseilles became in course of time the most flourishing of all Greek colonies, and down to the present day it has preserved the municipal feelings so characteristic of ancient Greece. Its geographical position has prevented it from becoming the centre of a political system, but it is nevertheless the true capital of Southern France, and whilst Paris looks to the north and the west, Marseilles keeps its eyes upon the south and the east.

Ancient Marseilles, or Massilia, occupied the hilly peninsula to the north of the old port, which then extended farther inland, whilst the cliffs facing the sea have been gnawed away, since the days of Cæsar, to the extent of 820 feet. Its port would have been silted up long ere this, if dredging machines were not kept constantly at work. It now covers an area of 60 acres, its average depth being 20 feet.

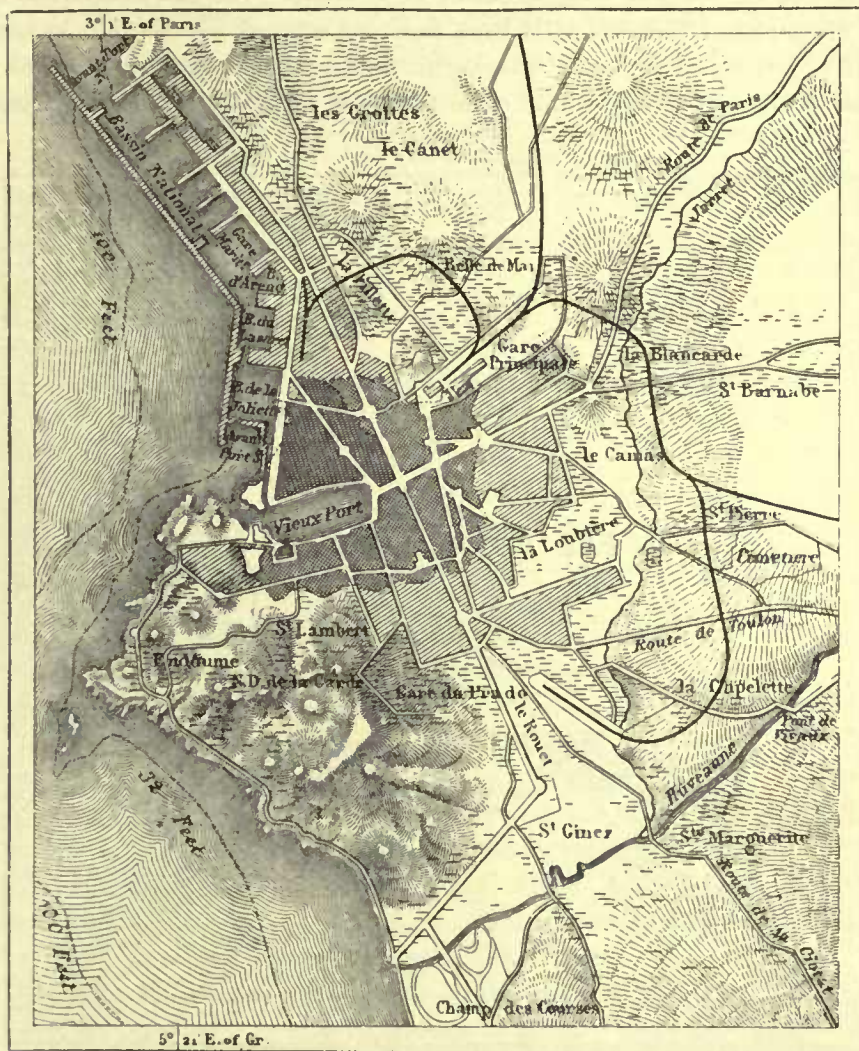
The sanitary condition of Marseilles was deplorable in former times, for there was neither water nor proper drainage. Every stranger who settled in the town



MARSEILLES: OLD PORT AND NOTRE-DAME DE LA GARDE.

had to pass through a dangerous period of acclimatization, and the plague was a frequent visitor. The canal, which supplies the city with the water of the Durance, has proved a real blessing to the inhabitants, for it suffices not merely

Fig. 92.—MARSEILLES.



Old city in the time of Julius Cæsar and in the thirteenth century.
 Extent of the city in 1666.
 Increase up to 1872.

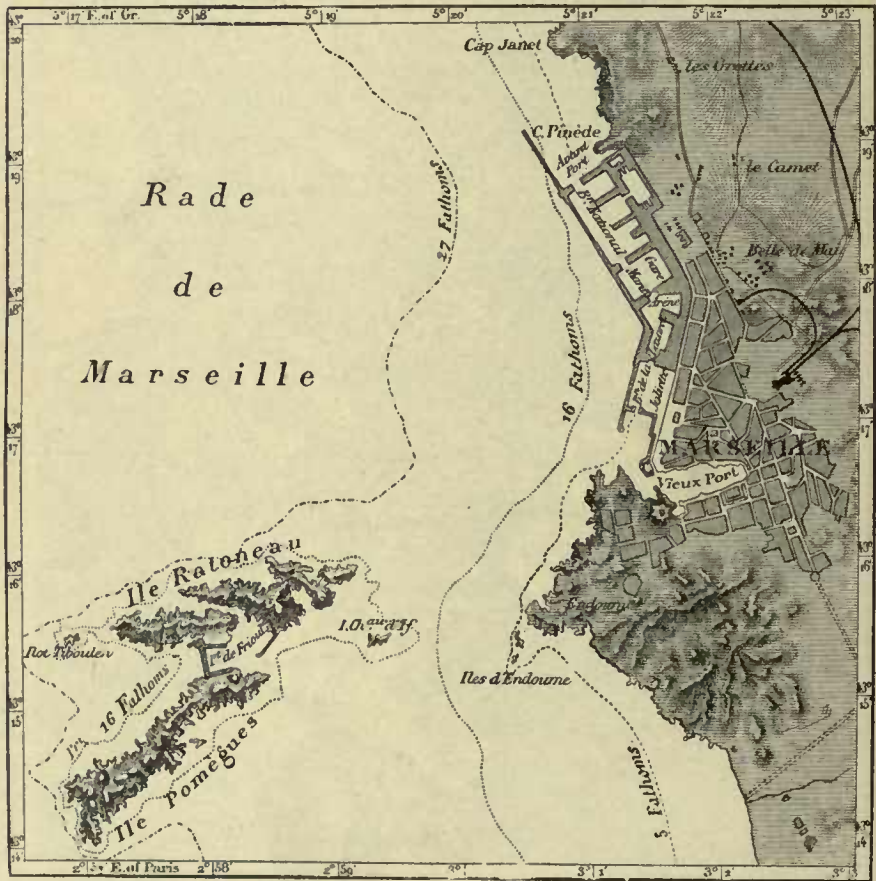
1 Mile.

for domestic purposes, but has also converted thirsty fields into productive gardens, and supplies the manufactories of the town with a cheap motive power. Other improvements on a vast scale have been carried out. The ancient fortifications have fallen, and the city has expanded in every direction. New

docks have been opened, and the construction of a huge breakwater is under consideration. The islands of Ratonneau and Pomègue afford, however, some shelter to vessels making for Marseilles, and it is there the quarantine has been established. Near them, on a small island, stands the castle of If, famous as a state prison.

The city has not only been pierced by huge avenues, but many buildings with some claim to architectural merit have been erected, and the Marseillais can no longer be reproached with concentrating all their attention upon the soap and the oil they deal in. One of the most characteristic of these structures is the Museum

Fig. 93.—THE ROADSTEAD OF MARSEILLES.



of Longchamps. The best view of the city is obtained from the tower of the Byzantine church of Notre-Dame, which crowns the most elevated hill to the south of Marseilles. The public promenades, including the Prado, lined with magnificent trees and numerous villas, and the Corniche, which follows the sinuosities of the coast, are a great ornament to the town, and afford magnificent prospects of the harbour and the picturesque promontories which bound it.

Marseilles, besides being a great commercial town, may boast of numerous manufactories. In its metallurgical establishments the ores imported from abroad, and more especially lead ores, are smelted. There are huge corn and oil mills and

tanneries. Provisions are preserved and salted for the use of the navy. The manufacture of soap (1,620,000 cwts. in 1875) equals that of the whole of the remainder of France. The sugar refineries, too, are of great importance.

The merchants of Marseilles own a fleet of 783 vessels (including 210 steamers), measuring 194,500 tons, most of these being built at Ciotat, La Seyne, and even at Genoa. In 1875 8,757 vessels of 2,527,200 tons burden entered the harbour, the imports were valued at £34,781,000, and the exports at £35,485,120. Cereals constitute the principal articles of import, and next to them cattle, cotton, wool, and iron ores from Algeria, Spanish wines, tea, silk, petroleum, timber, hides, guano, sugar, coffee, and oil seeds. Unfortunately most of the vessels are obliged to leave in ballast, for the high tariffs of the railway companies prevent Marseilles from exporting the coal of the Cévennes and the building stones of the Alps.

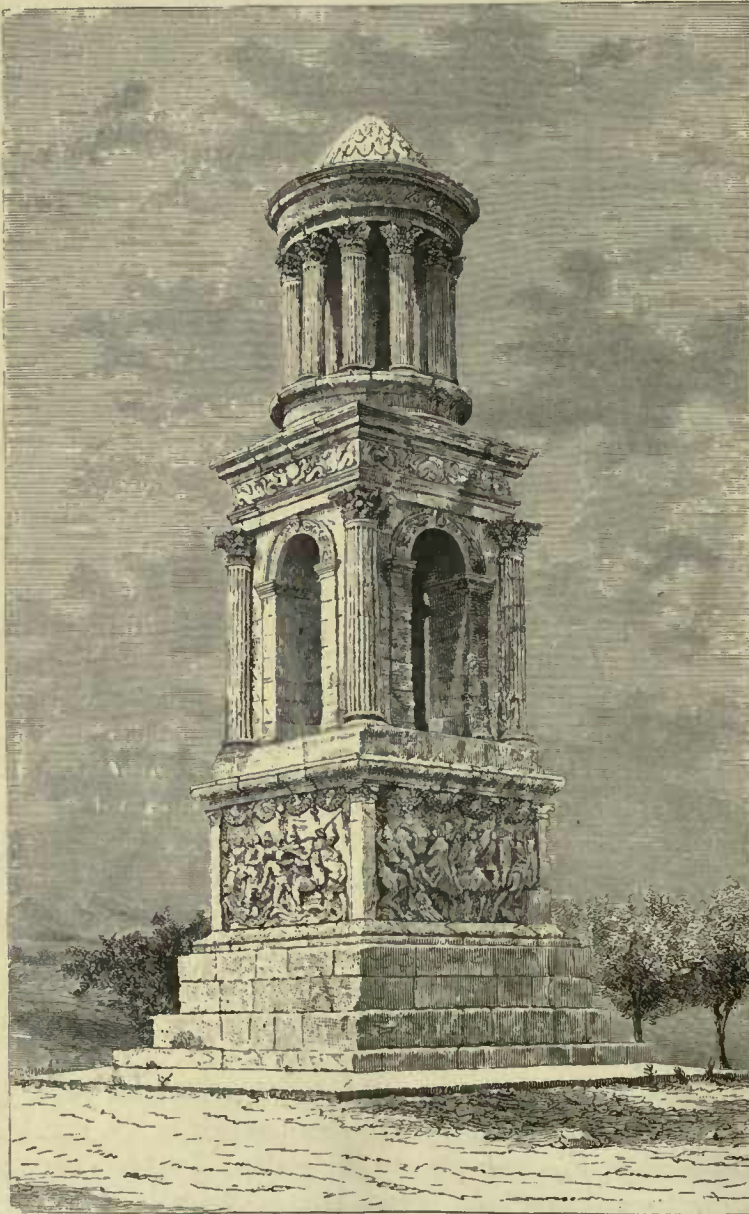
Marseilles, in spite of the competition of Brindisi and Trieste, still remains the great intermediary for the conveyance of passengers and costly merchandise between the north-west of Europe and the East. This superiority, however, it is sure to lose whenever Saloniki and Constantinople become connected with the railway systems of the rest of Europe. It will then have to seek compensation for this loss elsewhere. In this respect Algeria holds out much promise for the future. In 1874 Marseilles imported thence 400,000 tons of ore, 200,000 tons of corn, 50,000 tons of alfa, and 1,000,000 head of cattle. At the same time it will be necessary to develop the railway connections of this great port, which is at present dependent upon a single line for its communication with Paris, and has no direct intercourse at all with either Cette or Bordeaux.

The smaller towns in the neighbourhood may almost be looked upon as suburbs of the great city. *Cassis*, beyond Cap Tiboulén, produces the best wine of Provence, but likewise manufactures muscatel for exportation. At *Ciotat* (8,104 inhabitants), a little farther in the same direction, are the ship-yards of the Messageries Maritimes, which usually employ 3,200 workmen. *Aubagne* (5,087 inhabitants), an inland town, has cement works; whilst *Auriol* (2,453 inhabitants), *Roquevaire* (1,749 inhabitants), and *Peypin*, in the upper valley of the Huveaume, have coal mines, plaster works, potteries, and soap works.

Crossing the hill known as La Viste, to the north of Marseilles, we reach the valley of the Arc, the only important town in which is *Aix* (23,407 inhabitants), the residence of a sovereign during the Middle Ages. Aix, in spite of its ancient Academy, its Court of Appeal, and an archbishop, is a decaying place. It may carry off the honours, but Marseilles has possessed herself of the wealth of Provence. The famous springs are no longer fashionable. The town, nevertheless, is most interesting on account of many of its ancient buildings, including the Roman baths of Sextius; it carries on a considerable commerce; and the olives grown in its plain, irrigated by a canal derived from the Verdon, furnish an oil of world-wide reputation. In the upper valley of the Arc, at *Gardanne* (2,268 inhabitants), *Fuveau* (2,253 inhabitants), and *Trets* (2,694 inhabitants), there are coal mines yielding above 300,000 tons annually.

An ancient Roman road conducts us from Aix to *Salon* (5,085 inhabitants), on the margin of the Crau, the fields of which are irrigated by the canal of Crapponne, and thence to *Arles* (15,563 inhabitants), after Narbonne the most ancient Roman

Fig. 94.—THE MAUSOLEUM AT ST. REMY.



colony on Gallie soil. The position of this town at the head of the Rhône delta insures its prosperity. It attained the height of its power in the thirteenth century, when its flag was seen in all the ports of the Mediterranean, but dissensions amongst its ruling families led to its fall. The town is rich in Roman remains,

including an amphitheatre, and in mediæval buildings, and its women are famous for their beauty and good taste. Arles carries on a considerable commerce in agricultural produce, cattle, horses, and sheep. A bridge connects it with the suburb of Trinquetailles, in the Camargue, a district formerly described as the "granary of the Roman army," but now a region of pestiferous swamps. In this district is the hamlet of *Saintes-Maries*, before the church of which stood formerly two marble

Fig. 95.—KING RENÉ'S CASTLE AT TARASCON.



lions, in allusion to which the neighbouring gulf is said to have been named Lion Gulf (*Golfe du Lion*).

Like Arles, the neighbourhood abounds in ancient remains. At *Fontvieille* (2,237 inhabitants) there are huge artificial caverns, which served as places of sepulchre in prehistoric times. *Baux*, on the Alpines, has an old baronial castle hewn out of the solid rock, and *St. Remy* (3,490 inhabitants), beyond that range of beautifully contoured hills, boasts of a fine mausoleum of the age of Cæsar.

Tarascon (7,777 inhabitants), the sister city of Beaucaire, has at all times been a great place of traffic. Up to the thirteenth century it stood upon an island, but

when King René built the castle, the massive proportions of which challenge admiration, the channel separating this island from the left bank of the river had been filled up.

VAR, most absurdly called after the river Var, which lies outside its boundaries, might more appropriately become known as Argens, from a river flowing right through its centre. It is a mountainous country, half of its area being covered

Fig. 96.—TOULON.

Scale 1 : 128,000.



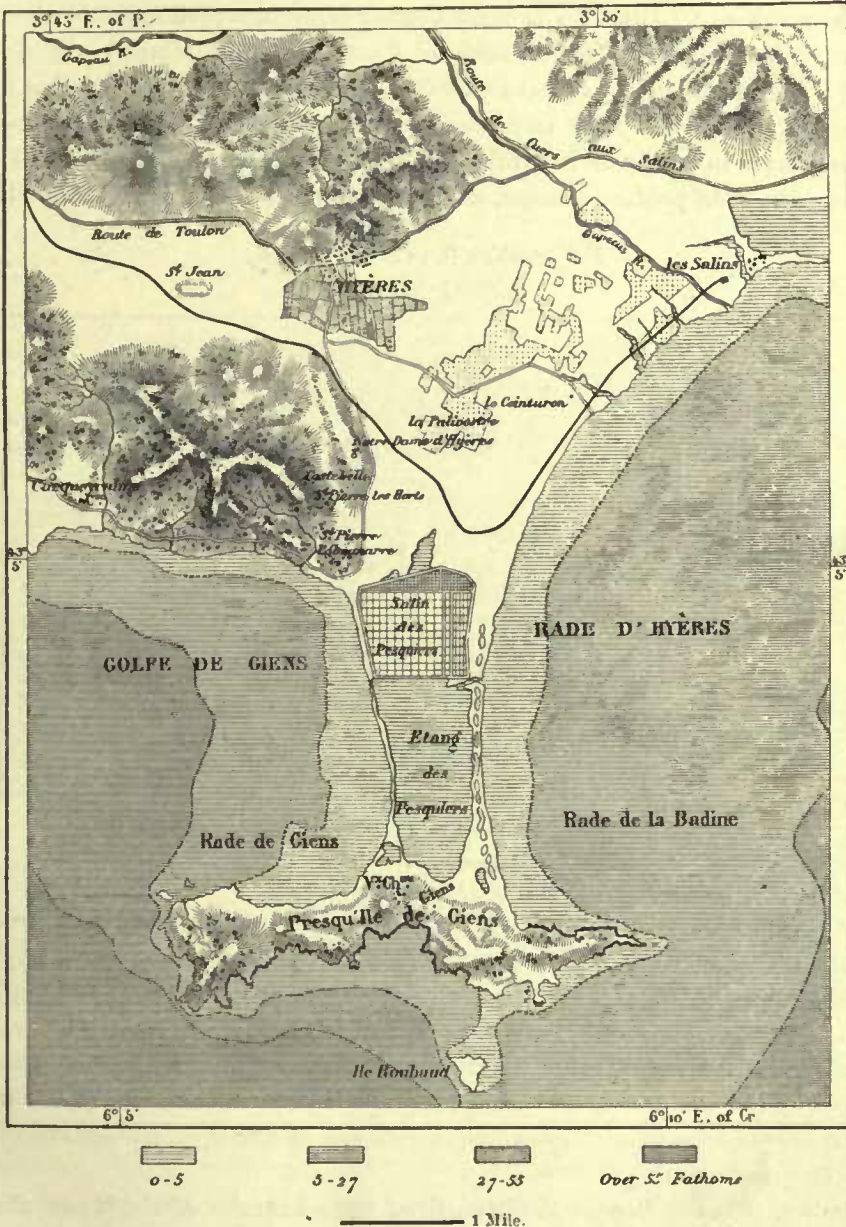
with forests. The most flourishing towns lie on the coast, but those in the interior likewise manufacture cloth, felt, paper, and earthenware.

Toulon (61,382 inhabitants) enjoys the double advantage of having an excellent port and of lying on the high-road connecting France with Italy. The excellent shelter afforded by its port has caused Toulon to be chosen as the great naval station of France in the Mediterranean. The arsenal and dockyards, begun by Vauban in the seventeenth century, cover an area of 667 acres, and have cost no less than £6,400,000, although much of the work was per-

formed by convicts. Forts occupy every point of vantage, and render Toulon one of the strongest fortresses in Europe. In commerce and industry, however, it ranks very low, in spite of its excellent harbour, on the western side of which are

Fig. 97.—HYÈRES.

Scale 1 : 100,000.



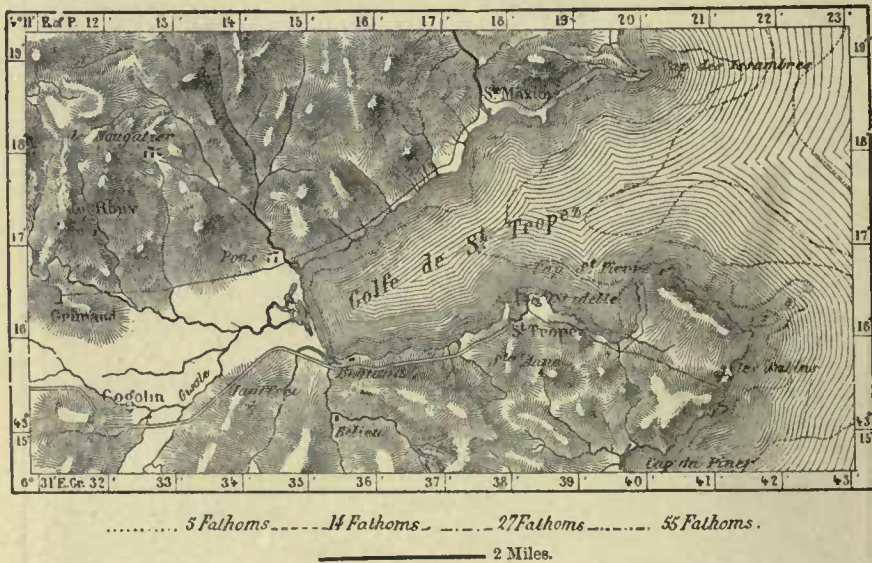
the busy ship-yards of *La Seyne* (8,152 inhabitants), employing several thousand workmen. *St. Nazaire* (1,537 inhabitants) and *Bandols*, to the west of Cap Sèpet, may be looked upon as outposts of Toulon: they export agricultural

produce, and at the former of these villages there is a tunny fishery. Every town, like every individual, appears to have its destiny. Toulon became a place of war, but failed to attract visitors like its neighbours, Nice, Cannes, and Mentone, although its climate is equally delightful and its environs abound in picturesque sites.

Hyères (6,797 inhabitants), up to the fourteenth century, was more important than its neighbour Toulon. The river Gapeau facilitates communication between its fine roadstead and the fertile fields of *Cuers* (3,683 inhabitants) and *Solliès-Pont* (2,239 inhabitants). It was formerly a favourite winter residence, but being separated from the sea by salt marshes, and exposed to the mistral, it is now somewhat neglected in favour of its rivals of the Alpes-Maritimes. The gardens surrounding the town produce peaches, almonds, and a great variety of exotic plants.

Fig. 98.—THE GULF OF ST. TROPEZ.

Scale 1 : 155,000.



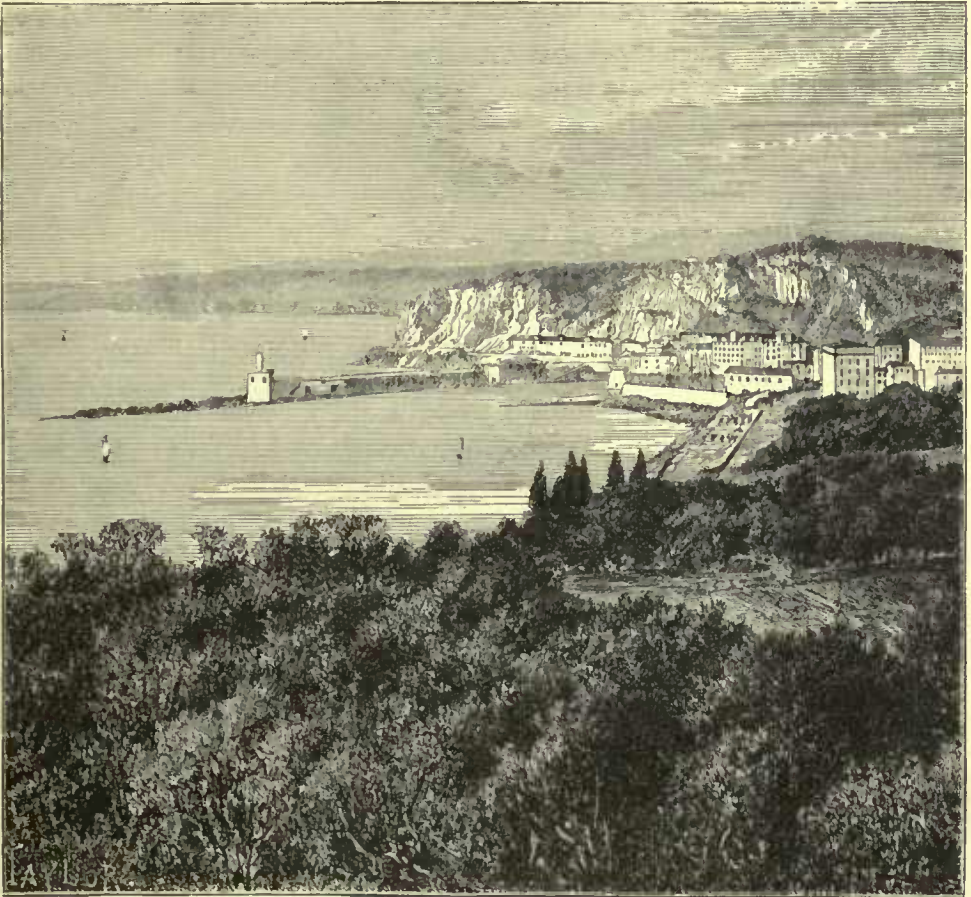
A few palm-trees flourish, and early vegetables are exported. As to the picturesque islands of *Hyères*—*Porquerolles*, *Port-Cros*, and *Le Titan*—they support only a few inhabitants, and are scarcely ever visited.

St. Tropez (3,236 inhabitants) occupies a delightful spot near the eastern termination of the mountains of the Moors. It exports timber, cork, and chestnuts, supplied by the villages in its vicinity, amongst which *Garde-Freinet* (1,947 inhabitants) enjoys some reputation as having been one of the great strongholds of the Moors or Saracens.

The valley of the Argens, to the north of the mountains of the Moors, affords the easiest communication between the east and west of Provence. Since the terrible day on which the Teutonic hosts, about to cross over from the valley of the Arc, were annihilated at *Pourrières*, that valley has frequently been traversed by armies. *St. Maximin* (3,150 inhabitants), near its head, is the point of con-

vergence of many roads, and the relics in its fine Gothic church formerly attracted numerous visitors. *Brignolles* (5,164 inhabitants), farther east, has tan-yards, silk-twist factories, distilleries, and brick-kilns. *Le Luc* (3,148 inhabitants) and *Vidauban* (2,415 inhabitants), on the railway, are flourishing market towns. *Lorgues* (3,030 inhabitants), embosomed in elms, has cloth factories, and at *Dra-guignan* (8,029 inhabitants), the capital of the department, there are numerous factories, the motive power being furnished by the Nartuby, a tributary of the

Fig. 99.—NICE.



Argens. The town itself is void of curiosities, but its neighbourhood abounds in picturesque sites.

Fréjus (2,791 inhabitants), the Roman *Foro Juliensis*, near the mouth of the Argens, is a decayed town. Its famous port, which sheltered the fleet of Actium, is now dry land, and the town has never been able to recover from the disasters of war which have overtaken it. Close by, on a hill, there are Roman ruins, which testify to its former importance, and the aqueduct which conveyed hither the water of the Siagnole is the most considerable ruin of that class in all France.

ALPES-MARITIMES.—The greater portion of this department was ceded by Italy in 1860. French is spoken in the valleys of the Var and Tinée, Italian in the basin of the Roya and as far as Nice, whilst the local dialect of that town is a curious jumble of Provençal French and Italian. The entertainment of visitors is the great business of the department. Oil, wine, fruits, and scents are exported, but upon the whole agriculture is in a very backward state.

Nice (Nizza, 46,683 inhabitants), the “Victorious,” founded by the Phocians of Marseilles in commemoration of a victory won over the Ligurians, is one of the most characteristic cities of France. On a high, rocky eminence, an ancient island now attached to the continent, may still be seen the remains of the walls of what was formerly one of the strongest fortresses on the Mediterranean seaboard. One quarter of the town lies in the plain to the east of that rock, but the veritable Nice lies to the west of it, being bounded by the torrent of the Paillon, beyond which extend the modern suburbs, with wide streets intersecting each other at right angles. Numerous villas peep out from the verdure-clad slopes of the surrounding hills, and cover the terrace of Cimiès, upon which stood the Roman town of Cemenelum. The climate of Nice has been extolled in all ages. The mountains in the north shelter it against cold winds, and the temperature only rarely descends below freezing point. At the same time Nice is exposed to violent gusts of wind. In early spring the mistral whirls up clouds of dust; the damp sirocco, blowing from the south-east, produces a feeling of languor; and the westerly winds formerly carried thither the miasmata bred in the swamps of the Lower Var. Since these have been drained this wind has lost its danger, besides which the plantations of eucalyptus and other trees now form a screen around the town, which up to the beginning of last century was frequently invaded by the pest.

As we journey along the coast to the east of Nice the country becomes more and more picturesque. Crossing the promontory bounding the Bay of Nice, we descend to the fine roadstead of *Villefranche* (Villa Franca, 1,933 inhabitants), where, sheltered by the encircling cliffs, exotic plants luxuriate. We traverse the olive groves of Beaulieu, pass through numerous railway tunnels, and reach *Monaco* (1,200 inhabitants), perched on an isolated rock at the foot of the cliffs of La Turbie. This, too, is an old Greek colony dedicated to Hercules. The sovereign rights of its prince have been respected, and he has availed himself of them to establish a gambling hell in the delightful grounds of Monte Carlo. *Roquebrune* is merely a village; but *Mentone* (6,891 inhabitants) is a town of importance, and the rival of Nice, the “pearl of France.” Lemons, oranges, and other exotic plants grow near the shore, olives on the slopes of the hills, and pines on the mountains which shelter the town in the north. Its houses are dotted over the hills, and are frequently accessible only by stairs; its climate is mild and equable. To the east of Mentone, on Italian soil, are the famous caverns of *Baoussé-Roussé*, in which human skeletons and stone and bone implements have been discovered.

To the west of Nice there are other favourite winter resorts. At *Antibes* (5,546 inhabitants), an old fortress, the charming promontory of La Garoupe projects into the Mediterranean, and beyond it opens the small Bay of Jouan, where

Napoleon landed after his escape from Elba. *Vallauris* (2,956 inhabitants), the "golden vale," lies a short distance inland. *Cannes* (13,519 inhabitants) lies beyond; its hotels and houses extending to the river Siagne. It enjoys a mild

Fig. 100.—VILLEFRANCHE.
Scale 1 : 44,400.



climate, and though its vegetation is less luxuriant than that of Nice, its serene sky and distant horizons render it a most delightful residence. The isles of Lérins lie off its bay, the largest of them, that of Ste. Marguerite, being famous on account of its prison-fort, from which Marshal Bazaine effected his escape, as the

"Iron Mask" had done before him. On St. Honorat are the ruins of a monastery which was destroyed by the Moors in 725. Cannes, in spite of its shallow harbour, is next to Nice the busiest seaport of French Liguria. It is the port of Grasse (9,673 inhabitants), lying about 10 miles inland, the vicinity of which produces the best olives of Provence, besides roses, jasmines, and other flowers. The manufacture of perfumery and liqueurs has one of its great centres at Grasse.

Fig. 101.—THE CAVERNS OF BAOUSSÉ-ROUSSÉ.



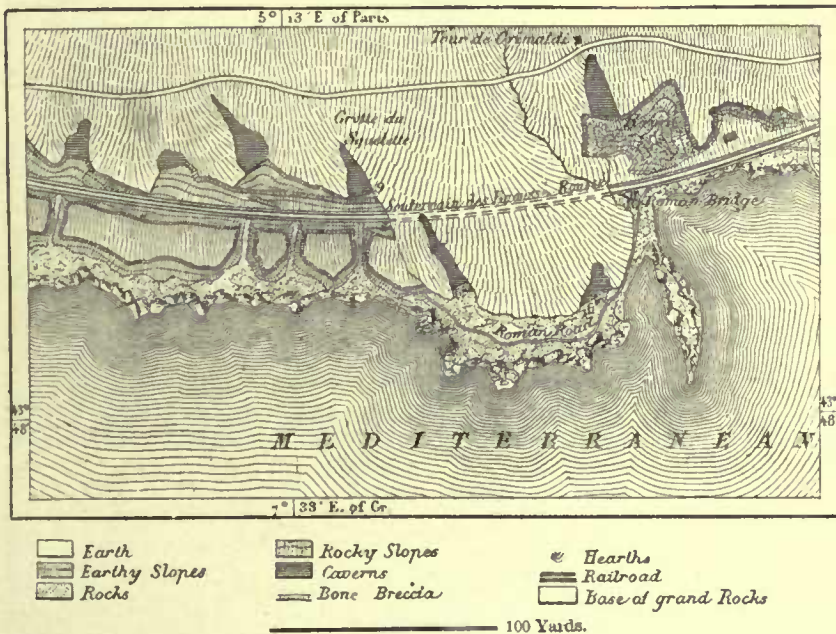
These seaside towns of the Alpes-Maritimes possess immense advantages as summer resorts, and might be converted into sanatoria for the whole of France. They are supplemented by mountain villages, such as *St. Martin-Lantosque* (1,956 inhabitants), Roquebillière, and others, within easy reach of the coast, and admirably suited for summer stations

VAUCLUSE, though lying inland to the north of the Rhône delta, is essentially one of the Mediterranean departments of France. Its western half consists of an

alluvial plain intersected by numerous canals, very productive, and abounding in industrious towns.

Avignon (33,189 inhabitants), at the confluence of the Durance and Rhône, was a prosperous town in the time of the Romans, and as an independent commonwealth it ranked amongst the first cities of the south during the twelfth century. The religious wars of the thirteenth century destroyed its wealth. Between 1309 and 1376 it was the residence of the popes, and from that epoch in its history date its most striking buildings, its turreted walls, its cathedral, and its fortress-like palace on the rock of the Doms, or "lords." From that rock we look down upon the verdant plain, with its plantations of olive and mulberry trees, its towns and villages, and upon the swiftly flowing waters of the Rhône, spanned here by a

Fig. 102.—Baoussé-Roussé.
According to M. Rivière. Scale 1 : 3,000.



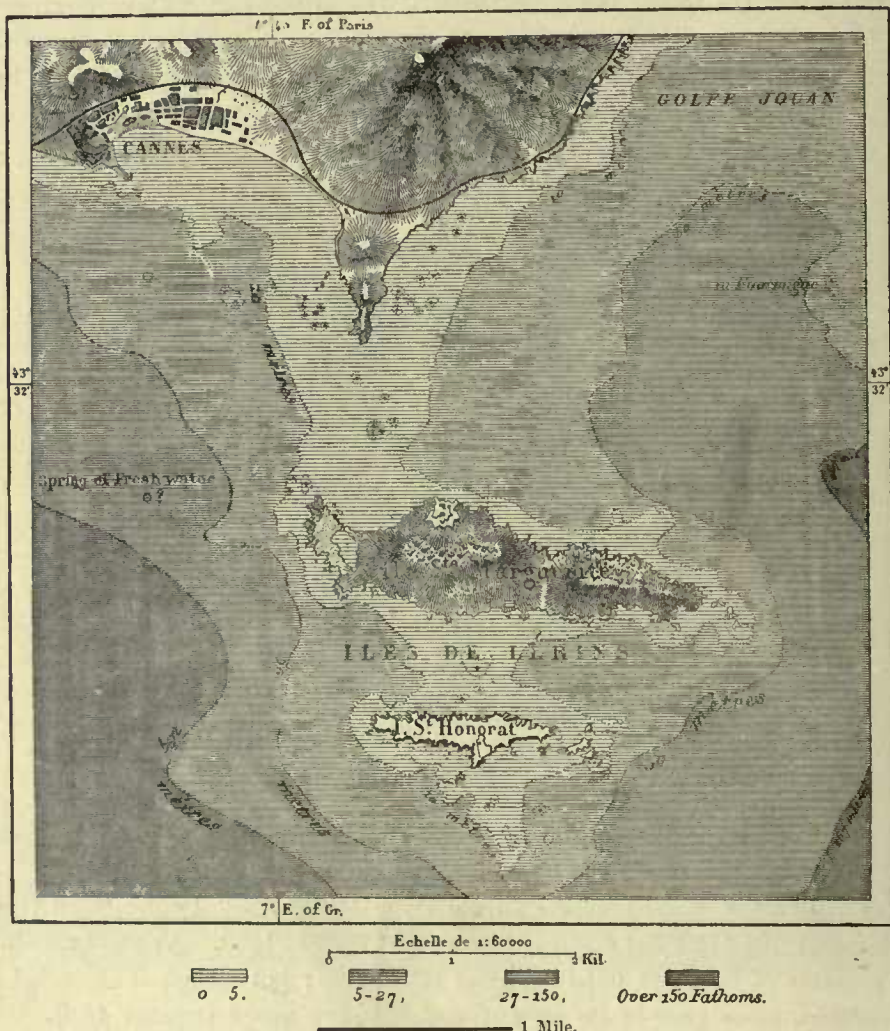
suspension bridge, which replaces an old stone bridge built by the "Devil and St. Bénézet" in 1188, but destroyed by a great flood in 1669. Avignon remained the property of the Pope until the great Revolution; but though it abounded in monasteries, grass grew in its streets, and industry was a stranger to it. But since it has belonged to France it has become one of the busiest towns of the south—spinning the silk grown in the neighbourhood, manufacturing agricultural machinery, and colours from madder, and extending its commerce to the highest valleys of the Alps. The department has not only suffered much from the invasion of the phylloxera and the disease of silkworms, but its cultivation of madder is jeopardised through the invention of aniline colours.

The towns and villages lying at the foot of the Léberon and of the hills of

Vaucluse are surrounded by verdant fields. *Cavaillon* (3,906 inhabitants) is environed by gardens irrigated by canals derived from the Calavon and the Durance. *L'Isle* (3,795 inhabitants) and *Thor* (1,667 inhabitants) are supplied with water from the fountain of Vaucluse; *Pernes* (2,801 inhabitants), *Monteux* (2,262 inhabitants), and *Carpentras* (8,127 inhabitants), have likewise their canals of irrigation. The latter, though proverbially a dull provincial town, is in reality

Fig. 103.—CANNES AND THE ISLES OF LÉRINS.

Scale 1 : 60,000.



a bustling place, supporting a library and museum, and proud of its Roman triumphal arch, its modern town-hall, and its aqueducts.

Orange (6,782 inhabitants), the ancient Arausio, and formerly the capital of a county, is the rival of Carpentras in trade and industry, and boasts a Roman amphitheatre and a triumphal arch, which are amongst the finest ruins of that kind in France. *Vaison* (3,330 inhabitants) has a Roman bridge over the Ouvèze,

and is partly built with the stones of Gallo-Roman buildings. *Malaucène* (1,610 inhabitants) has a Roman aqueduct; *Bollène* (3,168 inhabitants) has potteries, and *Valvéas* (4,705 inhabitants) carries on a considerable trade in raw silk. Both these towns are surrounded by old walls. *Pertuis* (4,905 inhabitants), thus called because of its situation near the gorge, or *pertuis*, of the Durance, has a few factories, but the mountain region beyond it is very thinly inhabited. *Apt* (4,278 inhabitants), the only town in the mountains, has sulphur mines and pits of plastic clay, from which its potteries are supplied.

HAUTES-ALPES.—The two departments on the Upper Durance constitute the

Fig. 104.—AVIGNON AND THE PALACE OF THE POPES.



poorest and most desolate district of France. Hautes-Alpes, though enjoying the advantage of more extensive forests and pasture grounds than its neighbour Basses-Alpes, ranks, nevertheless, very low as to its agricultural produce; and its resources not being sufficient to support its population, many of the inhabitants annually descend to the plains in search of work.

Briançon (2,321 inhabitants) defends, with its seven forts, the road over the Mont Genève, and is the most inhospitable garrison town in France. Descending the Durance, we pass the mountain fort of *Mont Dauphin* and *Embrun* (3,287 inha-

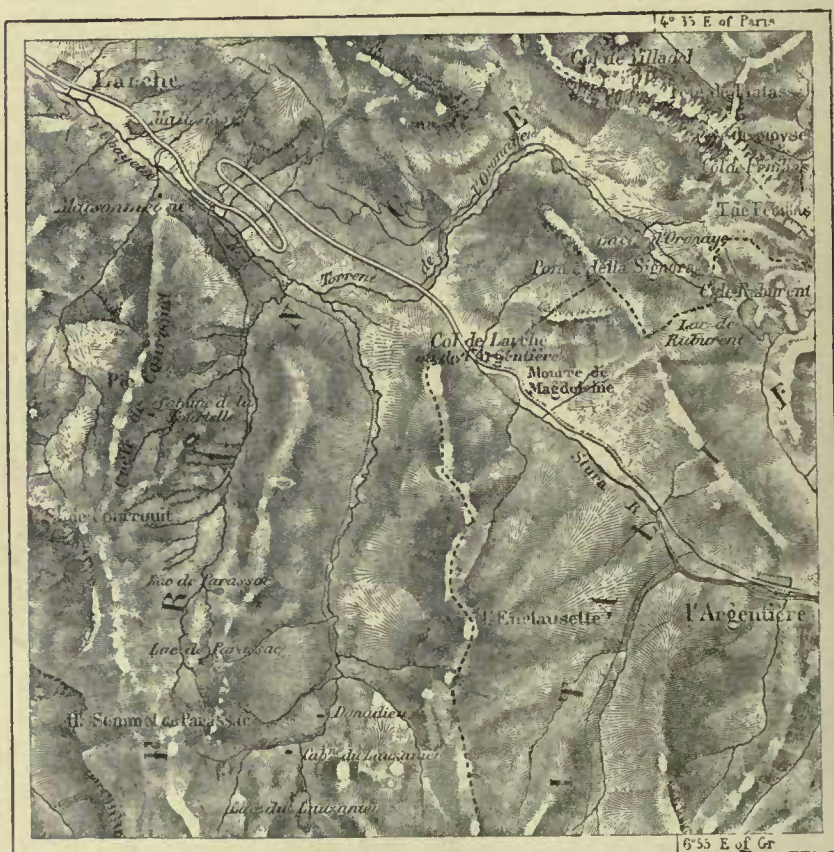
bitants), likewise a fortress, the most prominent building within which is a prison. *Gap* (7,249 inhabitants), the only large town of the department, and its capital, lies about 6 miles to the north of the Durance. The ores and marbles which abound near it have not hitherto been worked.

BASSES-ALPES is a country of naked mountains, lying almost completely within the basin of the Durance. It is the least-populated department of France, but by planting forests its resources might be considerably developed.

Barcelonnette (1,921 inhabitants), on the Ubaye, and at the foot of the Col de

Fig. 105.—COL DE LARCHE.

Scale 1 : 80,000.



Larche or of Argentière, is the chief town of the most elevated arrondissement, but otherwise insignificant. *Sisteron* (3,768 inhabitants), lower down on the Durance, is a picturesque town, with an old citadel. *Manosque* (5,162 inhabitants) enjoys a southern climate, carries on a considerable trade in wine, oil, and fruits, works a coal mine, and has several manufactories. It is the most important town of the department, superior by far to *Forcalquier* (1,816 inhabitants), the capital of the arrondissement within which it lies, and even to *Digne* (5,540 inhabitants), the departmental capital. This latter lies on a winter torrent, the Bléonne, 2,098 feet

above the sea, but nevertheless produces excellent fruits, which its confectioners convert into *confitures*. There are likewise efficacious sulphur springs.

Colmars and *Castellanne*, on the Verdon, are of no importance whatever. At *Riez* (Colonia Augusta Reiorum, 2,370 inhabitants) and at *Valensoles* (2,182 inhabitants), both on tributaries of that river, and at *Gréoulx*, near its mouth, Roman ruins have been discovered, and at the latter there are sulphur springs.

Fig. 106.—SISTERON.



DRÔME* has been cut out of ancient Dauphiné, and is named after a river that flows through it towards the Rhône, which forms its western boundary. Its climate and productions are similar to those of Ardèche, on the other side of the Rhône; but Drôme is the more mountainous of the two.

Nyons (2,462 inhabitants), the capital of the southern arrondissement, lies at the mouth of a gorge, from which a cold wind, known as *pontias*, blows every

* Scipion Gras, "Statistique minérale de la Drôme."

night. Its olive-trees perished in the cold winter of 1829, and the vineyards then planted have recently been attacked by the phylloxera, which has likewise invaded the lowland district of Tricastin, of which *St. Paul* (1,657 inhabitants) is the capital.

Montélimar (9,512 inhabitants), at the confluence of Jabron and Roubion, and not far from the Rhône, carries on a brisk trade in agricultural productions and the manufactures of the Protestant town of *Dieu-le-Fit* (3,072 inhabitants), on the Upper Jabon. To the south-west of it, on the Lez, rises the sumptuous castle of *Grignan*, known as the residence of Madame de Sévigné.

Crest (4,848 inhabitants) is the most important town on the Drôme. Its old castle has frequently seen Protestants and political offenders within its walls. *Die* (3,427 inhabitants), higher up the river, carried on considerable industry before the revocation of the Edict of Nantes.

Livron (1,874 inhabitants) and *Loriol* (2,181 inhabitants), at the mouth of the river, are indebted for their prosperity to the railway.

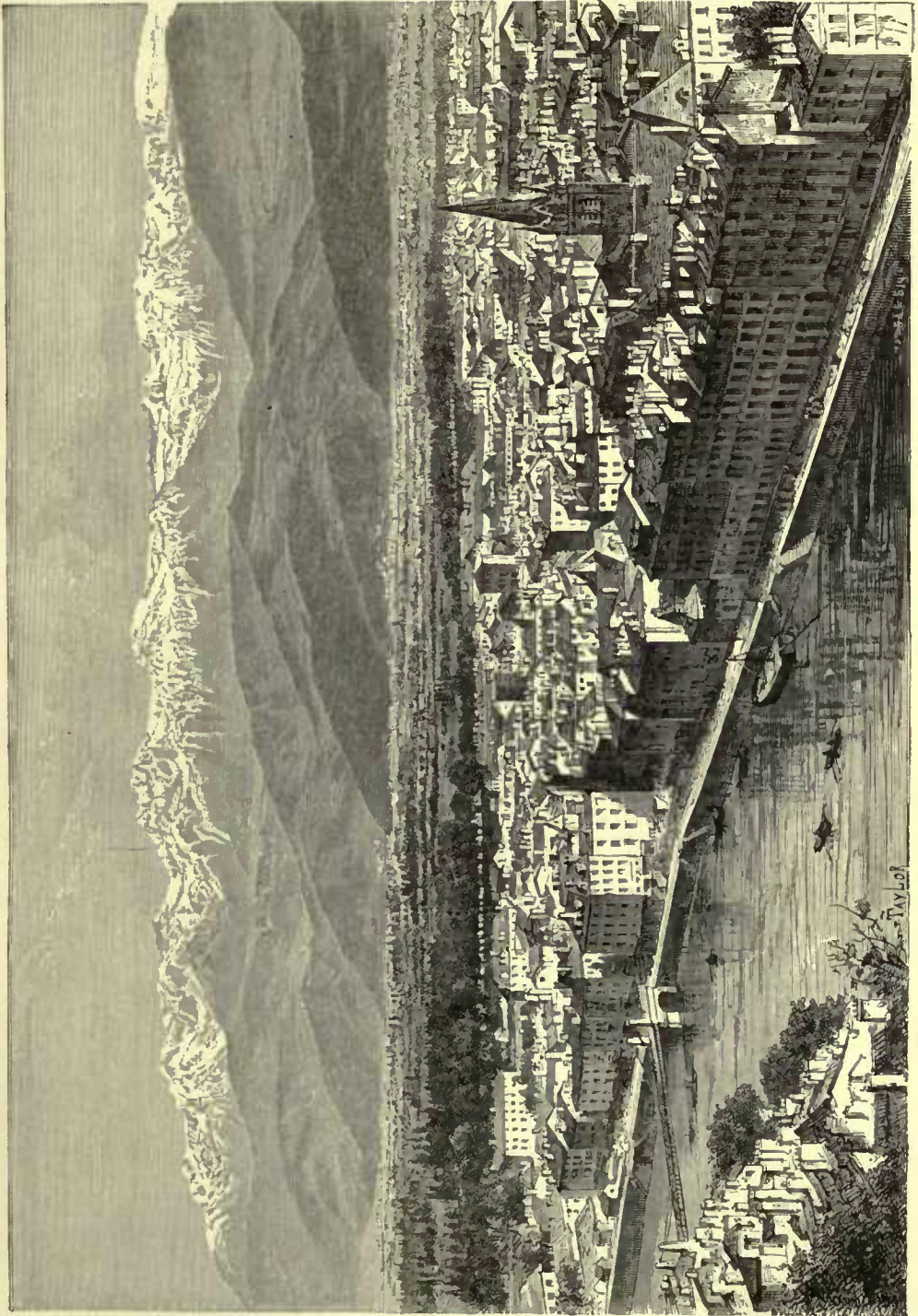
Valence (20,476 inhabitants) maintained its municipal liberties until the thirteenth century, and with its suburb, *Bourg-lès-Valence* (2,574 inhabitants), is now the seat of a considerable textile industry. *Chabeuil* (1,300 inhabitants), near it, has likewise a few factories, but *Romans* (11,024 inhabitants), on the Isère, and its suburb, *Bourg-de-Péage* (4,151 inhabitants), are at present the great industrial centre of the department, where cloth, silks, cottons, felt, and leather are being manufactured.

Tain (2,381 inhabitants), on the Rhône, lies close to the granitic hill which yields the famous "Ermitage," and an acre of which is worth £1,000. *St. Vallier* (3,035 inhabitants) and the railway junction of *St. Rambert* are in the extreme north of the department.

ISÈRE, named after its principal river, was formed out of the northern portion of the Dauphiné. It is essentially a mountain country, the soil capable of cultivation being confined to its western half, descending in terraces towards the Rhône. About half the area of the department consists of cultivated land, one-fifth of heaths and barren rocks, and nearly the same proportion of woods. The breeding of cattle and manufacture of cheese are carried on extensively in its Alpine portion; there are coal and iron mines, and even gold mines were worked not long since. Industry is increasing, and the paper-mills are the most important of France (produce in 1873, 105,650 cwts.).

Allevard (2,015 inhabitants) is the only town in the interior of the department, and is indebted to its sulphur springs for the position it holds. *Grenoble* (43,054 inhabitants), at the confluence of the Isère and Drac, occupies the centre of a magnificent amphitheatre of mountains. It is the focus of much intellectual activity, with colleges, libraries, and museums, and the seat of a considerable industry, the manufacture of gloves alone occupying 20,000 hands in the town and the neighbouring villages.

Vizille (3,539 inhabitants), on the Romanche, has numerous factories, but is better known in connection with the refusal of the delegates of the towns of

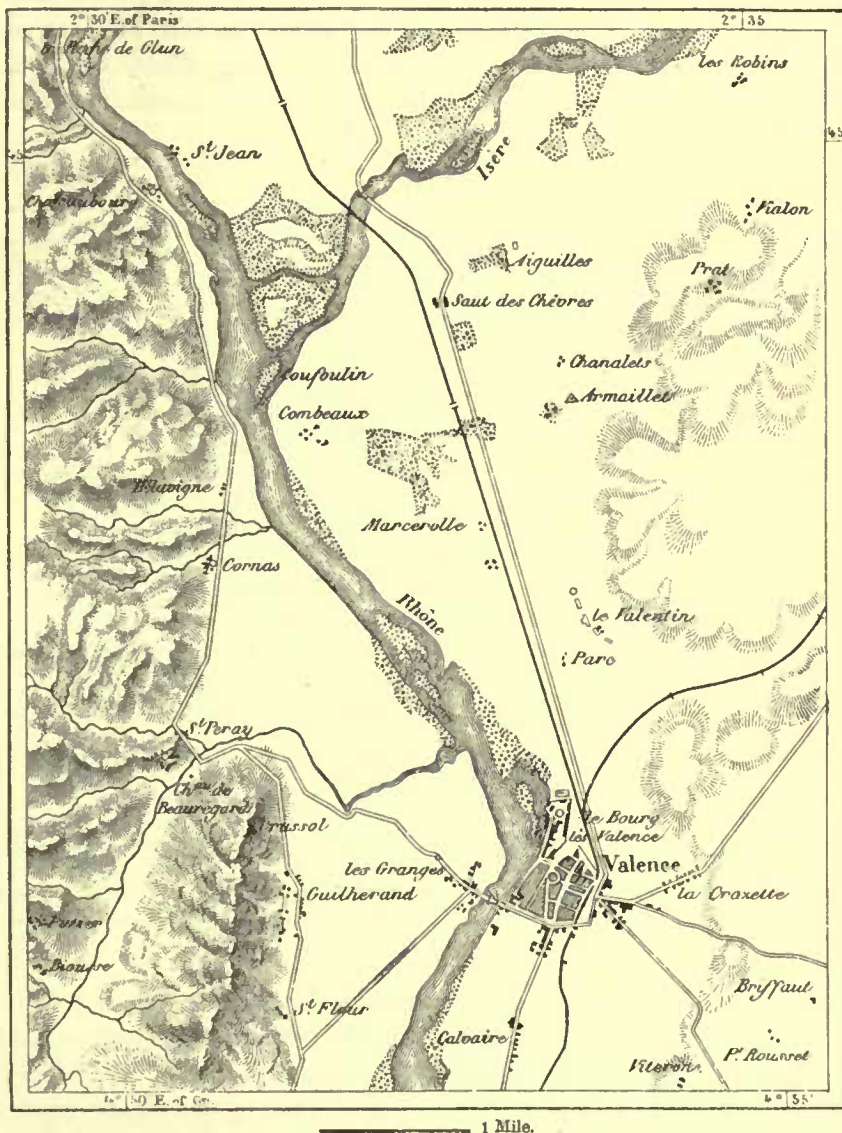


GRENOBLE AND THE ALPS OF BELLEDONNE.

Dauphiné, in July, 1788, to pay taxes not voted by Parliament. *Bourg-d'Oisans* (1,400 inhabitants), higher up on the Romanche, is the centre of one of the finest Alpine districts of France. The monastery of the *Grande Chartreuse*, in the hills to the north of Grenoble, is famous throughout the world for its liqueur.

Fig. 107.—VALENCE.

Scale 1 : 75,000.

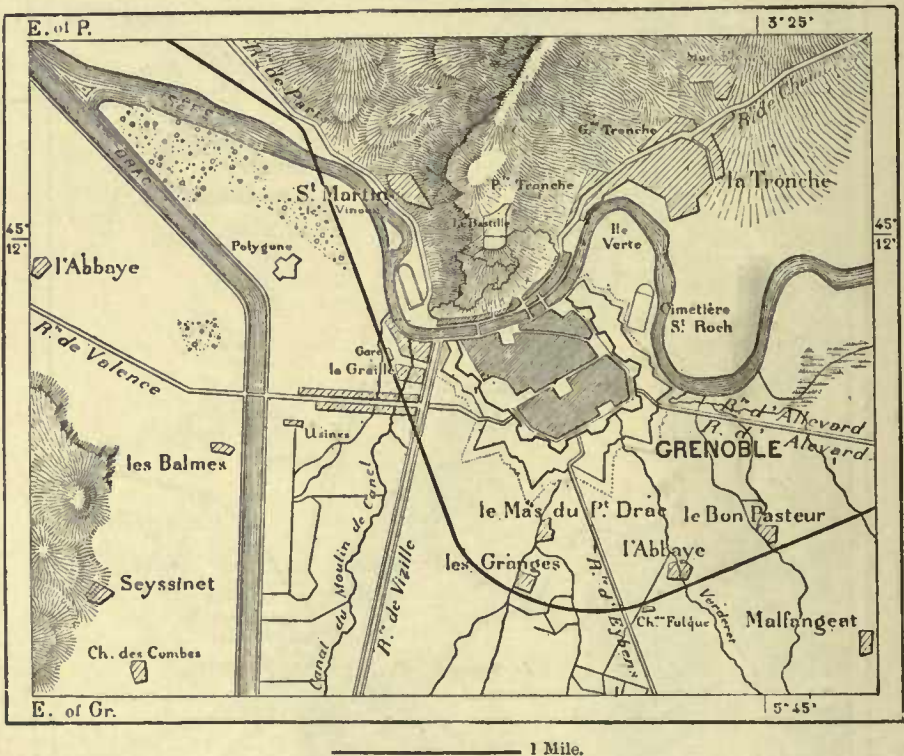


At *Voiron* (7,909 inhabitants), to the north of the elbow of the Isère, as well as at the neighbouring villages of *Rives* (1,471 inhabitants) and *La Côte St. André* (3,496 inhabitants) there are numerous paper-mills, steel works, and tan-yards, and most of the peasantry engage in linen-weaving. The towns on the Isère, *Tullins* (3,398 inhabitants), *Vinay* (1,692 inhabitants), and *St. Marcellin* (2,839 inha-

bitants), are indebted for their prosperity to the fertile fields which surround them.

Vienne (22,950 inhabitants), on the Rhône, was a very important place in Roman times, but had dwindled down to 11,000 inhabitants in 1789. Since then the population has increased rapidly, and thousands find employment in the cloth factories, silk-mills, paper-mills, foundries, glass works, and other industrial establishments which have sprung up here, being supplied with coal from the mines of St. Étienne. A temple, a pyramid, several aqueducts still in a serviceable condition, and other ruins recall the age of the Romans. *Bourgoin* (4,309 inhabitants, inclusive of Jaillon), to the north-east of Vienne, manufactures cards for

Fig. 105.—GRENOBLE.
Scale 1 : 60,000.



combing flax and other articles. Near it are productive turf pits. *La Tour-du-Pin* (2,731 inhabitants) is remarkable only as the capital of an arrondissement.

SAVOIE (Savoy).—This department only includes a portion of the old duchy of Savoy, ceded in 1860 to France. It consists of three geographical regions, viz. Savoy proper, including Chambéry and the Lake of Bourget; the Tarentaise, or valley of the Upper Isère; and the Maurienne, or valley of the Arc. Only about one-third of its area is under cultivation, but fine pasture grounds extend from the valleys up to the barren rocks and snow-fields. Agriculture and cattle-breeding are the principal occupations. There are a little industry and much traffic, produced by the international tunnel of Mont Cenis, but the country is nevertheless

incapable of supporting its population, and thousands of Savoyards annually leave their mountain valleys in search of work, generally returning in winter with their savings.

Chambéry (16,486 inhabitants) is the only town worthy of the name. It boasts of an academy and other scientific institutions, but to strangers its chief claim to notice consists in its delightful environs. Silk-spinning is carried on there, and at the neighbouring village of *Cognin*. At *Challes* there is a mineral spring containing iodine and bromine, but its fame is eclipsed by that of the thermal sulphur springs at *Aix-les-Bains* (2,689 inhabitants), on Lake Bourget.

Following the railway up the valleys of the Isère and the Arc, we pass

Fig. 109.—PASSES OVER THE ALPS BETWEEN THE GENÈVRE AND COL DE FRÉJUS.

Scale 1 433,000.



5 Miles.

Montmélian, an old fortress; *St. Pierre-d'Albigny*; *St. Jean*, the capital of the Maurienne (2,623 inhabitants); *Modane* (1,322 inhabitants), at the entrance to the tunnel; and *Lans-le-Bourg*, at the foot of the pass leading over Mont Cenis.

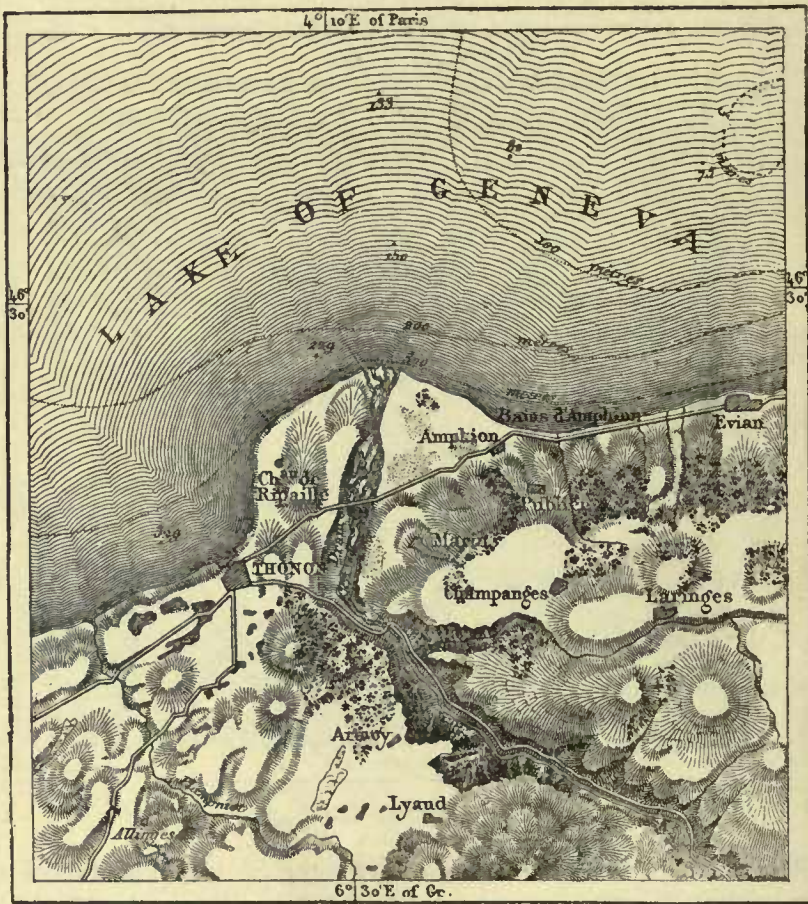
The Tarentaise is less sterile than the Maurienne, but the stature of its inhabitants is less than in any other part of Savoy, and they are supposed to be the descendants of the Ceutrons, a southern tribe mentioned by ancient authors. The principal towns are *Albertville* (3,835 inhabitants) and *Moutiers* (1,946 inhabitants), the latter with salt works yielding annually 3,500 cwts. of salt. Higher up, in the side valley of the Doron, are the sulphur springs of *Brides*, in the midst of magnificent Alpine scenery.

HAUTE-SAVOIE consists of several districts known by local names. The *Génevois* includes that part of Savoy which slopes down to the Rhône; *Faucigny* comprehends the high Alps, traversed by the Arve, and dominated by Mont Blanc; while *Chablais* extends along the Lake of Geneva. Only one-half of the area of the department consists of fields and pasture lands, but agriculture, the breeding of cattle, the making of butter and cheese, and industrial pursuits suffice to support a population more dense than that of France at large.

Thônes (1,059 inhabitants) is the only town on the Fier which flows through

Fig. 110.—THONON.

Scale 1 : 125,000.



the southern portion of the department. *Annecy* (10,360 inhabitants), the capital, stands on the Thioux, a tributary of the Fier, and at the foot of the lake named after it. It is an ancient city, carrying on the manufacture of textile fabrics, hats, paper, and iron. *Rumilly* (2,916 inhabitants), on another tributary of the Fier, manufactures woollen stuffs; and near *Faverge* (1,537 inhabitants) there is a large silk-mill belonging to a Lyons company. Formerly that place had iron and copper works.

There are no towns in the valley of the Arve. *Chamonix* (Chamouni, 491 inhabitants) is merely a village of hotels, and *St. Gervais* a huge bathing establishment. At *Sallanches* (1,594 inhabitants) one of the finest views of Mont Blanc may be enjoyed. At *Cluses* there is a school for watchmaking, and many of the inhabitants of *Bonneville* (1,842 inhabitants) and of *St. Julien* (1,250 inhabitants), the latter in reality a suburb of Geneva, are engaged in watchmaking.

Thonon (3,953 inhabitants), the capital of Chablais, occupies a magnificent site on the banks of the Lake of Geneva, and to the west of the alluvial delta of the Dranse. The castle of Ripaille is close to the town, whilst *Évian* (2,028 inhabitants), a favourite spa embosomed in woods of chestnut and walnut trees, lies to the east of the Dranse. Still farther east the greyish cliffs of the Meillerie rise boldly above the lake. Most of the houses are built of stone quarried there.





CHAPTER IV.

THE JURA AND THE BASIN OF THE SAÔNE.

FRANCHE-COMTÉ AND BURGUNDY.



THE boundaries of this region of France are more or less conventional, for though the parallel ridges of the Jura and the valley of the Saône are well defined, there are also included in it several outlying districts. The valley of the Saône is essentially a country of transit. In the south it leads to the Rhône, which it joins at Lyons; in the north-west numerous passages through the Côte d'Or connect it with the basin of the Seine; in the north-east the gate of Belfort opens communication with the Rhine; and intercourse with the Loire in the west meets with no obstacles. The climate and vegetation of Northern and Southern France become blended in this valley, and whilst the pine forests in the Jura are quite northern in their aspect, the bleached rocks of Côte d'Or, on the other side of the valley, recall the foot-hills of the Cévennes and the Alps. Even the inhabitants, a mixture of Celts, Ligurians, Romans, and Teutonic Burgundians, exhibit the strength and earnestness of men of the north, in combination with the passionate temper of men of the south.

The ranges of the Jura belong geologically to the same orographical system as do certain mountain masses of the Dauphiné and of Savoy. They at first extend in a northerly direction, but by degrees curve round to the north-east, until they pass over into Switzerland. The Jura, very unlike other mountain systems, consists of a series of parallel ranges, rising from a platform sloping down towards the west and north-west. Looked at from an elevation, they resemble a series of parallel waves approaching a coast. Each of these ridges is intersected by one or more transverse gorges, or *chuses*, and there are also *combes*, or valleys of erosion, at the bottom of which lie sparkling lakes or rivulets.

The strata composing the Jura have been folded by exterior pressure, the ridges being formed of anticlinal, the valleys of synclinal folds. Denudation, however, has so much affected the surface of the country that out of one hundred and sixty ridges there are but thirty the tops of which consist of Jurassic limestone, this having been carried away, exposing the lias and trias which underlie it. The

limestones of the Jura are rich in fossils, and even ancient *atolls* have been discovered.

The Jura abounds in forests: that of Chaux, covering nearly 50,000 acres, lies at the foot of the Jura, and consists principally of oaks and beeches. Firs cover the superior slopes; and in the woods of Haute-Joux trunks 100 feet in height and over 3 feet thick abound. The moisture of the atmosphere, as well as the calcareous nature of the soil, promotes the growth of grass and herbage, and

Fig. 111.—THE JURA.

Scale 1 : 845,000.



cattle-breeding and the making of butter and cheese are carried on with much profit. The cows of the same district always pasture together, and co-operation is practised in the making of cheese.

The numerous rivulets of the Jura supply motive power to a host of manufactories, besides which the mountaineers engage largely in sedentary industries, such as watchmaking.

The emancipation of the peasantry during the French Revolution and the construction of roads have wonderfully aided the material prosperity of the Jura.

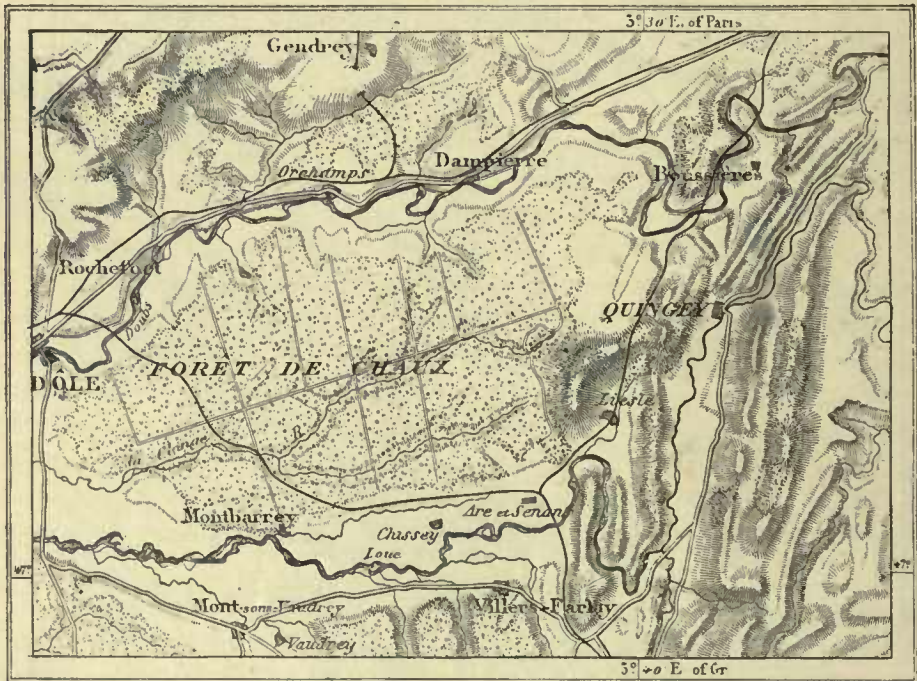
Not very long ago there existed no carriage roads at all, but at the present day no less than three railroads and twenty carriage roads, some of them masterpieces of engineering, facilitate intercourse between the opposite slopes of the mountains.*

LAKES AND RIVERS.

THE lakes of the French Jura are much inferior to those of Switzerland, but geologically they are full of interest. A few of them occupy the longitudinal valleys; others are bounded by the steep walls of the cluses, these being the most picturesque; others, again, occupy the combes referred to above.

Fig. 112.—THE FOREST OF CHAUX.

Scale 1 : 320,000.



The Ain is the most characteristic river of the Jura. Born of plenteous springs issuing from mysterious caverns, the river winds through narrow defiles and cluses, and frequently disappears between the masses of huge rocks which have tumbled down from the surrounding precipices. Being bounded for the most part by two parallel ridges of the Jura, the Ain receives only a few tributaries, but these, being the effluents of lakes, are more abundant than might be expected. Amongst the tributaries are the emissary of the Lake of Chalin, the Bienne, and the Oignon, rising in the Lake of Nantua. Of the numerous waterfalls of the

* Heights in the Jura:—Grande Colombier, 5,033 feet; Credo, 5,545 feet; Reulet, 5,644 feet; Crêt de la Neige, 5,657 feet; Pass of La Faucille, 4,356 feet; Col des Verrières, 3,084 feet.

Ain that near the bridge of Peitte is one of the most considerable. It is 52 feet high, and its tumultuous waters supply the iron forges of La Saisse with motive power. Champagnole is the only town in the narrow valley of the Ain, which only widens out as it approaches the Rhône, near which the river winds through the fertile and populous district of Valbonne, an ancient lake basin.

In most mountain countries the water-shed runs parallel with the mountain ranges. Not so in the Jura, the ridges of which gradually decrease in height as we travel north or south from the culminating summits on the frontier between France and Switzerland. In the Jura the line which parts the waters flowing to

Fig. 113.—THE LAKE OF ST. POINT.

Scale 1 : 115,794.



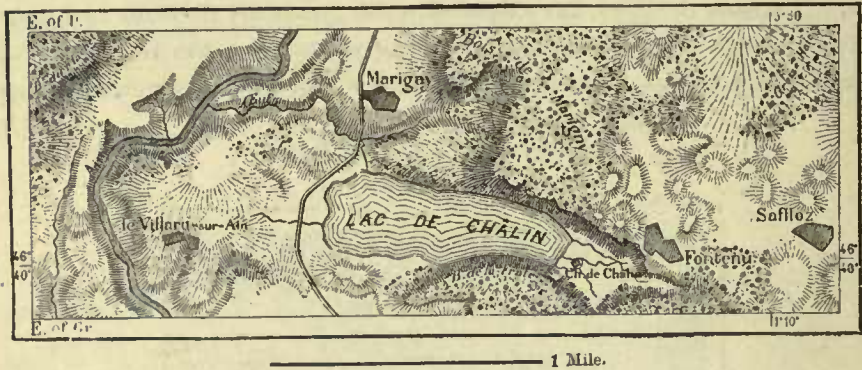
1 Mile.

the Mediterranean from those wending their way to the north runs transversely across the whole system of ridges. Even the Doubs, which finally finds its way to the Mediterranean, appears to have formerly flowed to the Rhine, and if a barrier were to be placed across the defile of Ste. Ursanne it might possibly do so again. Historically and geologically the Saône is the main artery of the valley of the Rhône, and if its volume equalled that of the latter, its name would prevail down to the Mediterranean. The Doubs, however, though spoken of as a tributary, is in reality the main branch of the Saône. It flows at first in a north-westerly direction. Having traversed the Lake of St. Point, it enters the narrow gorges of Pontarlier, where mills occupy every available spot. At the small Lake

of Chaillexon the river reaches the Swiss frontier, which it follows for a considerable distance. It there gathers itself up, and then leaps over a precipice 89 feet in height, forming the famous Falls of the Doubs. The course of the river

Fig. 114.—THE LAKE OF CHALIN.

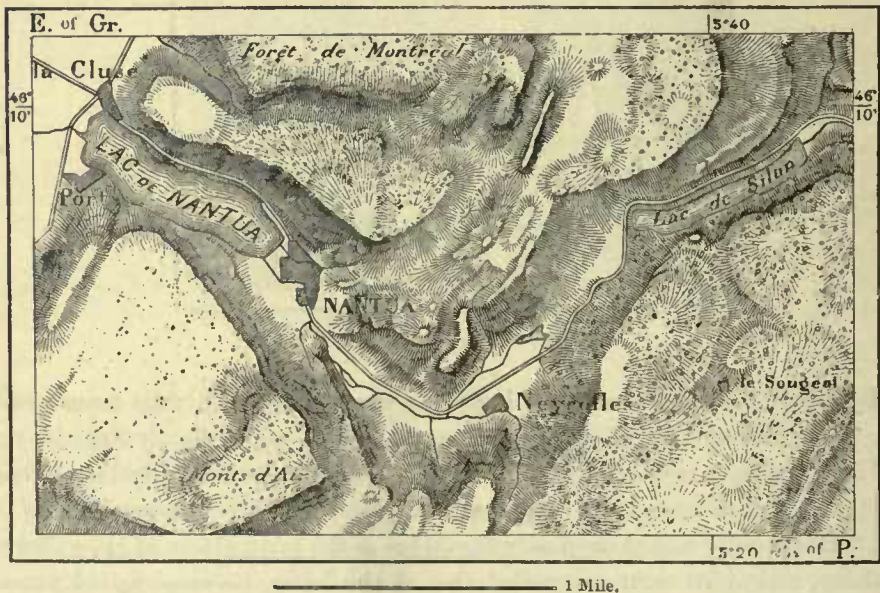
Scale 1 : 83,000.



is most erratic, but at length it turns abruptly to the west, piercing one chain of the Jura after the other. Below St. Hippolyte the river turns to the north, forcing itself a passage through the mountains of the Lomont, and approaching

Fig. 115.—THE LAKES OF THE CLUSE OF NANTUA.

Scale 1 : 80,000.



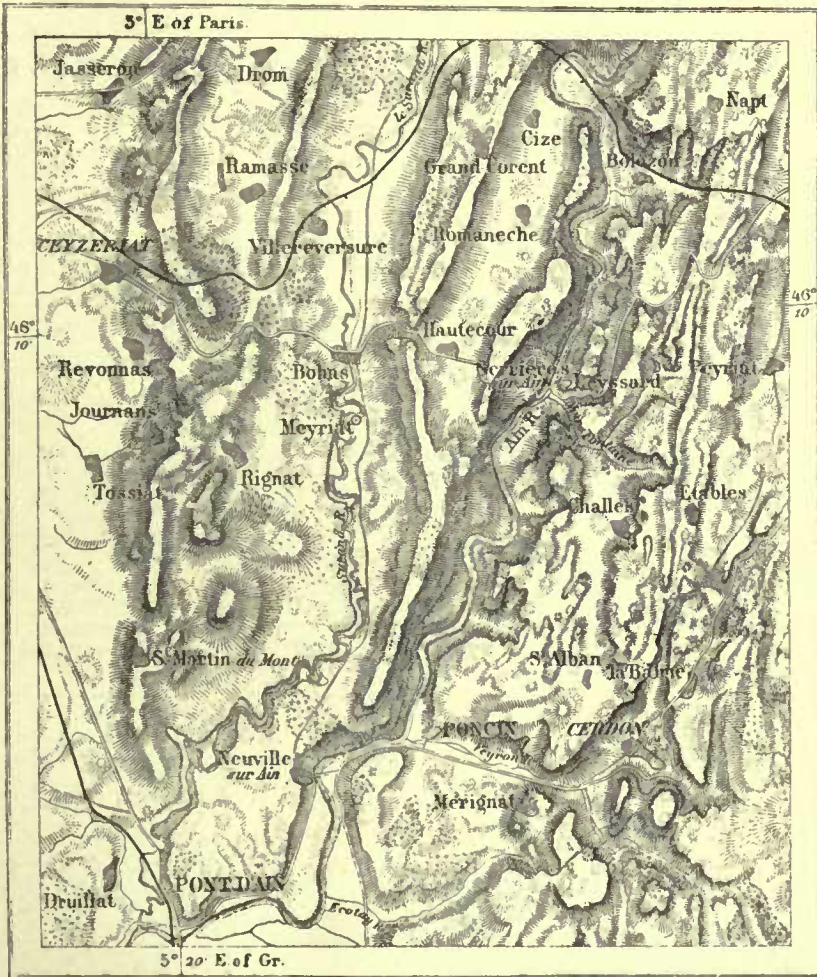
the gap of Belfort, through which runs a canal connecting the Doubs with the Rhine. Thenceforth the general course of the river is south-westerly until it joins the Saône, but it winds about much, passing alternately between steep precipices

and over undulating valley plains. The course of the Loue, which is the principal tributary of the Doubs, is almost equally erratic. At Pontarlier the Doubs in summer was formerly swallowed up in sinks, and flowed underground. But the mill-owners, who were much inconvenienced by this occasional disappearance, have built walls around the mouths of these sink-holes, and the water power furnished by the river is now available throughout the year.

Many of the tributaries of the Saône likewise flow for considerable distances

Fig. 116.—THE LOWER VALLEY OF THE AIN.

Scale 1 : 160,000.



underground. Near Vesoul there are several rivulets of this kind. They reappear again in the spring of Champdamoy, and when the subterranean channels are full to repletion, a supplementary spring, about a mile higher, begins to flow.

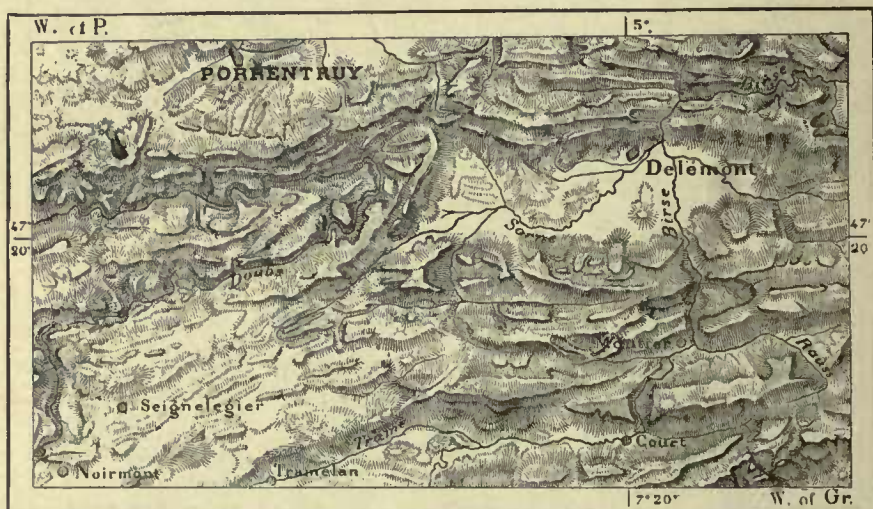
The Saône rises in the chain of the Faucilles ("sickle mountains"), and having received numerous tributaries from the Vosges and the plateau of Langres, it flows

in a direction parallel to the hills which produce the famous wines of Burgundy. The canal of Burgundy connects the Saône with the Seine; that of the Centre with the Loire. The Saône, for 407 miles out of a total of 732, has a fall of only 5·67 inches a mile, and is therefore excellently suited for navigation. Below Chalons it flows through the silted-up basin of an ancient lake, which towards the close of the tertiary epoch extended from the foot of the Jura to the promontories of Charollais and Beaujolais.

To the east of the Lower Saône lies the remarkable clayey plateau of the Dombes, abounding in cavities filled with stagnant pools, and surmounted by a few isolated hillocks locally known as *poipes*, or paps. Most of these pools are of recent origin, for in the fourteenth century the greater portion of the country was under cultivation. But feudal wars led to the desertion of entire villages, the

Fig. 117.—THE GREAT DEFILE (PERCÉE) OF THE DOUBS.

Scale 1 : 3,750,000.



channels of the rivulets became obstructed, and the stagnant waters occupied every depression in the soil. Subsequently a peculiar system of rotation got into vogue, which consisted in alternately inundating and draining the fields, which nevertheless yielded but poor harvests, whilst the fevers bred by the numerous swamps annually decimated the population. At length, about a quarter of a century ago, the reclamation of this forsaken part of France was taken in hand. A railway and roads were constructed, and up to 1870 no less than half the swamps, or 25,000 acres, had been drained. The effect upon the health of the inhabitants was almost immediate. The population in twenty years has increased 30 per cent., and the mean age is now thirty-five years instead of twenty-five as before.

The Saône, to the west of the plateau of the Dombes, continues its peaceable course for some distance longer, and the peasants say with unconscious pride—

“ From Villefranche to Anse—the finest mile in France.”

But soon afterwards the progress of the river is stopped by a range of hills.

Fig. 118.—THE FALLS OF THE DOUES.



Twisting about to the east, the Saône is swallowed up by the gorge of Rochetaillée, widened, it is said, by Roman engineers, and finally joins the Rhône at Lyons.

On an average the Saône discharges 8,830 cubic feet every second, the discharge of the Rhône at Lyons amounting to 23,000 cubic feet. The Saône is usually in flood after the autumn and winter rains, whilst the Rhône, fed by the ice and snow of Switzerland and Savoy, carries the greatest volume in summer, a circumstance most advantageous to the Lyonese.

Fig. 119—THE DOMBES IN 1834.

Scale 1 : 160,000.



INHABITANTS.

THE men of the Jura are the tallest of all France. The pure race of Franche-Comté only exists on the Jurassic plateau, and is distinguished by a short trunk, broad shoulders, long arms, and long legs. Families are numerous in the villages, and emigration goes on steadily, Comtois being met with in every town of France. Formerly, when Franche-Comté formed a part of the vast domains of

Charles V., no less than 20,000 of them lived at Madrid, and at Rome they occupied by themselves the so-called Burgundian quarter.

Powerful, silent, and circumspect, the mountaineers of Franche-Comté have at all times been distinguished for their industry and their spirit of independence. Until crushed by Louis XIV., who conquered the country and converted its peasants into serfs, they enjoyed the privileges of self-government. Franche-Comté only became truly French through the Revolution, but since that time has contributed more than its proper share to the work achieved by the entire nation.

TOPOGRAPHY.

AIN.—This rectangular department, enclosed between the Rhône and Saône, has been named after the river Ain, which runs through it from north to south. It comprises a level region in the west, and a mountainous tract in the east. The former includes the districts of Bresse and the Dombes, the latter abounding in small lakes and marshes. The district of Bugey lies on the French slopes of the Jura; that of Gex beyond these mountains, to the north of Geneva. Agriculture, cattle-breeding, and the manufacture of cheese are the leading occupations.

Gex (1,469 inhabitants) is but a small place, but to those who first behold it on descending the Pass of Faucille it will for ever be identified with the marvellous panorama of the Lake of Geneva. On that same route lies *Ferney*, associated with Voltaire; and to the north of it is *Nivonne*, with its hydropathic establishments.

Tracing the narrow valley of the Rhône downwards from the Lake of Geneva, we pass *Collonges*, the fort of *L'Écluse* and *Bellegarde* (p. 89), and *Seysssel*, known through its asphalt.

Belley (4,105 inhabitants), the old capital of Bugey, not being either on a river or on a railway, is doomed to decay, whilst *Ambérieu* (1,770 inhabitants), a railway station at the mouth of the valley of the Albarine, *St. Rambert-de-Jour* (1,571 inhabitants), and *Tenay* (2,459 inhabitants), higher up in that valley, are instinct with life. *Nantua* (2,940 inhabitants) is the only place of importance in northern Bugey, and carries on some trade with the cheese of Valromey and the lithographic stones of the Forest of Montréal.

Bourg (14,289 inhabitants), the old capital of Bresse, is actually the capital of the entire department. The mausoleum of the Dukes of Savoy, built in the sixteenth century, is its most remarkable building. Bourg is a busy mart for agricultural produce. It was the birthplace of Lalande and Edgar Quinet, and Bichat was born in a neighbouring village. *Pont-de-Vaux* (2,910 inhabitants), lower down on the Reyssouze, the river of Bourg, is a small manufacturing town, the inhabitants of which differ essentially from those of the surrounding country, and are believed to be descended from Saracens. *Trévoux* (2,217 inhabitants), the old capital of Bresse, had its own Parliament formerly, as well as a mint, now represented by a few jewellers' shops, and is mentioned in the history of literature as the place where the Jesuits printed their famous Dictionary and other works. *Sathonay* (3,958 inhabitants) is a military camp rather than a village. It was

here the battle of Lyons was fought in 197, which gave the dominion of the world to Septimius Severus.

JURA.—This portion of the old Franche-Comté is occupied to the extent of one-half by ridges of the Jura, but these are by no means the most elevated in France. It is one of the wealthiest districts of the Jura. More than a third of its area is covered with forests, and it has iron works and other industrial establishments.

Fig. 120.—THE MOUNTAINS OF MOREZ AND ST. CLAUDE.

Scale 1 : 147,125.



St. Claude (6,632 inhabitants) is a mountain town at the foot of the Pass of La Faucille, the inhabitants of which depend on wood-carving and lapidary's work for their existence, and export the cheese known as "Septmoncel," from a village in the neighbourhood. The old abbey has disappeared, but on a plateau to the north may still be traced the ruins of a Gallo-Roman city. *Morez* (5,375

inhabitants), higher up in the same valley, depends solely upon its manufacture of watches, jewellery, glasses for spectacles, &c.

Lons-le-Saunier (11,265 inhabitants), at the foot of the first terrace of the Jura, exports the produce of its vineyards and gardens, wood and cheese procured from the mountains, spectacles, articles in copper and iron, and textile fabrics manufactured in the town. At Montmorot, close by, are brine springs yielding annually nearly 10,000 tons of salt. Excellent building stones are quarried in the vicinity, as also at *St. Amour* (1,911 inhabitants), half-way to Bourg-en-Bresse.

The terrace lying to the east of the cliffs bounding this terrace of the Jura abounds in ancient remains. At *Orgelet* there are barrows and stone walls of defence; on the road thence to St. Claude a Roman bridge spans the Ain, and pile dwellings have been discovered on the small Lake of *Chairvaux*. *Voiteur* and *Potigny* (4,783 inhabitants) occupy sites analogous to that of Lons-le-Saunier, and Poligny, like its more populous neighbour, has its vineyards, quarries, and brine springs. *Arbois* (4,809 inhabitants) is noted for its wines, but the best growths of the department are the white wines of Chateau-Chalons, below Voiteur, and the red ones of the hills of Arsures, near Mouchard. *Salins* (5,577 inhabitants), in a mountain gorge and on the banks of a river, appropriately called La Furieuse, is best known on account of its springs of brine, a portion of which is conveyed to the salt works of Arc and Senans. In addition to wine, salt, and cheese, Salins exports iron ore, plaster of Paris, lime, building stones, and timber. At *Champagnole* (3,342 inhabitants), about 13 miles to the south, there are iron-mills and manufactures of tools.

Dôle (12,009 inhabitants), on the Doubs, occupies the extremity of a range of hills, and commands an extensive plain. It was the old capital of Franche-Comté, the seat of a university and of a Parliament, and valiantly defended its ancient liberties against the armies of Louis XI. It is in every respect a more important place than Lons-le-Saunier, possessing not only libraries and museums, but also numerous industrial establishments, including corn and saw mills, machine shops, and manufactories of agricultural implements. On the Upper Doubs, at *Rans* and *Fraisans*, there are important iron works.

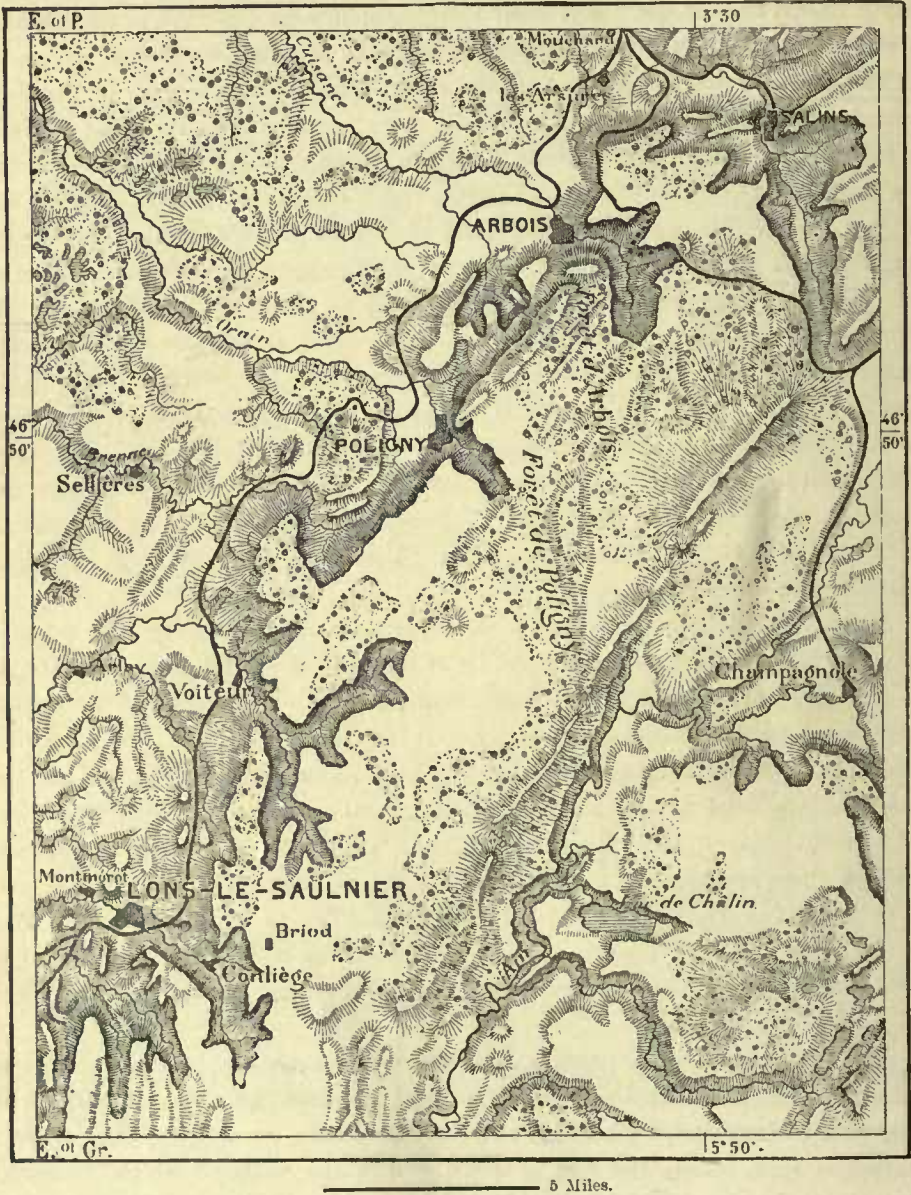
DOUBS.—Nearly the whole of this department drains into the Doubs. It is essentially a mountain country, the inhabitants of which depend largely upon watchmaking and other industries for their subsistence. Excellent "Gruyère" is made in the upper valleys.

Pontarlier (5,163 inhabitants), the highest town on the Doubs, enjoyed its municipal liberties until 1678. It is mainly indebted for its prosperity to its trade with Switzerland, with which two lines of railway connect it. Near it, on a precipitous rock, stands the fort of Joux, within the walls of which Toussaint-Louverture, the negro patriot, perished from cold and misery. *Morteau*, about 20 miles lower down, and near the famous Falls of the Doubs, is the centre of French watchmaking, and a school has been established there to encourage this important industry. The vicinity of this busy hive abounds in natural curiosities, savage defiles, caverns, and waterfalls.

Where the Doubs emerges from the gorges of the Jura the aspect of the country changes, and we enter upon a region of hills sloping down towards the great gap of Belfort. All along the river, at *Pont-de-Roide* (2,363 inhabitants) and

Fig. 121.—THE FIRST TERRACE OF THE JURA, BETWEEN LONS-LE-SAULNIER AND SALINS.

Scale 1 : 280,000.



Audincourt (4,258 inhabitants), factory succeeds to factory, until we reach *Montbéliard* (7,625 inhabitants), the natural centre of this busy region, where textile manufactures and watchmaking constitute the leading industries. Montbéliard, up to the French Revolution, belonged to Würtemberg, and this circumstance

accounts for its large Protestant population. The strong castle has been converted into a prison, but the town, for all that, has lost none of its ancient strategical importance. A monument has been erected to Cuvier, the most famous of its sons. Near it are ruins of a Roman city.

Below Montbéliard the Doubs enters a second defile, within which is situated the small town of *Baume-les-Dames* (2,497 inhabitants), thus named after a convent occupied by ladies of noble birth, whose fare in Lent has passed into a proverb.

Besançon (42,808 inhabitants), the largest town in Franche-Comté, stands on

Fig. 122.—BESANÇON.

Scale 1 : 45,000.



one of those sites marked out by nature as a place of strength. A rock 410 feet in height rises boldly from the narrow neck of the peninsula occupied by the town. It is crowned by a citadel, and detached forts placed upon the surrounding hills render Besançon a formidable fortress even when attacked by modern artillery. Amongst the public monuments of the town are a Roman gate, a cathedral, a mansion built by Granvelle, the famous chancellor of Charles V., but now devoted to the objects of the numerous scientific societies of the town. There are colleges, a rich library, a gallery of paintings, and several museums. The town has at all

times been jealous of its liberties, and only surrendered to Louis XIV. on his promising to maintain its municipal institutions. Victor Hago, Charles Fourier, and Proudhon are natives of it. Watchmaking is the great industry of Besançon: in 1875 419,984 watches were manufactured there, and in the French Jura, and only 2,050 in all the rest of France. But there are also important metallurgical establishments, and iron forges are numerous on the Doubs and its tributary, the Loue. At *Miserey*, to the north of the town, there are brine springs. *Ornans* (3,033 inhabitants) on the Loue, is a manufacturing town, and the cherries

Fig. 123.—BESANÇON, AS SEEN FROM LA MOUILLÈRE.



grown in its orchards are converted into a favourite liqueur. Near it, in the picturesque valley of the Lison, are the ruins of the Roman city of *Alesia* (Alaise), where Cæsar is believed to have finally overthrown the forces of the Gauls.

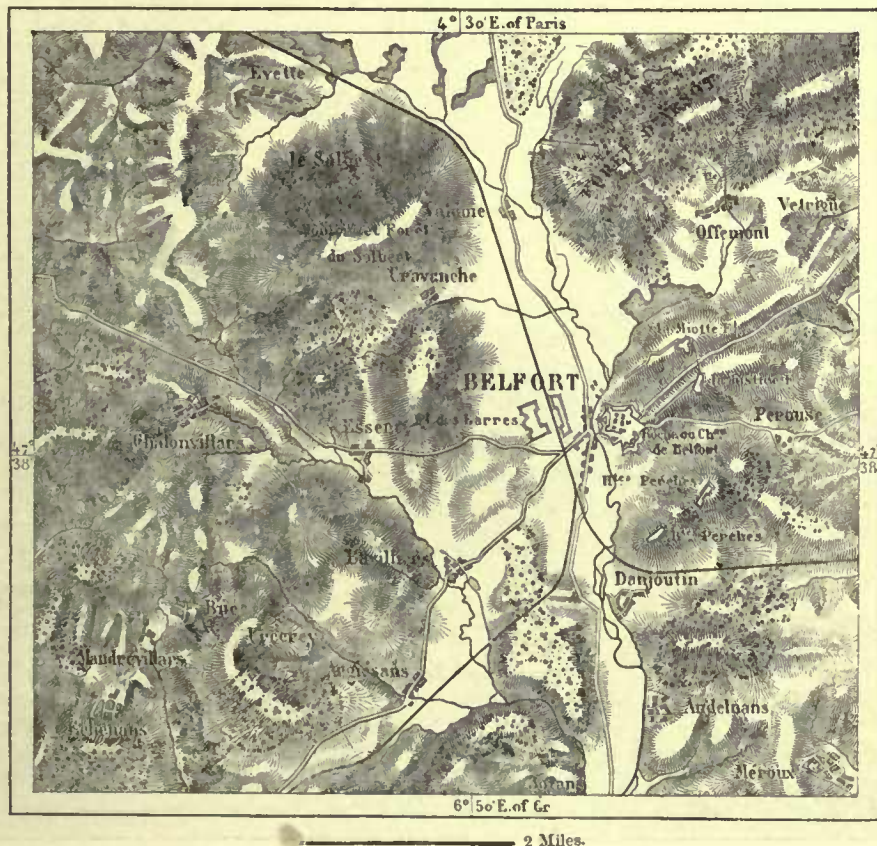
BELFORT.—The gap between the Vosges and the Jura is defended by the fortress of Belfort, which offered so valiant a resistance to the German besiegers. French is spoken in three out of the four cantons depending upon the town; German and French in the fourth, that of Delle. Belfort has lost somewhat of its strategical importance since Metz has become a German fortress, but it still closes one of the great gateways of France. Its citadel was built by Vauban, and other

fortifications of more recent date crown the surrounding heights. The only remains of mediæval works of defence are the "Citizens' Tower," in the town itself, and the "Stone" of La Miotte, on the summit of a hill, occupied by one of the modern forts. Military rule, as usual, has prevented the growth of industry, and the only manufacturing place of the territory is *Giromagny* (3,058 inhabitants), on the Upper Savoureuse, where there are cotton-mills.

HAUTE-SAÔNE comprises nearly the whole of the upper basin of the Saône. From the granitic "Ballons" of the Vosges the department slopes down towards

Fig. 124.—BELFORT.

Scale 1 : 106,066.



the south-west. Nearly one-third of its area is wooded, and the villages are embosomed in orchards. There are no large towns, but though agriculture is the chief pursuit, we meet also with coal, iron, and salt mines, iron works, potteries, and other industrial establishments.

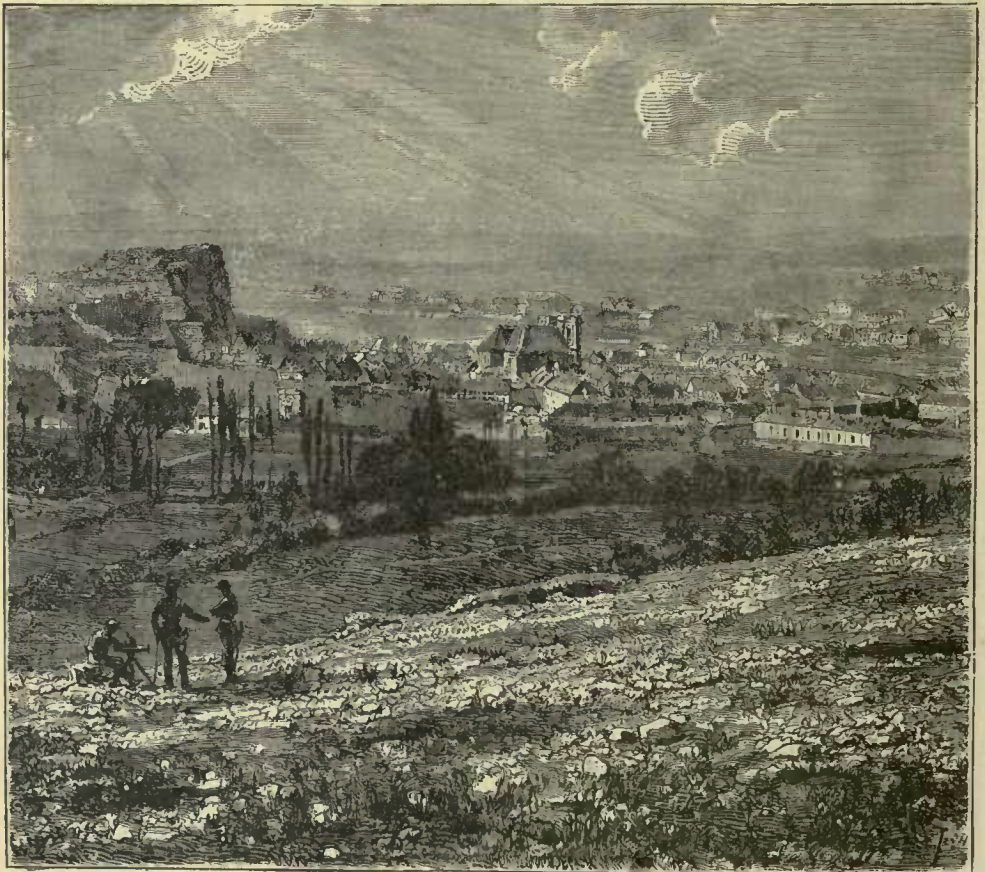
Héricourt (3,402 inhabitants) is the only town in that portion of the department which lies within the basin of the Doubs. It is mostly inhabited by Protestants engaged in the cotton industry.

Lure (3,896 inhabitants), near the Ognon, the capital of the eastern arrondissement, is a place without importance, surpassed in industry by *Ronchamps* (1,895

inhabitants) and *Champagney* (2,080 inhabitants), occupying a valley of the Vosges, and surrounded by coal mines yielding 200,000 tons annually. *Luxeuil* (4,047 inhabitants), a famous watering-place, not yielding to Plombières in the abundance of its springs, lies to the north-west, in the midst of a delightful country. Near it is *Fougerolles* (1,282 inhabitants), a large village embosomed in cherry gardens.

Vesoul (9,097 inhabitants), the capital of the department, lies in the verdant valley of the Durgeon, and being the junction of four railways, is a bustling place,

Fig. 125.—BELFORT, FROM THE FORT LA MIOTTE.



though exceeded in that respect by its rival, *Gray* (7,345 inhabitants), which, in addition to railway communications, possesses the advantage of lying upon a navigable river, the Saône. *Gray* is a great corn market, and has numerous corn-mills.

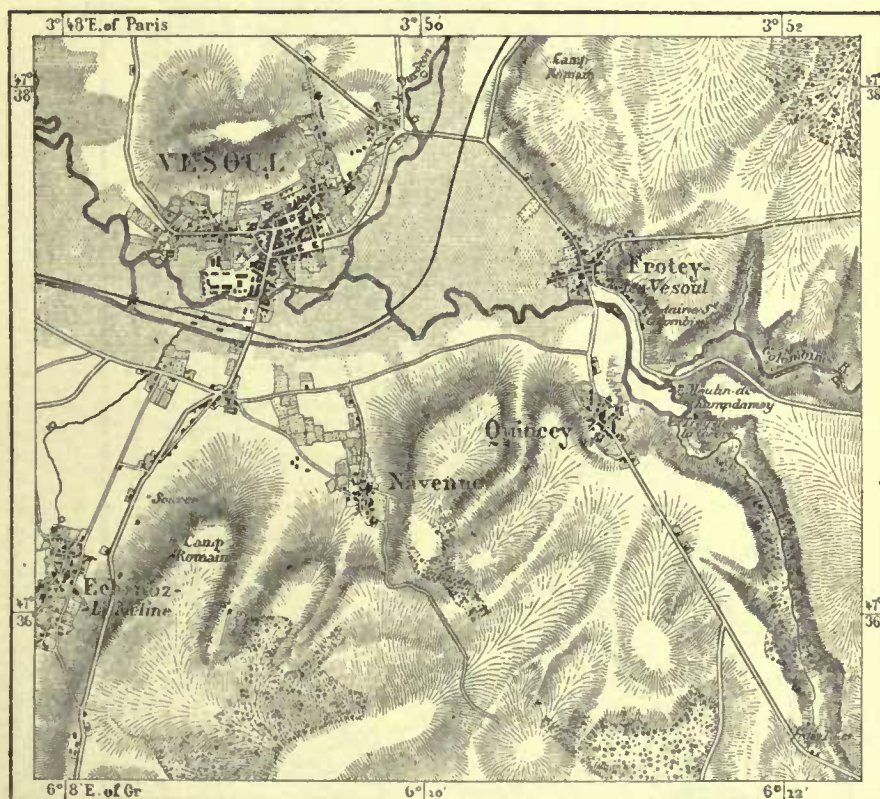
CÔTE-D'OR.—The department named after the range of hills producing the famous wines of Burgundy is one of the most important countries of passage in France, belonging partly to the basin of the Saône, and partly to those of the Seine and the Loire. The whole of it formerly constituted a portion of the province known as Burgundy (*La Bourgogne*), and consists geographically of several

well-defined divisions. The granitic hills of the Morvan, with their woods, ponds, and sparkling rivulets, form one of these. The plateau of the Auxois, farther east, intersected by numerous deep river valleys, is another. The plateau of Langres extends thence in the direction of the Vosges. It, too, is wooded, but the most extensive forests are met with on the limestone plateau of Châtillonnais. The most fertile region of the department lies to the east of the famous range known as Côte-d'Or. The department, in addition to its wines, exports iron and marble.

On the Saône, which flows through the plain in the south-west of the department, there are no large towns. *Auxonne* (4,964 inhabitants), an old fortress,

Fig 126.—VESOUL.

Scale 1 : 50,000.



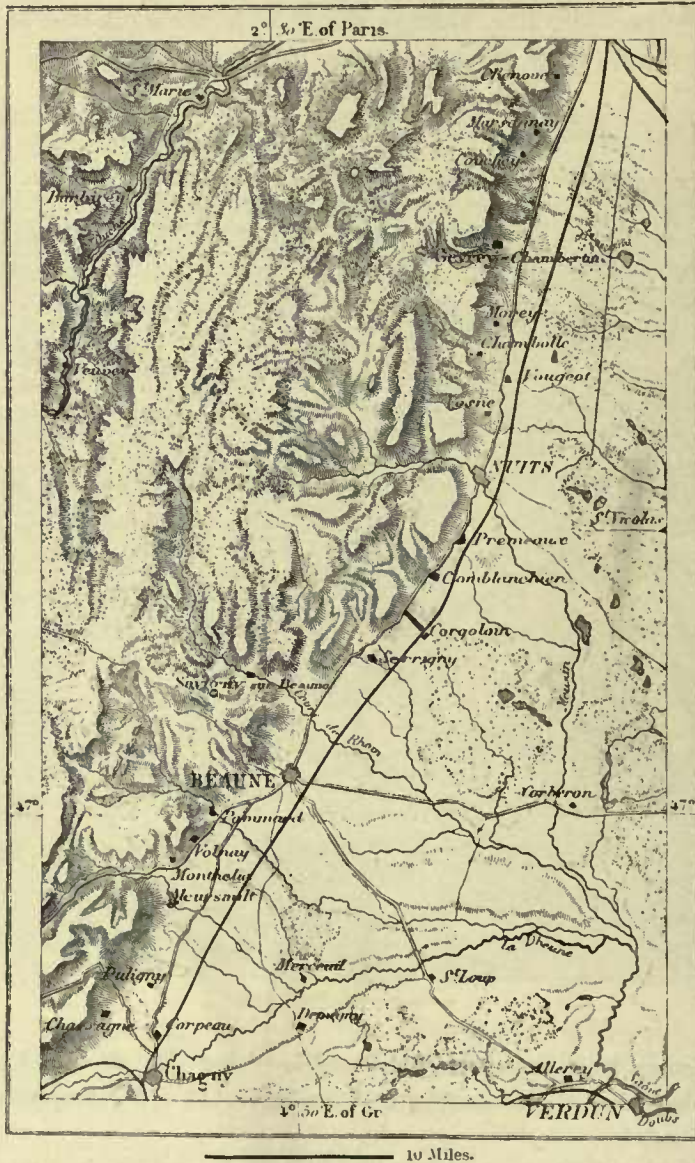
— Half a Mile.

carries on some trade in agricultural produce; but *St. Jean-de-Losne*, at the mouth of the canal of Bourgogne, and *Seurre* (2,514 inhabitants), lower down, exceed it in activity.

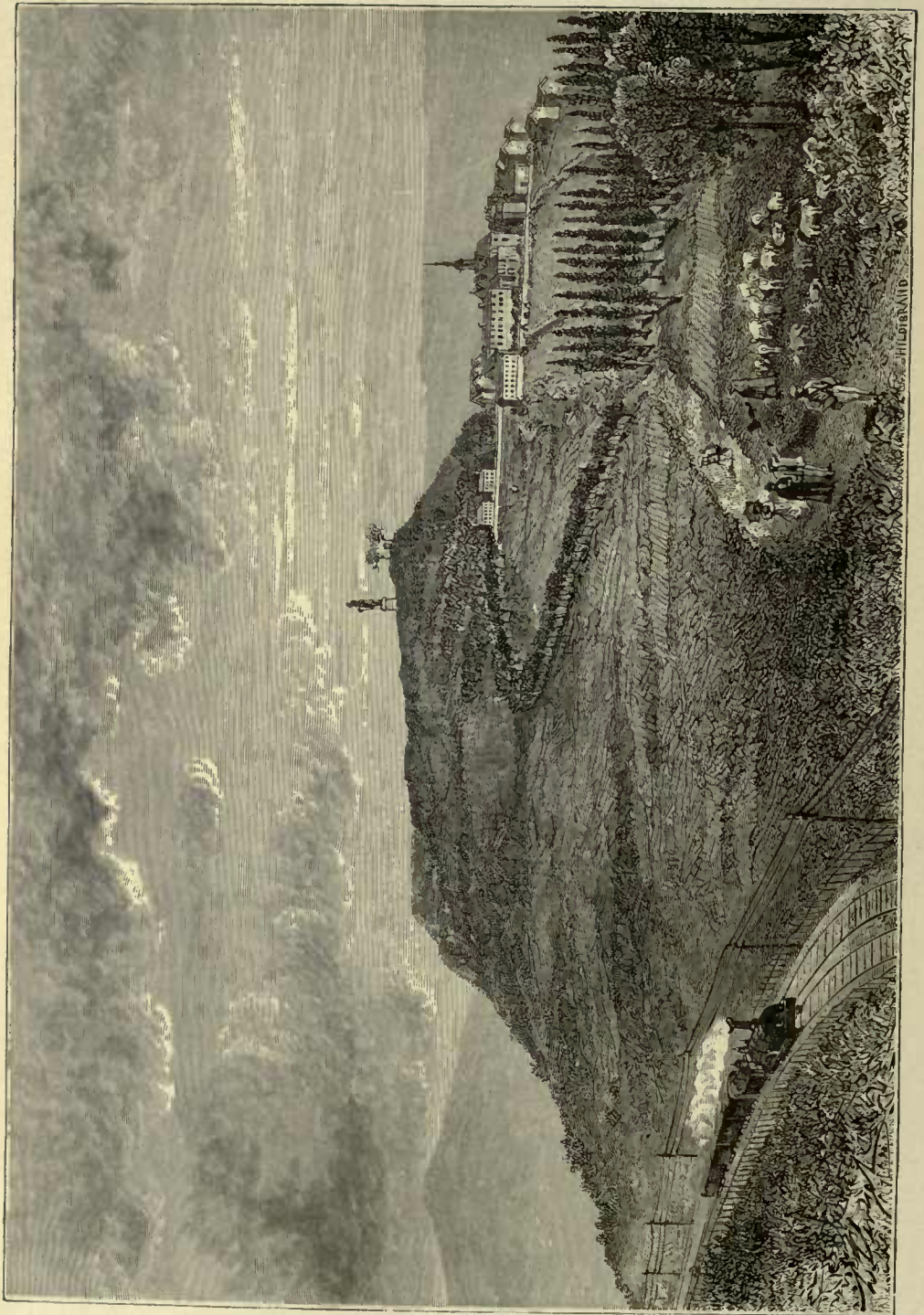
Dijon (45,607 inhabitants), the old capital of Burgundy, is most favourably situated for commerce. The canal of Bourgogne connects it with the Saône and the Seine, and it is the principal town on the road between Paris and Lyons. It carries on a considerable trade in corn, possesses a variety of manufactures, and its mustard, gingerbread, and sweetmeats enjoy a wide reputation. Dijon is one of

those provincial towns which have not taken Paris for their pattern. It has produced many men of eminence—St. Bernard, Bossuet, Rameau, Guyton de Morveau, Joutfroy, and Rude; and its scientific establishments, its schools of art and music, its libraries and museums, are amongst the most important of France. The old

Fig. 127.—THE WINE DISTRICT OF CÔTE-D'OR.
Scale 1 : 320,000



ramparts have fallen, but there still remain many fine old churches and mansions, which impart originality to the town. The old palace of the Dukes of Burgundy, erected in the fifteenth century, is now used as a town-hall and museum, the guard-chamber containing the tombs of Philip the Bold and John the Fearless,



MONT AUXOIS AND STATUE OF VERCIINGETORIX.

and other works of art. In the old Charter-house are preserved the statues of the prophets, the work of Claux Slutter, a sculptor of the fourteenth century. The public park was laid out by Le Nôtre.

The famous white slopes of Côte-d'Or begin almost immediately to the south of Dijon. In succession we pass here the hills of Chambertin, Chambolle, and the famous "clos" Vougeot. The best wines are produced on Oxford clay, and they have undoubtedly influenced the temperament of the people who drink them. As Stendhal says, "Logic alone does not suffice to make superior men; a fiery temperament, too, is requisite;" and that temperament the wines of Burgundy are supposed to give. *Nuits* (3,503 inhabitants) is the farthest point reached by the Germans during the late war. In the monotonous plain to the east of it stands the old abbey of Cîteaux, upon which formerly depended three thousand convents and monasteries, but which has been converted into an agricultural penitentiary. *Beaune* (10,696 inhabitants), the second town of the department, the seat of a Parliament before Dijon, and long its rival, is an interesting old town, with a hospital built in the fifteenth century by Flemish workmen, and famous, too, on account of its wines, Pommard, Volnay, Montrachet, and Meursault (2,550 inhabitants) being near it. *Nolay* (2,355 inhabitants), the birthplace of Carnot, is the last place noted for its wines, for to the west of it hardly any vineyards are met with.

Châtillon-sur-Seine (4,894 inhabitants), the principal town of the northern arrondissement, was a place of some importance formerly, but its schools exist no longer, and the manufacture of cloth is of very little note now. There exist, however, important iron works. One of these, near the village of Ste. Colombe, is surmounted by Mont Lassois, upon which Gérard of Roussillon, one of the heroes of romance, built himself a castle.

Commercially the valley of the Oze is far more important than that of the Upper Seine, for the railway from Paris to Dijon runs along it, passing Mont Auxois, upon the slope of which stands the village of Alise Ste. Reine, which has been identified with *Alesia*, where Vercingetorix offered his final resistance to the legions of Cæsar. A colossal statue of the Gallic chief has been erected here, although the learned are by no means agreed as to the site of ancient Alesia. In a side valley close by, near the village of *Bussy-le-Grand*, there is a famous castle. Soon after the Brenne and the canal of Bourgogne join from the south. At *Montbard* (2,427 inhabitants) the mansion in which Buffon was born is pointed out. Below Montbard the Brenne joins the Armançon, and proceeding up the valley of the latter, we reach *Semur* (4,022 inhabitants), a curious old town, with a castle perched upon a rock of granite, and an ancient Gothic church. *Saulieu* (3,113 inhabitants), the ancient Sidolocus, farther south, lies upon the granitic plateau of Morvan. It exports timber, cattle, and wine casks.

SAÔNE-ET-LOIRE.—This department lies partly between the two navigable rivers after which it has been named. The plain to the east of the Saône is a continuation of that of La Bresse, and ascends gently towards the foot of the Jura. A more varied country lies to the west of the Saône, being bounded by the hills of

Autunais and Charollais, which form the water-shed between the Atlantic and the Mediterranean. The wooded mountains of Morvan rise to the west of Autun, and the valleys of Brionnais, sloping down to the Loire, are occupied by magnificent meadows. The department ranks high as an agricultural country, and the coal mines around Autun have led to the creation of flourishing manufactures.

Louhans (3,498 inhabitants) is the only town to the east of the Saône, the great centres of population having sprung into existence on the banks of that navigable river. *Chalons-sur-Saône* (20,571 inhabitants) is the most important

Fig. 128.—LE CREUSOT.

Scale 1 : 23,000.



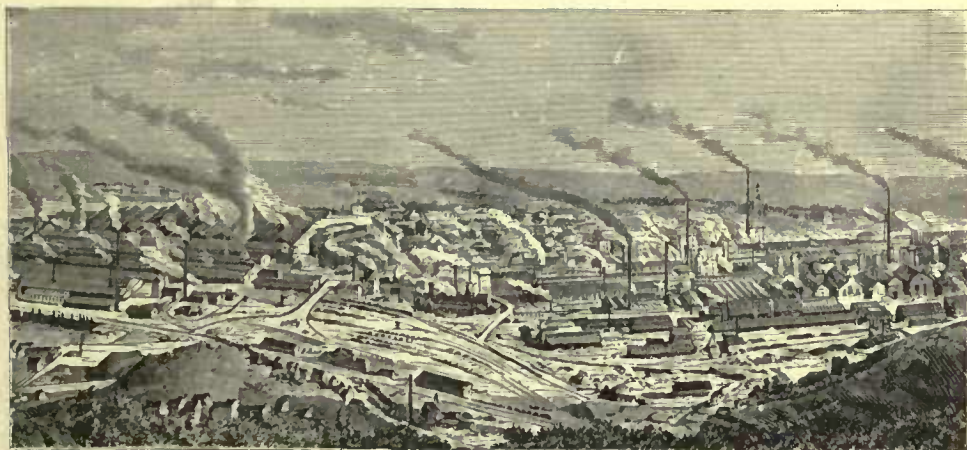
town of the entire department historically, and only cedes in population to the modern upstart, Le Creusot. Formerly a great river port, and a station of a Roman admiral, it is now a most important railway centre, and exports corn, iron, and wines. There are ship-yards, and barrels in large numbers are made. *Chagny* (3,950 inhabitants), on the Canal du Centre, which joins it to Chalons, has recently developed into a busy place of traffic.

Travelling down the Saône, we pass *Tournus* (4,412 inhabitants), the birthplace of Greuze, and reach *Mâcon* (16,579 inhabitants), the capital of the department. In the upper town, formerly inhabited by priests and nobles, Lamartine was born.

In the lower town there are manufactories and huge wine vaults, in which the famous growths of *Thorins* and Romanèche are stored. St. Laurent, a suburb on the other side of the river, is famous on account of its fairs. The country around Mâcon abounds in places of interest. Archæologists will seek out the village of *Solutré*, where the fossil skeletons of a hundred thousand horses have been discovered. The castles of *Montceau-les-Mines* (4,375 inhabitants), *Milly*, and *St. Point* allure the admirers of Lamartine's poetry, whilst the famous abbey of *Cluny* (4,007 inhabitants) must ever attract historians and artists.

Autun (11,358 inhabitants), in the north-western angle of the department, the Augustodunum of the Romans, has fallen from its high estate, and its buildings now hardly cover two-thirds of the area enclosed by its ancient walls. Its Roman ruins are of small importance, some of the most interesting amongst them having been utilised in the construction of modern buildings. The Middle Ages are represented by the fine church of St. Lazarus, with one of the best pictures of

Fig. 129.—LE CREUSOT.



Ingres. *Mont Beuvray* (2,660 feet), one of the highest summits of the Morvan, rises about 12 miles to the west of Autun. Upon its summit may be seen the remains of an ancient city, identified with the Bibracte of the Romans, but evidently of much older date, as is proved by cromlechs and entrenchments. Annually in May a fair is held on the summit of this mountain.

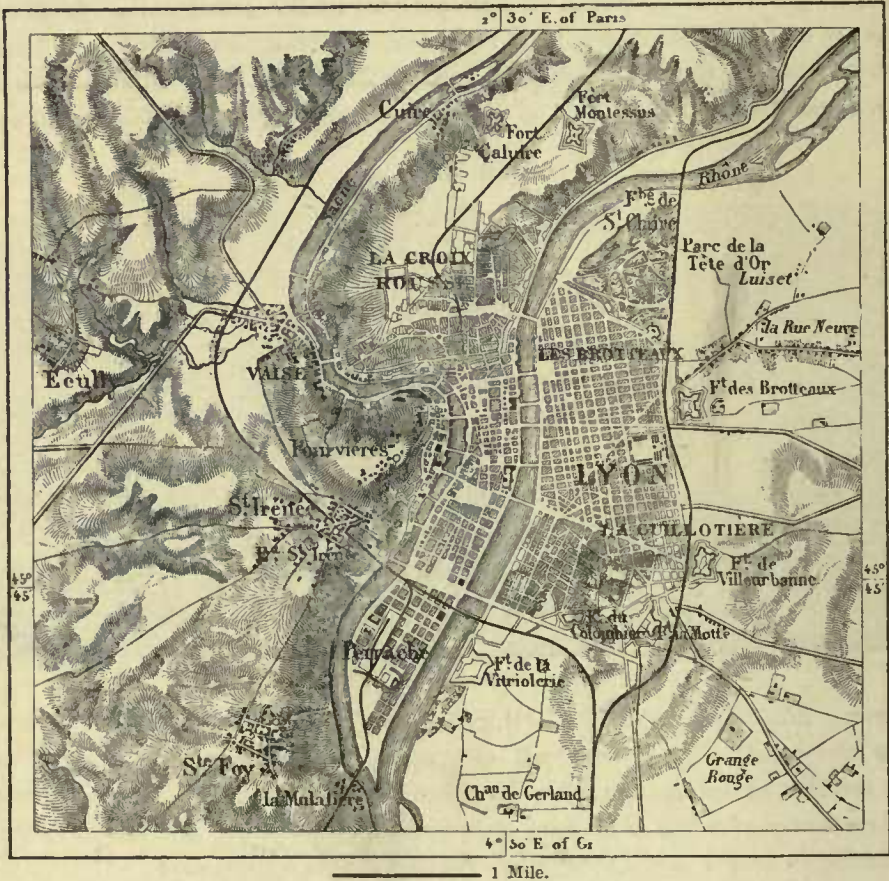
The country to the west of Autun is purely agricultural, but to the east of that town lies one of the great manufacturing centres of France. At *Épinac* (1,670 inhabitants) there are coal mines, yielding annually about 150,000 tons, and bottle works. *Couches-les-Mines* (1,597 inhabitants) produces iron, lime, and gypsum; but the great centre of industry lies still farther south, near the old Charbonnière. This is *Le Creusot* (26,432 inhabitants). A cannon foundry, glass works, and iron works existed there at the close of last century, but it is only since 1837 that the place has rapidly grown into importance. Its coal mines now extend to a depth of 1,300 feet, and their produce is utilised in innumerable iron

works, forges, and locomotive workshops, a considerable portion of the iron ore and coal consumed being imported from abroad. Other places to the south of Le Creusot participate in its industrial prosperity. *Montchanin-les-Mines* (3,334 inhabitants) has vast brick-kilns. *Blanzay* (1,886 inhabitants) has the most productive coal mines of the district. *Montceau* (4,375 inhabitants) has iron mines.

Charolles (2,969 inhabitants), a sleepy town, is the capital of Charollais. That district, as well as Brionnais, adjoining it on the south-west, is engaged in the

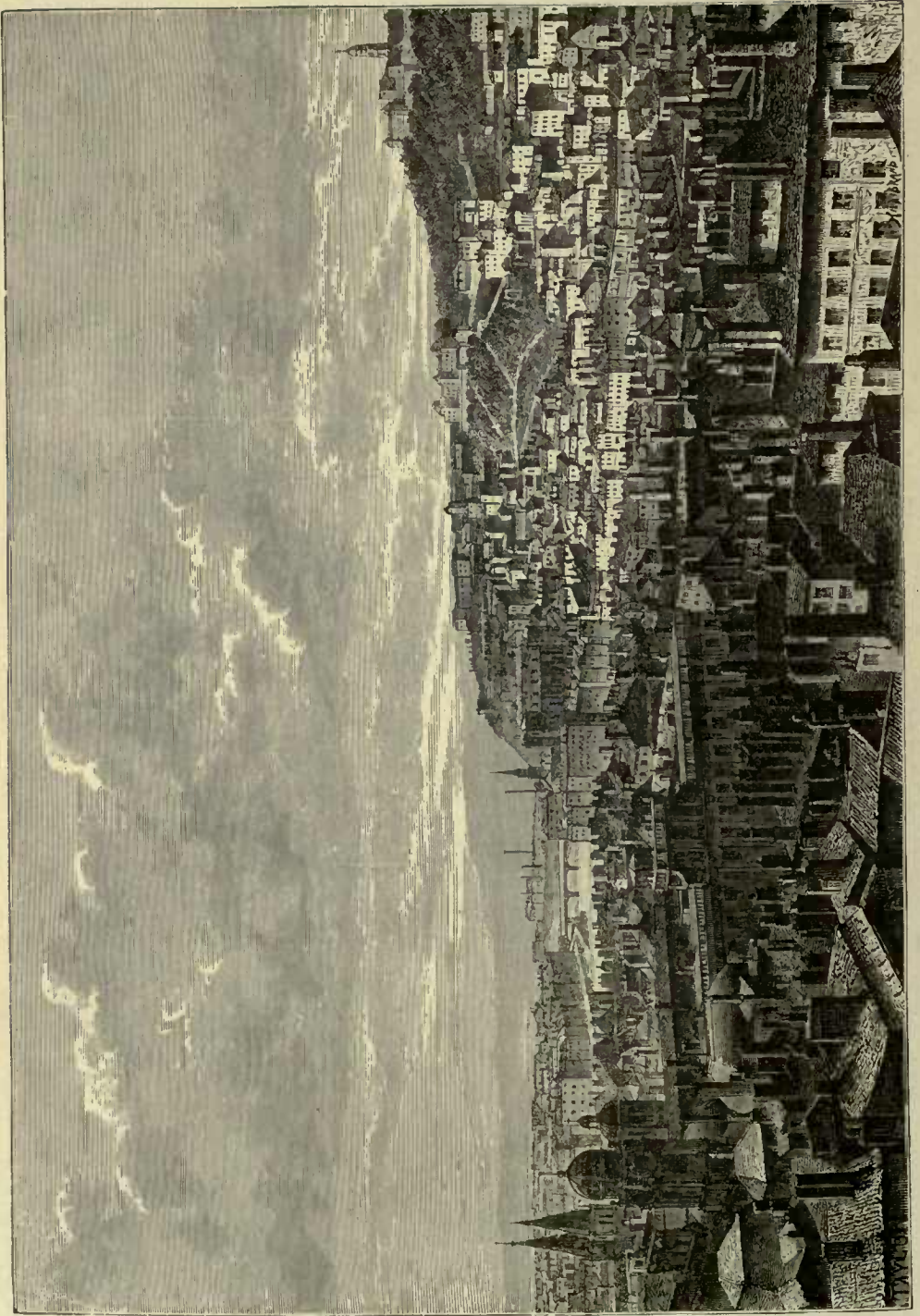
Fig. 130.—LYONS.

Scale 1 : 80,000.



fattening of cattle. *Chauffailles* (1,933 inhabitants), in that part of the country, is becoming of importance on account of its coal mines. *Digoin* (2,721 inhabitants), on the Loire, carries on a considerable commerce. *Bourbon-Lancy* (1,604 inhabitants) has been noted from immemorial times for its saline springs. *Paray-le-Monial* (2,895 inhabitants) has an abbey modelled after that of Cluny, and has recently become known through the visions of Marie Alacoque, which led to the "worship of the Sacred Heart." *

* In 1874 the department produced 1,110,000 tons of coal. Le Creusot, in 1872, employed 15,500 persons, and produced 330,000 tons of iron and steel, 308 locomotives, &c., valued at £620,000.



LYONS AND THE HEIGHTS OF CROIX-ROUSSE.

RHÔNE.—This department includes the slopes of the hills of Lyonnais and Beaujolais (3,320 feet), and is bounded by the rivers Saône and Rhône on the east. It is one of the smallest departments of France, but owing to its industry, the great centre of which is Lyons, one of the wealthiest.

Lyons, or *Lyon*, as it is called by the French (322,612 inhabitants), occupies a most favourable position at the confluence of the Saône and Rhône, and is marked out as a natural intermediary between north and south. The surrounding heights offer excellent sites for forts. The great advantages of Lyons have been recognised from the earliest times. L. Munatius Plancus planted a Roman colony upon the height overlooking the confluence of the two rivers; and *Lugdunensis* is spoken of by Strabo as the "heart of Gaul." It remains to this day the primatial city of all France, and the wealthiest society for propagating the Catholic faith has its seat there. The force of tradition still exhibits itself in the veneration with which the Lyonese regard the hill of Fourvières and its old church, built upon the site of the old Forum (*Fore vieux*) of the Romans. Another church, that of Ainay in the lower town, is partly constructed from the materials of the temple which sixty tribes of Gaul constructed in honour of Augustus.

The lowest quarter of the existing city, that of Perrache, only dates from the last century, and bears the name of the engineer who converted its site into dry land. It suffers more from floods than any other part of the town, and the fogs are densest there. In it are situated the arsenal, a huge goods station, gas works, and the docks for vessels navigating the Saône. Every one of the other quarters of the town has a distinctive character. The centre of the town, around Place Bellecour, is the seat of wealth and luxury. The business quarter lies at the foot of the hill of La Croix-Rousse, itself occupied by the dwellings of the workmen. Brotteaux, to the east of the Rhône, is inhabited by clerks and tradesmen, and adjoins the beautiful park of Tête-d'Or. La Guillotière, to the south of it, is a workmen's quarter. Vaise, beyond the Rhône, abounds in manufactories. Suburbs extend in all directions. The traces still existing of the dominion of the Romans are limited to the remains of three aqueducts, baths, amphitheatres, and other structures. The Palace of Arts, one of the most sumptuous buildings of modern Lyons, abounds not only in Roman antiquities, but contains likewise a valuable collection of paintings, a library of 70,000 volumes, and a natural history collection. The busts of celebrated men born in the town, including those of Ampère, Bernard de Jassieu, Flandrin, Delorme, and others, have been placed within it. The Exchange and Merchants' Hall contains an industrial museum modelled upon that of South Kensington. Public monuments abound. Science is represented by colleges and schools, by a public library of 180,000 volumes, and by numerous societies, including one of agriculture, which possesses a model farm on the heights of Écully.

Lyons is one of the great industrial centres of the world. There are machine shops, chemical works, and manufactories of paper-hangings; but the town is most famous for its silks. The latter industry was introduced by Italians, whom Louis XI. encouraged to settle in the town. The revocation of the Edict of

Nantes threatened destruction to this industry, but it survived the blow then inflicted, and, in spite of wars and revolutions, Lyons has maintained its pre-eminent position. In 1872 there were 120,000 looms in the department, 240,000 persons were employed in the silk industry, and the average value of silk stuffs produced annually is estimated at nearly £20,000,000 sterling. Most of the weavers work at their own homes, and their demeanour and character differ very favourably from those of ordinary factory hands. At the same time the solitary

Fig. 131.—THE ENVIRONS OF LYONS.



life which most of them lead nourishes a spirit of mystical exaltation which rises to the surface whenever there is a revolution.

Formerly nearly all the weavers lived in the town, but the manufacturers, desirous of weakening their unions and of obtaining cheaper labour, have transplanted the silk industry to most of the neighbouring towns and villages. *Villeurbanne* (8,163 inhabitants), *Venissieux* (1,943 inhabitants), *St. Foy* (4,337 inhabitants), *Oullins* (4,886 inhabitants), *St. Genis* (2,246 inhabitants), *Caluire et Cuire* (7,207 inhabitants), and *Neuville* (3,207 inhabitants) are inhabited to a large

extent by weavers. Nay, the great industry of Lyons extends far beyond the limits of the department, for the looms of Chambéry, in Savoy, work on account of Lyonese houses.

L'Arbresle (3,091 inhabitants), to the west of the hills of Lyons, has quarries, lime works, and, at St. Bel, almost inexhaustible deposits of pyrites, which supply nearly all France with the material required for the manufacture of sulphur and sulphuric acid. The village of *Chessy-les-Mines*, close by, was formerly important on account of its copper mines. *Tarare* (13,563 inhabitants), on the railway to Roanne, enjoys a high reputation for its muslins and embroidery, its plush and velvets. *Amplepuis* (4,047 inhabitants), *Thizy* (3,179 inhabitants), and *Cours* (3,897 inhabitants), near it, are likewise manufacturing places.

Beaujeu (3,043 inhabitants), which gives its name to the district of Beaujolais, *Villefranche* (11,994 inhabitants), and *Belleville* (2,691 inhabitants), have some manufactures, but agricultural pursuits predominate in that portion of the department. The wines of Beaujolais enjoy a high reputation, the most famous growths being produced on porphyritic granite.

Givors (10,856 inhabitants), on the Rhône, to the south of Lyons, is a dependency of St. Étienne rather than of the city just named. Its iron works, glass works, and brick-kilns are supplied with fuel from the neighbouring coal mines. The famous wine known as Côte-Rôtie grows on the slopes of sunburnt Mont Pila, close by.





CHAPTER V.

THE PLATEAU OF CENTRAL FRANCE.

GÉVAUDAN, VELAY, AUVERGNE, ROUERGUE, LIMOUSIN, PÉRIGORD, MARCHE, BOURBONNAIS.*

THE CÉVENNES.



THE granitic protuberance in the centre of France, whence the rivers radiate towards the Atlantic and the Mediterranean, has not inaptly been called a "pole of divergence," from which the people emigrate in all directions, and more especially towards the basin of the Seine, within which lies the "pole of attraction." The plateau under consideration covers an area of 31,000 square miles, and interposes a barrier 190 miles in length between the north and south of France. Its heights had to be scaled before the people dwelling on its opposite slopes became one, and although this national fusion was not accomplished without wars and bloodshed, it led in the end to the common enjoyment of the blessings of civilisation.

The plateau, as a whole, slopes down gently towards the north-west, and is bounded in the south and east by steep mountains. The Cévennes constitute the most important portion of the semicircular chain of mountains which envelop the plateau on the south-east, and form the water-shed between the Mediterranean and the Atlantic. They begin with the Montagne Noir ("black mountain," 3,970 feet), to the east of the gap of Revel, through which runs the railway connecting Castelnau-dary with Castres. The valley of the Thoré, tributary to the Tarn, separates these Black Mountains from the mountain rampart of Espineuze (4,198 feet), rising almost precipitously above the valleys of the Jaur and Orb, but sloping down gently towards the north-west. In the east this portion of the Cévennes terminates in a savage mountain mass, where granites and sedimentary strata intermingle in strange confusion, and which has been pierced in several places by volcanic eruptions. It almost appears as if a subterranean lake of lava extended in former times from the dome-shaped mountain of Auvergne to the shore of the Mediterranean; that is, along a line where the contrasts between north and south are most striking. On one slope of the mountains we have rivulets, meadows, and

* Poulett Scrope, "Volcanoes of Central France;" Rames, "Géozénie du Cantal;" A. Jullien, "Des Phénomènes Glaciaire dans le Plateau Central de la France;" Burat, "Géologie de la France."

forests; on the other, stony torrent beds, odoriferous herbs, and rare trees. The contrast between the inhabitants is equally great, and the dweller in the plain, proud of his ancient civilisation, looks with disdain upon the Gavache inhabiting the plateau, though the latter does not yield to him in industry.

In the east of the Orb the Garrigues—thus named from the kermes oaks, or *garrus*, which cover their slopes—form the southern edge of a series of limestone plateaux known as *causses*, from the Latin *calx*, lime. The most southern of these is that of Larzac (2,980 feet), but the most typical is the Causse of Méjean (4,260 feet), a huge mass of limestone 100,000 acres in extent, and bounded on all sides by steep precipices. There can be no doubt that these causses were formerly continuous, though separated now by deep cañons, which excite the

Fig. 132.—THE MOUNTAINS OF ESPINOUZE.

Scale 1 : 240,000.



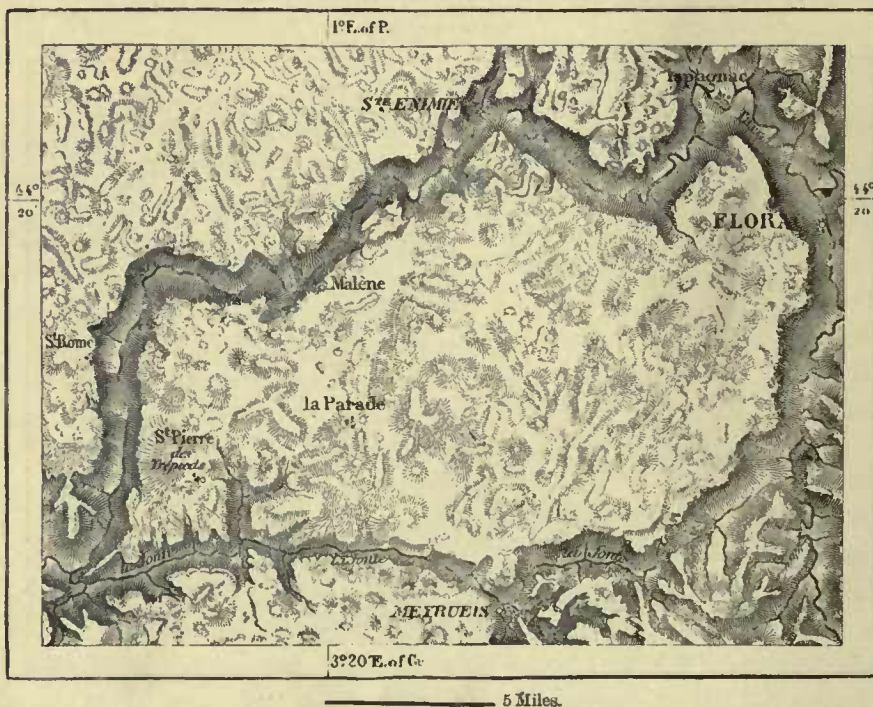
admiration of geologists. No running streams are met with on these limestone "tables," the rain disappearing almost immediately beneath the surface. The inhabitants carefully collect the rain-water in cisterns; and in summer, when the supply fails them, they are obliged to descend into the cañons in search of it. Springs of sparkling water abound there; and the shrubs and trees which flourish near them contrast most strikingly with the barren rocks around. The causses are covered with herbage, and the inhabitants, very few in number, confine themselves to the cultivation of oats, barley, and potatoes. The herbage, however, scanty as it is, supports thousands of sheep, which furnish excellent wool, and from whose milk is manufactured the famous cheese known as Roquefort. In winter, when these plateaux are covered with snow to the depth of several feet, and

most of the inhabitants have deserted them, it is sometimes dangerous to cross them.

Dolmens abound on these limestone plateaux, whilst scarcely any are met with in the crystalline region which adjoins them. It has been concluded from this circumstance that the ancient inhabitants of the plateau differed in origin and religion from their neighbours. Even at the present day the dwellers on the limestone plateau of the Lozère differ in many respects from the men inhabiting the district of granitic hills which slopes down westward in the direction of the Aveyron, and culminate in the Lézou (3,785 feet). On the one hand we have sweet herbage, a little barley, and oats; on the other the granitic slopes are covered

Fig. 133.—THE CAUSSE OF MÉJEAN.

Scale 1 : 315,000.



with shrub, and rye-fields, or *ségalas*, extend along their foot. The peasant of the causses, or Causseard, who eats bread made of barley or oats, and drinks clear water, is tall and bony, and far stronger than his neighbour of the granitic district, who lives upon rye and chestnuts, and drinks cider.

To the east of these Jurassic limestone plateaux lies the principal mass of the Cévennes, surmounted by the Espéron (4,658 feet) and the superb granite dome of Aigoual (5,141 feet). This is one of the wildest districts of France; but the bears, stags, and wild boars which formerly inhabited its forests have disappeared, and there now remain only wolves.

A rugged granite region, anciently known as Gévaudan, occupies the south-eastern corner of the department of Lozère, and expands further north into a



Drawn by A. Vuillemin.

- Granite
- Porphyry
- Lava
- Carboniferous

dome-shaped mass of granite 116 square miles in extent, and attaining in Mont Finieils a height of 5,638 feet. The limestone, which to all appearance formerly covered this plateau, has been removed by denudation. Even the crystalline rock has been subjected to erosive action. We meet with huge blocks of granite, and every cavity is filled up with shingle or coarse gravel. There are few villages, and their inhabitants are very poor.

Whilst the south-eastern portion of Lozère is diversified by mountains, that part of the department which lies to the north of the Lot is one of the most desolate regions of all France, consisting of barren plateaux traversed by a few sparsely wooded granitic ridges, such as the hills of the Goulet (4,918 feet), the forest of Mercoire (4,925 feet), the mountains of La Margeride (5,098 feet), and the region derisively called "King's Palace" (4,212 feet).

MÉZENC AND VIVARAIS.

THE volcanic region of Mont Mézenc and Coiron, to the east of this granitic plateau, separates the southern Cévennes from the northern prolongation of that mountain chain, terminating in the pyramid of Mont Pila (4,703 feet), from the summit of which the view extends across the Rhône valley to the snowy heights of Mont Blanc. The diversified eastern slopes of the Cévennes, with their mulberry plantations, vineyards, and chestnut forests, contrast most strikingly with the elongated slopes stretching towards the north and west.

The first volcanic cones are met with immediately to the north of Mont Tanargue (4,785 feet), a buttress of the plateau of Vivarais. The southernmost of these extinct volcanoes is that of Jaujac, the slopes of which are for the most part covered with chestnut trees, which here, as in Italy, flourish most on disintegrated basalt. Streams of lava extend from the old "cup," or crater, northwards into the valley of the Lignon, which flows between cliffs of basalt and granite. Lower down on that river, where it joins the Ardèche, rises the "Gravenne" of Souilloles. The village of Thueyts, higher up in the valley of the Ardèche, stands upon a stream of lava terminating in a magnificent range of basalt 160 feet in height. Close by rises the regular cone of the Gravenne of Montpezat, surrounded with fields of lava, through which the Ardèche and its tributaries have cut themselves a passage. The crater, or cup, of Aizac (2,126 feet), which rises in solitary grandeur in the valley of the Volane, is better known than any other of the volcanoes of Lower Vivarais, owing to its proximity to the cold mineral springs of Vals. Springs discharging mephitic gases have been discovered farther west.

But these six old volcanoes lying at the foot of the granitic plateau of Vivarais are very insignificant in comparison with the volcanic mountain range which forms the water-shed between Rhône and Loire, and in the centre of which rise the three "teeth" of Mont Mézenc (5,755 feet), surrounded by subsidiary cones, amongst which the Gerbier de Joncs (5,124 feet) is remarkable as giving birth to the river Loire. The phonolithic lava of Mont Mézenc must have burst forth in a high

state of fusion, for it spread rapidly over the granitic plateau, and the height of the volcanic cones here is less than that of the Cantal and Mont Dore, although the latter rest upon a much lower basis. Mr. Poulett Scrope even thinks that the lava currents extended as far north as the phonolithic cones of Meygal (4,717 feet). These lava beds would thus overspread an area of 154 square miles, their average thickness being 390 feet. They are now for the most part clothed with forests of

Fig 134.—THE DEFILE OF THE ARDÈCHE, NEAR ROOMS.



oak and firs. Other streams of lava flowed towards the east, covering the granitic hills of Coiron (3,380 feet), and even descending into the valley of the Rhône. This latter, since the last eruption of lava, has been scooped out to a depth of nearly 1,000 feet, whilst the hills of Coiron, protected by their cap of lava, offered a greater resistance to the destructive action of geological agencies; but they, too, are gradually being destroyed, and huge blocks of basalt sometimes slide down into the valleys, the castle of Rochemaure being built upon one

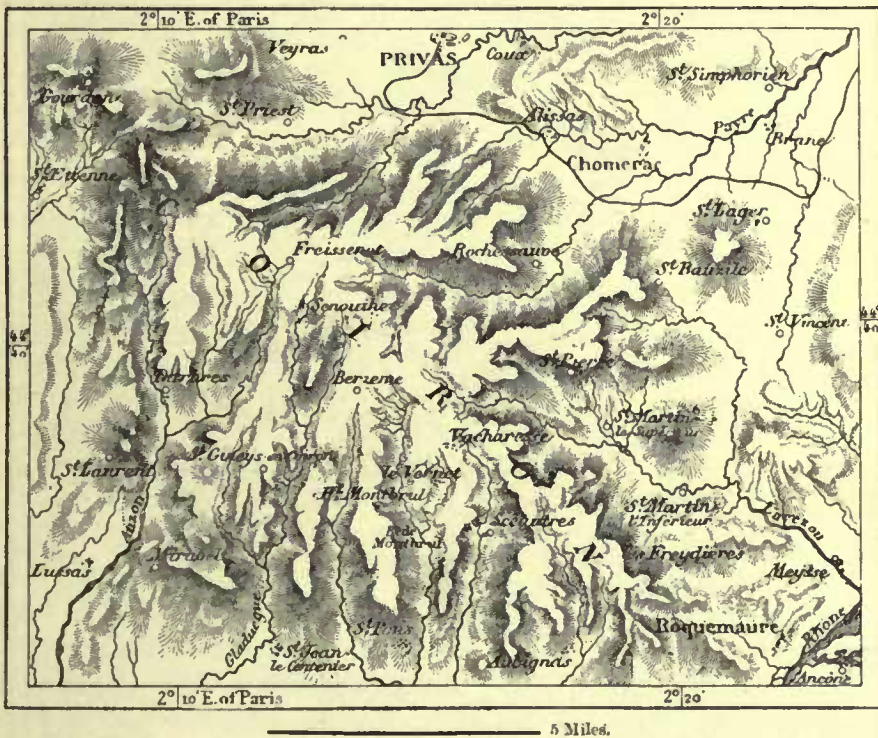
of them. These hills, are remarkable, moreover, on account of their promontories formed of columnar basalt, and resembling the castles of an ancient race of giants.

VELAY.

THE deep valley of erosion scooped out by the Loire separates the volcanoes of Mézenc from the volcanic plateau of Velay, covered with basaltic lavas vomited from at least a hundred and fifty craters, most of which can scarcely be distinguished now. Streams of lava have frequently blocked up the valley of the

Fig. 135.—THE HILLS OF COIRON.

Scale 1 : 200,000.

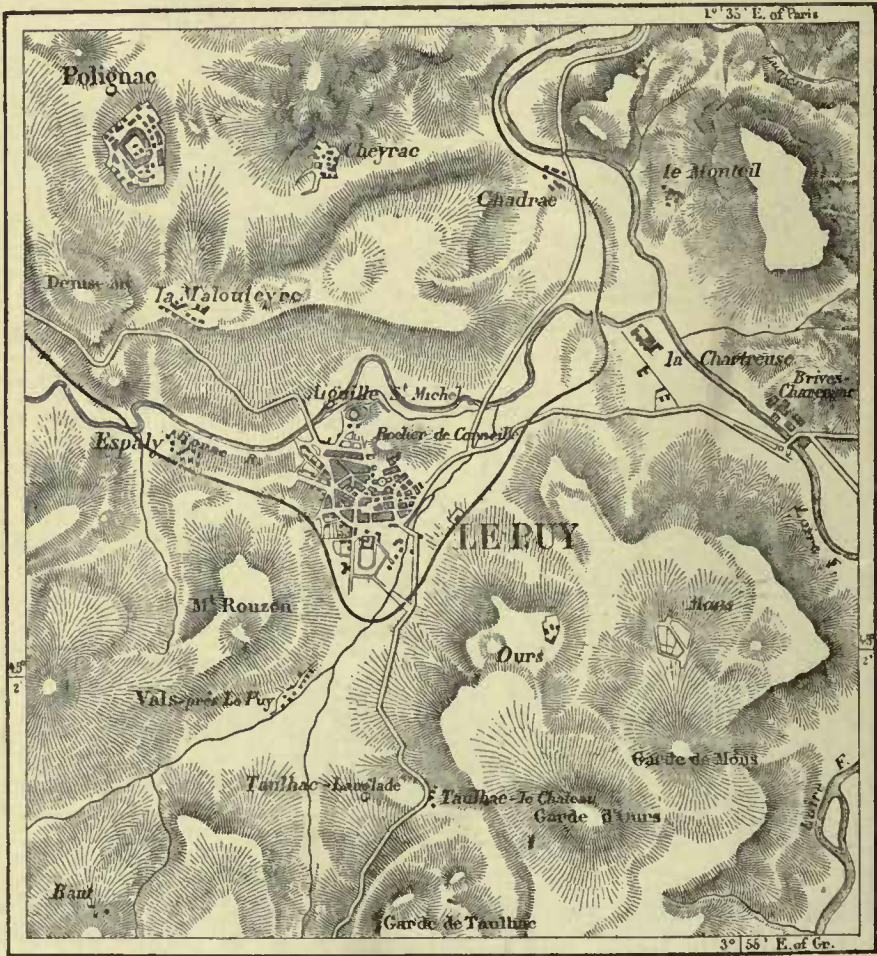


Loire and of the Allier, but these rivers have scooped themselves out new channels, frequently laying bare magnificent columns of basalt. One of the grandest of these defiles is that of the Loire at Chamalières, excavated in granite and basaltic lava to a depth of 980 feet. The volcanic formations in the vicinity of Le Puy (2,050 feet) are better known than any others in this region. They include columnar basalt, sheets of lava, and dykes. Close to the black houses of the town the "Needle" of St. Michel, an obelisk of lava, and the rock of Corneille (2,484 feet), raise their heads. Beyond the dismantled walls of Polignae, in the north-west, we reach the columns of basalt of La Denise, known as the "Cross of Straw" and the "Organ" of Espaly. It was here M. Aymard

discovered the fossil remains of animals which roamed over this region when the surrounding volcanoes were yet in a state of eruption. Two human skeletons have likewise been discovered, dating back, in all probability, to the same epoch. The flora of the country does not appear to have changed since then. Fine garnets and sapphires abound in the basalt of Espaly.

Around Le Puy every available spot is covered with vegetation, but the plateau which extends thence to the south is of grievous uniformity. It consists of a wide

Fig. 136.—LE PUY.
Scale 1 : 60,000.



plain covered with turf or stunted trees, over which are scattered the black cones of extinct volcanoes, the largest amongst which, that of the wood of L'Hôpital (4,663 feet), rises but little above the general surface. A cavity produced by the escape of a prodigious bubble of gas is occupied by the Lake of Bouchet (3,926 feet). The Lake of Limagne, farther north, is supposed to have originated in the same manner; but the old Lake of Bar (3,828 feet), now drained and converted into a beech wood, occupied the crater of an extinct volcano.

THE VOLCANOES OF AUVERGNE.

A THIRD volcanic region, that of Auvergne, lies to the east of the deep valley of the Allier and of the granitic spur of Margeride. The volcanic nature of this region has at all times been known to the peasants living there, and many of the mountains are called by them *Peyre Arse*; that is, "burnt mountain;" but Guettard, in 1751, was the first who revealed the existence of these French volcanoes to the world of science. The southernmost volcanic group of the Auvergne occupies the granitic plateau of Aubrac (4,825 feet), rising steeply above the valley of the Lot, and covered for the most part with pasture grounds, which support in summer about 30,000 cows and 40,000 sheep. Dolmens, locally known as "fairy bowers" or "magicians' castles," are scattered over the plateau, but the only human dwellings met with are the clusters of *burons* inhabited by cheese-makers. The people of this remote part of France have preserved their ancient manners, and even something of their ancient religion. On the second Sunday of July, as in the time of Gregory of Tours, they walk in procession to the Lake of St. Andéol, bathe in its turfy waters, and throw into it the clothes of the sick and propitiatory offerings. The extinct volcanoes of Aubrac possess no special features, but to the north of them rise the hot springs of Chaudes-Aigues, yielding a supply of water amply sufficing for all domestic purposes as well as for heating most of the houses in winter. The principal of these springs has a temperature of nearly 180° F., and the soil in the neighbourhood is so warm that in spite of the elevation of the town (2,130 feet), snow never remains on the ground.

Crossing the valley of the Truyère, we reach the most considerable volcanic group of France, that of Mont Cantal, which can fairly compare with Mount Etna and other great volcanoes. The various summits of the Cantal form collectively an isolated cone 95 miles in circumference, and resting upon a base of granite. Up to the tertiary epoch the centre of this granitic base was occupied in part by huge fresh-water lakes. The first eruptions took place in the miocene age, the last and most terrible of all during the quaternary period. The lava then ejected enveloped all the cones which existed at that time; it overwhelmed the forests, converting them into a thin layer of coal, and filled up the valleys to a depth of nearly 400 feet. The old volcano probably rose to a height of 8,200 feet, but there remain now only the shattered and worn fragments of its semicircular ridge, the most elevated points of which are the Plomb du Cantal (6,025 feet), the Puy Mary (5,863 feet), and the Puy Charvoche (5,722 feet). Valleys, scooped out by ancient glaciers, some of which had a length of nearly 20 miles, and by torrents, radiate in all directions from the central heights. Those of Cère and Alagnon are connected near their summits by the two tunnels of Lioran, which pierce the mountain at a height of 3,870 and 3,800 feet respectively, and are traversed by a road and a railway. These deep valleys lay open the geological structure of the mountain, and exhibit beds of gravel, carboniferous sandstones, and granite, subsequently

covered by currents of basaltic lava. The slopes of the Plomb du Cantal, and especially those exposed to the moist westerly winds, are covered with forests of beeches and firs. In the east the forests are confined to the valley bottoms. The currents of lava there form a monotonous treeless plateau known as Planèze, and terminating in promontories of columnar basalt, upon one of which is perched the old capital of Upper Auvergne, St. Flour (2,903 feet). The Alagnon separates

Fig. 137.—THE PUY DE L'AIGUILLIER, MONT DORE.



the Planèze from another basaltic plateau to the north of it, which terminates likewise in curious columnar formations.

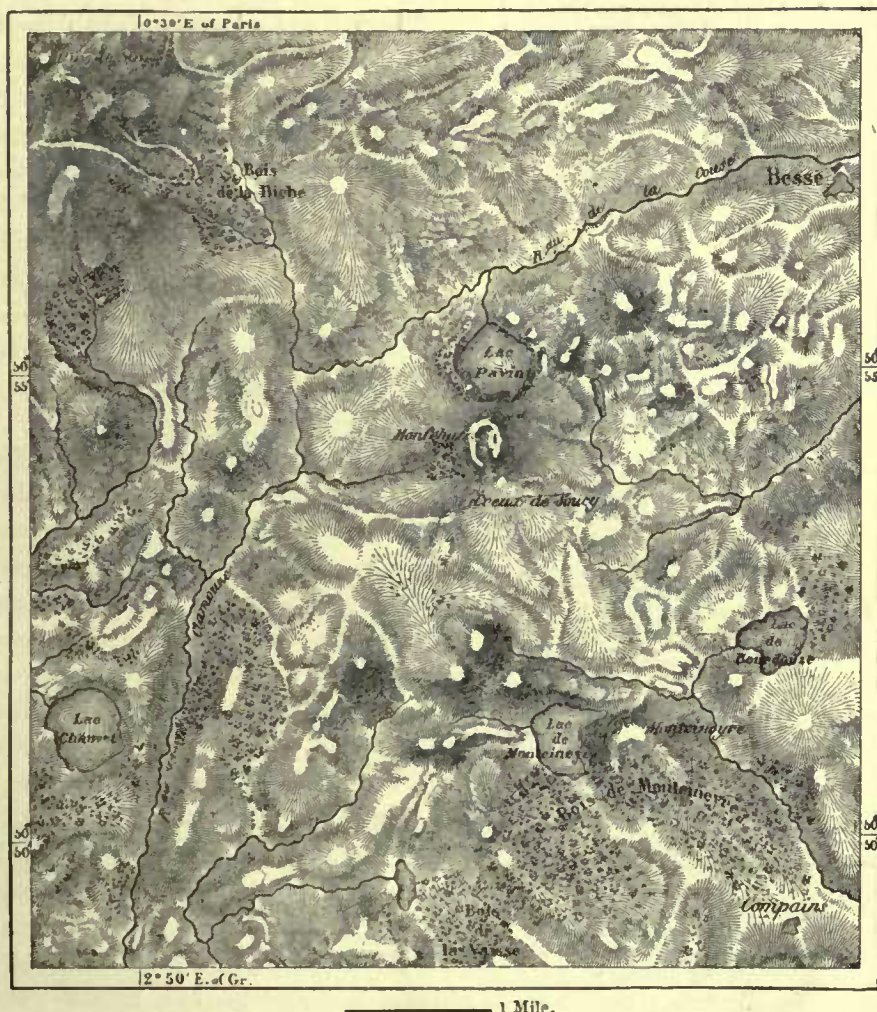
The basaltic plateaux of Cézallier, stretching from the Dordogne to the Allier in the east, separate the Mont du Cantal from the most ancient and conspicuous volcanic mass of Auvergne, that of Mont Dore. Though covering a smaller area than its neighbour of Cantal, it is here that the highest mountain of Central France, the Puy de Saney (6,180 feet), raises its head, surrounded by other peaks hardly inferior to it in altitude, such as the Puy Ferrant, the Puy de l'Aiguillier (5,076

feet), and the Cacadogne. No regular crater can now be traced, but one probably existed in the vicinity of Mont Dore (3,330 feet), a trachytic cone, near which the Dordogne and the Couze of Chambon take their rise. The beds of lava descend from this mountain, often in uninterrupted sheets, until they reach and spread themselves round its base. At a later period Mont Dore had its cap of ice, and glaciers descended from it to a distance of 25 miles.

When the great central volcano of Mont Dore became extinct, other vents

Fig. 138.—THE PUY OF SANCY AND THE LAKE DISTRICT.

Scale 1 : 80,000.



opened in its vicinity, and amongst these Mont Tartaret (3,156 feet) discharged its lavas, now covered with beeches and pines, right across the valley of the Couze, and, by drawing up the waters of that river, led to the formation of the Lake of Chambon (2,887 feet), the most delightful sheet of water in Auvergne, surrounded by meadows and trees, and having several small wooded islands.

The plateau to the north of Mont Dore is covered with volcanic cones of comparatively recent origin. Two of these, the Montsineyre (4,372 feet) and the Montchal (4,628 feet), are mirrored in small lakes, the one formed by the damming up of a rivulet, the other occupying an old crater. Amongst the many other lakes which fill depressions of this plateau, that of Pavin (3,925 feet) is distinguished by its aspect of solemn grandeur. The inhabitants formerly dreaded

it as the seat of evil spirits, but having been stocked with trout, it has lost its terrors. Its depth is 308 feet, and it is fed by subterranean streams.

Fig. 139.—THE CHAIN OF THE PUY DE DÔME.
Scale 1 : 100,000.



Thermal and mineral springs abound in this region, those of Mont Dore and of La Bourboule, near the source of the Dordogne, being the most frequented. The springs of St. Nectaire are the best known of those on the eastern slope, their water resembling that of Ems. Altogether there are no less than 200 springs, carbonate of soda associated with chloride of sodium predominating in the hot springs, whilst the cold ones are almost without exception charged with carbonic acid.

A chain of volcanic *puys* rising from the granitic plateau bounded by the valleys of the Allier and Sioule forms the termination of the volcanic region of Central France towards the north. Some of these puys are dome-shaped, others have the appearance of truncated cones; and craters and old lava currents, or *cheires*, can still be distinguished. The Puy de Dôme (4,805 feet), a dome-shaped mass of trachyte, is not only the highest summit of the whole range, but, on account of its regular shape and commanding aspect, is the most famous. A temple dedicated to Mercury formerly stood upon its summit, and a physical observatory has recently been

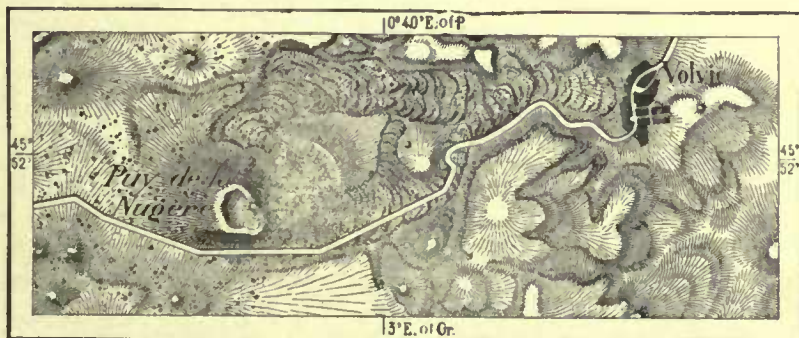
erected there. Immediately to the north of it lies the crater of the Little Puy de Dôme, locally known as the "Hen's Nest." The Puy de Côme (4,116 feet), near Clermont, has two distinct craters on its summits, from which broad streams of lava have poured down into the valley of the Sioule, filling the ancient river channel for the distance of more than a mile. The Sioule, thus dispossessed of its bed, has worked out a fresh one between the lava and the granite of its western bank. Its

neighbour, the Puy de Pariou, is remarkable on account of the sharpness of the brim of its crater. Farther north lies the dome-shaped Sarcouy, the clinkstone of which is used in the manufacture of filters and glass. But the most curious volcano of that region is the Puy Chopine, a dome rising from a crater formed of scoriæ, and consisting of granite placed "like the ham of a sandwich" between layers of basalt and trachyte. The range terminates in the north with two great volcanoes, the Puys of Louchadière and Nugère, from both of which immense sheets of lava extend to the east or west. At Volvic there are vast quarries, from which the towns in the neighbourhood procure most of their building stones.

Most of the cones to the south of the Puy de Dôme have craters on their summits. The combined lava streams of the Puys of Lassola, de la Vache, and Vichâtel have dammed up the valley of the Veyre, forming the Lake of Aydat (2,710 feet), upon the borders of which stood Avitacum, the residence of Sidonius Apollinaris. Amongst old volcanoes farther south are the Gravenoir

Fig. 140.—VOLVIC.

Scale 1 : 70,000.



1 Mile.

("black gravel"), thus called from the colour of its ash, and the Tazaunat, the crater of which is occupied by a lake. Near Aigueperse there is a "poison spring" discharging carbonic acid.

Numerous traces of volcanic activity are met with between the eastern slope of this range and the plain of the Allier; amongst others, the famous basaltic plateau of Gergovia (2,440 feet), the ancient capital of the country, defended by Vercingetorix against the legions of Julius Cæsar.

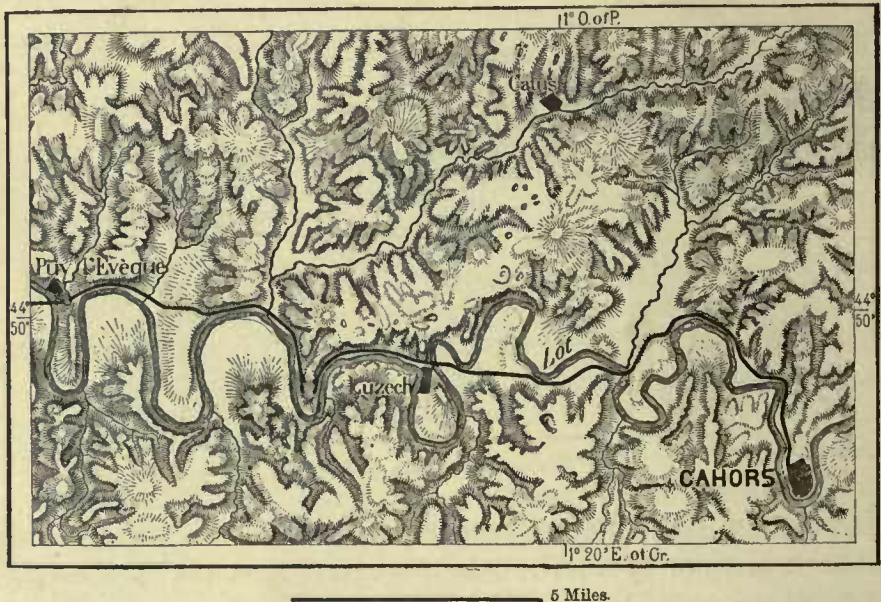
The integrity of many cones of the Auvergne is due, according to Sir Charles Lyell, to the loose porous nature of the soil, which instantly absorbs all moisture, and thus prevents the formation of rills. The water thus absorbed is discharged lower down as bounteous springs, some of which are valued for their medicinal properties, whilst others cover the rocky surfaces over which they flow with a coating of calc-tuff, and incrustate all objects exposed to their action. The most famous of these is that of St. Allyre at Clermont, which has built itself an aqueduct 250 feet in length, terminating in a superb arch thrown across the rivulet of Tire-

taine. Lecoq and other geologists trace the existence of limestones and gypsum in Auvergne to the action of this and other calcareous springs. They have contributed, too, towards the formation of the fertile plain of the Allier known as Limagne. This plain, during the miocene age, was a vast fresh-water lake, but long before the volcanoes surrounding it had ceased their activity this lake had been drained. The calcareous and other springs then deposited lime, silica, and gypsum, but it is to a layer of volcanic ashes that Limagne is indebted for its marvellous fecundity.

Amongst the mineral productions of the Auvergne are argentiferous lead, which is most abundant on the western slope of Mont Dôme, and coal, the carboniferous strata extending along the western foot of the volcanoes, from Mauriac to Moulins and Montluçon, being bedded with surprising regularity.

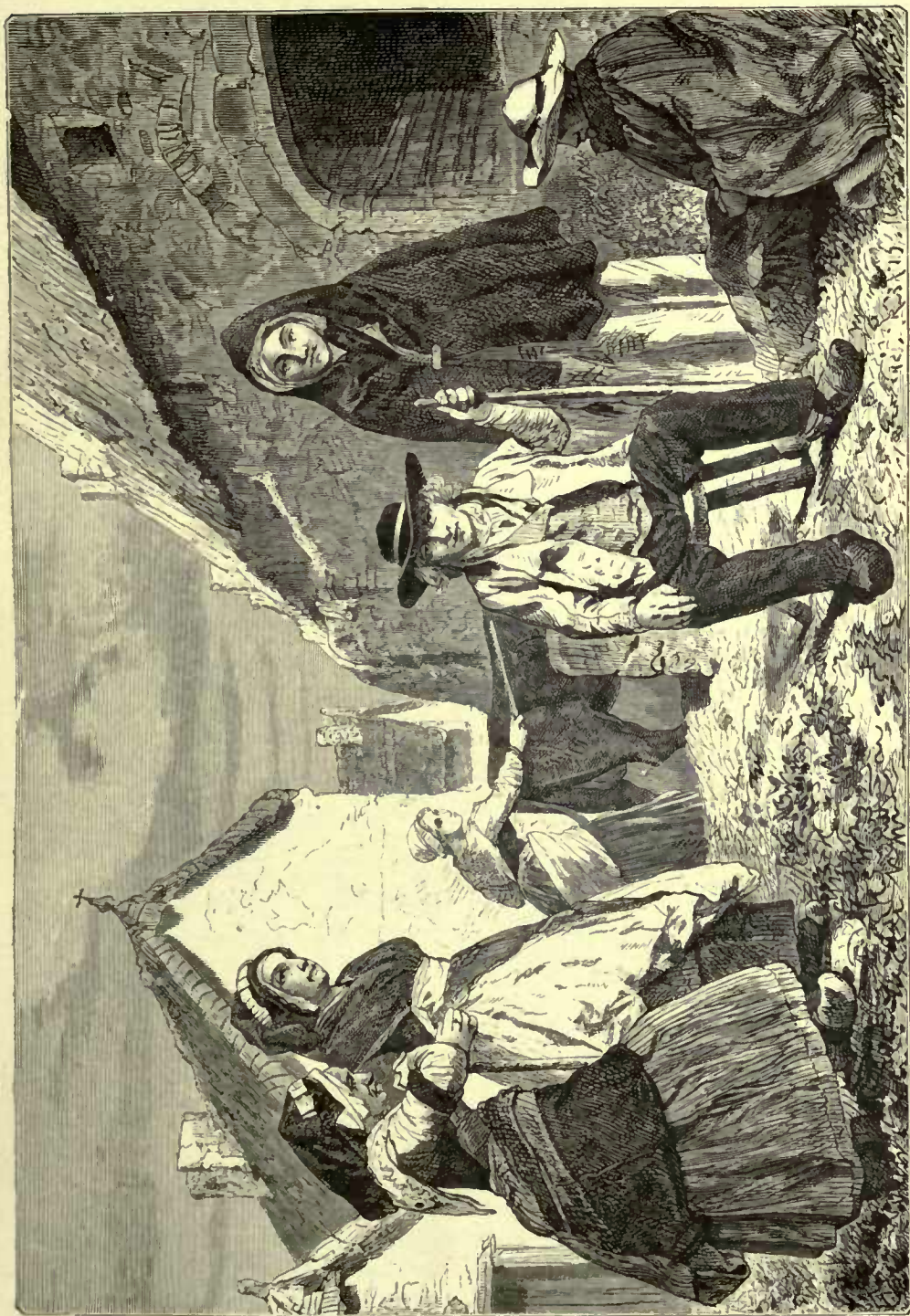
Fig. 141.—THE MEANDERINGS OF THE LOT.

Scale 1 : 230,000.



LIMOUSIN.

THE granitic platform of Auvergne penetrates like a blunt wedge between the Jurassic and tertiary rocks in the west, and forms a series of sterile plateaux or terraces, the most elevated of which is that of Mille Vaches ("thousand cows," 3,228 feet), in which the Vienne, the Vézère, and the northern tributaries of the Dordogne take their rise. The range of hills which thence extends to the west is even less elevated. These hills and plateaux have for the most part been robbed of their forests, and their sole covering consists of shrubs and heather, but the valleys which pierce them are often delightfully beautiful and of great fertility. Potter's earth abounds, and has given rise to much industry; metallic veins traverse the granite; and beds of coal are met with occasionally along a line

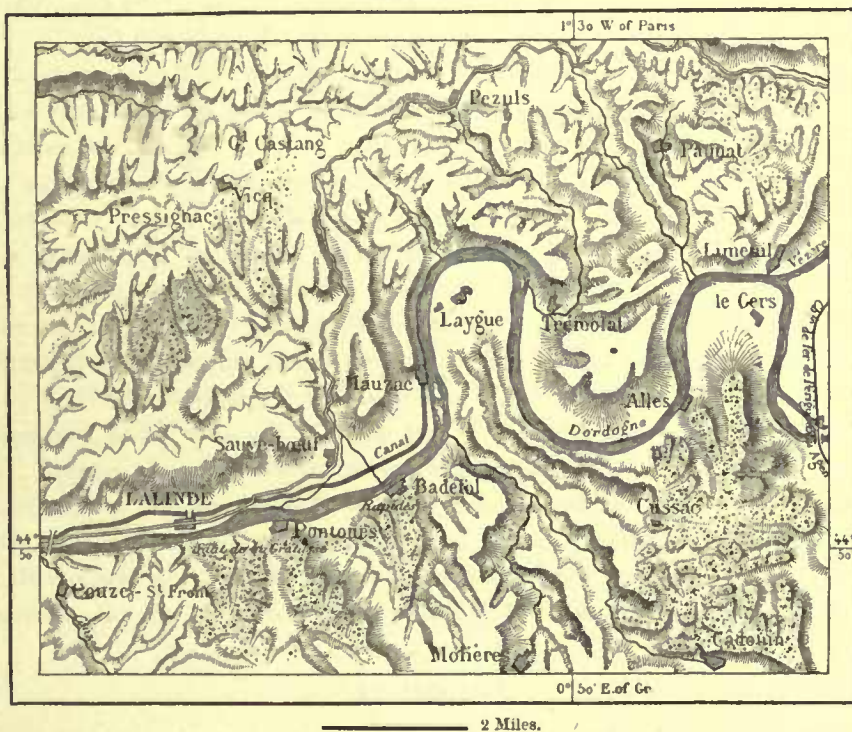


PEASANTS OF AUVERGNE.

separating the crystalline rocks from the sedimentary ones. The western prolongation of the plateau consists almost exclusively of Jurassic limestones and chalk. The limestone region lying between Figeac, Cahors, and Montauban resembles in every respect the causses of Aveyron (page 175), though, owing to its smaller elevation, it enjoys a milder climate. The hilly district farther north, traversed by the Dordogne and its tributaries, is very different in aspect. The sinuous course of the rivers traversing these secondary strata clearly marks out the difference between them and the granite. The Lot, flowing in a deep ravine excavated in Jurassic limestone, abruptly twists to the right and left, whilst

Fig. 142.—THE RAPIDS OF LALINDE.

Scale 1 : 150,000.



the Dordogne and other rivers, taking their course between gentle hills, wind about them in a more placid fashion.

Of all the rivers rising in Central France the Dordogne is the one which for the greatest part of its course belongs to the plateaux, differing in that respect essentially from the Loire and the Allier, which even in their upper course traverse ancient lake basins. The Dordogne, on the other hand, is confined within a narrow ravine until it debouches upon the lowlands of Aquitaine. At Bretenoux it escapes from the region of granite, and then winds about amongst limestone hills, its bed being frequently obstructed by rocks. One of these rapids, that of Lalinde, occurs only a few miles above Bergerac, and even below that

town navigation is interfered with by rapids. Though rendered navigable for a distance of 250 miles above its tidal head for barges drawing 12 inches, the Dordogne, owing to these rapids, is very little used as a commercial highway.

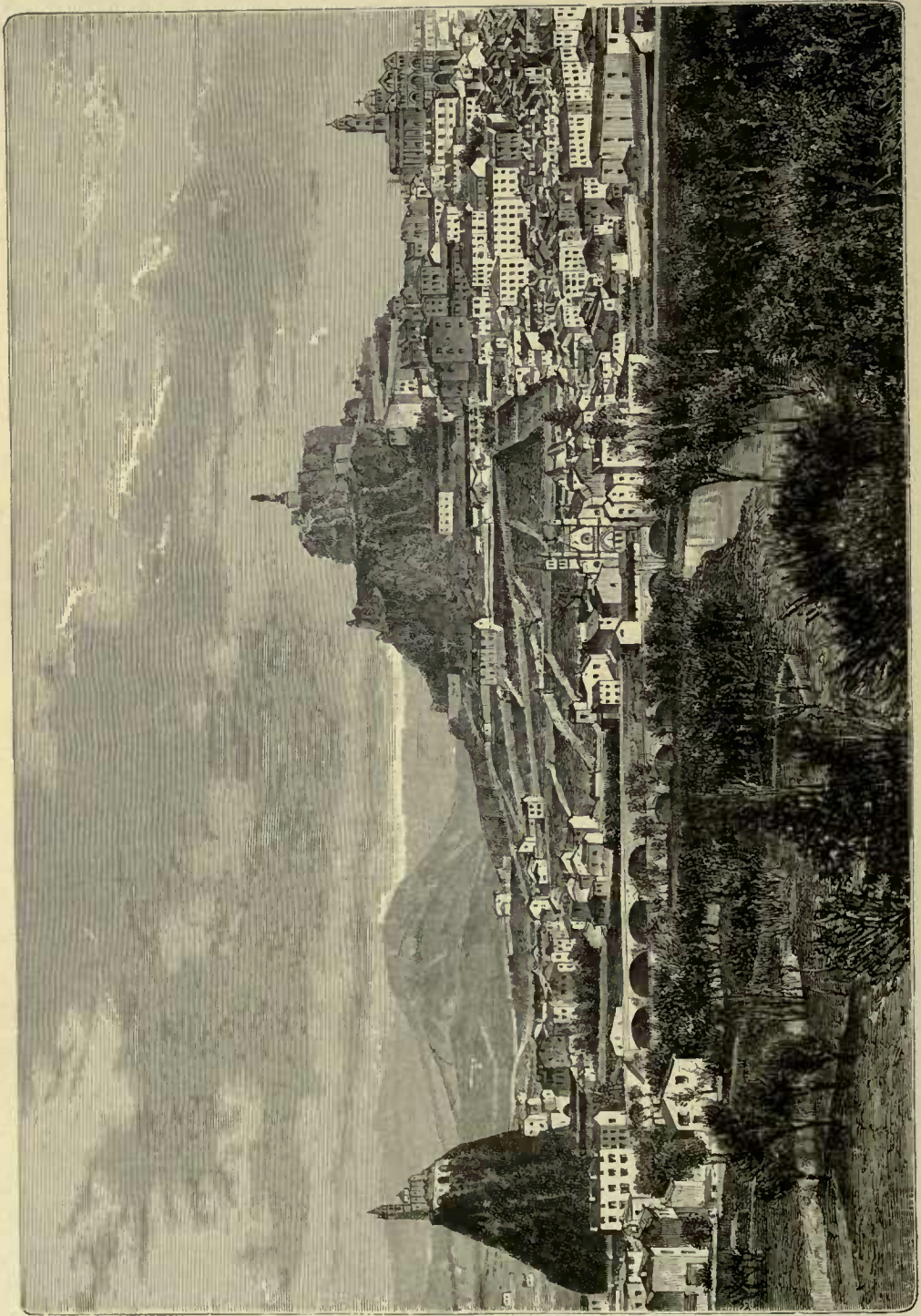
FOREZ, BEAUJOLAIS, CHAROLLAIS.

THE surface of the granitic plateau to the east of the Allier is far more varied than that to the west of the river, and more especially in the hills of Forez (5,380 feet) we meet with landscape scenery quite Alpine in its character, the bottom of the valleys being covered with meadows, and their slopes wooded. One of the most delightful valleys of this part of France, the scene of the pastoral plays of Honoré d'Urfé, is that of the northern Lignon. Beyond this valley porphyry enters largely into the structure of the hills, including the Bois-Noirs, or "black forest" (4,238 feet), and the range of La Madeleine (3,820 feet).

The wide valley of the Loire and the coal basin of St. Etienne, one of the most productive of France, separate the heights of Forez from the ranges forming the northern continuation of the Cévennes, and constituting the water-shed between the Mediterranean and the Atlantic. Granites predominate in these ranges, but are associated with a great variety of other rocks. The heights usually known as those of Lyonnais (3,293 feet) consist of granite and metamorphic rocks. The mountains of Beaujolais (3,320 feet) are composed of limestones, marls, and sandstones, pierced by porphyries which form picturesque promontories along the Saône, and extend westward across the valley of the Loire until they join the porphyries of Forez. In the hills of Charollais (2,540 feet) granite plays but a subordinate part, most of the area being occupied by Jurassic limestones and still more recent formations abounding in fossils. There are several coal basins, the best known amongst them being that of Le Creusot. The Canal du Centre, which joins the Loire to the Saône, passes across a depression in this range (1,100 feet) which completely severs the outlying porphyritic and granitic mountains of Morvan (2,960 feet) from the great central plateau of France.

INHABITANTS.

STERILITY of soil, an inclement climate, and remoteness from the great high-roads of commerce sufficiently account for the sparse population of the central plateau of France. Only the fertile plains of Limagne and of the Loire and the mining districts can boast of a population exceeding the average of France. In the coal basins of the Loire the population has doubled since the beginning of the century; but though the cattle breeders inhabiting the regions of pasturage have been benefited by this increase, the country, nevertheless, is not capable of supporting the whole of its children, and emigration to the more favoured regions of France is continuing steadily. Auvergnate canvassers are met with throughout France, and even in some of the neighbouring countries, and many of the new buildings in Paris have been constructed by masons imported from Corrèze, Haute-Vienne, and Creuse. The emigration from Cantal to Spain, first called into existence by



LE PUY-EN-VELAY.

the pilgrimages to the holy shrine of Compostella, where the monks of Aurillac had a church, has not yet ceased. The peasants of Ytrac and Crandelles, two villages to the west of Aurillac, are those who visit Spain most frequently, and this familiarity with the countries lying beyond the Pyrenees is said to be reflected in their customs, and even physique.

In former times the Auvergnates regularly returned to their homes to enjoy the fruits of their thrift. They kept aloof from strangers when abroad, and though honest, their love of gain supplanted all other feelings. They were hospitable and straightforward only when dealing with their own countrymen. In our own days, however, many Auvergnates never return to their native home, and become merged in the general population of modern France.

TOPOGRAPHY.

LOZÈRE.—This is one of the poorest regions of France, and its popular designation as Gévaudan—that is, country of the Gabales—is involuntarily associated in our mind with a barren, storm-beaten plateau. The rivers Lot and Tarn drain most of the department into the Garonne, only a small portion of it being drained by the Allier and the Ardèche, the former a tributary of the Loire, the latter of the Rhône. There are profitable lead mines (produce 435 tons of lead), but hardly any industry.

Mende (6,239 inhabitants), lying at a height of 2,460 feet above the sea, is looked upon as a place of exile by the functionaries who are stationed here. Coarse woollen stuffs are manufactured, and many strangers pass through the town in summer on their way to the sulphur springs of Bagnols, in the valley of the Lot. *Marvejols* (4,638 inhabitants), in a side valley of the Lot, manufactures coarse woollens. To the north of it, near the Truyère, lies Javols, the old capital of the Gabales, and still farther north the small town of *St. Alban* (1,148 inhabitants). *Florac* (1,845 inhabitants), near the Tarn, and in one of the cañons bounding the Causse of Méjean, and *Calas* (584 inhabitants), near which are lead mines, are the only places of any importance in the south, where Protestant Camisards and the dragoons of Louis XIV. waged a bloody war. *Châteauneuf-Randon* recalls the death of Duguesclin in 1380. The principal town on the railway which runs through the east of Lozère, up the valley of the Allier, is *Langogne* (3,228 inhabitants).

HAUTE-LOIRE includes the whole of ancient Velay, together with some adjoining districts, and though much of its surface consists of sterile granitic plateaux and sheets of lava, its population is relatively dense, for there are mineral treasures, fine pastures, and manufactures of ribbons and point-lace, known as *dentelles du Puy*.

Le Puy-en-Velay (19,010 inhabitants) was a great place of pilgrimage during the Middle Ages. The houses of the old town cluster round a venerable cathedral, a colossal statue of the Virgin surmounts the rock of Corneille, whilst an old chapel crowns the neighbouring Aiguille, or needle. The new town lies at the foot of

these hills, and contains the Government buildings, a museum rich in local antiquities, and several public monuments of merit. The manufacture of point and blond lace is the great business of the town, and indeed of the entire department. Fortunately the population is not wholly dependent upon this fluctuating branch of industry. Cattle are bred for the Lyons market, mules are exported to the Pyrenees, and the peasants of Velay thus come into contact with the outer world, and they no longer ostentatiously throw their knife upon the table when entering an inn. The neighbourhood of Le Puy abounds in natural curiosities, savage defiles, and fields of lava. The castle of *Polignac*, with its old well, 272 feet in depth, occupies a hill to the north-west of the town, and farther away, in the same direction, near *St. Paulien* (1,458 inhabitants), there are numerous caverns, and the romantic castle of Roche-Lambert, admirably described by Georges Sand. Other caverns, formerly inhabited, lie to the south-east of Le Puy, near the old hamlet of La Terrasse.

Yssingeaux (3,716 inhabitants), *St. Didier* (2,219 inhabitants), and *Monistrol* (2,299 inhabitants), in the eastern half of the department beyond the Loire, lie within the sphere of the great manufacturing town of *St. Étienne*, and, in addition or instead of lace, they manufacture ribbons, taffety, paper, cutlery, and cotton twist.

Brioude (4,643 inhabitants), on the Allier, is the capital of the poorest arrondissement of the department, which nevertheless possesses considerable resources in its argentiferous lead mines (at Paulhaguet) and coal (near *Längeac*, 3,530 inhabitants). A great part of this district formerly belonged to the famous abbey of *Chaise-Dieu*.

AVEYRON is the modern representative of Le Rouergue. Its principal rivers—Lot, Aveyron, and Tarn—discharge their waters into the Garonne. The greater portion of the surface consists of sterile *ségalas*, or rye-fields; but mineral treasures abound, and in 1875 there were produced 741,600 tons of coal, 75,000 tons of iron and steel, and 2,350 tons of zinc.

Millau (14,482 inhabitants), on the Tarn, is the largest town of the department, and some of the spirit of enterprise peculiar to the Protestants who inhabited it until the revocation of the Edict of Nantes survives to this day, and, in addition to agricultural produce, its inhabitants export leather gloves, dressed skins, cloth, and silk stuffs. *St. Affrique* (5,572 inhabitants), on a tributary of the Tarn, has played an important part during the religious wars as Millau, and its linens and leather enjoy a high reputation to the present day. *Roquefort*, a village in the neighbourhood, has been famous since the eleventh century for its cheese, which owes its excellent qualities to its being placed in natural caverns of equable temperature to “ripen.” In 1876 the milk of no less than 350,000 ewes was converted into 10,000,000 lbs. of cheese. “Bastard” caverns have been excavated elsewhere in the Cévennes, but the cheese placed in them does not acquire the properties of real Roquefort.

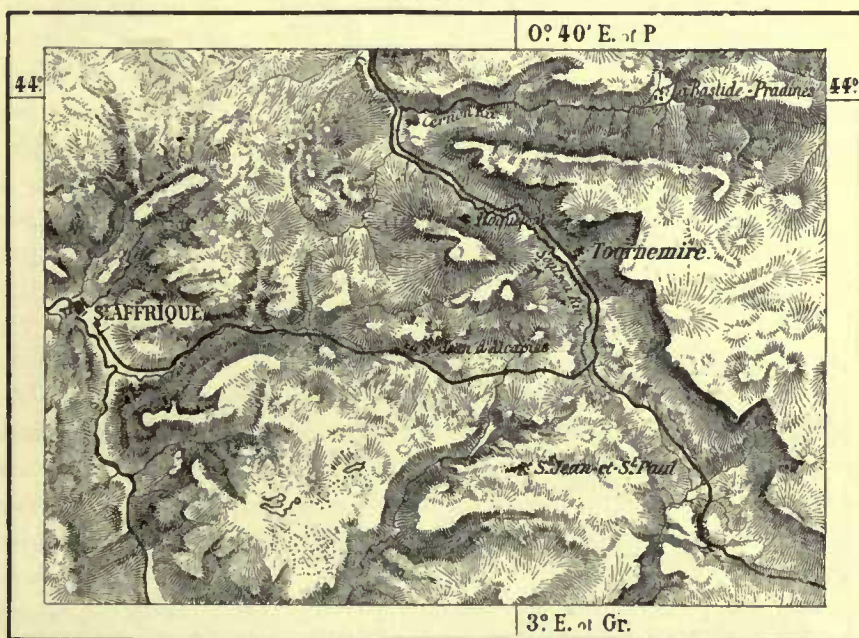
Rodez (12,881 inhabitants), on the Aveyron, with a Gothic cathedral, from the tower of which may be obtained a magnificent view of the surrounding country, is

an ancient city, still enclosed within mediæval walls, and supplied with water by means of a Roman aqueduct only discovered in 1856. A most productive coal basin lies to the north-west of that town, extending to the river Lot and beyond, its principal centres of population being *Aubin* (2,472 inhabitants) and *Decazeville* (5,968 inhabitants). The coal, unfortunately, is of inferior quality, but in spite of this, iron works, forges, foundries, machine shops, and glass works have sprung up near the mines, contrasting curiously with the ruined castles crowning the neighbouring heights. At *Cransac* there are mineral springs. The coal near this place took fire centuries ago, and still keeps burning.

Villefranche (7,819 inhabitants) is a curious old town, charmingly situated on the Aveyron, near the western frontier of the department. The north, including

Fig. 143.—ROQUEFORT.

Scale 1 : 160,000.



the valleys of the Lot, the Dourdon, and the Truyère, is equally noted for its picturesque scenery, though rarely visited. The principal towns there are *St. Geniez* (3,167 inhabitants), in the "country of Olt," and *Espalion* (2,580 inhabitants). *Conques* and *Bazouls* are delightful villages in the valley of the Dourdou.

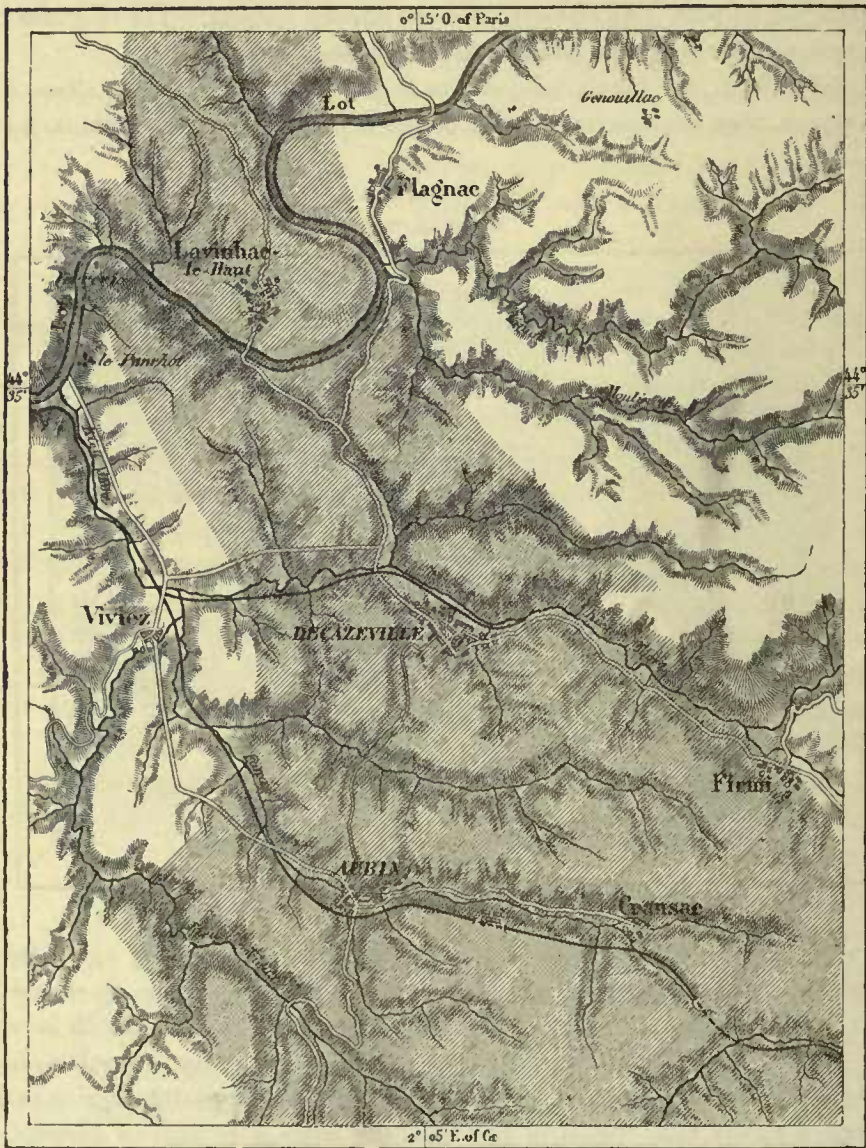
TARN, the ancient Albigeois, embraces a mountainous crystalline region in the east, and a fertile hilly region in the west, the latter a productive agricultural district, the former more adapted for the breeding of cattle and sheep. The coal basin of Carmaux, yielding about 250,000 tons a year, lies within the department.

Two towns in the picturesque valley of the Cérou, which traverses the northern portion of the department, contrast strangely with each other, the one, *Carmaux* (5,384 inhabitants), having but recently grown from a small village into an impor-

tant town, owing to its vicinity to productive coal mines; whilst the other, *Cordes* (2,115 inhabitants), perched upon its high rock, has retained all the characteristics of a town of the thirteenth century.

Albi (15,874 inhabitants), the principal town on the Tarn, the birthplace of

Fig. 144.—DECAZEVILLE.
Scale 1 : 90,000. The Coal Basin is shaded.



Eche de Beaumont

Lapeyrouse, and the original seat of the Albigenses, upon which the hand of the northern crusaders weighed heavily, abounds in curious old buildings, including a cathedral built in brick, a fortified archiepiscopal palace, and a remarkable bridge

over the Tarn. Near it are many old castles. At *Lescure* there is an old church said to have been built by the Albigenes, and still farther to the east a series of rapids, known as Saut-de-Sabo, stops the navigation of the Tarn. The lower valley of that river is noted for its fertility. *Gaillac* (6,099 inhabitants) was the great centre of the wine trade during the dominion of the English, whilst *L'Isle d'Albi* (1,743 inhabitants) and *Rabastens* (3,108 inhabitants), in addition to vineyards, have a few manufactories.

Castres (20,520 inhabitants), the great manufacturing centre of the department, occupies a favourable position on the Agout, which is joined here by the Thoré. The manufacture of cloth is carried on there on a large scale, and there are also dyeing-houses, tan-yards, paper-mills, and machine shops. *Mazamet* (10,770 inhabitants), on the Thoré, has likewise grown into an important manufacturing town. and there as well as at *St. Amans-Soult* (2,084 inhabitants), the birthplace of Marshal Soult, in the same valley, similar industries are carried on as at Castres. Ascending the Agout, we pass *Roquecourbe* and *Vabre*, two manufacturing villages, and finally reach *Lacaune*, where there are marble quarries and manufactories of spurious Roquefort cheese. *Lavaur* (4,937 inhabitants), the principal town on the Lower Agout, has silk and cotton mills, whilst *Graulhet* (4,435 inhabitants), in a lateral valley, engages more especially in the dressing of hides.

Sorèze (1,390 inhabitants), near the southern boundary of the department, to the south of Castres, has become famous through its college, founded in the thirteenth century by Benedictine monks.

Lor is the old province of Quercy, and consists for the greater part of comparatively sterile limestone plateaux, traversed by the river after which it has been named. Only its north-eastern portion is mountainous.

Figeac (5,660 inhabitants) is the natural centre of this mountain region, but although three lines of railway connect it now with the rest of France, it has quite preserved its mediæval aspect. The smiling valley of the Dorogne contrasts most pleasantly with the barren mountain region extending to the north of Figeac. It abounds, too, in historical remains. At *Martel* (1,617 inhabitants) there are tumuli and mediæval ruins, and Puy d'Issoli disputes with other places the honour of being the site of ancient Uxellodunum. *Rocamadour*, in a side valley of the Dordogne, is one of the most renowned places of pilgrimage in France, its origin, like that of the neighbouring town of *Gramat* (2,040 inhabitants), dating back to a very remote age. At Gramat there are mineral springs and a remarkable swallow somewhat like the "fountain of Italy," near Alatri, and known as Le Gouffre de Bède.

Ascending the heights immediately in the rear of Gramat, we find ourselves upon the barren *cause*, or limestone plateau, of the Lot, the chief town of which is *Gourdon* (2,688 inhabitants). *La Bastide*, a poor village, was the birthplace of Murat. The curiosities of this plateau include sinks, grave-hills, and dolmens.

Cahors (12,190 inhabitants), the Divona "fountain" of the ancient Gauls, is named now after the tribe of the Cadurei, whose capital it was. It is the principal

town on the Lot, and boasts of Roman ruins and remarkable mediæval buildings, including a cathedral and a fortified bridge. In the time of the Romans Cahors exported linens and mattresses; it is now a great centre of the wine trade. The valley of the Lot is one of the most productive wine districts of France, and from *Cajarc* in the east, to *Puy-l'Évêque* (1,241 inhabitants) in the west, vineyard adjoins vineyard. Castles abound in this portion of the country; and *Luzsch* has been fixed upon by a scientific commission appointed by the late emperor as the site of ancient Uxellodunum. Valuable deposits of phosphate of lime have been discovered in the hills near Cahors.

CANTAL, which adjoins Lot in the east, is covered with forests, barren plateaux, and mountains. Its inhabitants, to judge from their physique, are the purest of Celts. The population is decreasing, for thousands leave their homes annually in search of work, many of whom never return. The breeding of cattle and sheep is of considerable importance, and so-called Dutch cheese is manufactured in the filthy cabins, or burons, scattered over the plateaux.

Aurillac (10,399 inhabitants) the capital, lies at the foot of the old volcano of Cantal, in the picturesque valley of the Jordane, which, a few miles below the town, at Arpajon, joins the valley of the Cère. Aurillac was a place of importance as early as the ninth century. The most remarkable monument of the Middle Ages is the old abbatial castle, which the citizens captured and partly razed to the ground in 1233. The environs are delightful, more especially the valleys of the Jordane and the Cère. *Vic-sur-Cère*, in the latter, was the capital of the barony of Carladès during the Middle Ages, and is much frequented now for its mineral waters. The baronial stronghold of *Carlut*, on a high basaltic rock to the south, was destroyed by order of Henri IV. *Mauris* (1,949 inhabitants), on the road to Figeac, has important fairs. The arrondissement of *Mauriac* lies wholly within the basin of the Dordogne, and, consisting for the most part of upland forests and pastures, is dependent upon cattle-breeding and the manufacture of cheese. *Salers*, otherwise of no importance, is famous on account of its peculiar race of cattle, and *Mauriac* (2,357 inhabitants) carries on a brisk trade in cattle, mules, horses, and sheep, besides exporting home-made linens and wooden ware.

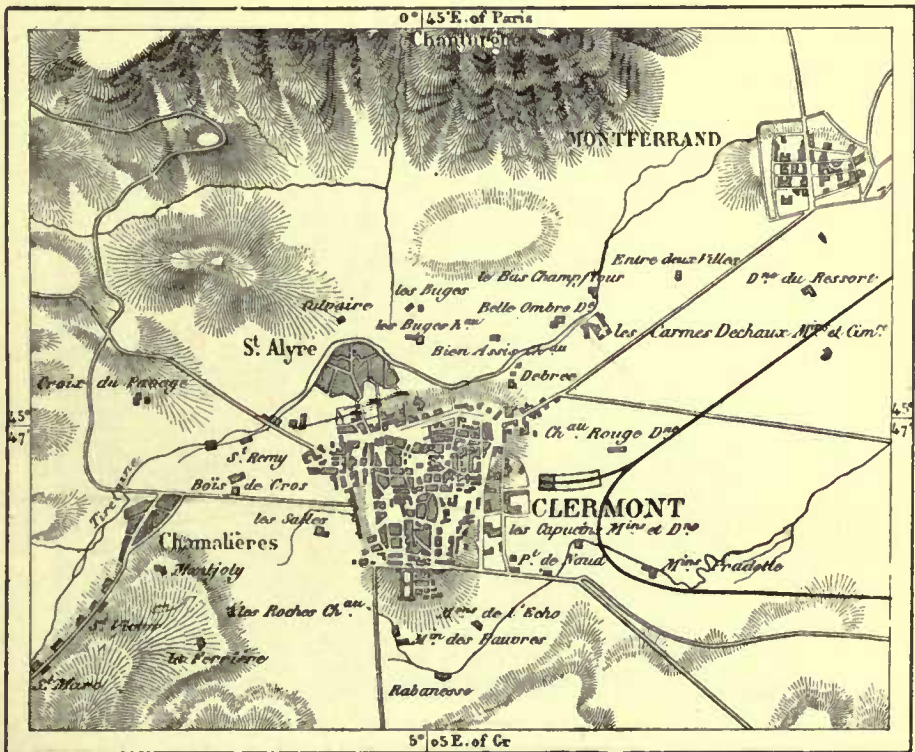
The eastern slope of Cantal is inferior in natural beauties, but upon the whole very fertile. The Planèze, an uninviting plateau, is known as the granary of Auvergne. The rounded hills of La Margeride, Luguët, and Cézallier offer but little variety, but in the valleys of the Truyère and the Alagnon we meet with many picturesque promontories of basalt. One of these is crowned by the old city of *St. Flour* (4,848 inhabitants), the most widely known place of Upper Auvergne, with potteries, manufactures of blankets and of the textile fabrics known as *marègues*, but not of brazier-ware, as is popularly supposed. *Murat* (2,854 inhabitants) and *Massiac* (1,251 inhabitants), on the line of rail which connects Bordeaux and Lyons, enjoy a favourable position for commerce. Near *Pierrefort*, an old stronghold commanding a tributary of the Truyère, lies the experimental farm of M. Richard; and *Chavagnac*, to the north of Murat, was the birthplace of

Lafayette. Antiquities of prehistoric age, including cave dwellings and dolmens, abound in this part of Cantal.

PUY-DE-DÔME includes the greater portion of Lower Auvergne, and is not only one of the largest departments of France, but the wide and fertile valley of the Allier and its mild climate enable it to support a comparatively dense population. *Clermont* (37,074 inhabitants), the capital, occupies a slightly elevated platform rising in the midst of an amphitheatre of mountains, the most elevated of which is the Puy, which has given its name to the department. *Clermont*, the *Nemetum* of the Romans, was a populous town in the time of the Gallo-Romans, when its

Fig. 145.—CLERMONT AND MONTFERRAND.

Scale 1: 40,000.



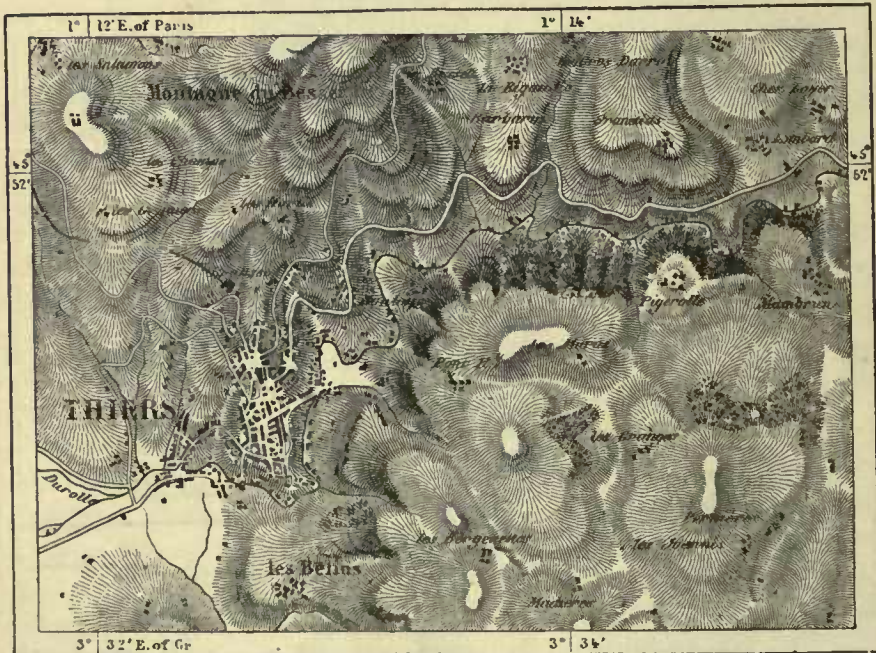
temple of Mercury proved a great focus of attraction. The Franks, and after them the Saracens, destroyed the town, and Philip the Fair established the royal courts in the neighbouring Montferrand. The latter, however, lost these advantages when the courts of law declared Clermont to be the property of the Crown. Montferrand, since that time, has been deserted, and life pulsated all the more briskly through the streets of Clermont. Most of the houses are built of black lava, and their sombre aspect contrasts strangely with the smiling country around. There are several remarkable buildings, including a magnificent Gothic cathedral and the Byzantine church of *Notre-Dame*, near which the stone upon which sat Pope Urban II. when presiding over the Council of *Nemetum* is pointed out.

The town is noted for its semolina and other farinaceous preparations, its confectionery and apricot patties. Cutlery, wooden ware, and textile fabrics are likewise produced, and a brisk trade in agricultural products carried on. At the same time Clermont has not forgotten that it gave birth to Pascal, and there are several fine museums. The environs are highly interesting to geologists. An incrusting spring rises in the suburb of St. Alyre, the thermal springs of St. Mart are above the town, and old volcanoes and currents of lava are met with in every direction.

Riom (10,004 inhabitants), formerly the second capital of Lower Auvergne, occupies a site very much like that of Clermont, and is likewise built of sombre lava. It is famous on account of its law school, and has given birth to

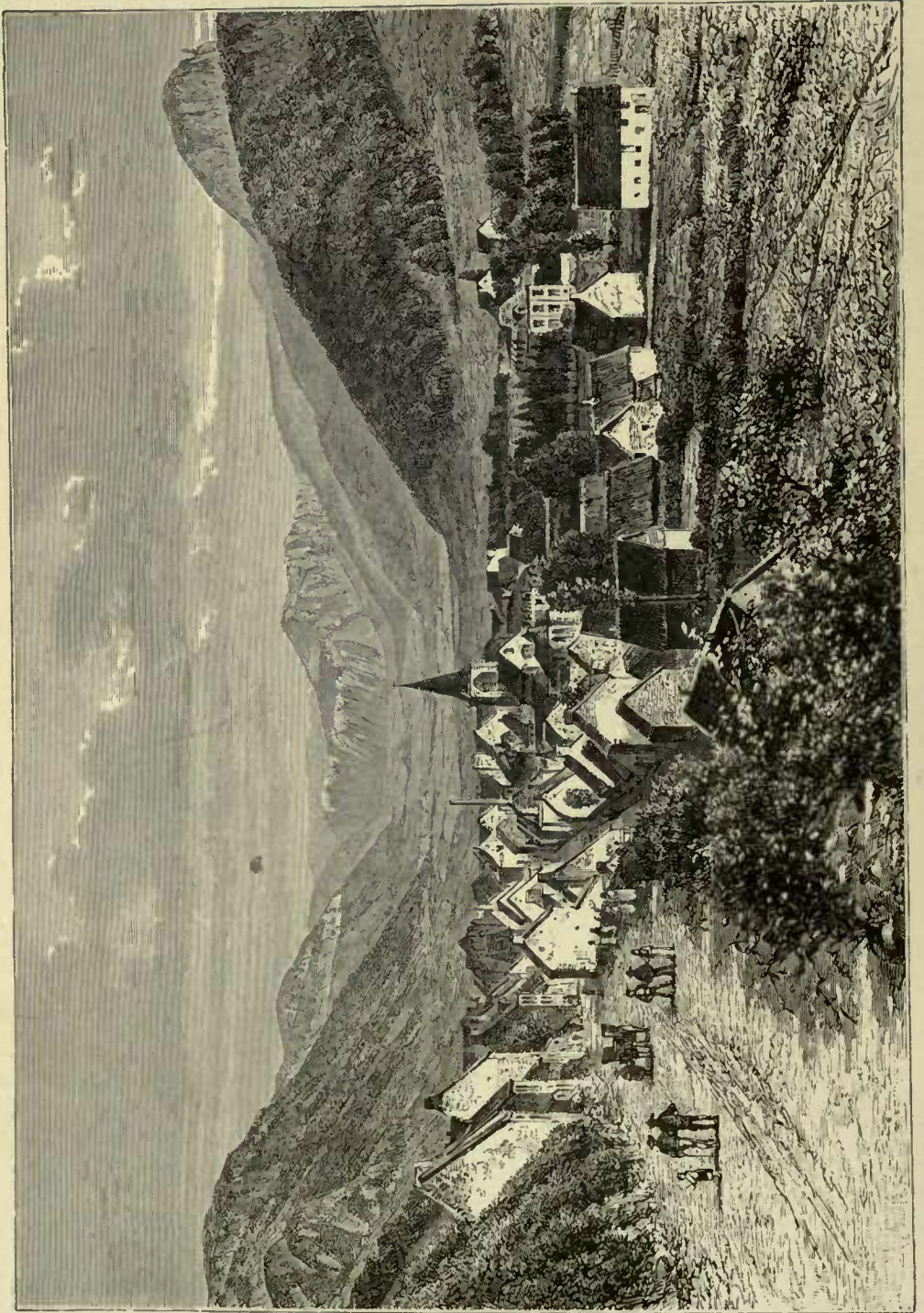
Fig. 146.—THIERS.

Scale 1 : 40,000.



some of the most illustrious lawyers of France. The environs are delightful. *Volvic* (2,265 inhabitants), which supplies Riom with building stone and water, is commanded by the ruined castle of Tournoël, whence the eye ranges over the verdant plains of La Limagne, and as far as the town of *L'Aigueperse* (2,410 inhabitants), in the north-east, the wooded heights of Montpensier, the castles of Effrat and Randan, and the busy little town of *Maringues*.

Thiers (11,182 inhabitants), in the valley of the Durolle, and suspended, as it were, upon the steep slopes of the Hill of Besset, is mainly engaged in the manufacture of coarse cutlery, but there are also paper-mills, &c. *Châteldon*, the old centre of industry in this part of the country, has dwindled down into an insignificant village, visited only for the sake of its cold mineral springs.



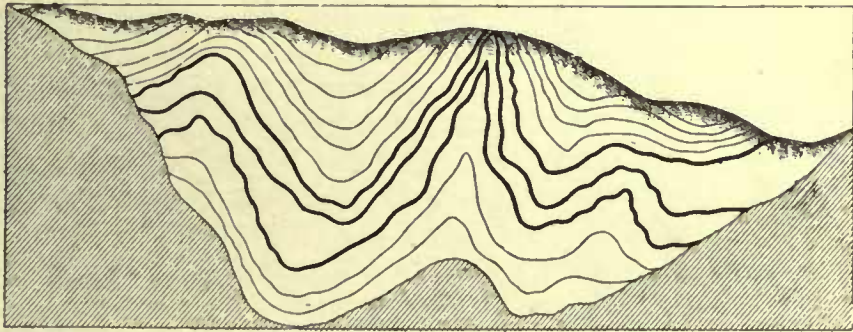
VALLEY OF MONT DORE-LES-BAINS.

Ambert (3,882 inhabitants), the old capital of Livradois, is the only town in the upper valley of the Dore, and engages in the manufacture of linen, cloth, and paper. *Arlanc* (1,840 inhabitants) and several other villages in that valley likewise manufacture coarse linens and lace. There are no towns whatever in the hilly district lying between the valleys of the Dore and the Allier, for *Billom*, which had its own mint during the Carlovingian age, and a famous school in the thirteenth century, has dwindled down into a poor village.

Issoire (6,089 inhabitants), the principal town on the Allier, was almost levelled with the ground during the religious wars, and the Duke of Alençon erected a column inscribed "Here stood Issoire!" The town has now recovered from these disasters, but is principally known on account of the natural curiosities met with in its vicinity, and more especially in the valleys of the Couze-Pavin, the Northern Couze, and the Veyre, all of them rising in the volcanic region in the west, and descending to the Allier. *Brassac*, on the Allier, close to the western frontier of the department, has become known through its coal-fields.

Another mineral district lies in the north-west, being intersected by the valley of the Sioule. At *Pontgibaud* there are argentiferous lead mines; at *St. Gervais*

Fig. 147.—SECTION OF THE CARBONIFEROUS STRATA OF ST. ÉLOY.



coal mines; at *Menat* deposits of tripoli; at *Château-neuf* numerous mineral springs, cold and warm; and at *St. Éloy* coal mines. The valley of the Dordogne, in the south-west, is visited principally on account of its famous hot springs of *Mont Dore* and *Bourboule*, the latter being richer in arsenic than any others discovered hitherto.

CORRÈZE lies almost wholly within the basin of the Dordogne, of which the Corrèze is merely a tributary. Its eastern portion consists for the most part of elevated granitic plateaux affording scant pasturage to herds of cattle. *Ussel* (2,822 inhabitants), its principal place, is known rather on account of its claiming to be the representative of ancient Uxellodunum than for its woollen stuffs, which are also manufactured at *Meymac* (1,570 inhabitants) and other villages, and exported from *Bort* (2,298 inhabitants), on the Dordogne, here bounded by columns of basalt. At *Argentat* (2,094 inhabitants) the Dordogne becomes navigable for barges.

Tulle (11,038 inhabitants), on the Corrèze, in the centre of the department, is

mainly indebted for its prosperity to its being the seat of a government small-arms factory employing 1,500 workmen. The manufacture of the kind of lace named after this town has ceased long ago. The neighbourhood abounds in wild gorges and picturesque waterfalls, amongst which are those of Montane and Gimel. *Brive* (9,417 inhabitants), also on the Corrèze, is by far the most pleasant town of the department, its fine cathedral, ancient walls, and reddish hills presenting a delightful *ensemble*. The castle of *Turenne*, to the south, is the ancestral home of the famous captain of that name.

The valley of the *Vézère*, which joins the *Corrèze* a few miles below *Brive*, abounds in picturesque sites. Ascending it, we pass *Allasac* (1,338 inhabitants),

Fig. 148.—TAYAC AND LES EYZIES, ON THE VÉZÈRE.

Scale 1 : 90,000.



an ancient village; *Uzerehe* (2,146 inhabitants), one of the towns claiming to be the ancient *Uxellodunum*; and *Treignae* (1,772 inhabitants), where the manufacture of arms is carried on. A stud for breeding horses has been established close to the old castle of the Marchioness of *Pompadour*, in the west.

DORDOGNE includes nearly the whole of the old province of *Périgord*, together with portions of adjoining districts. The rivers which traverse it divide it into several distinct regions. The granitic plateau of *Nontronnais*, in the north, is barren; in the south there are extensive forests, and between the *Isle* and the *Dordogne* also heaths, now gradually being brought under cultivation. There are

iron mines, iron works, and paper-mills, but Périgord no longer monopolizes the trade in truffles.

Sarlat (4,521 inhabitants), the capital of the south-eastern arrondissement, is an old city carrying on some export trade through Vitrac, on the Dordogne. Close to the latter are *Domme*, a picturesque old village, and the mediæval castle of *Beynac*. The principal places in the valley of the Vézère are *Terrasson* (2,586 inhabitants), *Montignac* (2,561 inhabitants), and *Le Bugue* (1,685 inhabitants), which export iron, wine, and truffles. The environs of *Le Bugue* are famous for their caverns, which have yielded prehistoric remains of the highest interest, and some of the more remarkable of which are near the villages of *Tayac* and *Les Eyzies*, on the Vézère.

Descending the Dordogne, we pass *Lalinde* (857 inhabitants), and reach *Bergerac* (10,610 inhabitants), which exports wines, but is merely a shadow of what it was before the revocation of the Edict of Nantes. In the vicinity there are several mediæval castles, including those of *Montaigne*, the birthplace of the famous writer of that name.

Périgueux (23,290 inhabitants), the capital of Périgord, stands on the Isle. It abounds in Roman and mediæval ruins, but its glory is the church of *St. Front*, a huge basilica, built in the tenth century, in the purest Byzantine style. Coach-building, the manufacture of cloth, the casting of iron, and other industries are carried on at *Périgueux*, as well as a brisk commerce; but the other towns and villages of the valley are hardly remarkable for anything but ruins and historical associations. *Hautefort* is commanded by the castle which *Bertrand de Born*, the warrior and troubadour, inhabited. *Thiviers* (2,114 inhabitants) exports cattle and cheese, and manufactures earthenware. The lower valley of the Isle is one of the most productive agricultural districts of France. The most important towns there are *Mussidan* (1,886 inhabitants) and *Montpont* (1,697 inhabitants).

Brantôme (1,292 inhabitants), with the ruins of an abbey; *Bourdeilles*, with two old castles and curious grottoes; and *Ribérac* (1,818 inhabitants), the capital of the forest district known as *La Double*, are the principal places in the picturesque and well-cultivated valley of the Dronne, which forms the boundary between French and the Romaic dialect, known as *Périgourdin*.

At *Nontron* (2,378 inhabitants), in the extreme north of the department, are forges and cutlery works, in which knives with box-wood handles and movable copper ferrules are manufactured.

HAUTE-VIENNE includes a portion of Upper Limousin, and lies wholly upon a granitic plateau, having an average elevation of 1,600 feet, and intersected by the river *Vienne* and its numerous tributaries. The soil, however, is not very favourable to agriculture, and the breeding of cattle, pigs, and horses is the chief occupation. Chestnuts form the principal food of thousands of the population. Excellent kaolin and potter's earth are found.

St. Yrieix (3,522 inhabitants), a town founded in the sixth century, in the extreme south of the department, has potteries, supplied with raw material from the clay pits in its vicinity. The south-western portion of the department abounds

in feudal castles, from one of which, near *Châlus* (1,425 inhabitants), was shot the arrow which mortally wounded King Richard Cœur de Lion in 1199. *Rochechouart* (1,754 inhabitants) likewise boasts of a magnificent castle, rebuilt in the fifteenth century.

The Vienne flows past *Eymoutiers* (2,228 inhabitants), *St. Léonard* (3,464 inhabitants), where Guy-Lussac was born, and the industrial village of *Pont-de-Noblat*, and having been reinforced by the Thaurion, it washes the foot of the prominent hill upon which rise the houses of *Limoges* (55,097 inhabitants), the most important town on the western slope of the granitic plateau of Central France. Originally the town owed its rapid growth to its favourable geographical position on the high-road connecting Orleans with Bordeaux; but not being a great railway centre, nor having the disposal of a navigable river, it has somewhat lost its ancient importance. Only very few traces of Roman age exist now, but mediæval buildings abound, the most noteworthy being a Gothic cathedral and a bridge. Amongst the old "rows" still existing, that of the Butchers is the most curious, its stone houses being ornamented with wood carvings. Limoges is famous for its ceramic industry. It no longer produces such fine enamelled metal-work as in the Middle Ages, but several thousand workmen are now engaged in the manufacture of china, besides which there are cotton, woollen, linen, and paper mills.

The towns lower down on the Vienne are equally industrious. Passing the picturesque valley of the Briance, which opens on the left, and leads to *Pierre-buffière*, the native village of Dupuytren, we reach *Aixe* (2,328 inhabitants), where there are mills and tan-yards; and still lower down, *St. Junien* (5,736 inhabitants), with paper and oil mills, and manufactories of china.

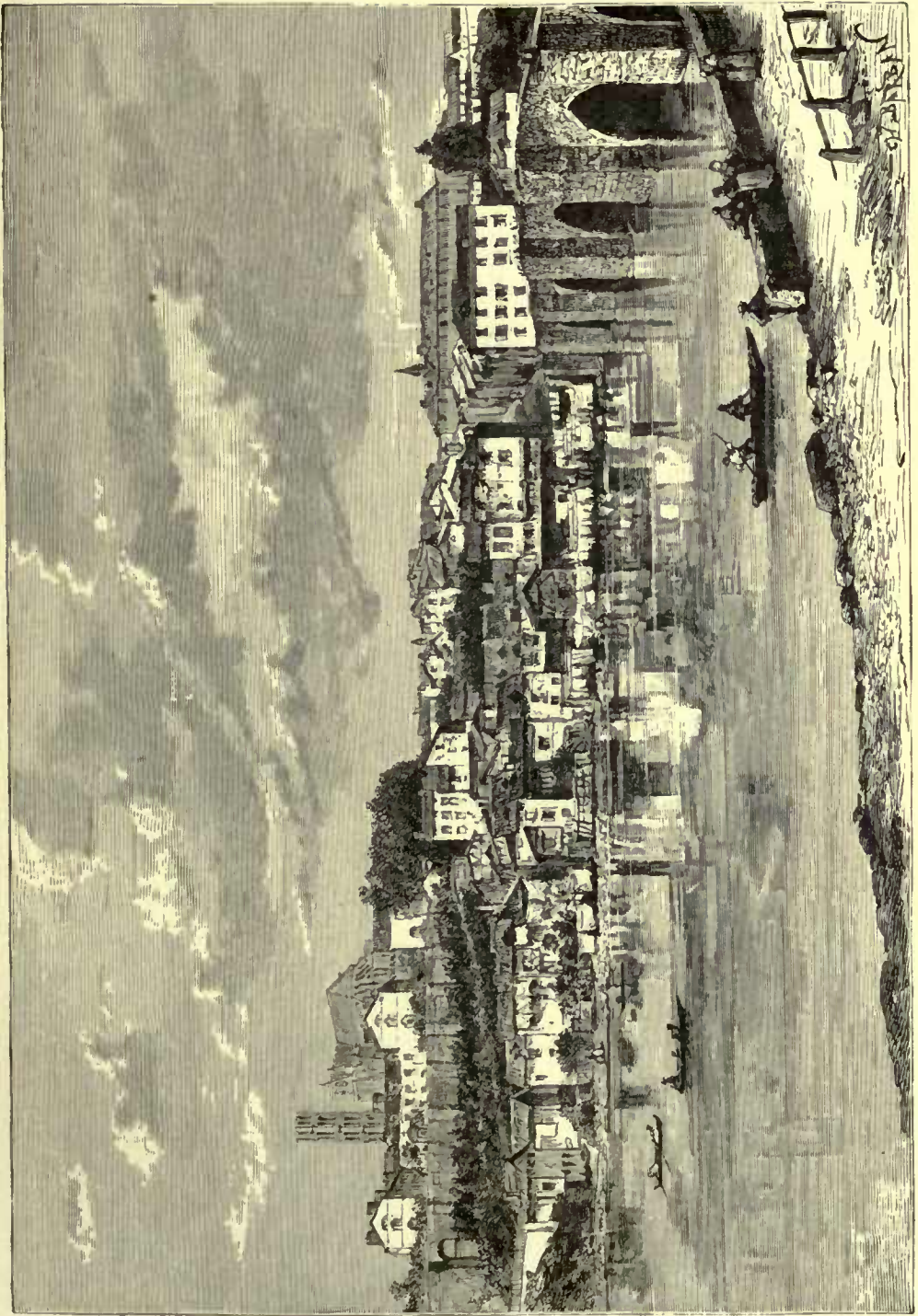
The north of the department is sparsely populated, but abounds in picturesque scenery, notably in the valley of the Gartempe. The principal towns there are *Bellac* (3,252 inhabitants) and *Dorat* (2,322 inhabitants).

CREUSE, thus named after a river flowing through a deep ravine carved into the granitic plateau, includes the greater portion of the old province of Marche. It is by no means a fertile country, but cattle-breeding is carried on with fair results, and its coal mines have given rise to a certain amount of industry.

Bourganeuf (2,745 inhabitants), on the Thaurion, carries on the same industries as Limoges, its manufactories being supplied with fuel from the neighbouring coal mines of *Bosmoreau*. Here are the ruins of an old priory with a Moorish tower, in which Zizim, a brother of Bajazet II., was kept a prisoner.

Aubusson (6,427 inhabitants) is the principal manufacturing town on the Creuse. It is said to have been founded by the Saracens, and has been famous ever since for its carpets, the designs for which, in the present day, are supplied from Paris. *Felletin* (2,913 inhabitants), a little higher up on the same river, likewise manufactures carpets. The elevated table-land on both banks of the Creuse abounds in cromlechs. *Ahun* (1,047 inhabitants) and *Lavarciex* (3,617 inhabitants) are the centres of a productive coal district, which yielded 277,000 tons in 1875.

Guéret (4,973 inhabitants), on a plateau between the Creuse and the Gartempe,



LINOGEN.

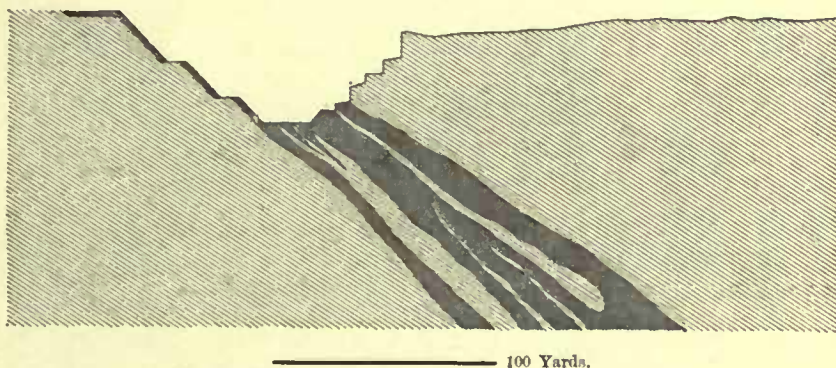
is the capital of the department, but not otherwise remarkable. The whole of this district of the old province of Marche abounds in prehistoric and mediæval remains, the vicinity of *La Souterraine* (2,829 inhabitants) being especially rich in them.

Boussac (990 inhabitants) is the only place of note in the valley of the Little Creuse, and about 6 miles to the south of it, near *Toulx St. Croix*, may still be traced the triple enceinte of an ancient city of the Celts.

The valleys of the Tardes and Cher, which rise in the eastern portion of the department, delight by their verdure; but the plateau through which they flow is arid, and yields only a poor return to its cultivators. One of the many revolts of the peasantry originated here, and it is supposed that the name of *croquants*, by which its participators were designated, is derived from the village of *Crocq. Chambon* (1,433 inhabitants) is the principal place in the valley of the Tardes. Near it is *Évauc* (1,611 inhabitants), with sulphur and ferruginous springs.

ALLIER includes the old province of Bourbonnais, and is named after the fine river which intersects it from north to south. The Cher crosses the western

Fig. 149.—THE COAL MEASURES OF BÉZENET (COMMENTRY).



portion of the department; the Loire washes its eastern boundary. There are mountains in the south, but the greater portion of Bourbonnais lies beyond the limits of the granitic plateau, and the valleys of the Allier and the Loire are of considerable width. Up to the middle of this century the department was almost wholly agricultural, but the development of its coal and iron mines has wrought a remarkable transformation.*

Mouluçon (21,904 inhabitants), on the Cher, has quadrupled its population in the course of a single generation, and aspires to become the Manchester of France. The old feudal city, perched on a rock, is environed by the fine streets of the modern town. The plate-glass manufactory of St. Gobain is the most considerable establishment of the town. Mouluçon is supplied with fuel from the neighbouring coal basin of *Commentry* (9,789 inhabitants), one of the most productive of all France. Near the village of Bézenet the coal seams are 45 feet in thickness. They caught fire in 1816, and burnt until 1840, when a rivulet was diverted from its course and soon inundated the mines. *Néris* (2,190 inhabitants),

* In 1875 the department produced 944,500 tons of coal and 120,800 tons of iron and steel.

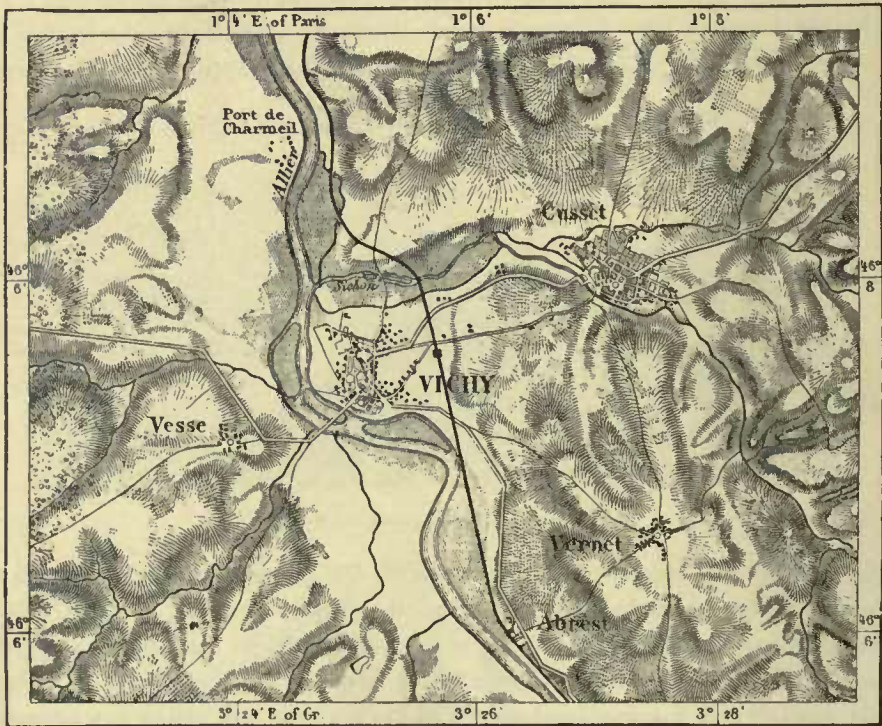
close to Montluçon, is the *Aquæ Neri* of the Romans, and its hot springs still attract many visitors.

Ébreuil (2,206 inhabitants) and *St. Pourçain* (3,465 inhabitants) are the principal towns in the valley of the Sioule, which joins that of the Allier a few miles before the town last named. *Gannat* (5,042 inhabitants), on the *Andelot*, another tributary of the Allier, is the capital of the whole of this district, which abounds in Byzantine churches and castles, and enjoyed a certain reputation in former times for its wines.

Vichy (6,154 inhabitants), on the Allier, is one of the fashionable watering-places of Europe, boasting of no less than 25,000 visitors a year. Some of the

Fig. 150.—VICHY.

Scale 1 : 80,000.



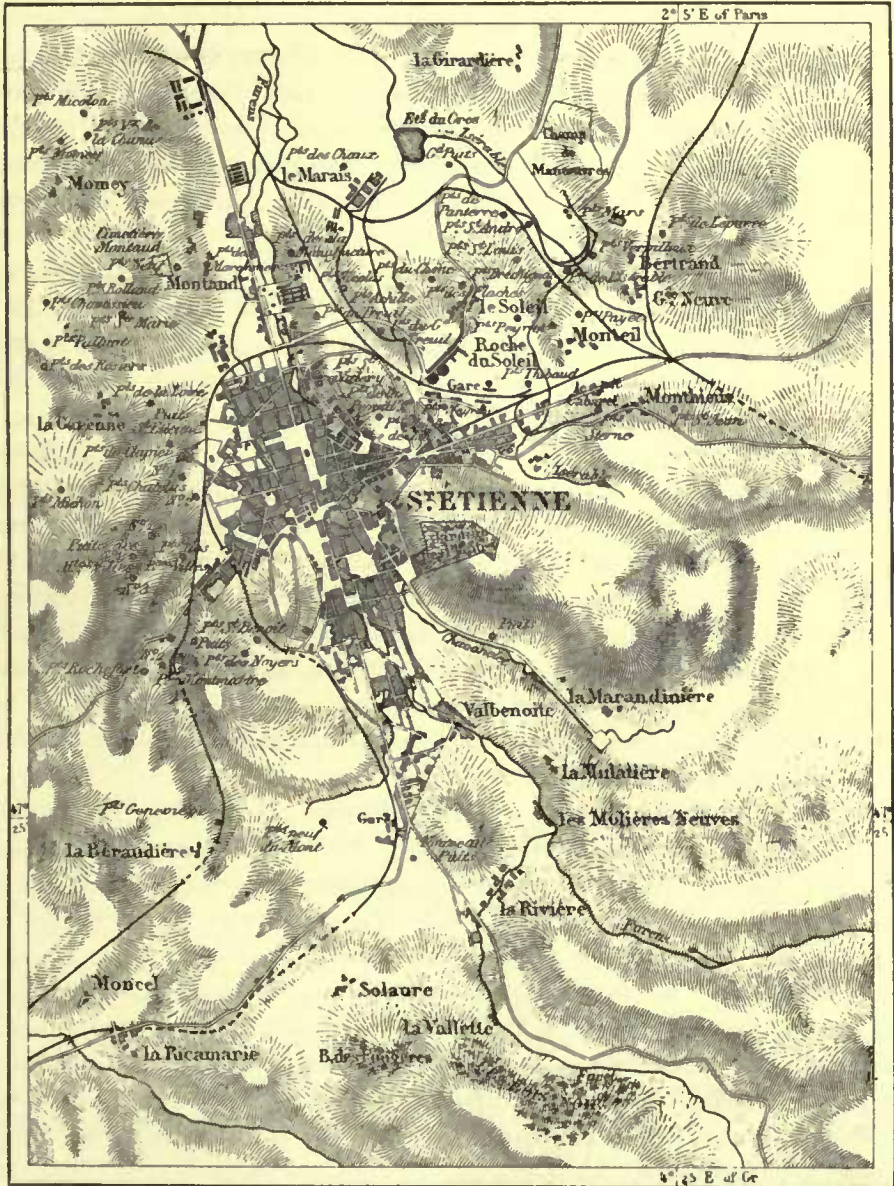
1 Mile.

springs are hot, others cold, and they all contain bicarbonate of soda. *Cusset* (5,087 inhabitants), close to Vichy, has similar springs, and the time is not far distant when both these towns will form but one. Checked cotton stuffs are manufactured at Vichy. The vicinity of these towns abounds in picturesque scenery, and amongst old castles are those of Bourbon-Busset and Montgilbert. As we descend the Allier the character of the country changes gradually until we enter upon a broad vale, swampy in part. At a point where this vale contracts stands *Moulins* (21,122 inhabitants), the capital of the department and the birth-place of Villars. There are the ruins of the old castle of the Dukes of Bourbon-

nais, a fine Gothic church, and several other mediæval buildings of interest, but Moulins is nevertheless a town of modern growth. Agriculture has made great progress in the environs, and vast tracts of heath have recently been brought

Fig. 151.—St. ÉTIENNE.

Scale 1 : 50,000.



under cultivation. *Souigny* (1,581 inhabitants), in a side valley which opens at Moulins, is the cradle of the house of Bourbon. It was here that Adhémar, the head of the family, built himself a castle in the tenth century, and founded an

abbey. In the thirteenth century the family seat was transferred to the neighbouring town of *Bourbon*, surnamed *l'Archambault* (2,452 inhabitants), after one of the dukes. This town is noted now only for its mineral springs. *Lurey-Lévy* (1,665 inhabitants), to the north of it, has a manufactory of china, and forges.

La Palisse (1,796 inhabitants), on the Bèbre, is the capital of the arrondissement of the department. Above that town there are carding-mills, dye works, and other factories, and below it, near *Bert*, coal mines.

LOIRE, with the adjoining department of Haute-Loire, forms the easternmost portion of the plateau, and consists of the old lake basin of the Loire, bounded on each side by mountains of the most varied geological constitution. It includes nearly the whole of the old province of Forez. The area capable of cultivation is of restricted extent, but there are rich coal mines, and these account for the population having doubled since the beginning of the century.

Feurs (2,695 inhabitants), the Roman Forum, and old capital of Forez, in spite of its favourable geographical position on the Loire, is a decayed town. In the Middle Ages *Montbrison* (5,959 inhabitants) became the capital, because it offered greater facilities for defence; but in our own days *St. Étienne* (117,537 inhabitants) has become the great centre of population. The town is situated on the *Furens*, a tributary of the Loire, and close to a gap in the mountains through which runs the road connecting the river just named with the valley of the Rhône. The coal-fields, to which the town is indebted for its prosperity, cover an area of 50,000 acres, yield over 3,000,000 tons a year, and contain 577,000,000 tons, sufficient for 175 years' consumption at the present rate. The physiognomy of *St. Étienne* resembles that of some of the manufacturing towns in the north of England, the atmosphere is filled with coal dust, and the houses and streets are covered with it. There are an art school and a public museum, but the most striking objects in the town are its huge factories, amongst which those of ribbons, lace, and small arms hold the first rank.

The towns in the vicinity of *St. Étienne* carry on important manufactures. *Ricamarie* (3,269 inhabitants) and *Le Chambon* (3,928 inhabitants) have forges and foundries; *Firminy* (10,010 inhabitants) manufactures steel and hardware; and *Fouillouse*, in the north-west, manufactures ribbons and small arms. On the road to Lyons one manufacturing town rapidly succeeds the other. At *Terrenoire* (2,856 inhabitants) the first Bessemer steel was manufactured in France; *St. Chamond* (14,420 inhabitants) is noted for its lace; *Rive-de-Gier* (14,518 inhabitants) has glass works, and machine shops in which locomotives are constructed. Other manufacturing towns on the Gier are *St. Julien-en-Jarret* (4,553 inhabitants), *St. Paul-en-Jarret* (1,753 inhabitants), *Grand Croix* (3,434 inhabitants), and *Lorette* (3,751 inhabitants).

As we descend the valley of the Loire we leave this manufacturing district behind us, and enter an agricultural country. At *St. Rambert* (1,319 inhabitants) and *Andrezieux* the barges navigating the Loire take in their cargoes of coal. In the side valley of the Bonson, which leads to *St. Bonnet-le-Château* (2,351 inhabitants), the peasants spend their leisure hours in the manufacture of

point-lace. At *Montrond* the river Coise joins the Loire from the right. Ascending it, we reach *St. Galmier* (1,996 inhabitants), famous for its cold effervescent springs, and higher up the small industrial town of *Chazelles-sur-Lyon* (4,694 inhabitants), a dependency of Lyons, as its name implies. *Roanne* (21,472 inhabitants), the principal town in the north of the department, has cotton-mills, and carries on a considerable commerce, facilitated by the navigable Loire and the railways which converge upon it. *Panissières* (2,332 inhabitants), in the north-east, engages in the manufacture of linen and embroidery.

Montbrison (5,959 inhabitants), the old capital of the department, occupies the summit of a volcanic hill to the west of the broad valley of the Loire, and offers a curious contrast to the busy manufacturing towns on the east of that river. Its most curious edifice is the so-called Room of Diana, ornamented with 1,500 coats of arms of the ancient nobility of Forez. Several of the old volcanoes of this region are now surmounted by villages or the ruins of castles or abbeys. *Boën* (2,204 inhabitants), on the north-west, is the chief town of the picturesque district of Urfé.





CHAPTER VI.

CHARENTE AND VENDÉE (ANGOUMOIS, SAINTONGE, AUNIS, POITOU).

GENERAL ASPECTS.—HILLS.



THE geographical region which forms the physical and ethnological boundary between the basins of Loire and Garonne is only of small extent, for it is confined to the three departments of Poitou and the two of the Charente. But in spite of its small extent this is one of the most interesting portions of France, whether we look at its history or its physical geography. Its subterranean rivers and the changes continually going on along its seaboard are full of interest. The transition from north to south is exhibited in the vegetation, and a traveller proceeding from the valley of the Vienne almost feels as if he breathed another atmosphere. The gap between the central plateau and the heights of northern Poitou has been fought for on many occasions by the men of the North and the South. The Franks passed through it when warring against Aquitaine and the Visigoths; Christians and Moslems have struggled there for the possession of Gaul; and the French of the north there fought a terrible battle against the English, who held possession of Guyenne. The Protestants here made a stand against the Catholics, and still more recently the Vendée was the scene of a struggle between Royalists and Republicans.

The rounded ridges which ramify from the mountains of Limousin are devoid of almost every picturesque feature, and to a great extent consist of barren uplands, but the valleys which intersect them delight by their transparent streams and verdure, and on the banks of the Gironde these chalk hills terminate in bold cliffs, equal in beauty to those on the English Channel.

Of very different aspect are the granitic hills of the Gâtine, in the centre of Poitou, and on the Upper Sèvre of Niort. Being covered only with a thin layer of vegetable soil, they are for the most part barren, but sparkling rivulets intersect their numerous valleys. They culminate in Mont Malchus—that is, Mercury (935 feet)—named probably after some now forgotten deity, for in this poor district of Gaul the worship of the old gods maintained itself longer than elsewhere, and cromlechs abound.

The hilly district of Bocage lies to the east of the Gâtine, and is characterized by numerous trees, shady lanes, and hedges. The country in the north is wild and varied in the extreme, and its hedges and trees rendered it eminently suited for partisan warfare as long as there existed no ready means of communication. It was here the Vendéans resisted most obstinately the progress of the Republican armies. In the Middle Ages a "march," or border district, separated Poitou from Brittany. Contending armies were forbidden access to it, and its inhabitants paid neither taxes nor excise dues. At the present time this march no longer differs from the adjoining districts, and the introduction of cattle-breeding is gradually changing the physiognomy of the country and enriching its inhabitants. Every peasant proprietor keeps a cow, a pig, and a pair

Fig. 152.—THE HEAD-WATERS OF THE TOUVRE.

Scale 1 : 640,000.



10 Miles.

of draught oxen, which he incites to labour by chanting soft and persuasive melodies.

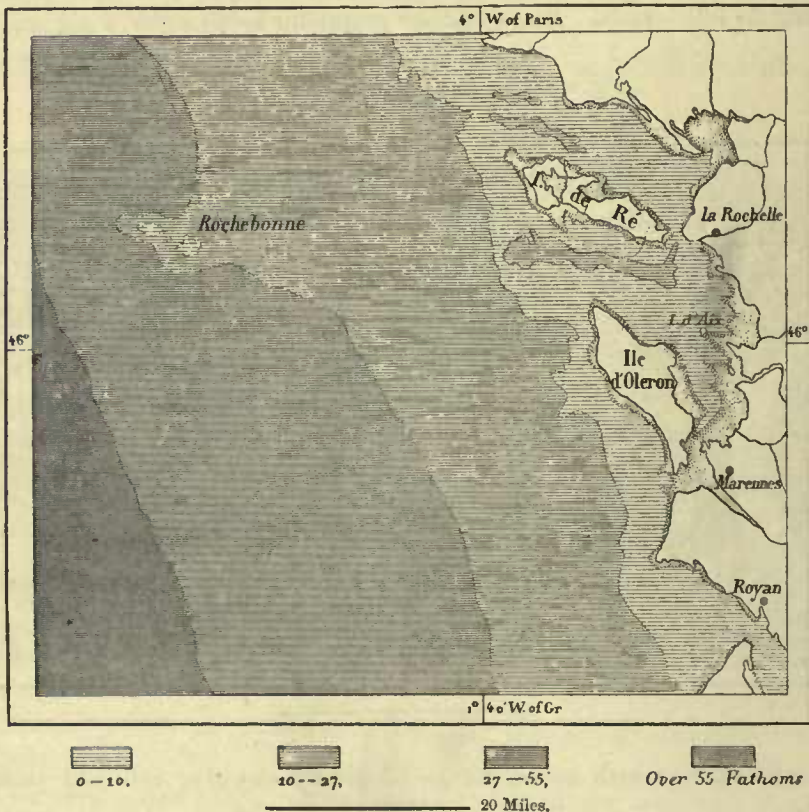
RIVERS.

THE Charente is the only large river between the Loire and the Garonne. It rises on the granitic plateau of Limousin. At first it flows in the same direction as the Vienne, from which it is separated by a narrow ridge, but soon it swerves abruptly round to the south-west, and, having pierced the plateau which up till then barred its course, it enters upon a wide valley covered with pastures and poplars. A little above Angoulême its crystal waters are reinforced by those of the Touvre, one of those curious rivers which flow for a considerable portion of their course through subterranean channels. This river is fed by the Tardoire and the Bandiat, both of which rise on the granitic plateau of Central France,

but almost entirely disappear whilst passing through a fissured and cavernous limestone region. The greater portion of their water seems to find its way to the Touvre, a river which, close to its source, sets in motion the paper-mills of Ruelle. Engineering works have converted the Lower Charente into an important high-road of commerce. It takes its course through a wide valley bounded by hills, and covered with woods or vines. The tide makes itself felt nearly as high up as Cognac. Small coasters can ascend the Charente as far as Saintes, a short distance below its confluence with the Seugne or Sévigne. Below

Fig. 153.—THE OLD COAST OF VENDÉE, EXTENDING TO ROCHEBONNE.

Scale 1 : 1,200,000.



Rochefort the estuary of the river is bounded by mud-banks, and its mouth is closed by a bar having but 2 feet of water at low ebb.

The other rivers of Saintonge and Poitou, such as the Sèvre, the blue Sèvre of Niort, and the Lay, are very inferior to the Charente. The Sèvre, indeed, is hardly more than a creek, but it was the great naval station of France on the Atlantic up to the time when the ports of Brest and Rochefort were created.

THE COAST.

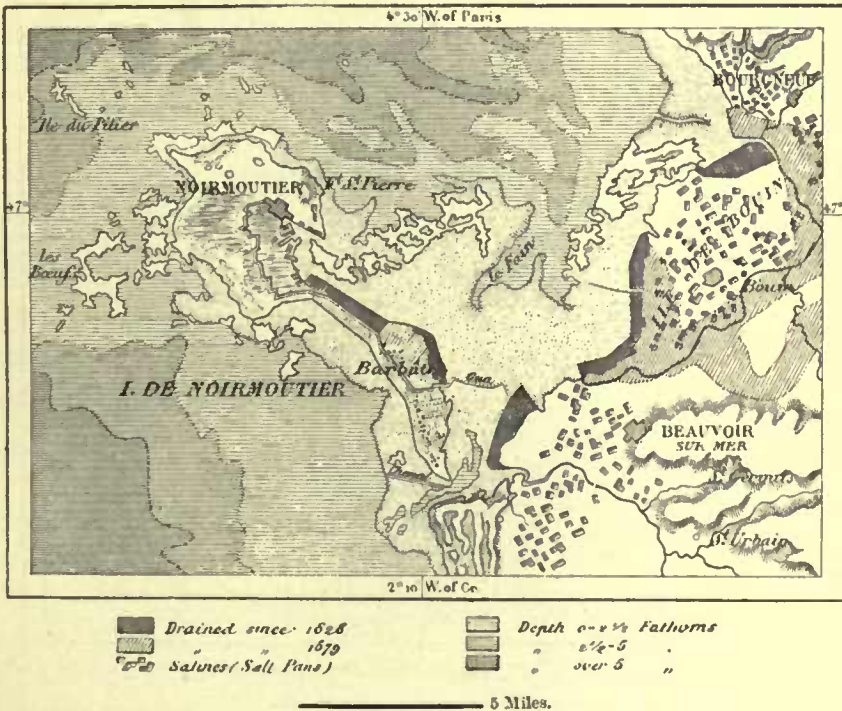
The geological agencies which have severed Cornwall from Armorica and reduced Brittany to its existing dimensions have been active likewise all along the

coast from the Loire to the Gironde. Submerged rocks extend to the west of Oleron, of the island of Ré, and of the entire coast of Vendée, and join the island of Yeu by a submarine "bridge," or isthmus, to the mainland. These rocks are nothing else but the platform which supported the ancient coast, supposed to have extended as far as the rocks of Rochebonne, 30 miles to the west of Ré.

But within this ancient coast-line we are able to discover traces of one which has been swallowed up more recently. The island of Oleron was undoubtedly a portion of the mainland in former times. The arm of the sea which now separates it from the continent is hardly 1,600 feet wide at low water, and in the fourteenth

Fig. 154.—NOIRMOUTIER.

Scale 1 : 320,000.



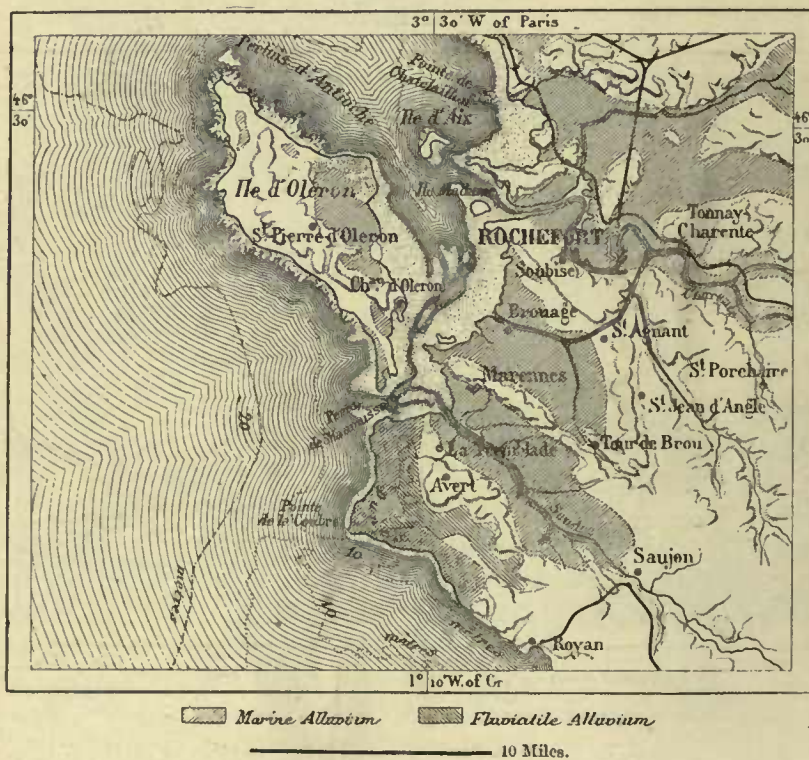
century it was narrower still. No vessel could pass it then, but a frigate might sail through it with confidence now, if it were not for its irregular currents and sand-banks.

The island of Ré, too, is nothing but a detached portion of the mainland, first heard of in the eighth century. Its Jurassic limestones are of the same age as those of the neighbouring coast, and ledges, or *platin*s, of rocks extend far into the sea, more especially near the lighthouse known as the "Whalers' Tower." Tradition speaks of a city of Antioch which formerly stood upon the west coast of the island, and whose houses reveal themselves occasionally to a fisherman floating upon the "Savage Sea" which has swallowed them up.

The island of Noirmoutier, on the northern coast of the Vendée, presents the same features as that of Oleron. The narrow channel which separates it from the mainland can be crossed dry-shod during low water. Geologically this island no doubt attaches itself to the mainland, but its separation must date back to a very remote epoch; for insects, a snail, and several crustacea not known on the mainland, are found on it; whilst the viper, so common throughout Poitou, is unknown there. The strait certainly was wider and deeper formerly, and no one would have ventured to cross it up to 1766. Erosion and deposition always go hand in hand. Thus, in the case under notice, the débris of the north-western

Fig. 155.—SILTED-UP BAYS ON THE COAST OF AUNIS.

Scale 1 : 650,000.



portion of Noirmoutier has to a great extent been deposited in the Gulf of Le Fain, which is gradually being silted up. Other instances of the land gaining upon the sea have been noticed, and geologists are of opinion that they can only be accounted for by our assuming a gradual upheaval of the land. The creek of Aiguillon was of great extent formerly, and the Sèvre debouched into a gulf of the sea which has completely disappeared. Traces of marine erosion have been discovered at a considerable distance inland. At St. Michel, in Herin, there are old oyster beds at an elevation of 30 feet above the sea. The old port of Talmont, where Henry IV. embarked his artillery, has become dry land.

The emerged lands of Rochefort and the Marennes consist of clay carried

thither by sea, for the neighbouring hills of Saintonge are composed of limestone. These new lands may therefore be fitly described as "gifts of the ocean."

Submerged and recently formed lands frequently exist in close proximity to each other. Thus the isthmus which formerly joined the island of Aix to the mainland has been washed away, and the towns of Montmeillan and Châtelailion, farther north, have disappeared beneath the waves. On the other hand, many of the marshes to the south of the Charente were bays of the sea formerly, and are still known as "ports." The old port of Brouage, of great importance during the Middle Ages, and possibly identical with Ptolemy's *Portus Santonum*, is now at a considerable distance from the sea. In this instance, however, man aided the work of nature, for in 1586 the citizens of Rochefort sank twenty vessels laden with stone at its mouth.

Dunes fringe nearly the whole of the coast from the Gironde to the Loire. Those of Arvert cover an area of 350 square miles, and rise to a height of 210 feet.

Fig. 156.—THE ANCIENT GULF OF POITOU.

Scale 1 : 800,000.



They differ from those of the Landes by their richness in carbonate of lime and shells; but like them they march, and many a town has been overwhelmed by them within historical times. Many of these dunes have recently been planted with pines.

Man has taken possession of many tracts formerly invaded by the sea. The whole of the ancient Gulf of Poitou, 150 square miles in extent, has been drained and converted into pastures and fields. The towns and villages surrounding this ancient gulf are built upon hillocks formerly washed by the sea. The cottiers inhabiting the *polders* never travel without a leaping pole, enabling them to clear the ditches which separate their fields. Similar reclamations have been made opposite to the island of Noirmoutier and elsewhere.

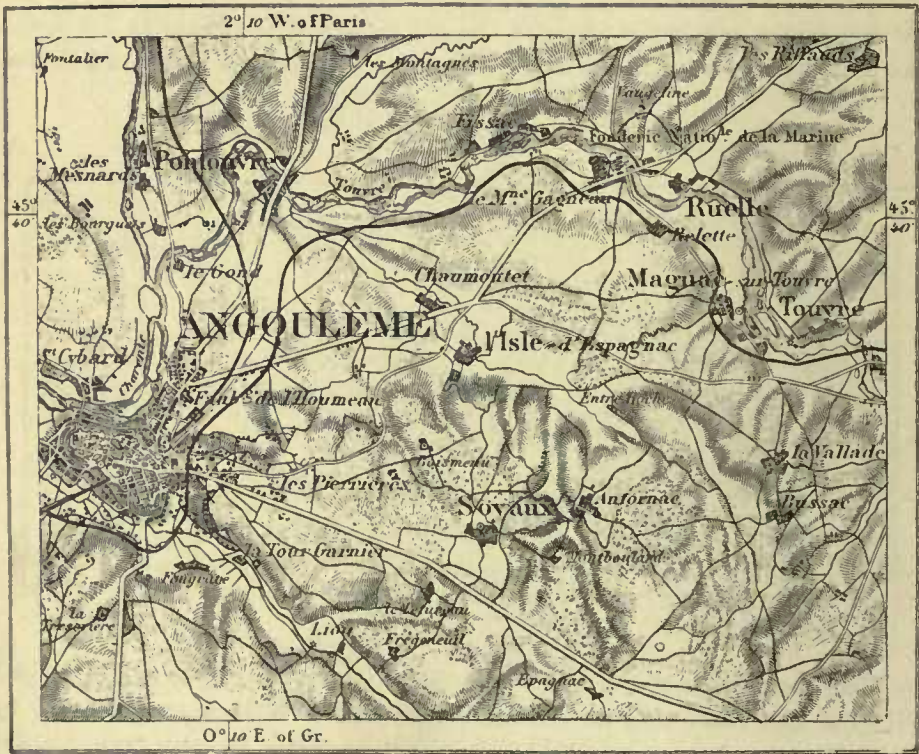
In former times, when salt was dearer than it is now, the inhabitants along the coast established numerous salt-pans, which have now been deserted. These old pans, however, can be made to yield a rich harvest of hay and herbage, but

care must be taken to prevent the mixture of fresh with brackish water. To a disregard of this sanitary law must be traced the endemic fevers which formerly decimated the vicinity of Rochefort and of Marennes. It is due mainly to the energy of M. Le Terme that this source of danger to life has been suppressed, and since 1832 the annual death rate has been reduced from 48 to 27 per thousand inhabitants.

The sea adds in more than one respect to the wealth of the inhabitants. Oyster parks, fish-ponds, and mussel farms have been established, and the islanders collect seaweed with which to manure their fields.

Fig. 157.—ANGOULÊME.

Scale 1 : 80,000.



TOPOGRAPHY.

CHARENTE has been formed out of portions of Poitou, Marche, Saintonge, and Angoumois. The Charente is the principal river, but the north-western portion forms part of the granitic plateau of Central France, and is drained by the Vienne. The Jurassic limestone region in the north is, to a great extent covered with forests. The cretaceous districts in the south are by far the most productive.

Confolens (2,374 inhabitants), the principal place on the Vienne, and *Ruffec* (3,155 inhabitants), on the Upper Charente, are the only towns of importance in

the north-western portion of the department, the latter being noted for its partridge and truffle patties.

Angoulême (28,665 inhabitants), the capital, occupies a scarped hill on the western bank of the Charente. Its old ramparts, now converted into public walks, afford magnificent prospects over the surrounding country. Its position on a great navigable river, and in the midst of a fertile country, is exceedingly favourable. The most prominent buildings are a cathedral of the twelfth century and a

Fig. 158.—THE BRANDY DISTRICTS OF CHARENTE.

Scale 1 : 640,000.



modern town-hall of noble proportions, which contains also the town library and a museum. Of the dominion of the Romans there exist but few traces. The manufacture of paper is the great industry of the city, the annual produce amounting to 73,000 tons, valued at nearly £400,000. The quarries in the vicinity yield an excellent white stone, which hardens on being exposed to the air, and forms an important article of export. On the Touvre is a Government cannon foundry. Amongst places in the vicinity of interest to the archæologist are *La Couronne* (1,045 inhabitants), with a picturesque old abbey; *St. Amant de Boixe*, with a

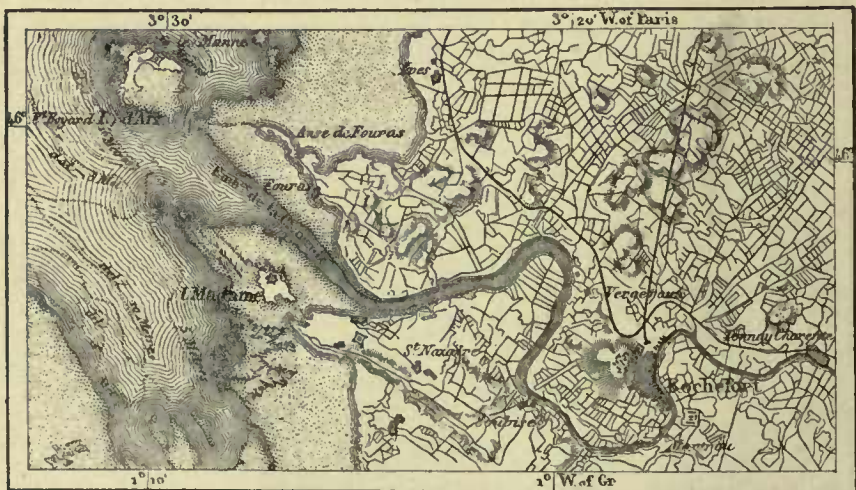
Romanesque church; the old town of *Montbron* (1,416 inhabitants); and the castle of *Rochefoucauld* (2,378 inhabitants).

In its course to the west the Charente flows past *Châteauneuf* (2,691 inhabitants), *Jarnac* (4,390 inhabitants), and *Cognac* (13,811 inhabitants), before entering Saintonge. Cognac owes its great wealth to the brandy trade. The "Champagne," with its spongy soil overlying chalk, yields the best qualities of brandy, that produced in the other district being known as *Crû des Bois*—that is, of the woods—from the patches of forest still existing. All the brandies produced in the two departments of Charente are known as Cognacs, whatever their quality. Cognac has an old Romanesque church and the ruins of an ancient castle. In the vicinity there exist a few remarkable cromlechs, including that of *St. Fort*.

Barbezieux (2,958 inhabitants) is the principal town in the southern part of the department. Other places are *Chalais*, *Montmoreau*, and *Aubeterre*, all of them

Fig. 159.—ROCHEFORT AND THE LOWER CHARENTE.

Scale 1 : 240,000.



5 Miles.

with old castles. *St. Entrope*, a village near Montmoreau, is inhabited by a colony of Limousin potters, who have retained their dialect.

CHARENTE-INFÉRIEURE (Lower Charente) includes nearly the whole of Saintonge, with portions of Poitou and Anis. It is divided into the hilly district of Bocage; the lowlands along the Gironde and the Atlantic, still known as "marshes," though for the greater part drained; and the two islands of Oleron and Ré, which constitute a little world apart. It is one of the richest agricultural departments of France, producing excellent vegetables and fruits, wines, and cattle. The sea yields fish, oysters, and salt, and there is also some industry. Commercially it is dependent upon Bordeaux. The population is decreasing.

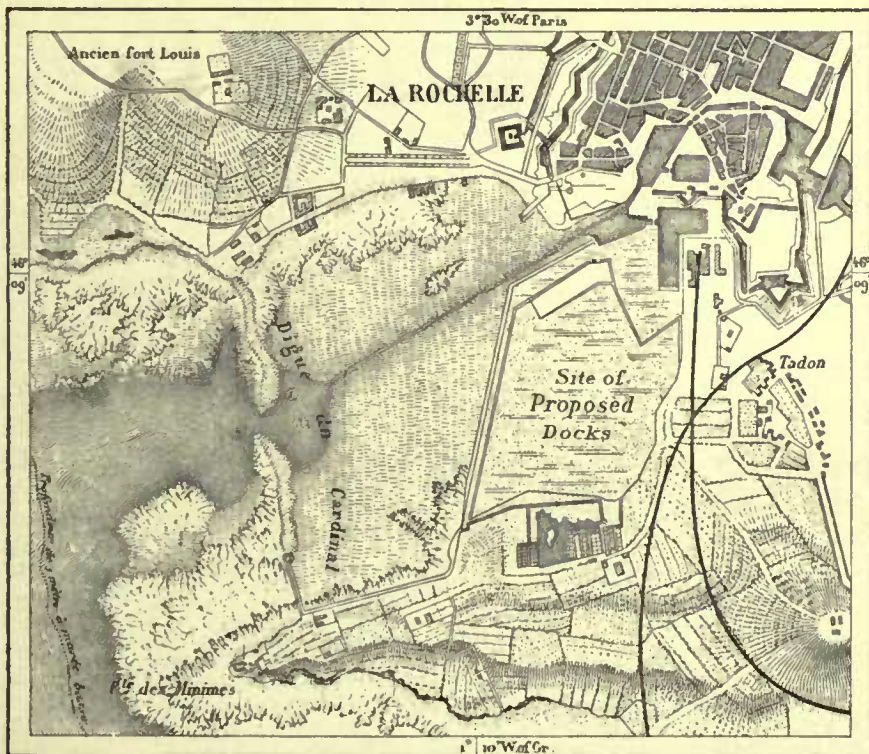
The southern portion of the department consists of wooded hills and extensive landes, which are gradually being brought under cultivation. *Jonzac* (2,446 inhabitants) and *Pons* (3,440 inhabitants), both on the Seugne, the latter town

having an old castle now used as town-hall, school, and prison, are the principal places in that part of the country.

Saintes (11,150 inhabitants), the ancient Santones, on the Charente, is the capital of Saintonge. A triumphal arch and a huge amphitheatre recall the Roman age. Other remarkable buildings are the Gothic cathedral, a vast crypt in the suburb of St. Eutrope, and a museum rich in antiquities. *Saintes* has potteries, with which Bernard Palissy's name is honourably connected, and carries on a brisk trade in brandy. Following the course of the Charente, we pass *Taillebourg*, where St. Louis defeated the English; the castle of *Crazannes*, and the busy port of

Fig. 160.—LA ROCHELLE.

Scale 1 : 30,000.



— 1 1/2 Miles.

St. Savinien (1,458 inhabitants), near which are famous quarries; and finally reach *Rochefort* (25,454 inhabitants), the largest town of the department, and one of the five great military ports of France. The foundation of the town hardly dates back two centuries. It is regularly built, has fine public gardens, but no remarkable buildings except those connected with naval or military matters, including an arsenal, dockyard, and huge hospital. The navigation of the Lower Charente is intricate, but men-of-war are nevertheless able to proceed up to the town, where they are safe from every hostile attack. The roadstead is defended by several forts, and well sheltered. *Tonnay-Charente* (2,203 inhabitants), only 3 miles above

Rochefort, is a commercial port, much frequented by English vessels in search of brandy.

Marennes (1,863 inhabitants), in the marshes to the south of Rochefort, was famous in former times for its salt-pans, which yielded as much as 100,000 tons, but this industry has disappeared almost entirely, and the salt-pans have been converted into pasture-grounds, fish, or mussel ponds. Commerce, too, has nearly deserted the town; and the tower of its church, 256 feet in height, no longer serves as a landmark to the mariner. The fattening of oysters, however, is carried on now with considerable success here, as well as at the neighbouring *La Tremblade*

Fig. 161.—LA ROCHELLE.



(2,568 inhabitants), no less than 30,000,000 being sold annually. *La Tremblade* likewise attracts a few visitors, but the great seaside resort of the department is *Royan* (4,198 inhabitants), at the mouth of the Gironde. A few miles inland from that place is *Sanjon* (2,209 inhabitants), with a Roman obelisk (*Pire Longe*) 72 feet in height.

The island of *Oleron* has grown rich since the introduction of the vine, the value of land having quadrupled in the course of forty years. The principal towns on the island are *St. Georges* (999 inhabitants), *Le Château* (1,578 inhabitants), and *St. Pierre* (1,545 inhabitants).

La Rochelle (19,030 inhabitants) is the principal commercial port of the department, and its capital. In the fourteenth and fifteenth centuries the town was one of the great ports of France, and on the eve of St. Bartholomew its Protestant citizens forced the royal army to retire, after a siege which cost it 20,000 men. Fifty years later Richelieu compelled the surrender of the town, after nearly the whole of its population had died of hunger. From this disaster the place has never completely recovered, but its citizens are still noted for their public spirit, and there remain in it many buildings dating back to the Middle Ages. There

Fig. 162.—ARS-EN-RÉ.



are "rows" (porches) as at Chester, an old town-hall, and four huge towers, one of which was formerly used as a lighthouse. The commerce of the town has considerably increased since railways connect it with Paris and Bordeaux, and it is proposed to construct docks capable of receiving trans-Atlantic steamers.

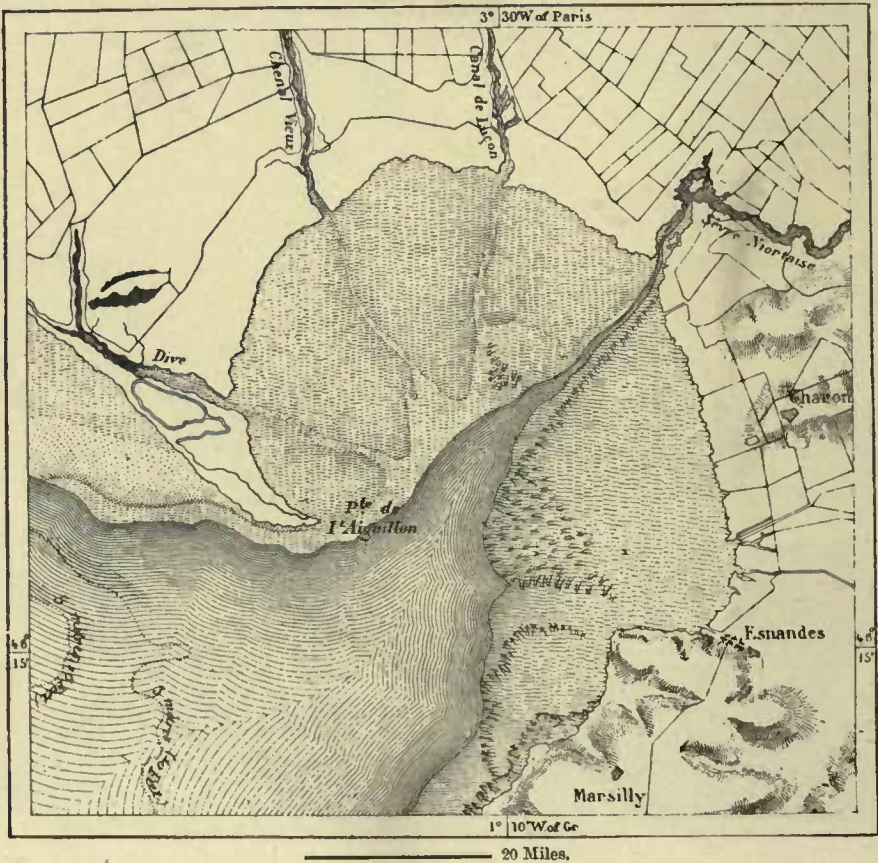
The island of Ré, close to *La Rochelle*, supports a dense population, who cultivate the soil, grow wine, fish, and make salt. Their wine, however, like that of *Oleron*, has the flavour of the seaweed with which they manure their vineyards. The principal towns on the island are *St. Martin* (2,645 inhabitants), *Ars* (1,954 inhabitants), and *La Flotte* (2,241 inhabitants).

The breeding of mussels is carried on most extensively on the mud-banks of the Bay of Aiguillon, where nearly 10,000 acres are enclosed by stockades, upon which the mussels grow in clusters. Each of these enclosures has an opening for the admission of fish. The fishermen, when they cross these mud-banks, rest with one knee upon a miniature wherry, and propel themselves with the disengaged leg. This curious apparatus was invented by an Irishman named Walton, who was shipwrecked on this coast in 1246.

Marans (3,217 inhabitants), on the Sèvre, which enters the Bay of Aiguillon, is the centre of a highly productive corn district, and carries on a considerable com-

Fig. 163.—THE GULF OF AIGUILLON.

Scale 1 : 125 000.



merce. *Surgères* (3,246 inhabitants) and *St. Jean d'Angély* (6,309 inhabitants) are inland agricultural towns.

VIENNE includes the eastern half of the old province of Poitou, and, in addition to the river after which it is named, is drained by the Charente and the Dive. It is by no means a wealthy department, and has hardly any industry.

Civray (2,210 inhabitants), on the Charente, is the centre of an agricultural district. The environs abound in prehistoric remains, and at Charroux there are Roman ruins. Crossing a height of land, we enter the picturesque valley of the

Clain, which is tributary to the Vienne. Passing *Vivonne* (1,180 inhabitants), and leaving *Lusignan* (1,332 inhabitants) far on our left, we reach *Poitiers* (31,892 inhabitants), the capital of Poitou, perched on a plateau, and of imposing appearance. Its streets are narrow and tortuous: churches and monasteries abound, the Jesuits occupying an immense block of buildings. The Byzantine cathedral of Notre-Dame is one of the most original edifices in France; the baptistery, usually called the Temple, one of the most ancient. In another church, that of Ste. Radegonde, are shown the footprints of God Almighty. There are schools of law and arts, but intellectual life can scarcely be said to exist, nor is there much industry. The battles of Poitiers, so called, were not fought at that place. It was between that town and Tours, perhaps at Ste. Maure, that Charles Martel annihilated the army of Abd-el-Rahman in 732, whilst King John was made prisoner by the Black Prince near the town of La Cardinerie, formerly called Maupertuis, about 5 miles to the north of the city.

A railway connects Poitiers with the small manufacturing town of *Neuville* (1,833 inhabitants) and with *Loudun* (3,986 inhabitants), the chief place in the north-western portion of the department. Near the latter is the kistvuen of Pierre-Folle, 56 feet in length and 15 wide. The neighbouring castle of *Moucon-tour* recalls a defeat of the Protestants (1569).

Châtellerault (15,244 inhabitants), on the Vienne, a few miles below its confluence with the Clain, is the industrial centre of the department, where cutlery, hardware, and small arms are manufactured. *Chauvigny* (1,911 inhabitants), on the Upper Vienne, has valuable stone quarries and a curious old church. At *Montmorillon* (4,126 inhabitants), on the Gartempe, in the extreme east of the department, there are lime-kilns and manufactories of agricultural implements.

DEUX-SÈVRES has been formed out of portions of Poitou, Saintonge, and Aunis. Of the two rivers after which it is named, the Sèvre of Niort flows direct into the ocean; the other is a tributary of the Loire. The hilly district of Gâtine is not particularly well adapted for agriculture, but the breeding of horses and mules is carried on with much success. The lowlands in the south are more fertile. Industry is almost confined to the currying of skins and to weaving. About one-ninth of the inhabitants are Protestants.

The level tract of country drained by the Boutonne, a tributary of the Charente, cannot boast of large towns, for *Melle*, its chief place, has only 2,221 inhabitants. It is known for its Byzantine church and for its mules. *La Mothe-St. Héraye* (1,932 inhabitants) and *St. Maixent* (4,259 inhabitants), both on the Upper Sèvre, are the centres of the Protestant population of the department, and engage in the manufacture of woollen stuffs, as well as in the breeding of horses. *Niort* (20,336 inhabitants), lower down on the same river, is the capital of the department, and commercially as well as industrially a busy place, where the preparation of skins and horsehair, glove-making, cotton-spinning, and the manufacture of agricultural implements are actively carried on. The produce of its marsh gardens enjoys a high reputation. A Gothic cathedral and the ruins of a vast castle built by the

English rise high above the houses lining the river, and pleasant walks surround the town, which was the birthplace of Madame de Maintenon.

Parthenay (4,212 inhabitants), the principal town on the Thouet, which flows north to the Loire, has an old Byzantine church, and manufactures woollen stuffs. Lower down, at *Airvault*, the river is spanned by an ancient bridge of eleven arches, the oldest structure of that kind in France. *Thouars* (3,468 inhabitants), still farther north, on a cliff overhanging the Thouet, has an enormous castle built in the seventeenth century, and now used as a prison.

Bressuire (3,214 inhabitants), the capital of the northern arrondissement, has become a great railway centre. Its huge castle, with forty-eight towers, is in ruins, as are other buildings; for the town suffered much during the Vendéan wars, and was captured and recaptured repeatedly.

Fig. 164.—LES SABLES-D'OLONNE.

Scale 1 : 62,000.



VENDÉE is named after a tributary of the Sèvre of Niort, although its principal river is the Lay. The department includes the region of granitic hills (Bocage), a region of calcareous lowlands, and an alluvial region extending along the sea. The islands of Yeu and Noirmoutier belong to it. Agriculture and cattle-breeding are the principal occupations.

Fontenay-le-Comte (7,309 inhabitants), on the navigable Vendée, is an ancient city, the inhabitants of which manufacture cloth, and carry on some commerce. At *Vouvant* and *Faymoreau*, in the hills, there are coal mines of no great importance. The ancient episcopal city of *Maillezais*, on a hillock surrounded by old marshes, lies to the south-east. *Luçon* (6,026 inhabitants) is the seat of a bishop, and has a Gothic cathedral. A canal 10 feet deep connects it with the sea, and its export of agricultural produce is considerable.

Chantonnay (1,593 inhabitants) and *Pouzauges* (1,405 inhabitants) are the only towns in or near the valley of the Lay. *Roche-sur-Yon* (9,021 inhabitants), on a high rock on the Yon, as its name implies, was founded by Napoleon on the site of an old castle. It possesses no attractions whatever, its importance being entirely due to its being the seat of the departmental authorities. Until recently it was known as *Napoléon-Vendée*.

Sables-d'Olonne (9,188 inhabitants) is the principal maritime town of the department, and its fine beach attracts thousands of visitors during summer. The mariners of this town are renowned for their boldness. Many of them engage in the sardine fishery. The neighbouring country is rich in cromlechs and kistvaens, the finest being that of Frébouchère, beyond Talmont, in the south-west. This block of granite, supported by two rows of stones, must have been conveyed hither from a considerable distance, but nevertheless it weighs 60 tons. Travelling north along the coast, we pass *St. Gilles-sur-Vie*, the port of embarkation for the island of Yeu, *St. Jean de Mont*, *Beauvoir-sur-Mer*, and *Bouin*, of which only the last has over 1,000 inhabitants. *Noirmoutier* (2,080 inhabitants), on the island of the same name, is the most populous town of this north-western corner of the department, and carries on a brisk trade in the products of the fields.

In conclusion should be mentioned the famous windmills on the *Butte-aux-Alouettes*, or Larks' Hill (758 feet), between the towns of *Herbiers* and *Mortagne-sur-Sèvre* (2,080 inhabitants), on the north-western frontier, by means of whose arms the Royalist millers signalled the movements of the Republican troops.





CHAPTER VII.

THE BASIN OF THE LOIRE.

GENERAL ASPECTS.



THE vast area drained by the Loire belongs to three distinct regions, geologically as well as physiognomically and historically. In its upper course the river, as far as the "Bill" of the Allier, is shut in by the rocks of the central plateau; in its lower course it traverses the granitic region of Poitou and Brittany; whilst its middle course leads in a wide curve through the sands, clays, and marls of the tertiary lake basin of Paris.

The river, in spite of its course of more than 600 miles, has not been powerful enough as a geological agent to combine these three regions into a whole. Nor is the importance of the river as a commercial highway as great as might be expected, for, owing to its ever-changing volume, it is navigable only during a portion of the year. Neither does the Loire coincide with any of the great historical high-roads of Europe, for its sources lie in an inaccessible mountain region, and it discharges itself into a remote part of the Atlantic. The high-road from Northern Europe to Spain follows the Loire from Orléans to Tours, but this very fact proves that the river is indebted for its importance, as an international high-road, to the position it occupies with reference to the adjoining river basins.

Touraine and the country on the Middle Loire generally have done more towards the birth and development of the French nation than any other part of France. Being sheltered in the south-east and west by the sterile plateau of Central France, the hills of Morvan, and the granitic heights of Poitou, this region was without natural defences only on its northern frontier. But in that direction the inhabitants of Lorraine, Champagne, Picardy, and the Isle de France formed a formidable barrier against intended invasions. It was less troubled by wars than other parts of France, and its development consequently went on at a more rapid rate. The inhabitants of Touraine speak the purest "langue d'oui," and they possess in harmonious combination the common sense and gaiety, the wit and earnestness, which distinguish the inhabitants of other parts of France.

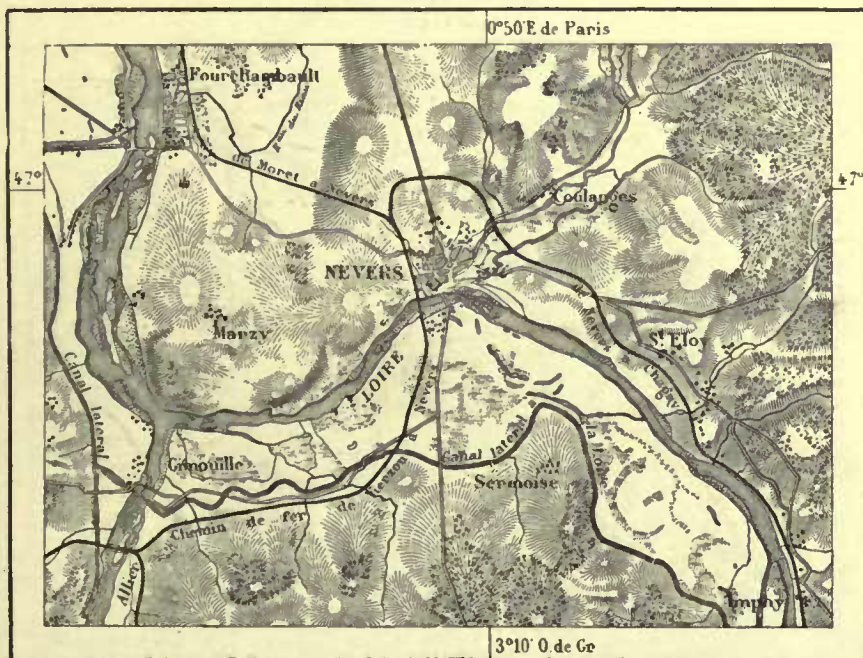
For many years the landscapes of Touraine were looked upon as the most

charming in all France. More extensive travel has brought them somewhat into disrepute, but if it is borne in mind that our forefathers preferred a quiet and serene landscape to inhospitable and pathless mountains, we cannot deny the palm to "la belle Touraine." Verdant hills, gently undulating, bound the horizon, sparkling rivulets wind between elms and poplars, clumps of trees give variety to fields and meadows, a castle peeps out from behind a screen of foliage, whilst in the distance glitter the silvery waters of the great river. Can we imagine a landscape of more gentle aspect? and was not Torquato Tasso right when he spoke of the valley of the Loire as—

"La terra molle e lieta e diletta?"

Fig. 165.—THE "BILL" OF THE ALLIER.

Scale 1 : 160,000.



Grave par Erhard

5 Miles.

THE LOIRE.

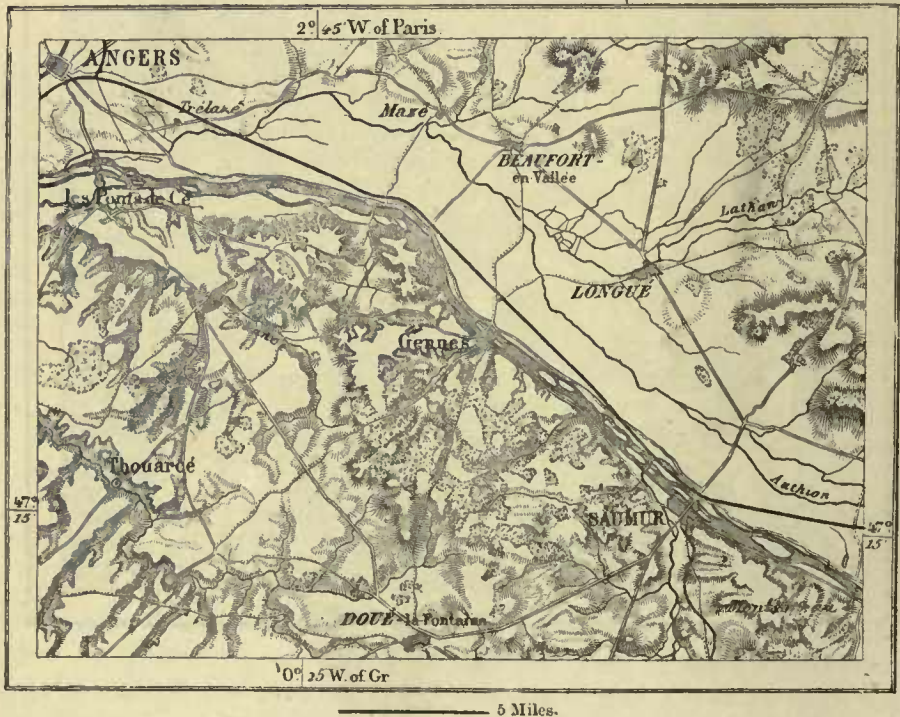
THE Loire rises in the Cévennes, and after a course of 270 miles is joined by its twin river, the Allier, a few miles below Nevers, at the so-called "Bec," or Bill, the volume of the Loire being but slightly superior to that of the Allier. From its junction as far as Orléans the Loire flows to the north and north-west in the direction of the Seine, from which it is separated by land of moderate elevation (260 feet). Conformably to the impulsion given to its waters by the rotation of the earth, they press upon its right bank, gnawing away the land. The right bank, consequently, is usually steep, whilst the left is flat.

At Orléans the Loire sweeps round to the south-west. The Loiret, which joins it below that town, can hardly be called a tributary, for it is fed from the Loire itself through subterranean channels. The principal rivers which enter the Loire on the left, far below Orléans, are the Cher, the Indre, and the Vienne, all of them having their sources on the central plateau. Lower down still, the Maine flows into the Loire from the north. It is formed by the junction of the Sarthe and the Mayenne with the Loir. Each of the three head-streams traverses a distinct geological region, whilst the united river has excavated itself a channel through the schists of Angers, quarried for slate.

The Maine and the other tributaries of the Lower Loire, which flow through crystalline or palæozoic formations, join almost at right angles, whilst the rivers

Fig. 166.—THE AUTHION.

Scale 1 : 410,000



winding through the tertiary formations of Orléanais and Touraine sometimes flow for considerable distances in the same direction as the river which they are about to join. The Cher, the Indre, and the Vienne are instances of this kind, not to speak of minor rivers. Lateral channels, enclosing willow-clad islands, form a distinctive feature of the alluvial valley of the Loire. One of these extends for 30 miles below the confluence of the Cher; another, known as the Authion, accompanies the left bank of the Loire for a distance of 40 miles.

These parallel channels, which extend from Blois to Ancenis, must be looked upon as the result of the frequent inundations of the Loire. The river, when in flood, undermines the hills bounding its valley, and thus creates lateral channels,

into which its tributaries subsequently empty themselves instead of flowing direct into the main channel. Moreover, the immense quantity of alluvium brought down by the river tends to the elevation of the tongues of land which separate its tributary rivers. It has been computed that 9,000,000 cubic tons of sand are carried past the confluence of the Loire and Allier annually, travelling down the

Fig. 167.—LA SOLOGNE

Scale 1 : 640,000.



river at a daily rate of 8.5 feet in summer, and of 30 feet in winter. This incessant denudation and deposition explain the physical aspect of the valley of the Loire.

If we look upon that river in summer, when it rolls on sluggishly between banks of sand, we can hardly conceive it possible that it should occasionally rise twenty and more feet above its usual level, and, breaking through the embankments

thrown up along it, flood the plains beyond to the extent of miles. These floods are due partly to the small height of the mountains from which the river is fed, and partly to the impervious nature of the rocks which compose them. The former prevents the formation of glaciers which could feed the river during summer; the latter causes the rain to run off rapidly. The volume of the river below its confluence with the Allier varies, according to the seasons, between 30 and 10,000 tons a second.

Embankments for the protection of the towns and villages were thrown up as early as the ninth century, and perhaps

Fig. 168.—THE ERDRE.
Scale 1: 100,000.



earlier, and the river has not changed its bed during the historical epoch. The embankments, however, which lined the Loire between Orléans and Angers up to the seventeenth century were only 10 or 12 feet in height, and the floods frequently swept over them. They have been heightened and strengthened since that time. A double barrier, 23 feet in height, was completed in 1783, and extends from the "Bill" of the Allier downwards along the whole of the Middle Loire. These embankments suffice as a rule, but the disastrous floods of 1841, 1856, and 1866 prove that they do not meet exceptional cases. The river has been imprudently confined to a channel only 20 to 980 feet in width. When the river begins to swell it very soon fills up this narrow channel, and frequently overflows or breaks through the barriers erected to confine it. As a rule the embankments on the upper part of the river give way first. The water then pours through them into the lateral channels of the river, and the perils of inundation, therefore, diminish in proportion as we descend the river, and below the Maine they need not be dreaded at all.

There can be no doubt about the urgent necessity of reconstructing the river defences, a work of no small difficulty, as it would interfere with innumerable conflicting private interests. The channel enclosed between embankments must be widened so as to enable the river, when flooded, to spread over a larger surface; and an interior line of dykes must be constructed to meet ordinary freshets. In addition to this, dams should be built across the head-streams of the Loire, in order that their water may be stored up, and its discharge regulated. Only one dam of this kind exists as yet, above Roanne, and its effect is satisfactory in every respect. It is believed that if dams of this kind were to be thrown across every one of the valleys the Loire might be rendered navigable during the whole of the year.

The aspect of the lake districts of Sologne and Brenne amply proves that the basin of the Loire is passing through a state of geological transformation. The plains of Sologne were formerly covered with a dense forest which absorbed the moisture. The forests have been destroyed, and the district converted into a region of pestilential swamps and lakes similar to the Dombes, described on p. 154. The work of draining and planting is, however, being proceeded with rapidly. The Brenne, a similar district farther south, is likewise being drained.

In the crystalline and palæozoic region on the Lower Loire several of the rivers are still in a state of transition. The Erdre, for instance, which joins the

Fig. 169.—THE LAKE OF GRAND LIEU.

Scale 1 : 250,000.



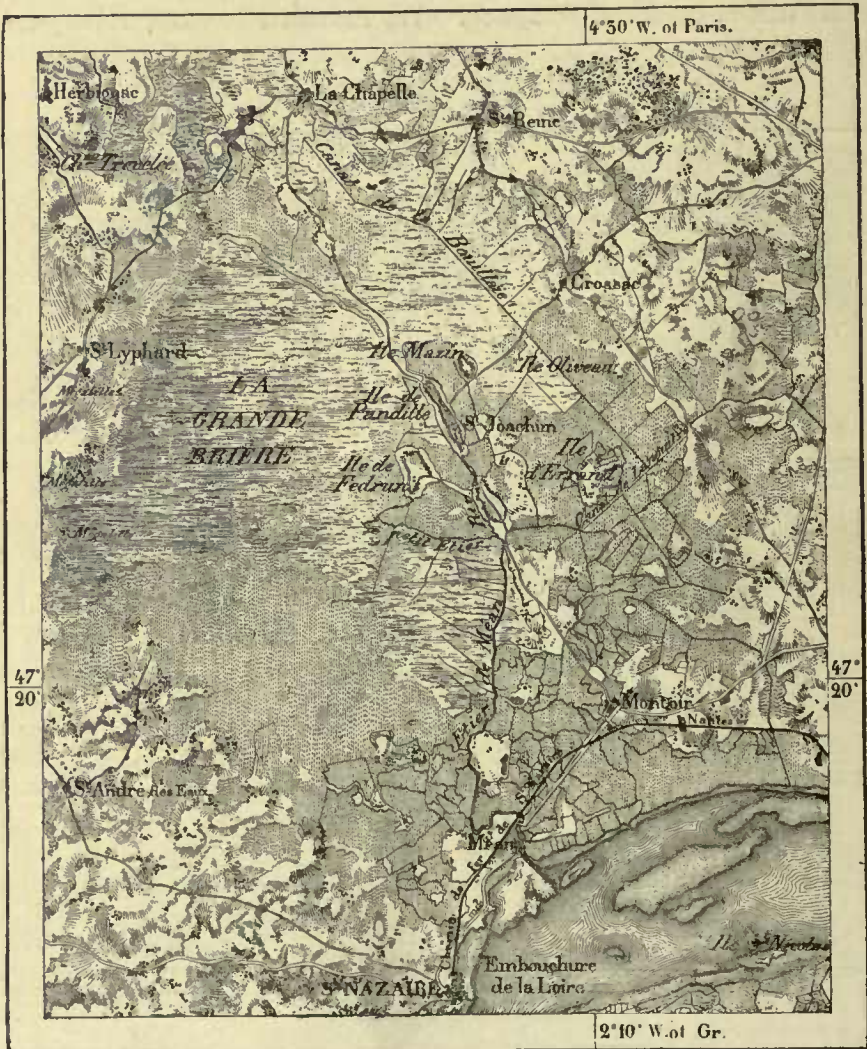
Loire at Nantes, may be described as a lacustrine river. To the south of the Loire the Lake of Grand Lieu occupies a cavity in the granite. This lake is fed not only by rivulets which fall into it, but also by the Loire, the level of which, at high water, is about 3 feet higher than that of the lake. The channel which connects the latter is consequently alternately an affluent and an effluent. Nay, tradition tells us that the lake owes its existence to an irruption of the Loire, and superstitious fishermen occasionally hear the bells of St. Herbadilla, a village now

buried beneath it. The lake covers an area of 17,000 acres, and, as its average depth does not exceed 6 feet, it might easily be drained.

Another lake, near the mouth of the river, that of Grande Brière, is now completely silted up. Some geologists look upon this bog as an old gulf of the sea, with which it communicated formerly through Ptolemy's Brivates Portus,

Fig. 170.—LA GRANDE BRIÈRE.

Scale 1 : 160,000.

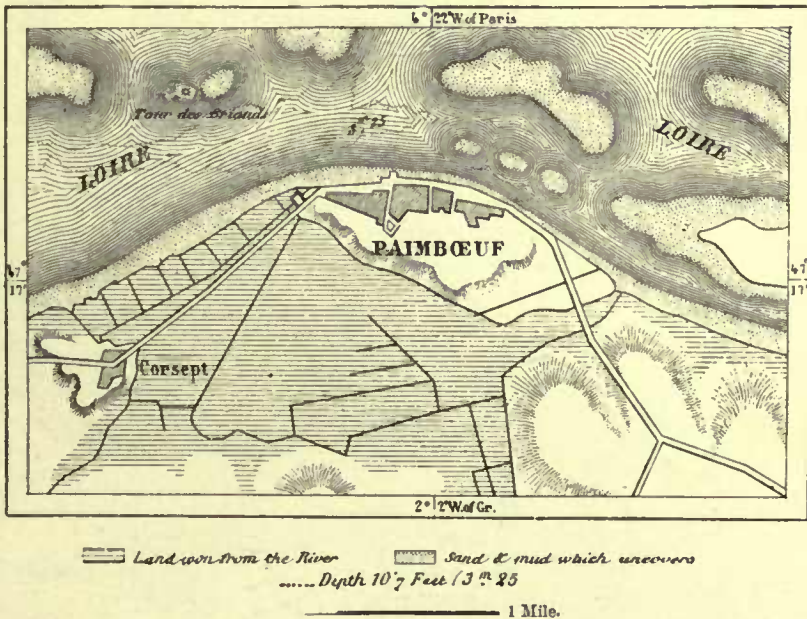


whose name survives in the river Brive. In reality, however, this is a spongy morass, similar in all respects to the bogs of Ireland, and formed in the same manner. The peasants around it, known as "Briérons," cut about 20,000 tons of turf annually, which is exported to all the towns of Western France, and a considerable portion of which is converted into manure.

The tide ascends far beyond Nantes, but the maritime estuary can be said to begin only at Pellerin, about 9 miles below that town. The river thence varies in width between 1 and 3 miles, and is obstructed by numerous ever-shifting sand-banks and islands. Some of these latter have, in course of time, been attached to the mainland, the most remarkable instance being that of the *tête*, or "head," upon which rises the town of Pen-Bo ("bullock's head"), called Paimbœuf in French.

The narrows between St. Nazaire and Mindin separate the estuary from the outer bay of the river. A bar, covered with 12 feet of water at the ebb, lies off the mouth of this bay, the navigation of which is, moreover, obstructed by

Fig. 171 — PAIMBŒUF.
Scale 1 : 50,000.



numerous islands and sunken rocks. The tide rises 17 feet, and the largest vessels can consequently enter the river if they bide their time.

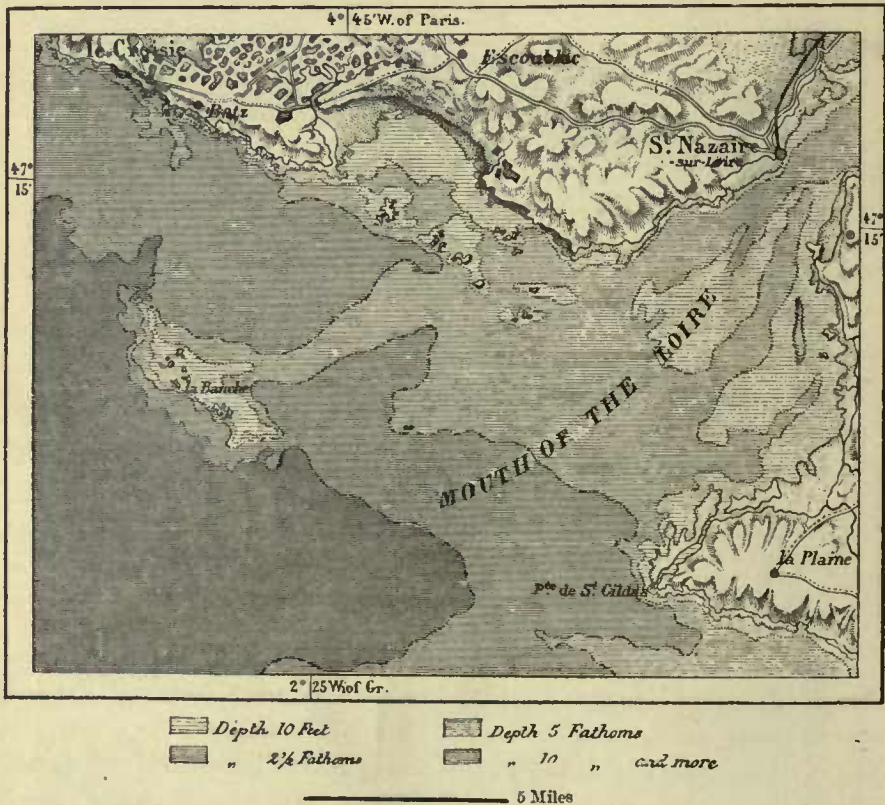
The northern coast of this bay has been subjected to considerable changes. In the east, for a distance of 8 miles, the land has been washed away by the sea, there remaining only a line of cliffs, beyond which the sea has invaded the land, forming a vast gulf surrounded by shifting dunes, which in 1779 overwhelmed the village of Escoubiac. In the west an inverse process has been going on, and the old islands of Pouliguen, Batz, and Le Croisic are now attached to the mainland, the arm of the sea which separated them having gradually been converted into a brackish swamp.

The inhabitants of Batz claim to be of Saxon or Scandinavian descent, but in reality they do not differ from their neighbours on the plateau of Guérande either in dress, customs, or language. In both districts we meet with a number of tall, fair, blue-eyed men. They both spoke Breton up to the close of the seventeenth

century, a language at present restricted to a small village near Batz. The isolation, however, in which the islanders of Batz lived for centuries gave birth to a strong local patriotism. Their young men never looked for wives beyond their "island," and all the inhabitants are cousins. Out of a population of 2,750 persons, nearly one-half belong to eight families, and there is one family which can boast of 490 members. Under these circumstances family names and surnames do not suffice, and nearly every individual is known by some sobriquet. No ill consequences have resulted from these consanguineous marriages, either physically or mentally. Morally, likewise, the inhabitants of Batz enjoy a high reputation,

Fig. 172.—THE MOUTH OF THE LOIRE.

Scale 1: 250,000.



and a local proverb says that "no bowl can be thrown in the village but stops in front of an honest man's house."

TOPOGRAPHY.

NIEVRE, thus named after a little river entering the Loire at Nevers, is the modern representative of Nivernais. It is within this department that the Loire first assumes the character which it retains throughout its middle course. The crystalline heights of Morvan in the east are drained into the Seine. The soil is not very fertile, but carefully cultivated. There are mineral springs, iron and coal

mines, clay pits, and manufactories of china, cutlery, and hardware. The iron industry of the country dates back to a very remote age, and the remains of Gallo-Roman forges are met with by hundreds. The population, owing to the hilly nature of the department, is not dense. Of late years it has decreased.

Decize (3,547 inhabitants) occupies an island of the Upper Loire, and has several iron works, supplied with coal from the neighbouring mines of *La Machine* (3,091 inhabitants). *Nevers* (20,601 inhabitants), the capital, occupies a favourable site near the junction of the Loire and Allier, and is the centre of a busy manufacturing district. It enjoyed some importance in the time of Julius Cæsar, but its finest edifice is the old castle of its dukes, now used as a court of justice. The manufacture of china was introduced by the Gonzagos of Mantua, who were proprietors of the town in the sixteenth century, and still flourishes, but the

Fig. 173.—LE CROISIC AND BATZ.

Scale 1 : 150,000.



largest establishment is the Government arsenal for the manufacture of cannon and artillery carriages. At *Imphy* (1,437 inhabitants), above Nevers, are iron foundries; at *Fourchambault* (5,686 inhabitants), below, iron works and a foundry; and at *Guérigny* (1,870 inhabitants) the Government foundry of La Chaussade.

Travelling down the Loire we pass *Pougues*, with its steel springs; the old monastic city of *La Charité* (4,776 inhabitants), with an old abbey, a "daughter" of that of Cluny, and exceedingly wealthy in the eleventh and twelfth centuries; *Ponilly-sur-Loire* (1,939 inhabitants), with famous vineyards planted by the monks of La Charité; and *Cosne* (5,711 inhabitants).

St. Amand (1,443 inhabitants), in Puisaye, at some distance from the Loire, has potteries, while *Donzy* (2,560 inhabitants), to the south of it, is known for its hardware.

Château-Chinon (2,593 inhabitants), the old capital of Morvan, in the eastern portion of the department, occupies a most picturesque site overlooking the Yonne and the wooded heights beyond it. Descending the river just named, we reach the busy little town of *Clamecy* (4,663 inhabitants), which carries on a considerable trade in timber.

CHER includes about one-half of Berry and a small portion of Bourbonnais. It is bounded by the Loire in the east, whilst the Cher, with its tributaries, Yèvre and Auron, traverses its western portion. The department produces corn, hemp, and sheep, the latter noted for their fine wool. Its iron mines, yielding 274,000 tons of ore annually, are of considerable importance.

Sancerre (2,830 inhabitants) is the only town of importance on the Loire. It has become known through the heroic siege which its Protestant inhabitants sustained in 1573. Proceeding up the Aubeis, we pass *Guerche* (1,837 inhabitants) and *Saneoins* (2,970 inhabitants), and following the canal of Berry, reach the valley of Auron, the richest iron district of the department. The town of *Dun-le-Roi* (4,357 inhabitants) occupies its centre.

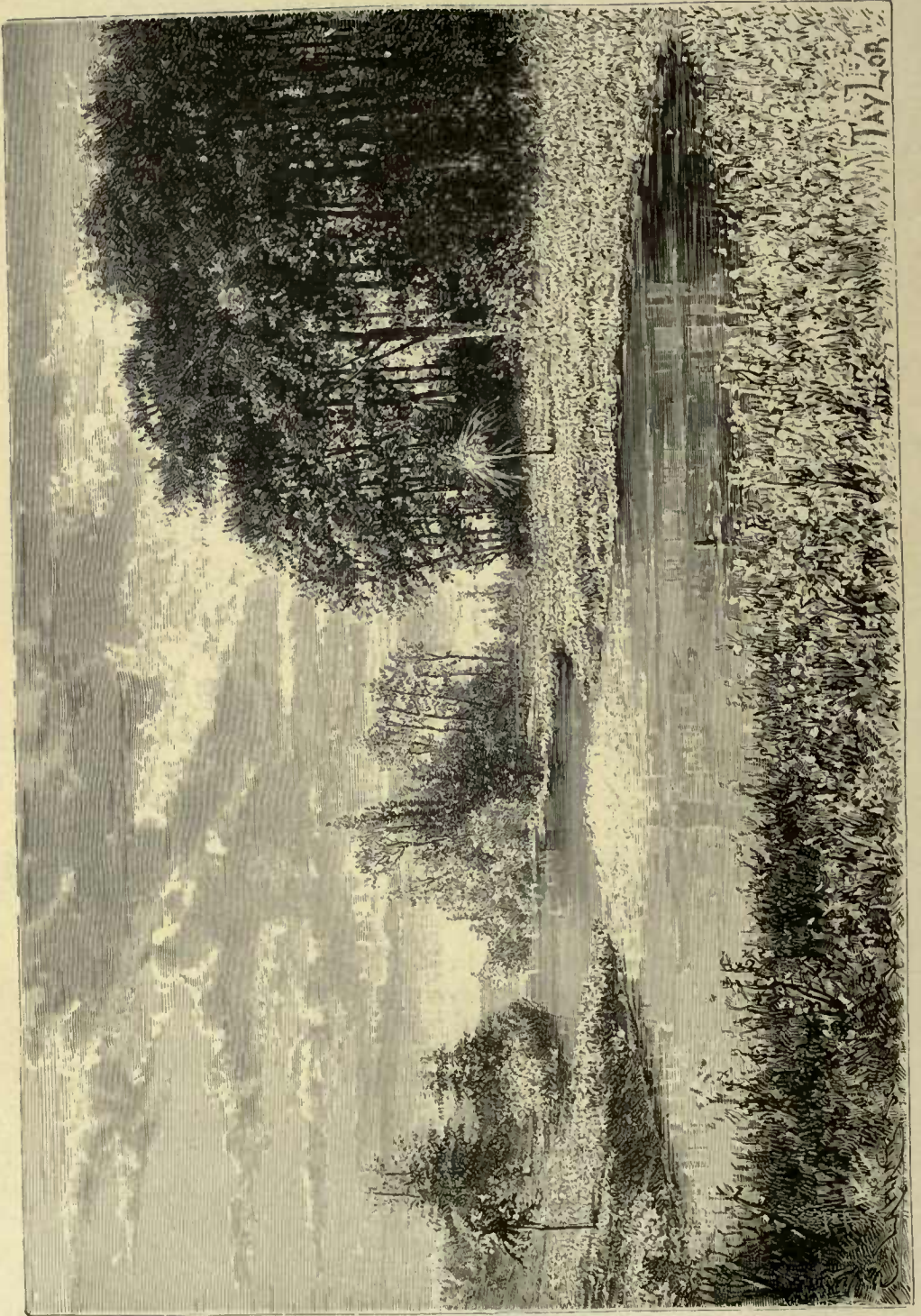
Bourges (31,102 inhabitants), the old capital of Berry, occupies a low site at the confluence of the Auron with the Yèvre. It is the Avaricum of the Romans, and a council was held here in 1225, which led to Louis VIII. taking the field against the Albigenses. The most remarkable buildings of the town are a cathedral of the thirteenth century; the mansion of the silversmith, Jacques Cœur, a masterpiece of the Renaissance, now used as a court of justice; and the Hôtel Cujas, converted into police barracks. A vast arsenal, including a cannon foundry, a laboratory, stores, and artillery ranges, occupies a considerable area to the east of the town.

Passing *Mehun* (5,256 inhabitants), with its manufactories of china, and a castle in which died Charles VII., we reach *Vierzon* (10,053 inhabitants), at the confluence of the Yèvre and Cher, the most important manufacturing town of the department, where china, glass, cutlery, textile fabrics, and agricultural machinery are produced.

St. Amand-Mont Rond (7,719 inhabitants) is the only town of importance on the Cher. Near it are Roman ruins, including a temple, a theatre, baths, and an aqueduct. A castle of the Duke of Mortemart, sumptuously restored, lies to the north of the town, in the forest of Meillant.

INDRE forms a portion of the old province of Berry. The river Indre traverses its centre, whilst its north and south are respectively drained by the Loire and the Cher. The south of the department is occupied by granite mountains, but the greater portion of it consists of Jurassic limestone or tertiary plains. In these latter three districts are distinguished, viz. the Brenne, a tract abounding in ponds, woods, and heaths; the Bois-Chaud, a pebbly tract covered with forests; and the Champagne country, a limestone district, not exactly distinguished for its fertility. The iron industry, which was of great importance formerly, is declining steadily.

Issoudun (11,293 inhabitants), the largest town in the basin of the Loire, and one of the oldest in France, has suffered much through the revocation of the Edict



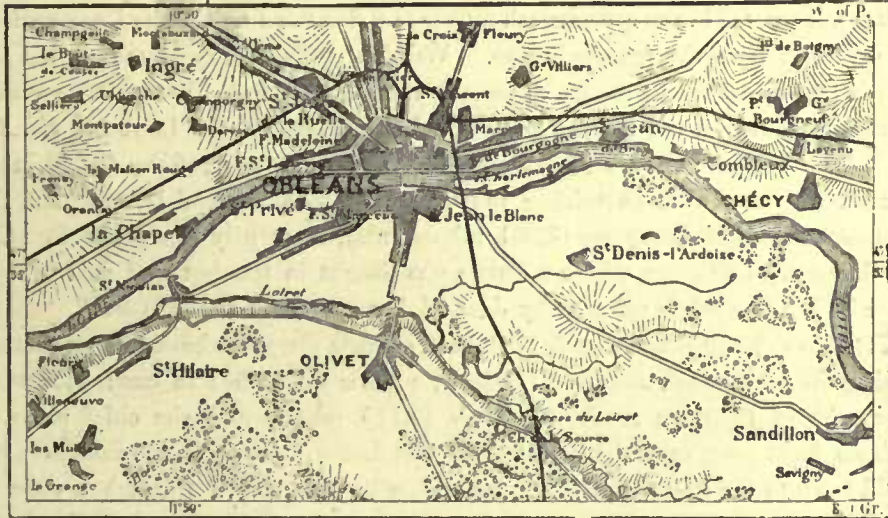
SOURCE OF THE LOIRET.

of Nantes, but still engages in the manufacture of leather and of woollen stuffs, drawing most of its raw materials from the surrounding country. The valley of the Théols, as well as the country to the west of it as far as *Vatan* (2,045 inhabitants) and *Levroux* (3,293 inhabitants), abounds in prehistoric remains and mediæval castles. One of these latter is at *Valençay* (1,842 inhabitants), and within its walls Napoleon confined King Ferdinand VII. of Spain.

La Châtre (4,394 inhabitants), on the Upper Indre, has important markets. Near it is the village of *Nohant*, where Georges Sand resided. *Châteauroux* (16,980 inhabitants), lower down on the Indre, and the capital of the department, has manufactories of tobacco and army cloth. It was founded in the tenth century, but for a long time remained inferior to the abbatial city of *Déols* (2,334 inha-

Fig. 174.—ORLÉANS.

Scale 1 : 100,000.



bitants), on the opposite bank of the river. The other towns on the Indre are *Buzançais* (3,470 inhabitants) and *Châtillon* (2,123 inhabitants).

Argenton (5,003 inhabitants), on the Creuse, is an important town, having tan-yards, cloth factories, paper-mills, and brick-kilns. *Le Blanc* (4,724 inhabitants) has cloth factories. At *Neuvy St. Sépulture* (1,292 inhabitants), in a side valley of the Creuse, there is a curious old church imitated from that of the Holy Sepulchre at Jerusalem.

LOIRET, named after a subterranean river which rises to the surface near Orléans, includes the greater part of old Orléanais. It occupies that portion of France where the valleys of the Loire and the Seine approach nearest to each other. The valley of the Loire, with its fertile fields and populous towns, traverses the centre of the department. To the north of it lie the forest-clad hills of Puisaye; the Gâtinais, partly wooded; the forest of Orléans; and the corn-fields of Beauce. To the south of the river are the sterile sands of Sologne.

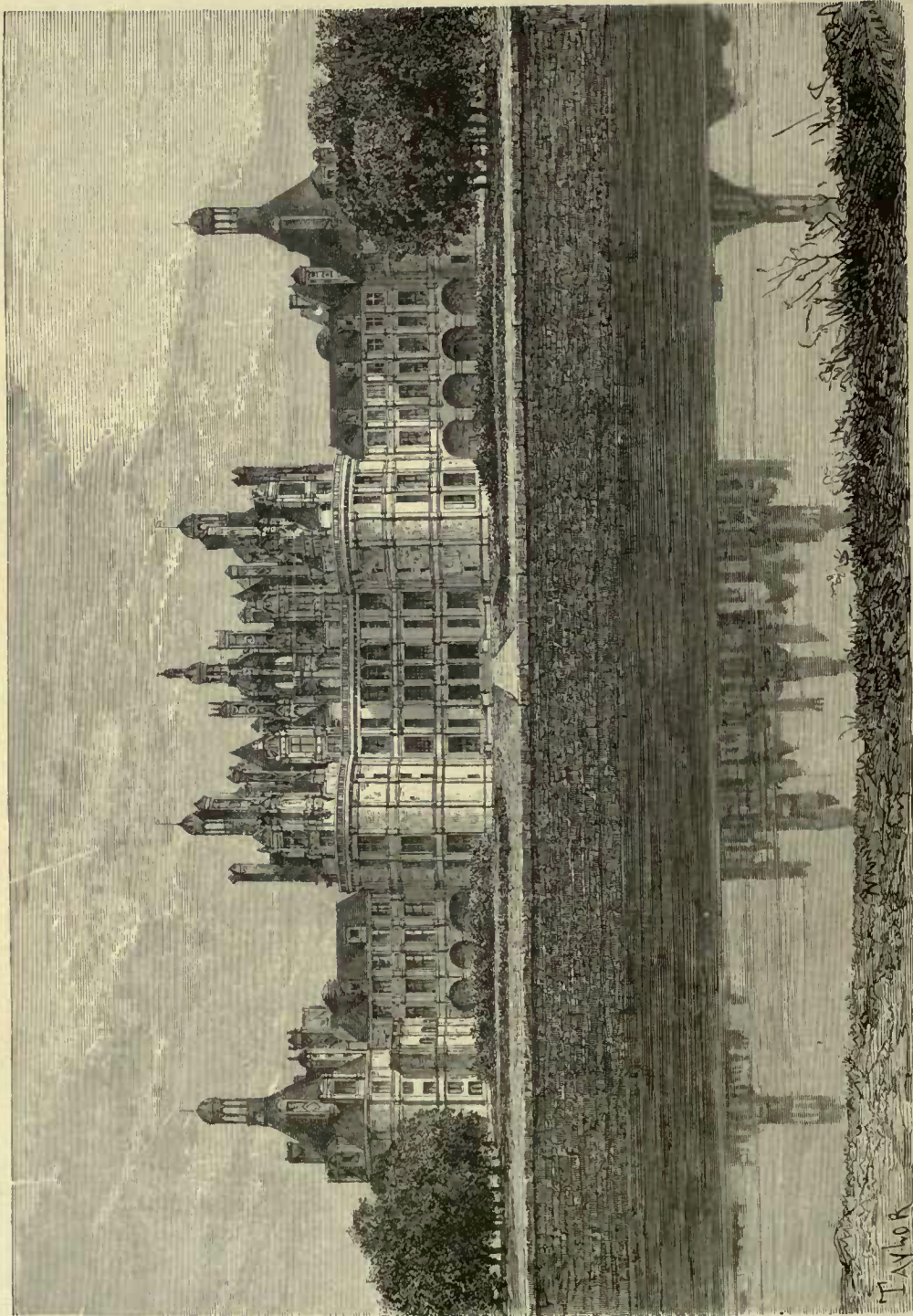
Briare (3,970 inhabitants) is the first town met with on descending the Loire. Its position at the mouth of the canal which connects the Loire with the Seine enables it to carry on a profitable commerce. *Gien* (6,493 inhabitants), a few miles lower down, has potteries. We then pass *Sully* (1,980 inhabitants), with an old castle of Henri IV.'s duke; and *St. Benoît*, a very important town in the time of the Carlovingians, with the remains of an old abbey; *Châteauneuf* (2,799 inhabitants), an old residence of the Kings of France; and *Jargeau* (1,558 inhabitants), where Joan of Arc was wounded during the siege of Orléans.

Orléans (49,896 inhabitants) is one of the great historical towns of France, and has played a part quite out of proportion to its population. "Upon the fate of Orléans frequently depended that of all France; the names of Cæsar, Attila, Joan of Arc, and De Guise record the sieges which it has sustained." Amongst its ancient buildings are a tower captured by Joan of Arc during the memorable siege of 1429; an old town-hall, converted into a museum; several churches, including a cathedral erected in the seventeenth century; a fine town-hall of the Renaissance; and several noteworthy private houses. Woollen stuffs are manufactured, but the town is prominent rather for its commerce than for its industries. The vicinity abounds in nurseries and market gardens. Lower down on the Loire are *St. Ay*, noted for its wines; *Meung* (3,122 inhabitants), an old town; *Cléry* (1,225 inhabitants), with a church containing the tombs of Louis XI. and Dunois; and the picturesque town of *Beaugency* (3,901 inhabitants), frequently mentioned in military history. *Coulmiers*, where a battle was fought in the last war, and *Patay*, where Talbot was taken prisoner by Joan of Arc, are north of the latter.

Pithiviers (4,899 inhabitants), in Beauce, exports almond cakes and lark patties. Passing thence through *Beaune la Rolande*, a place mentioned in connection with the events of 1870, we reach *Montargis* (9,175 inhabitants), the chief place of Gâtinais, built upon several islands of the river Loing. *Lorris* (1,438 inhabitants), an old town to the south-west of the latter, has become known through a code of laws collected in the twelfth century, and for a long time in force throughout the surrounding districts.

LOIR-ET-CHER is named after two rivers, which intersect its northern and southern portions, separated by the valley of the Loire. In the north are the corn-fields of Beauce, but the verdant hills lining the southern bank of the Loire soon merge into the dreary plains of Sologne. About one-tenth of the area is covered with forests, an equal area consists of heaths, and there exists but little manufacturing industry.

Mer (3,467 inhabitants), on the Loire, has a few vineyards. At *Suèvres* may be seen "sacred" stones and the remains of an ancient city; *Menars* boasts an old castle; and *St. Denis* has mineral springs similar to those of Spa. *Blois* (18,188 inhabitants) is beautifully situated upon hills overlooking the Loire. Historically it abounds in interest. It was here the Estates of France met between 1576 and 1588, the Duke of Guise was assassinated, and Catherine de Médicis breathed her last. The fine old castle in which these events took place has been carefully restored. Amongst the famous children of Blois was Denys Papin, the physician,



CHAMBORD CASTLE.

EURE-ET-LOIR, named after its two principal rivers, includes the greater part of Beauce, and is almost void of natural beauties. The western districts of Dunois, Drouais, Thymerais, and Perche offer more varied scenery. The department is one of the granaries of France, and famous for a fine breed of horses known as Percherons.

Châteaudun (6,061 inhabitants), on the Loir, is the old capital of Dunois, and boasts of an ancient castle. The other old places of note on that river are *Bonneval* (2,373 inhabitants) and *Cloyes* (1,759 inhabitants).

Nogent-le-Rotrou (6,569 inhabitants), on the Huisne, has an old castle built by the Counts of Perche, and manufactures textile fabrics. The villagers in the neighbourhood engage extensively in baby-farming, and the mortality amongst their little charges is extraordinarily large.

Chartres (20,067 inhabitants), on the Eure, the old city of the Carnutes, and the capital of the department, has a magnificent cathedral, the two steeples of which are visible for miles around, and several other interesting churches. The ancient fortifications have been converted into public walks, and only one of its fortified gates now remains. Descending the Eure, we pass *Maintenon*, with an old castle. *Dreux* (7,087 inhabitants), in a side valley of the Eure, is an old seat of royalty. It contains the mausoleum of the Orléans family. In the vast forest extending to the north of it lies the castle of Anet, which Philibert Delorme built for Diana of Poitiers.

INDRE-ET-LOIRE includes nearly the whole of the old province of Touraine. It consists of several well-marked districts, viz. the sterile tertiary plateau of "Gâtine," to the north of the Loire; the rich alluvial tract of Varenne, between Loire and Cher; the elevated tract of La Champeigne, between the Cher and the delightful valley of the Indre; the sterile plateau of Ste. Maure, beyond the valley; and the cretaceous district of Véron, which extends along the Loire, between it and the Lower Vienne.

On the Loire rise several magnificent castles, amongst which are those of *Amboise* (4,475 inhabitants), a favourite residence of the kings during the sixteenth century; of *Pocé*; and of *Clos-Lucé*, within the walls of which died Leonardo da Vinci in 1519. Another castle equally famous rises upon an island of the Cher, at *Chenonceaux*, one of the finest examples of the Renaissance, where Farmer-General Dupin gathered around him the most famous representatives of the literature of the eighteenth century.

Tours (48,325 inhabitants) occupies a site on the narrow tongue of land lying between the Loire and the Cher. This fine town transmits to us the name of the old tribe of the Turones. Its Roman remains are restricted to a few remnants of the old walls and to the foundations of an amphitheatre. The Middle Ages are represented by a cathedral, the towers of St. Martin's Church, and the ruins of a palace built by Louis XI. Amongst modern structures the fine bridge over the Loire, which connects Tours with its suburb of St. Symphorien (2,169 inhabitants), is the most remarkable. A statue of Descartes has been erected upon it. Tours is one of the most pleasant towns of France, and its library, museum, and scientific

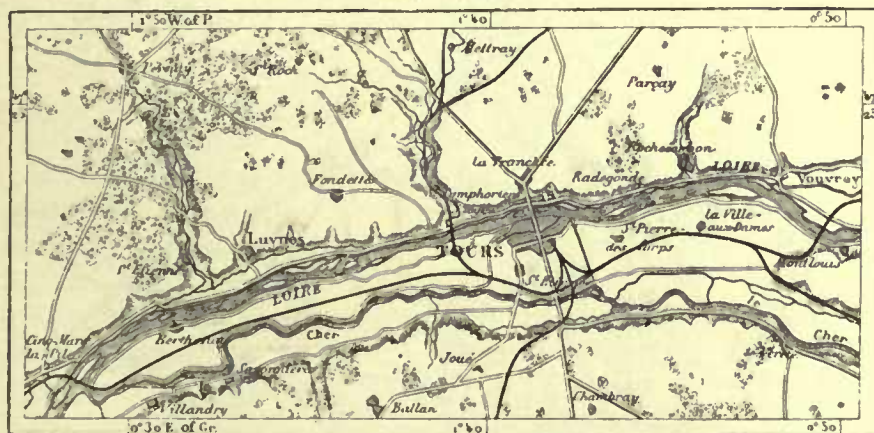
societies afford intellectual resources, but its commerce and industry are far less than might be expected from its favourable geographical position. In the time of Louis XI. it had a population of 80,000 souls, but its prosperity was destroyed by the revocation of the Edict of Nantes. There are railway works, silk-mills, woollen factories, tan-yards, and manufactories of glazed china. Candied prunes are amongst the delicacies for which "Fat" Tours is celebrated.

Vouvray (1,394 inhabitants), to the east of Tours, produces a superior wine. *Mettray* (1,875 inhabitants), to the north, has a reformatory founded in 1859. *Châteaurenault* (3,487 inhabitants) is the largest town in that part of the department which lies to the north of the Loire. Its tan-yards and leather manufactures are of considerable importance.

Descending the Loire, we pass several fine castles, including those of *Luygnes*, *Véretz*, *Cinq-Mars* (St. Médard), and *Langeais*, the latter one of the finest examples of the military architecture of the fifteenth century. *Bourgueil* (1,711 inhabitants),

Fig. 176.—TOURS.

Scale 1 : 260,000.



5 Miles.

on the north of the Loire, has vineyards, but the red wines grown there do not keep.

Loches (3,689 inhabitants) is the principal town in the valley of the Indre. In addition to a huge castle, now used as a prison, it boasts of several mediæval buildings, including two royal castles. *Montbazou* and *Azay-le-Rideau* (1,335 inhabitants), lower down on that river, are likewise noted on account of their old castles.

Chinon (4,536 inhabitants), on the Vienne, is one of the historical towns of France. From the time of Clovis to that of the religious wars it was one of the most coveted fortresses. The Norman Kings of England frequently resided here, and Charles VII. of France here assembled the Estates of his kingdom. Fearful scenes have taken place within its walls, and a spot is still pointed out where one hundred and fifty Jews were burnt for poisoning the wells. Rabelais was born in the neighbourhood. Ascending the Vienne, we reach *L'Isle Boucard*, with

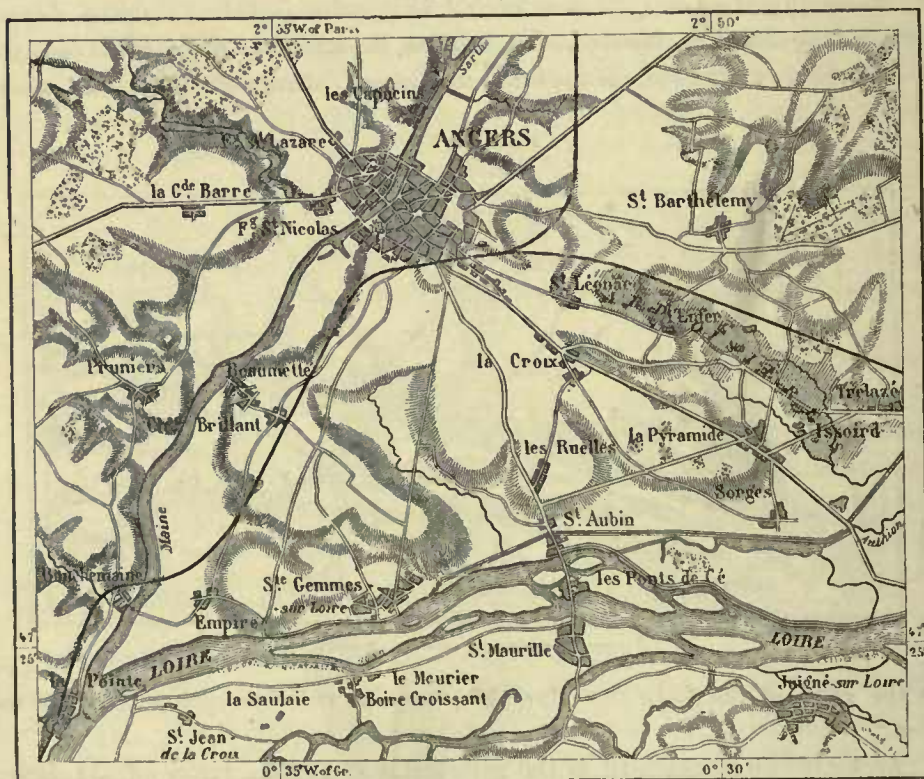
cement works, and *La Haye*, the birthplace of Descartes. At *Grand Pressigny*, near the latter, M. Léveillé, in 1863, discovered a rich store of flint implements.

Ste. Maure (1,684 inhabitants) lies on the sterile plateau to the north of the Vienne. *Richelieu* (2,328 inhabitants), in a side valley of that river, was the birthplace of the famous cardinal of that name. Of the magnificent palace which he built himself there exist now only a few insignificant ruins.

MAINE-ET-LOIRE, named after the two rivers which join below Angers, includes the most important portion of the old province of Anjou. Crystalline rocks predominate in the east, sedimentary ones in the west, and these two zones conse-

Fig. 177.—ANGERS.

Scale 1 : 120,000.



quently differ in their physiognomy, vegetation, systems of husbandry, and the material used in building houses. In the east forests of some extent still exist, but upon the whole the department is carefully cultivated, and wine, corn, fruit, and cattle form important articles of export.

We begin travelling down the valley of the Loire. The first town we reach is *Saumur* (13,463 inhabitants), with a fine old castle, numerous church steeples, and excellent quays along the river. The town is the seat of the great cavalry school of the French army, almost monopolizes the manufacture of chaplets, and carries on much trade in agricultural produce. The vicinity abounds in antiquities. The

cromlech of *Bagneux*, within a mile of the town, is the finest of all Anjou. At *Doué-la-Fontaine* (3,194 inhabitants), farther to the south-east, are several other cromlechs; but far more famous than these are the remains of a magnificent abbey at *Fontevrault* (2,651 inhabitants), now used as a house of detention.

The villages below Saumur, such as *Trèves*, *Cunault*, *Gennes*, *La Ménitré*, and *St. Maur*, are remarkable on account of their ruins of ecclesiastical or other old buildings. *Les Ponts-de-Cé* (1,876 inhabitants), on an island, is strategically important, as the passage of the Loire can easily be effected here. The Authion (see Fig. 166) joins it below that town, the principal places in its fertile valley being *Longué* (1,876 inhabitants) and *Beaufort-en-Vallée* (2,680 inhabitants), both centres of the linen industry. The best hemp of France is grown there.

A few miles below Ponts-de-Cé, at *La Pointe*, the river Maine joins from the north. Still travelling down the Loire, we pass *Chalennes* (2,449 inhabitants) and its coal mines; the village of *Champtocé* (762 inhabitants), where Marshal Gilles de Retz, the legendary Bluebeard, had his castle; and the picturesque little town of *St. Florent-le-Vieil* (958 inhabitants), with David's mausoleum of the Vendéan partisan, Bonchamps. Retracing our steps to the mouth of the Maine, we ascend that river for 5 miles, and reach *Angers* (53,366 inhabitants), the capital of the department, named after the Gallic tribe of the Andécaves, and next to Nantes the most important town in the basin of the Lower Loire. Boulevards enclose the old city, built around a magnificent cathedral, and suburbs stretch out beyond them in every direction. The castle built by Louis IX. occupies the summit of a bold rock, and there are many other mediæval buildings which impart a character to the town. There are scientific societies and colleges, a school of art industry, and museums, amongst which that containing a collection of the works of the sculptor, David of Angers, is perhaps the most interesting. Commerce and industry flourish. There are foundries and linen and sail-cloth manufactories. The nurseries and market gardens in the neighbourhood are famous throughout France, and the vineyards of *St. Barthélemy*, *Rochefort*, *St. Georges*, and *Serrant* enjoy a high reputation. The slate quarries (*ardoisières*), to the east of the town, are the most important in France, yielding about 200,000,000 slates annually.

Segré (2,212 inhabitants) and *Baugé* (3,318 inhabitants) are the only towns of any importance in the north of the department.

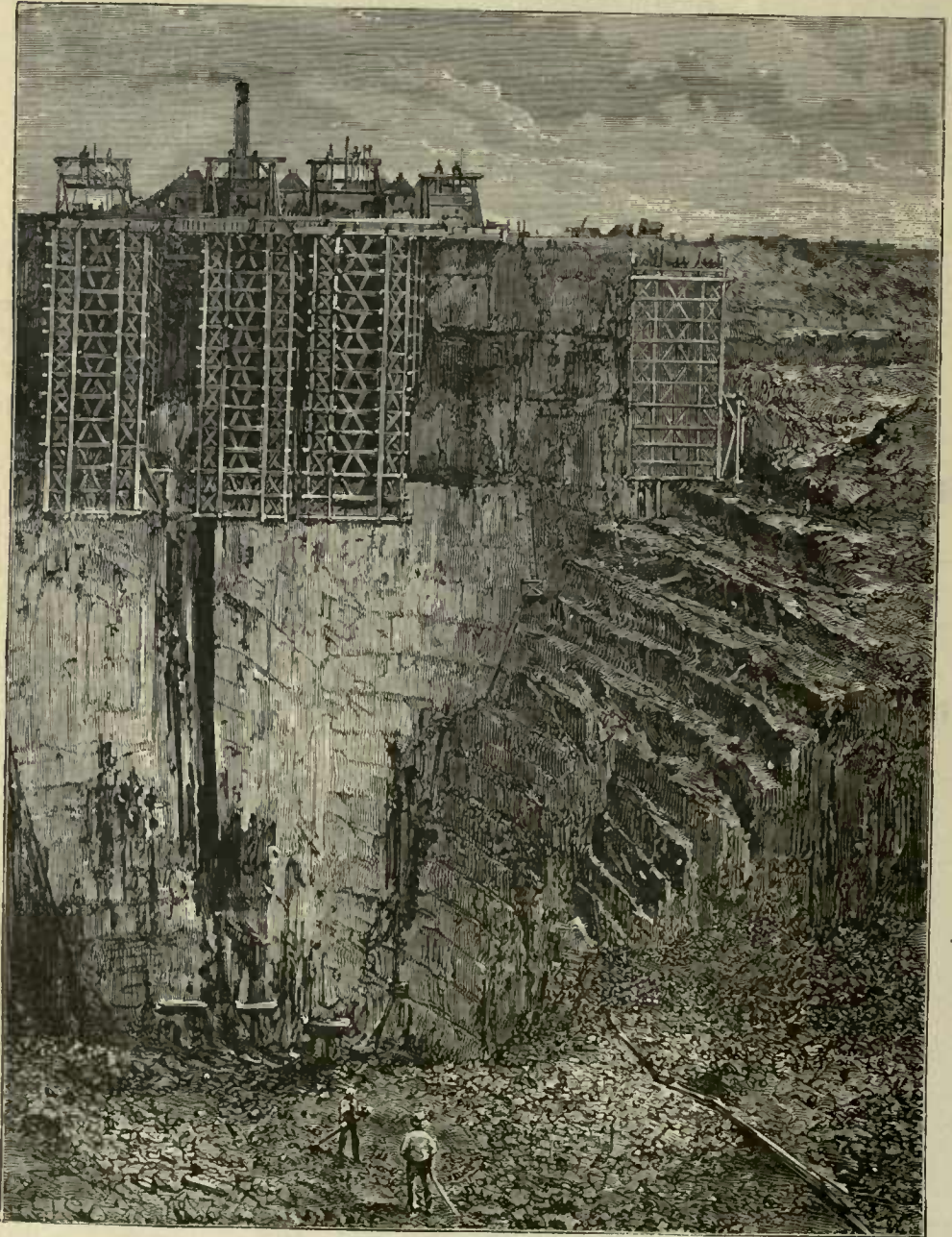
Cholet (12,335 inhabitants), in the south-west, on a tributary of the Sèvre, suffered much during the Vendéan war, but recovered rapidly from its disasters. It is now one of the centres of the linen and woollen industry of France, besides which it carries on a brisk trade in cattle. The surrounding villages are dependent, in a large measure, upon the manufactories of Cholet, as are also *Beaupréau* (2,579 inhabitants), on the Èvre, and *Chemillé* (3,073 inhabitants).

At *Thouaré*, on the Layon, are Roman ruins; whilst *Brissac*, on the Aubance, boasts of a sumptuous castle built in the seventeenth century.

SARTHE includes portions of the old provinces of Maine, Anjou, and Perche. The Sarthe, which flows west through a hilly district, and the Loir, the valley of which is bounded by low chalk cliffs, drain the department into the Loire.

Jurassic limestones, chalk, and tertiary formations predominate. Agriculture is the principal occupation, the land being cultivated for the most part by farmers. Its geese, pullets, and capons are famous throughout France.

Fig. 178.—THE SLATE QUARRIES NEAR ANGERS.



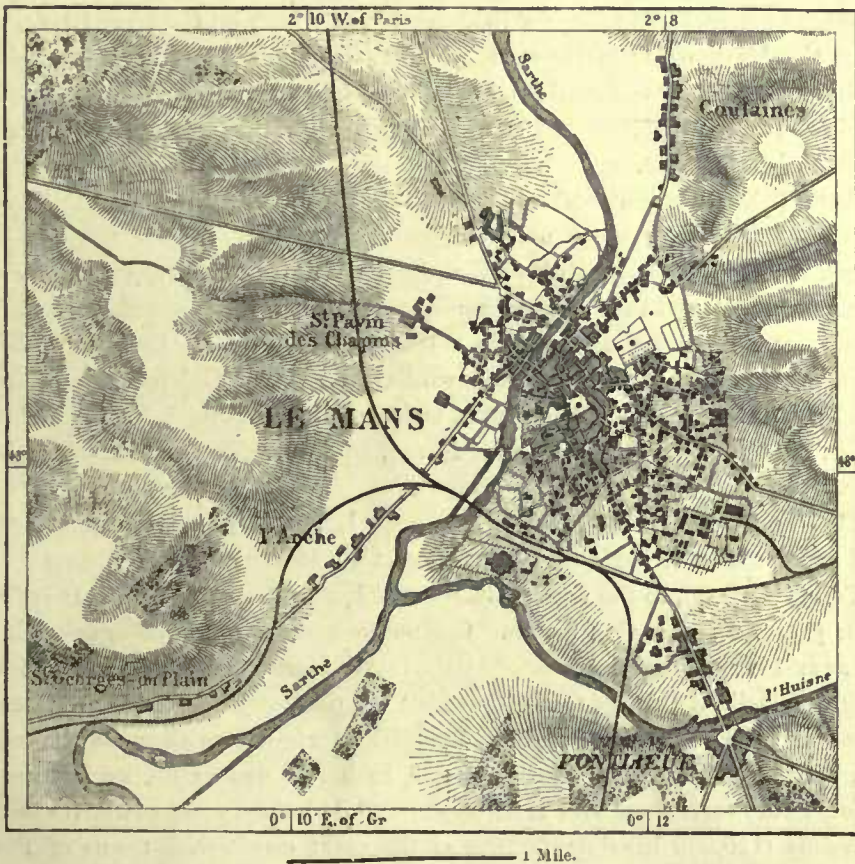
Le Mans (45,709 inhabitants) occupies an elevated site at the confluence of the Huisne with the Sarthe. It is a prosperous town. Roman towers and a magnificent cathedral attest its antiquity, but its numerous factories prove that it is

abreast of modern times. Hardware, agricultural implements, linens, and other textile fabrics are manufactured. *Fresnay-le-Vicomte* (3,010 inhabitants), on the Upper Sarthe, at the foot of a tottering fortress, manufactures linens, whilst *Sablé* (5,334 inhabitants), on the Lower Sarthe, has marble quarries, manufactories of farinaceous preparations, and cattle fairs. Within a couple of miles of it is the famous abbey of *Solesmes*, founded in the thirteenth century.

Sillé-le-Guillaume (2,995 inhabitants) and *Loué*, two small towns to the west of the Sarthe, engage in the manufacture of linen, an industry likewise carried on

Fig. 179.—LE MANS.

Scale 1 : 50,000.



in the picturesque town of *Mamers* (5,147 inhabitants), and at *Bonnétable* (3,185 inhabitants), to the east of that river.

La Ferté-Bernard (2,634 inhabitants) is the principal town in the beautiful valley of the Huisne. At *Dunau*, near it, may be seen a remarkable cromlech.

La Flèche (7,468 inhabitants), on the Loir, is the seat of a military school occupying the old Jesuit college in which Descartes was educated. Higher up on that river are *Le Lude* (2,720 inhabitants), with a fine modern mansion; *Château-du-Loir* (2,527 inhabitants), inhabited by clog-makers, quarrymen, and tanners;

and *Chartre*, where there are several subterranean habitations. North of the Loir are *Écommoy* (1,841 inhabitants), *Mayet* (1,631 inhabitants), and *St. Calais* (3,000 inhabitants).

MAYENNE lies almost wholly within the basin of the river whose name it bears, and which, lower down, is known as Maine. Geologically it forms a part of Brittany. There are slate quarries, coal mines, and lime-kilns. The linen industry is of importance, but more so the cultivation of the soil and the breeding of cattle.

Mayenne (8,826 inhabitants) is the chief town in the north of the department. The manufacture of linen occupies several thousand workmen in the town and the villages near it, and there are also cotton-mills, flour-mills, and lime-kilns. *Ernée* (3,866 inhabitants) and *Chailland* (518 inhabitants), both on the river Ernée, which enters the Mayenne from the west, are likewise engaged in the linen industry. *Jublains*, a village to the south-east of Mayenne, is the old capital of the Aulerici-Diablintes, and, in addition to a magnificent *castellum*, possesses other Roman ruins of the highest interest.

Laval (25,110 inhabitants) is a delightful city on both banks of the Mayenne, surrounded by shady walks and fine gardens. Ambroise Paré, the "father of French surgeons," was a native of the place, and a monument has been erected in his honour. Several thousand workmen are engaged in the manufacture of fancy ticking, and there are also marble works and lime-kilns. Coal is worked at *Germanchières*, to the west of Laval; whilst the rocks of Coévrans, above the fine old city of *Évron* (3,433 inhabitants), yield porphyry, granite, kaolin, and manganese. *St. Suzanne*, a village near Évron, still possesses its mediæval castle and walls.

Château-Gontier (7,218 inhabitants) on the Lower Mayenne, is a great agricultural mart, and its ferruginous springs attract a certain number of visitors. *Craon* (3,874 inhabitants), to the west of it, was the birthplace of Volney. It is famous for its pigs and its breed of horses. Coal mines and slate quarries are near it.

LOIRE-INFÉRIEURE is intersected by the Lower Loire and its estuary. Historically and geologically it belongs to Brittany, but the peasantry have long ago discarded the use of the Breton tongue, and commercial interests have alienated the country from Brittany. The department is rich in horses and cattle, agriculture and gardening are carried on with much success, while industry and commerce flourish.

Nantes (116,093 inhabitants), one of the great commercial towns of France, dates back to a time far anterior to that of the Romans, and bears the name of the Gallie tribe of the Namnetes. Its position, at a point where the rivers Erdre and Sèvre join the Loire, is exceedingly favourable for commerce, especially as sea-going vessels can reach its fine quays with every tide. Its most remarkable buildings are a castle on the river bank, a Gothic cathedral, and modern palatial edifice, beneath the roof of which have been brought together the library, museum, and art collections of the town. The public park is one of the finest. Historically the name of the town is connected with the Edict of Nantes, promulgated by Henri IV. in 1598, but revoked by Louis XIV. in 1685. As a maritime

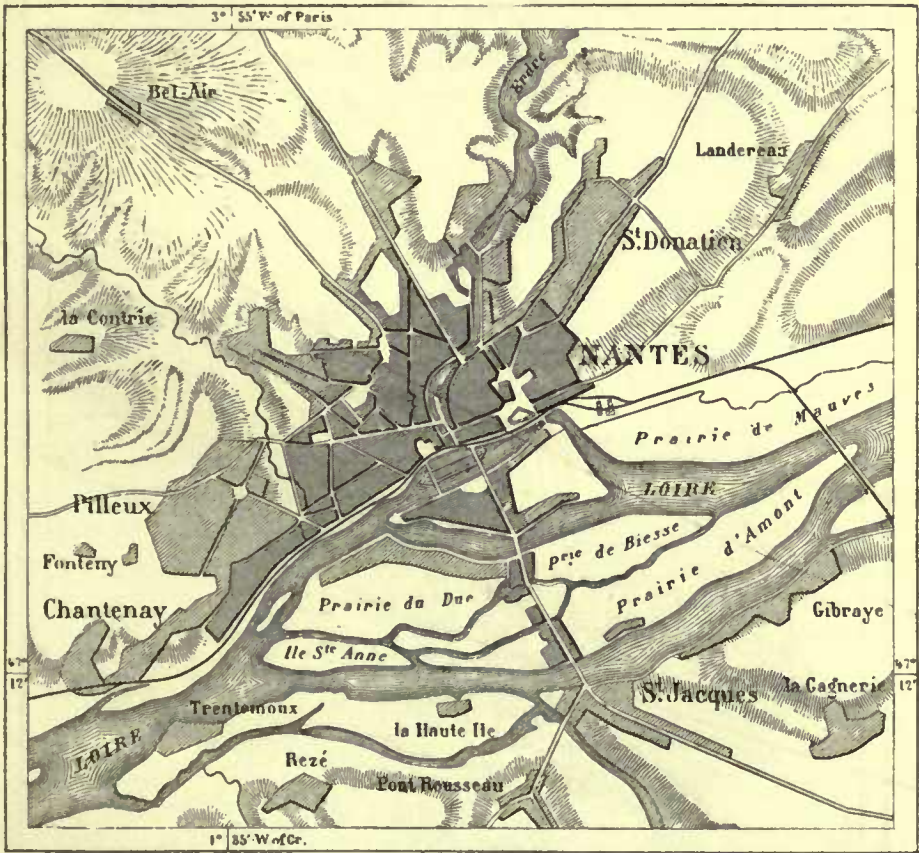


NANTES.

port the town is losing ground since the introduction of larger vessels, for only those drawing less than 10 feet of water can safely venture up the river. At the same time it must not be forgotten that the commerce of St. Nazaire, at the mouth of the river, is carried on almost exclusively by Nantes firms. In former times Nantes supplied the French West Indies with slaves, taking sugar in return, and up to the present time its intercourse with these colonies is very active. It is the great colonial depôt of the valley of the Loire, and its sugar refineries only yield to those of Paris and Marseilles. Iron foundries, lead and brass works, oil-mills,

Fig. 180.—NANTES.

Scale 1 : 56,000.



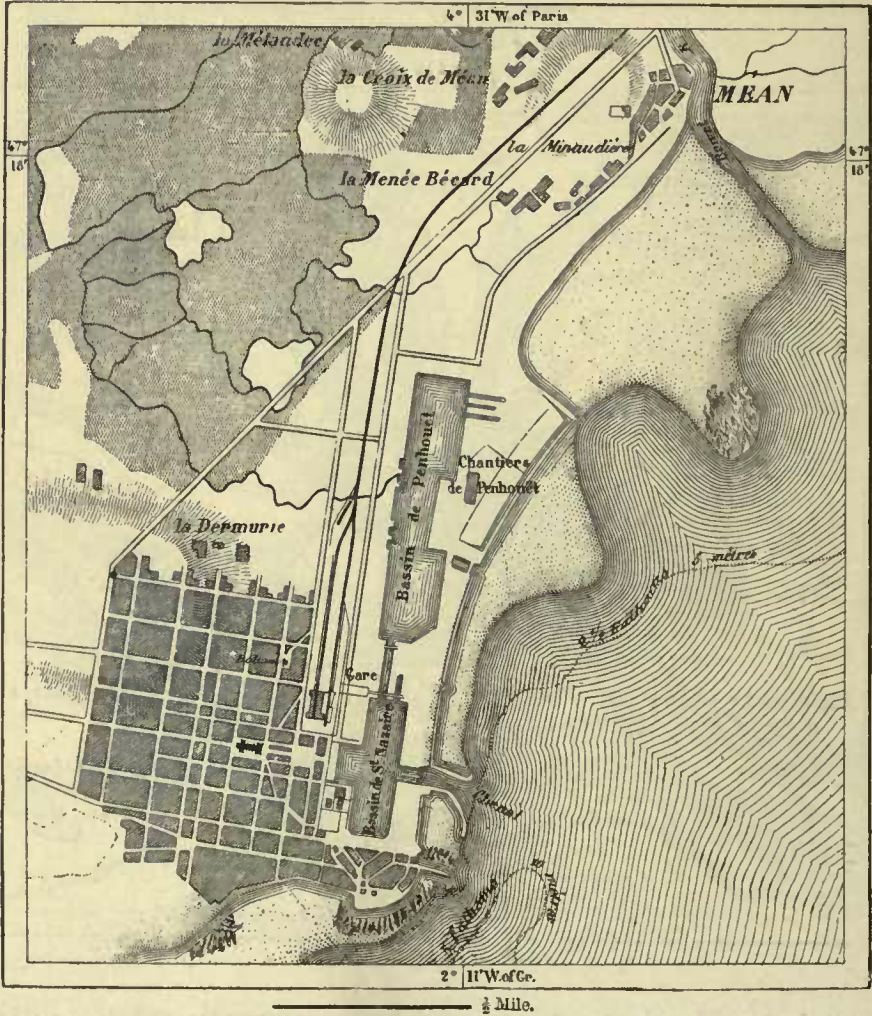
soap works, machine shops, a tobacco manufactory, ship-yards, and other industrial establishments give employment to thousands of workmen. Other thousands work in the granite quarries above the suburb of *Chantenay* (8,490 inhabitants). The preservation of food annually increases in importance. The valleys of the Erdre and Sèvre abound in fine old castles and modern country mansions, the latter more especially around *Clisson* (2,241 inhabitants).

Ancenis (4,668 inhabitants) is the only town on the Loire above Nantes. Descending the river, we pass *Indre* (2,229 inhabitants) and the island of *Indret*,

with an old castle and a Government manufactory for marine engines; *Couéron* (1,063 inhabitants) and its lead works; and reach *Savenay* (1,703 inhabitants), a small town built on a bluff to the north, affording a magnificent prospect over the estuary of the Loire. *Paimbeuf* (2,473 inhabitants) lies opposite, but its harbour is hardly ever now visited by merchantmen since docks have been excavated at *St. Nazaire* (14,761 inhabitants), at the mouth of the river, and 30 miles below

Fig. 181.—ST. NAZAIRE.

Scale 1 : 30,000.



Nantes. This town has sprung up rapidly since 1856 around a Breton village, and packet steamers connect it with the West Indies and other parts of the world. In reality, however, it is merely an outpost of Nantes, to which most of the merchandise is forwarded immediately after it has been landed. Its environs consist of barren heaths, and the town is very much in want of good drinking water.*

* Value of imports (1875) at St. Nazaire, £13,240,000; at Nantes, £2,800,000; of exports at St. Nazaire, £2,680,000, at Nantes £1,200,000.

The district to the west of St. Nazaire, with its primitive inhabitants, its ever-changing coast, and its salt swamps, yielding about 36,000 tons of salt a year, is one of the most interesting in France. Its principal towns are *Croisic* (1,981 inhabitants), much frequented by seaside visitors, and *Guérande* (2,415 inhabitants), still surrounded by turreted walls. On the wide bay to the south of the Loire, in the district of Retz, are *Bourgneuf* (817 inhabitants) and *Pornic*, a rising seaside resort, with numerous pretty villas.

Châteaubriant (4,082 inhabitants) is the only place of importance in the north of the department, its old walls and gabled houses offering a curious contrast to its modern court of justice and manufactories. Agricultural progress, too, changes the face of the country, and large tracts of heath in the vicinity of the agricultural school of *Grandjouan* have been converted into productive laud.





CHAPTER VIII.

BRITTANY (BRETAGNE).

GENERAL ASPECTS.

BRITTANY and Cotentin, the two peninsulas of Western France, are geologically of the same origin, and, together with Poitou and Cornwall, are the principal remaining portion of a huge granitic island, which also included Poitou and Cornwall, and was separated from the continent by an arm of the sea extending to the Vosges and the plateau of Central France. An irruption of the Atlantic severed the French portion of this ancient island from that lying beyond the Channel. The ocean incessantly lashes the broken coast of these peninsulas, but their granitic rocks are better able to resist its onslaughts than is the calcareous soil of Normandy and Saintonge.

The climate and physical aspects of these two peninsulas are the same, but their political history has been very different. The Bay of St. Michel completely separates Brittany from Cotentin; and the latter being too small of extent to lead an independent life, and moreover easy of access, very soon cast in its lot with that of the population of Northern France. Brittany, on the other hand, offered a stubborn resistance to every attempt at assimilation. Thanks to its remoteness—far away from the great high-roads of nations—it was able to maintain its old customs and its Celtic tongue. The stubborn resistance offered by the Bretons to foreign encroachments was maintained for centuries. The English, though masters of Anjou and of Normandy, never succeeded in firmly establishing themselves in Brittany; and long after that province had become French it maintained its ancient customs, and down to the present day it is distinguished for many peculiarities.

Rocks, tortuous valleys, heaths, and forests separate Brittany from the rest of France, and the readiest access to it is afforded by the sea. Its many fine harbours facilitated the creation of a mercantile marine, and the frequent wars between England and France afforded an opportunity to the Bretons for exhibiting their prowess at sea. The rivalry between them and the "Bretons" on the other side of the channel fed their local patriotism, whilst frequent intercourse with

other maritime districts of France created amongst them a French national feeling.

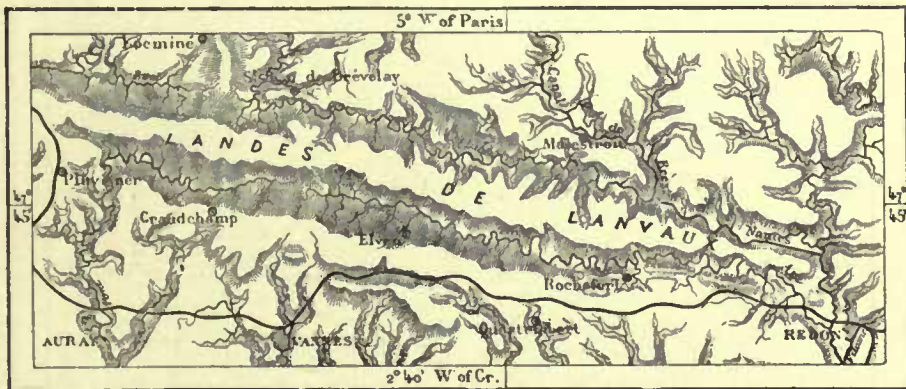
In its general features, Brittany consists of two bands of granite, gradually approaching each other in the west, the triangular space between them being occupied by ancient sedimentary formations.

The crystalline, fern-clad heights to the west of the Lower Loire, known as the Sillon ("furrow") of Brittany, may be described as the edge of a plateau rather than a chain of hills. The Vilaine has excavated itself a passage through the granitic heights, which farther west form the range known as the Landes of Lanvaux (574 feet). The granites finally give place to schists, which form the Black Mountains of Brittany, thus called after the forests which formerly covered them. They culminate in the bold Menez-Hom (1,083 feet), on the peninsula of Crozon.

The northern granitic range of Brittany is far more complicated in its structure

Fig. 182.—THE LANDES OF LANVAUX.

Scale 1 : 650,000.



than that of the south. From the plain intersected by the canal of the Ille the country gradually rises to the heights of Le Mené (1,116 feet); but beyond these extends a vast ledge of granite, until we reach the fine range of Arrée and its sandstone peak of St. Michel (1,284 feet), the most prominent hill of Brittany. The vale enclosed between these granitic heights is traversed by several rivers, communication between which has been established by means of a canal, which connects the Lower Loire with Brest, but has now been superseded by railways.

Brittany generally gives an impression of monotonous grandeur; and Brizeux, a native poet, addresses it as the "land of granite and of oaks." But the country is not without landscapes more pleasing to the eye—heaths and fields, shady lanes, tranquil rivulets, half-hidden lakelets, and old walls covered with ivy. On the seashore other sights greet the eye, and nothing can be more impressive than the billows of the Atlantic rushing upon the cliffs of Finistère. With a lowering sky the physiognomy of the country is sombre in the extreme, but the sun imparts to

it an aspect of quiet cheerfulness impossible to describe. The Bretons themselves yield completely to these impressions, and home sickness is frequent amongst them when abroad.

THE COAST.

ANCIENT ARMORICA, the "Land of the Sea," fully merits its Celtic appellation, for to the sea it is indebted for its climate and for most of its resources, and the sea has shaped the temper of its inhabitants. Off the western promontories of Brittany the gulf-stream encounters the secondary ocean current, which sweeps the

Fig. 183.—MORBIHAN.

Scale 1 : 240,000.



5 Miles.

shores of the Bay of Biscay. The tides are violent and irregular, and the sea is perpetually in motion down to its very bottom. A powerful under-current running along the northern coast sweeps the granitic sea-bottom, piling up the sand and mud in the east. Some of the rocks forming these are but ill adapted to resist the action of the sea, and enormous blocks of rock have tumbled down from the cliffs. In the west, where sedimentary strata intervene between the two bands of granitic rocks, the encroachments of the sea have been most considerable. The roadsteads of Brest and Douarnenez penetrate deeply into the land, and almost resemble Norwegian fiords, half obliterated by alluvium brought down by the rivers which enter them. To the west of the estuary of the Vilaine this contest between the

elements has given birth to a land-locked bay known as the Morbihan, or "little sea." Islands are scattered over it, some of them inhabited, and all subject to continual changes. M. E. Desjardins is of opinion that this inland bay is of com-

Fig. 184.—THE PENINSULA OF QUIBERON.

Scale 1 : 100,000.



paratively recent creation. A subsidence of the land has certainly taken place there, for cromlechs have been discovered which do not even uncover at low water. The numerous islands at the mouth of this bay indicate the direction of

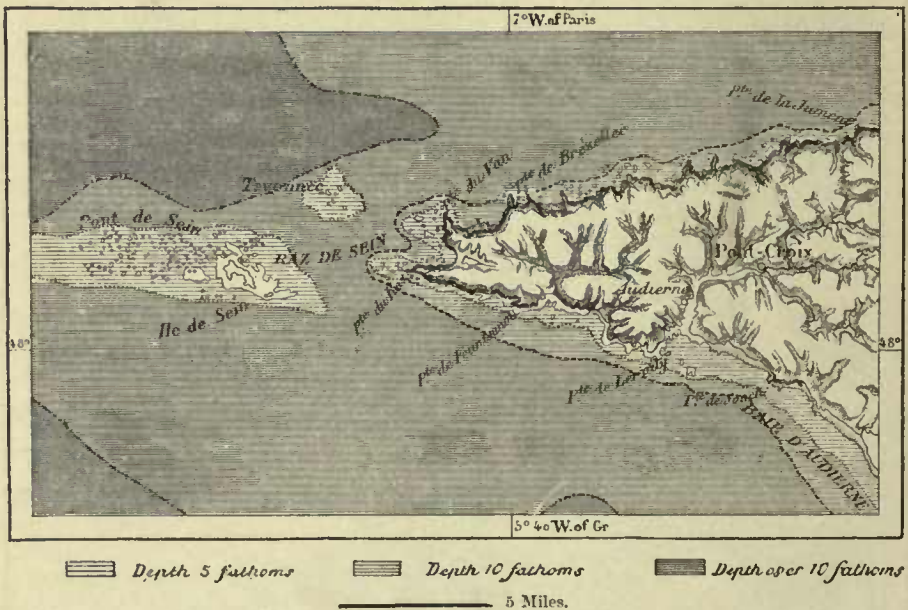
the old coast, and farther off a still more ancient coast-line may be traced in the islands lying between the Points of Croisic and of Quiberon. These islands, as well as the elongated peninsula of Quiberon, certainly mark the extent of Brittany in some bygone age. As to the peninsula mentioned, a causeway and sands submerged by each flood alone attach it to the mainland.

The island of Groix and the small archipelago of Glénan mark the extent of the old coast to the west of Quiberon. Tradition tells us that the nine islets of Glénan are the fragments of a larger island. As to the large island of Belle-Ile, or Guerveur, farther off the shore, it is, with the island of Yeu and the sunk rock of Rochebonne, the only remaining witness of a coast-line even more ancient than those noticed above.

Doubling the bold headland of Penmarch, or the "horse's head," we enter the

Fig. 185.—THE HEADLAND OF CORNOUAILLE.

Scale 1 : 400,000.



desolate Bay of Audierne. Not a tree grows upon the heights which surround it, and no traces of cultivation greet the eye. The headland of Cornouaille (Cornwall), to the north of that bay, juts far out into the sea. Standing upon its summit, no less than 262 feet above the sea, we are not beyond the reach of the spray, and the ground is felt to shake beneath our feet. The waves dash into the Enfer (hell) of Plogoff, at its foot, creating a sound like thunder, and at the neighbouring Bay of Trépassés the superstitious mariner fancies he hears the voices of the drowned rising above the howling storm and the roar of the waves. To our ancestors this uproar sounded like the voice of a god, whom nine Druid virgins sought to propitiate by leading a life of devotion upon the weather-beaten island of Sein. If tradition can be believed, many a town has been swallowed up by the waves in that part of the country. The Bay of Douarnenez is said to mark the site of the

ancient city of Is; and a causeway of Roman construction, leading to some place now submerged, may still be traced near the Bay of Trépassés.

The island of Ouessant occupies a position analogous to that of Sein, with reference to the headland of Léon. This cliff-bound island is cultivated, but not a tree, not a shrub grows upon it. Mariners dread to approach it, for rocks abound, the tides and winds are most irregular, and dense fogs prevail. But though the passages separating Ouessant and the neighbouring islets are full of danger, they give access to the magnificent road of Brest, where four hundred vessels find a secure shelter.

Several small islands and rocks on the north coast of Brittany enable us to trace the old line of coast. The dreaded granitic headland, known as "Swords of Tréguier," near Bréhat, has offered a powerful resistance to the waves, but the coast farther east has been encroached upon in many parts. In the Bay of St. Brieuc alone no less than 120 square miles of land have been swallowed up since the fifth century. Traces of ten Gallo-Roman buildings have been discovered at various spots on the beach, and the old walls on the Cape of Erquy, which bounds the bay on the east, are supposed to be the remains of the town of Reginea mentioned on Peutinger's Table. The island of Cézembre, at the mouth of the Bay of St. Malo, formed a portion of the mainland in the twelfth century, and even more recently. Submerged forests and bogs are met with at different points of this coast, and the recovery of the trees buried for centuries beneath the sands of the beach occupies many of the poorer inhabitants of St. Malo. The remains of buildings discovered in the Bay of St. Brieuc prove, however, that the encroachment of the sea is not exclusively due to its erosive action; a subsidence of the land has evidently contributed to that result.

If tradition and old chronicles are to be believed, the encroachments of the sea have been formidable indeed. The archipelago of Chausey is stated in the "Lives of the Saints" to have formed part of the mainland in the beginning of the eighth century, the area now covered by the sea being then occupied by a vast forest known as *Seisciacum nemus*. Thus much is certain—that a forest formerly covered what is now the beach of the Bay of St. Michel. The names of villages which stood in that forest have been handed down to us, and at low water traces of them may sometimes be seen. Nowhere else in the world, the estuary of the Severn and the Bay of Fundy alone excepted, does the tide attain so extraordinary a height as in the Bays of St. Malo and St. Michel, where it rises 40, and even 50 feet. In the course of six hours it invades the beach of the latter bay, converting the rock of St. Michel, with its picturesque castle, into an island. Man, however, has undertaken not only to put a stop to the further encroachments of the sea, but also to recover some of the land already swallowed up by it. The interesting hill of Dol, with its numerous remains of prehistoric animals, formerly stood in the midst of the sea, but 3,500 acres surrounding it have been converted into productive land. Embankments 30 feet in height, and constructed since the eleventh century, now extend for a distance of 30 miles along the southern shore of the Bay of St. Michel, and the recovery of the sandy beach lying beyond

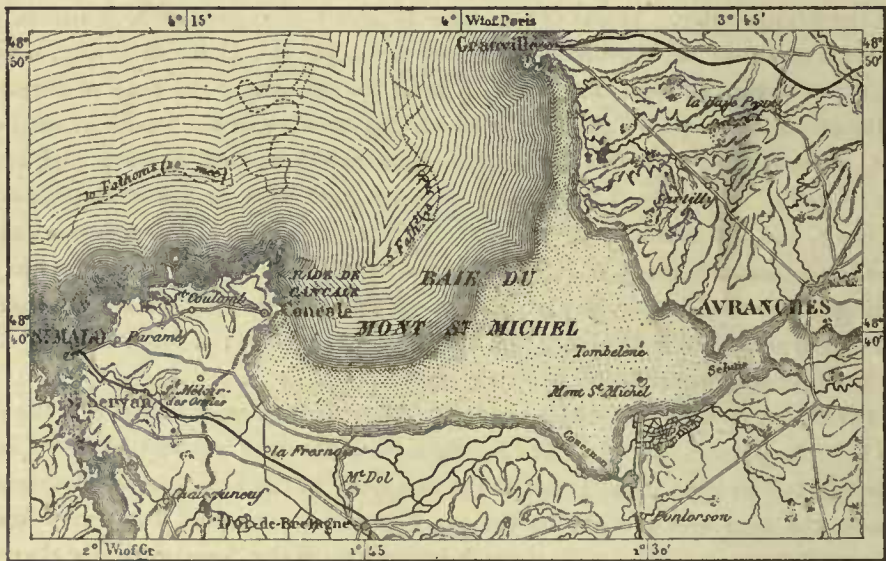
them is not considered a hopeless enterprise. The greatest obstacle to this reconquest is not offered by the sea, but by the rivers which flow into the bay, and for which an outlet must be provided.

Elsewhere on the coast of Brittany man has had to guard against an invasion of moving sand-hills. The dunes of St. Pol-de-Léon are the most formidable, but having been planted with trees, they no longer cause anxiety. The sand composing these and other dunes in Brittany is unusually rich in carbonate of lime. Fragments of shells and seaweed enter largely into their composition, and the *traëz*, or calcareous sand, carried thither by the winds actually constitutes an element of wealth, being most useful as manure.

Seaweeds are collected all along the coast, to be applied to the fields; and in the bogs of Cancale and St. Michel the peasants annually take up 500,000 tons of

Fig. 186.—THE BAY OF ST. MICHEL.

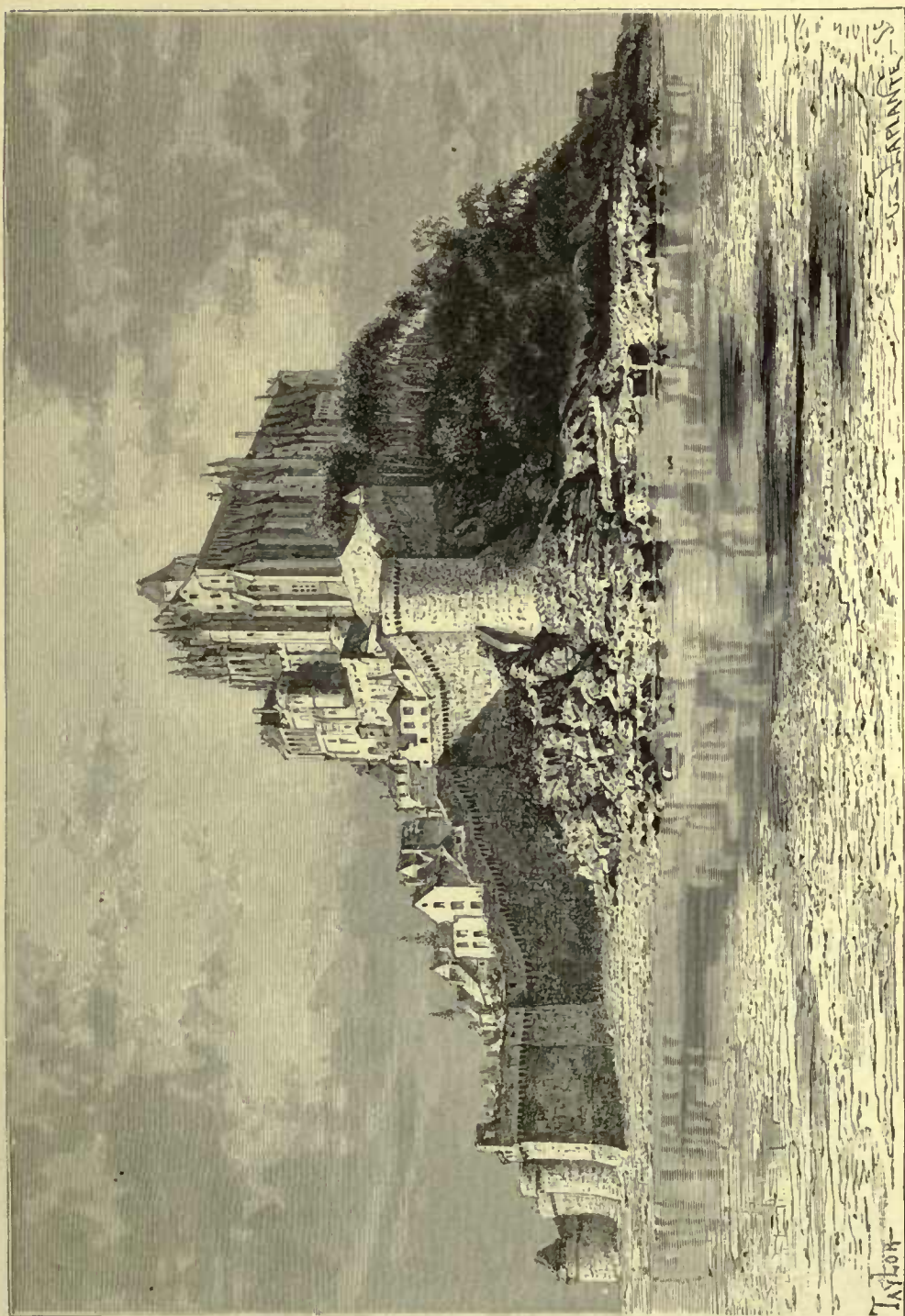
Scale 1 : 500,000.



5 Miles.

mud mixed with fragments of shells, which they spread over their fields. These fertilising agents are all the more appreciated as the crystalline and palæozoic rocks of Brittany contain hardly any lime at all.

The fishing grounds of Brittany are amongst the most productive of France. The peasants of Quimper and Châteaulin formerly almost lived upon salmon, and farm-labourers objected to their being required to eat it more than thrice a week. Thousands of men are engaged in the coast fisheries, yielding herrings, sardines, mackerel, lobsters, and oysters; and Breton fishermen, inured to the hardships of a seafaring life, annually visit the fishing grounds of Newfoundland and Iceland. Many amongst them work in the fields during winter, or collect seaweed, but early in spring engage themselves as sailors on board the vessels proceeding to the Arctic regions. The four departments of Brittany supply the mercantile marine of France with one-fifth of its sailors.



MONT ST. MICHEL.

INHABITANTS.

THE inhabitants of Brittany differ from those of the rest of France in language, manners, and social condition.

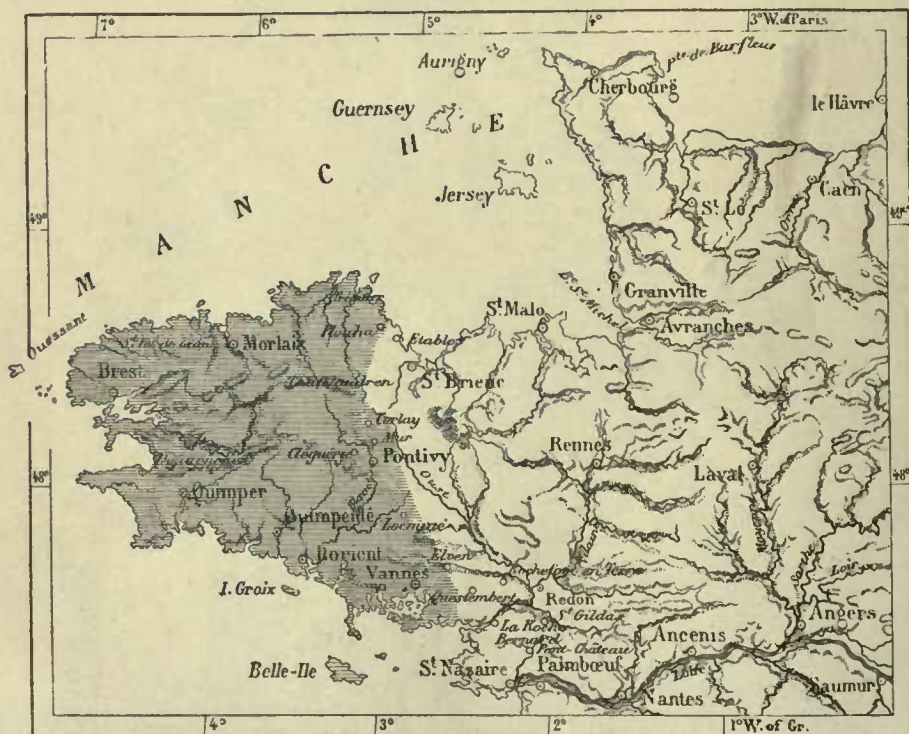
Fig. 187.—BRETON PEASANTS.



In Armorica, a remote region but little visited, ancient customs maintained themselves longer than in the more accessible parts of France, and the Druids enjoyed most power. The modern Bretons are no doubt, to a large extent, the

descendants of these ancient Armoricans, but kindred Celtic tribes, driven from Great Britain through the invasion of the Anglo-Saxons, settled amongst them. These new arrivals founded the towns of St. Brieu, St. Malo, and others. Being superior in intelligence to the aboriginal population, they soon gained a preponderance, and Armorica became Brittany, or Little Britain. The descendants of these immigrants still differ from other Bretons. They are tall, fair, and blue-eyed, these features being most prominent on the islands of Batz and Ouessant. The Bretons living to the south of the northern coast range are less tall, brown-complexioned, and have round heads; but they, too, have dark blue eyes. Some of the inhabitants of the islands and of remote districts are said to be of a different

Fig. 188.—APPROXIMATE EXTENT OF THE BRETON TONGUE.



origin. As a rule the Bretons bear a striking resemblance to the Limousins and other inhabitants of the plateau of Central France. They have even been likened to the Kabyls of Algeria. Dr. Bodichon, himself a Breton, says that "the Breton of pure blood has a thick skull, a palish yellow skin, a brown complexion, black or brown eyes, a squat build, and black hair. He, like the Kabyl, is stubborn and indefatigable, and his voice has the same intonation."

The Celtic, or *Breizad*, spoken by the Bretons, is akin to Welsh. There are four dialects, those of Tréguier, Léon, Cornouaille, and Vannes; and considerable jealousies exist between those who speak them, as is proved by uncomplimentary expressions like these: "A thief like a Léonard!" "a traitor like a Trégorrois!"

“a blockhead like a Vannetais!” and “a brute like a Cornouaillais!” The literature of Brittany is poor, and cannot compare in antiquity or wealth with that of

Fig. 189.—WOMEN OF CANCALE.



Ireland or Wales. Only one weekly paper is published in Breton. French is spoken in Brest and the towns generally, and is gaining ground rapidly amongst the peasants, most of whom can converse now with the “gentlemen” whom

formerly they hated so much. Still the boundary between the French-speaking Bretons, or "Gallots," in the east, and the Bretons proper, has changed but little since the twelfth century. An examination of a map almost enables us to draw the line dividing the two languages. On the one side we meet with French names, or with Breton ones accommodated to French tongues; on the other, with pure Breton names only, such as begin with *aber* (mouth), *conc* (port, conch-shell), *car*, *caër*, or *ker* (fortress, manor-house), *coat*, or *coët* (wood), *lan* (consecrated ground), *loc* (place, hermitage), *les* (court of justice), *mené* (hill), *mor* (sea), *penn* (head), *plé*, *pleu*, or *plow* (people, tribe), *ros* (coast), &c.

The manners of the Bretons, though peculiar in many respects, do not essentially differ from what may be met with in other remote localities of France. Brittany, in fact, presents us with a fair likeness of mediæval France. As Michelet says, "The Bretons have only been estranged from us because they have adhered most faithfully to what we were originally; they are not much French, but very much Gaul."

Old pagan customs still survive, and the peninsula of Pontusval, in Léonais, has been known as *ar paganiz*, or the "land of the pagans," down to the present time. But there are many other parts of the province where fountains and large trees remain objects of veneration, and the mistletoe has lost none of its pristine virtue. The ancient sanctuaries have been converted into chapels, but the old divinities survive under other names. Our Lady of Hatred, the patroness of a chapel near Tréguier, is the Christian representation of a ferocious Celtic deity, whom women invoke to destroy a detested husband, and to whom children pray for the death of aged parents. St. Ives the Truthful, on the other hand, is appealed to as the defender of orphans and widows, and to redress all wrongs.

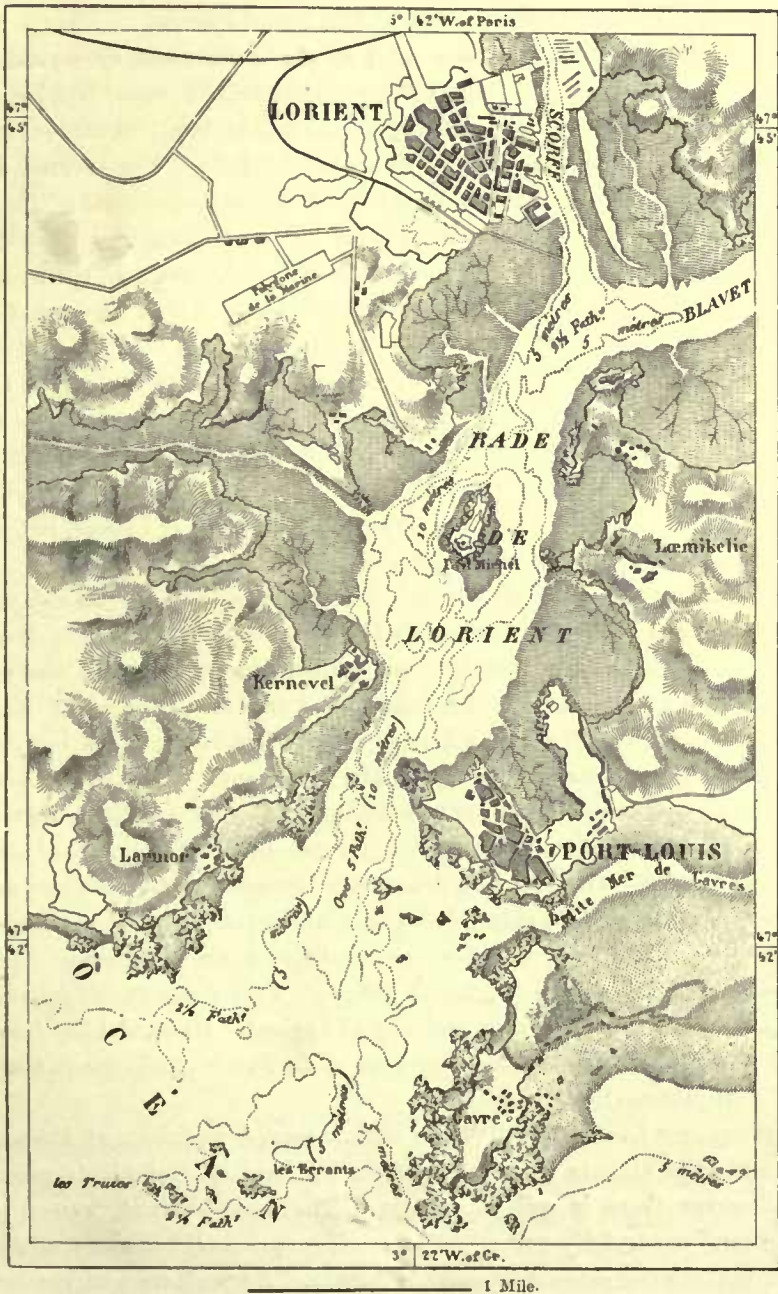
Dolmens, or cromlechs, are revered as the tombstones of powerful men, and raised stones, which no peasant passes by without crossing himself, abound throughout the country. The peasants near Auray, when suffering from rheumatism, lie down on an altar, invoking the aid of St. Étienne. Elsewhere they rub the forehead with "sacred" stones when suffering from headache. Young people still dance around the dolmens, and married couples furtively touch one of these stones in order that their posterity may prosper. The great grave-hill near Carnac, 140 feet in height, is visited by sailors' wives to pray for their husbands. In 1658 the Breton clergy solemnly declared that the devil alone could profit from food offerings placed upon these dolmens: since that time many of them have become objects of superstitious fear instead of veneration.

TOPOGRAPHY.

MORBHAN is richer in ancient stone monuments than any other department of Brittany, and its towns are more original in their aspect. Breeding cattle is of great importance. Heaths occupy a vast area even now, and most of the peasants keep bees. Rye, buckwheat, fish, and shell-fish constitute the principal articles of food.

The eastern portion of the department lies within the basin of the Vilaine and its tributary, the Oust. *Roche-Bernard* is a small port near the mouth of the

Fig. 190.—LORIENT AND PORT-LOUIS.
Scale 1 : 150,000.



Vilaine, here spanned by a bold suspension bridge, which offers no obstacle to sailing-vessels proceeding up the river to Redon. *Plœrmel* (2,790 inhabitants)

is the principal town in the valley of the Oust, with remains of ancient walls and a church of the sixteenth century. *Josselin* (2,522 inhabitants), higher up on the Oust, is commanded by a fine castle. A pyramid, half-way between these towns, marks the site of the "Battle of the Thirty," fought in 1531, between the champions of Beaumanoir and Bamborough. *Rohan*, with ruins of a castle, has given its name to one of the most powerful families of France.

Vanves (15,716 inhabitants), the capital of the department, on a creek of the Bay of Morbihan, resembles a large village rather than a town, but boasts of a museum rich in local antiquities. *Auray* (4,335 inhabitants), on another creek of the bay named, is famous on account of its oyster beds. The sardine fisheries occupy many of the inhabitants, and annually, at the commencement of the fishing season, a nautical procession is formed, headed by the priests, who solemnly bless the sea. A chapel near the town is much visited by pilgrims. In the neighbourhood was fought the battle which terminated the Breton war of succession (1364). *Port-Navalo* and *Loemariaker* are two villages at the mouth of the Bay of Morbihan. Near the former rises the artificial hill of Tumiac, 66 feet in height, and the latter boasts of a remarkable dolmen (see Fig. 8). Other dolmens of note are met inland, near the villages of *Elven* (756 inhabitants) and *Grand Champ* (668 inhabitants), as well as on the peninsula of Ruis, remarkable, moreover, for its mild climate. Around *Sarzeau* (840 inhabitants), the birthplace of Lesage, laurel-trees, camellias, myrtle-trees, and pomegranate-trees grow in the open air.

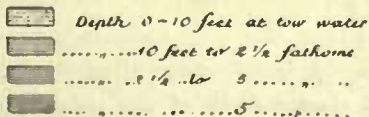
The western portion of the department is drained by the river Blavet, rendered navigable as far as *Pontivy* (6,402 inhabitants), formerly known as Napoléonville, and consisting of a Breton quarter, with quaint houses, and the military blocks adjoining it. Vessels of 200 tons ascend the Blavet as far as *Hennebont* (4,844 inhabitants), 6 miles above *Lorient* (31,000 inhabitants), the largest town of the department, and its busiest port. The harbour of Lorient is accessible to vessels of the largest size; and in the beginning of the eighteenth century, whilst the French East India Company existed, its commerce exceeded that of every other port of France. The company failed in consequence of the progress made by the English in India, and its ships, dockyards, and arsenal became the property of the State. It is still one of the five great military ports of France. The inhabitants are much interested in the sardine fishery. *Port-Louis* (3,262 inhabitants), at the mouth of the Blavet, is a dependency of Lorient. Its citadel has frequently served as a prison of state, as has also that of *Le Palais* (2,823 inhabitants), the capital of Belle-Ile-en-Mer.

FINISTÈRE, or "Land's End," is the westernmost department of France. To its moist and mild climate it is indebted for its fertility, and plants grow luxuriantly wherever there is soil to root in. The coast district, known as the "Golden Belt," is carefully cultivated by small proprietors, but many of the large estates in the interior consist of barren heaths. Agriculture and the breeding of cattle and horses constitute the wealth of Finistère. There are also quarries of granite and slates, but the argentiferous lead mines are no longer worked. The fisheries are of considerable importance.

Quimperlé, a pretty town of 4,080 inhabitants, is the first place met with on crossing from Morbihan into Finistère. Its port is accessible only to small coasting vessels. Then follows the village of *Pont-Aven*, with numerous windmills.

Fig. 191.—CONCARNEAU.

Scale 1 : 33,000.



————— 1 1/2 Miles.

Concarneau (4,614 inhabitants), on the wide Bay of Fouesnant or Forest, is one of the great fishing towns of Brittany. Its maritime fauna is exceedingly rich, and an aquarium has been established to enable scientific men to study it.

Quimper (13,879 inhabitants), the capital of Cornouaille, has a tidal harbour,

and boasts of a highly venerated cathedral, dedicated to St. Corentin. An agricultural college and a drainage and irrigation school have been established there. Quimper was the birthplace of Kerguelen, the navigator, and of Laënnec, the physician. The surrounding country abounds in natural curiosities, and the manners of the inhabitants are very primitive. *Briec* (482 inhabitants), a village to the north, is noted for its "double nags," which amble naturally. *Pont l'Abbé* (3,827 inhabitants) is one of the most old-fashioned towns of Brittany, and at the village of *Penmarch* we meet with the ruins of a considerable town. *Audierne* (1,627 inhabitants) is likewise a decayed city, but *Douarnenez* (8,687 inhabitants) has become one of the principal quarters of the sardine fishery, which employs 800 boats and several thousand men. The wide Bay of Douarnenez is bounded in

Fig. 192.—BREST.



the north by the peninsula of *Crozon* (824 inhabitants), beyond which a narrow gullet leads into the magnificent roadstead of Brest.

Brest (66,828 inhabitants) is the most populous town on the Atlantic seaboard between Havre and Nantes, and next to Toulon the greatest naval arsenal of France. Its aspect, however, is very different from that of the delightful city of Provence. It is almost sinister, and from afar only uniform ramparts and cannon are visible. The estuary of the Penfeld, hardly more than 300 feet wide, forms the port of the town. On its right rises a castle of the thirteenth century, very much older than the modern fortifications built by Vauban. The shabby buildings on the left contain marine stores. Passing beneath a swing-bridge, the estuary winds for more than a mile between stores, workshops, and ship-yards. Huge basins have been excavated in the solid rock, and a breakwater nearly a mile in length has recently been constructed. Steamers connect Brest with New York, but the commerce of the town is not of much importance.

The vicinity of Brest and of its industrial suburb of *Lambézellec* (2,243 inhabitants) abounds in remarkable sites. Ascending the Elorn, we have *Plougastel-Daoulas*, with its orchards and market gardens, on the right, and reach *Landerneau* (6,965 inhabitants), with a large linen-mill, and *St. Martyre*, famous on account of its horse fairs. The river Aulne, which likewise enters the road of Brest, leads past *Le Faou* and *Port-Launay* to *Châteaulin* (2,211 inhabitants), near which are slate quarries. On the Aven, a tributary of the Aulne, stands *Carhair* (2,296 inhabitants), the Roman Vorganium, where seven roads meet. Passing through the narrow gullet which connects the road of Brest with the open Atlantic, we notice *Camaret*, an old outpost, on the left, and the small creek of *Minou*, the terminus of an Atlantic cable, on the right. Doubling Point St. Matthieu, surmounted by the ruins of a church, we pass in succession *Conquet*, a favourite bathing-place; *Aber-Ildut*, where there are granite quarries; *Aber-Benott*; and *Aber-Wrach*. *Lesneven* (2,437 inhabitants), near which is the church of Folgoët, much frequented by pilgrims, lies some distance inland.

Morlaix (13,519 inhabitants), on the Dossen, has a tidal harbour, and vessels of several hundred tons are able to anchor close to the stores and manufactories which line both banks of the river. The most remarkable building of the town is a railway viaduct, which, at a height of 190 feet, passes over the river and the houses of the town. Moreau was born at Morlaix in 1763, and the traveller Lejean is a native of Plouegat-Guerrand, near Lanmeur, to the north-east of the town. Descending the river, we pass the castle of *Tuureau*, on an island at its mouth, built in the sixteenth century as a defence against the English, but now used as a prison. *St. Pol* (3,503 inhabitants), the old capital of Léonais, has two magnificent churches, but has otherwise lost all importance. The environs, protected by embankments, are exceedingly fertile. *Roseoff* (1,282 inhabitants), the old harbour of Léonais, is known on account of a fig-tree, which has grown to extraordinary proportions. The vegetables grown around it are exported to Paris, London, and Rotterdam. The sea abounds in fish, and a zoological station, similar to that at Concarneau, has been established.

CÔTES-DU-NORD, "north coast," is for the greater part carefully cultivated by a multitude of small proprietors. Agriculture and cattle-breeding are the leading occupations. A manufacturing industry can hardly be said to exist, and there are no great commercial ports.

Loudéac (2,091 inhabitants) is the principal town in the southern portion of the department, which drains into the rivers Blavet and Vilaine, and is covered to a large extent with furze. *Cor'ay*, a village to the north-west of it, is noted for its horses, said to be the descendants of Arabs introduced during the Crusades.

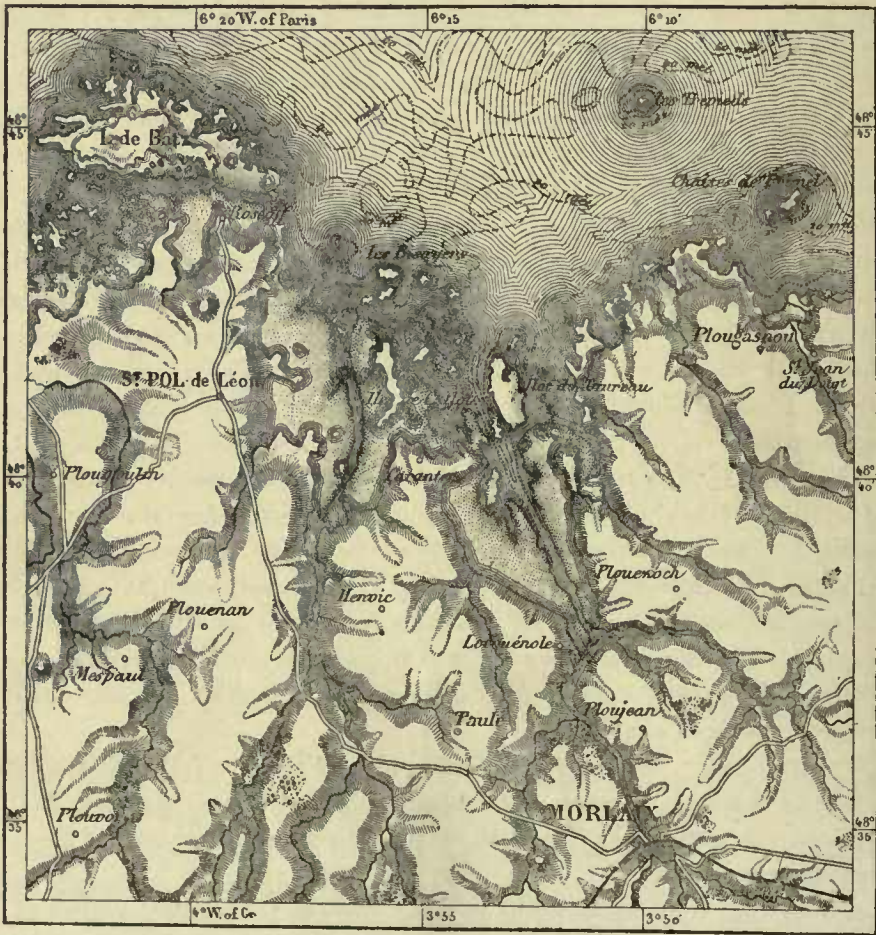
Lannion (6,115 inhabitants), in the delightful valley of the Guer, close to the frontier of Finistère, has a small port. There are several curious old buildings. The river Jaudy enters the sea farther west. The tide ascends it as far as the famous old city of *Tréguier* (3,611 inhabitants), with a cathedral of the fourteenth century. Doubling the dreaded headland known as the "Swords" (*Epées*) of Tréguier, we arrive at the mouth of the river Trieux and the small port of

Lézardrieux (516 inhabitants). The tide ascends as far as *Portrieux* (2,192 inhabitants). Higher up on the river is *Guingamp* (7,895 inhabitants), with an old citadel.

Returning to the coast, we pass the island of *Bréhat*, inhabited by a superior race of men, whom consanguineous marriages have not injuriously affected, and the small fishing ports of *Paimbol* (1,576 inhabitants), *Bréhec*, *St. Quay* (984 inha-

Fig. 193.—MORLAIX.

Scale 1 : 200,000.



..... 5 Fathoms 10 Fathoms 22 Fathoms 27 Fathoms.
 ————— 2 Miles.

bitants), and *Binie* (1,110 inhabitants); and entering the river *Gouet*, ascend with the tide to the tidal harbour of *St. Brievé*, (13,683 inhabitants), the capital of the department. The town is not remarkable for its buildings; but its inhabitants, known as *Briochins*, engage in the manufacture of textile fabrics, and carry on a considerable trade with agricultural produce. Hundreds of men find employment in the granite quarries in its neighbourhood. *St. Quentin* (3,218 inhabitants), on

the Upper Gouet, is noted for its linen industry, which was much more important formerly.

At *Plédran*, a small village 6 miles to the south-east of St. Brieuc, may be seen the curious ancient camp of *Péran*, with vitrified walls.

Lamballe (4,248 inhabitants), the old capital of the duchy of Penthièvre, lies on the road to *Dinan* (7,978 inhabitants), the easternmost town of the department,

Fig. 194.—ST. MALO AND ST. SERVAN.

Scale 1 : 80,000.



picturesquely situated on the banks of the river Rance, which lower down flows past St. Malo. An old castle, now used as a prison, crowns a hill near the town; a magnificent viaduct spans the river; and the heart of Dugueslin is preserved in the Gothic parish church. A granite pillar, 10 miles to the south-west of the town, marks the site of the castle of *La Motte-Broons*, in which Dugueslin was born (1321). *Dinan* has tan-yards and sail-cloth factories. Its mild climate has attracted many English residents.

ILLE-ET-VILAINE.—The greater portion of this department is drained by the river Vilaine and its tributary, the Ille, and only an inconsiderable part of it borders upon the British Channel. Agriculture and cattle-breeding are the principal occupations; bee-hives (160,000) are more numerous than in any other department in France; and at St. Malo and elsewhere on the coast fishing and navigation occupy many of the inhabitants.

St. Malo (10,061 inhabitants), at the mouth of the Rance, is the great seaport of the department, separated from its more ancient sister city of *St. Servan* (9,912 inhabitants) by extensive wet docks. The tides sometimes rise 50 feet, and the

Fig. 195.—VIEW OF ST. MALO.



sea alternately advances up to the quays and retires for a considerable distance, completely changing the aspect of the two towns. The inhabitants of St. Malo, or Malouins, have at all times enjoyed a reputation as bold seamen, engaging in commerce or piracy as opportunities offered themselves. Four expeditions were fitted out in England to burn the town, but they failed. The Malouins became so wealthy that they were able to lend 30,000,000 francs to Louis XIV. They are enterprising and persevering, and somewhat haughty. Lamennais and Châteaubriand were both natives of the town, and are amongst its most distinguished representatives. The commerce of the two towns is no longer what it used to be, in spite of fine docks and railways. About eighty vessels are engaged in the New-

foundland fisheries, and provisions in large quantities are exported to the Channel Islands and England. The town attracts numerous seaside visitors.

Cancale (3,269 inhabitants), on the western shore of the Bay of St. Michel, has famous oyster beds. They yielded 120,000,000 in 1802, but only 15,500,000 in 1875. At *Le Vivier*, on the same bay, oyster-breeding is carried on successfully. *Dol* (3,517 inhabitants), a famous old town with a fine Gothic church, lies a short distance inland. Near it stands the famous menhir of Champ-Dolent, surmounted by a cross. *Combourg* (1,491 inhabitants), with a castle in which Châteaubriand spent several years of his youth, lies to the south; *Fougères* (10,396 inhabitants), on the Upper Couesnon, in the south-east. The town retains its old castle, but the mediæval fortifications have been razed to make room for suburbs. Shoemaking, weaving, and the quarrying of granite occupy thousands of men in the town and its vicinity. At *St. Aubin-du-Cormier* (1,150 inhabitants), in this neighbourhood, was fought the battle which resulted in Brittany becoming a French province.

Crossing the water-shed separating the rivers flowing into the channel from those taking a southerly course, we reach *Rennes* (53,598 inhabitants), the capital of the department, at the confluence of the Ille with the Vilaine. Four railways and eleven highways converge upon the town, and a canal connects the navigable Ille with the river Rance, which enters the sea at St. Malo. Its commercial advantages are consequently very great. The aspect of the town, with its houses built of greyish granite and deserted streets, is nevertheless very dreary. The gate of Mordelaise is the most interesting monument of the Middle Ages, but a fine university building, with valuable scientific and art collections, constitutes the glory of the place. Rich meadow lands surround the town, and the butter known as *Prévalaye* is named after a castle in the neighbourhood.

Vitré (8,475 inhabitants) is a picturesque old town on the Upper Vilaine. Madame de Sévigné resided for a considerable time at the castle of *Rochers*, to the south-east of it. Descending the Vilaine below Rennes, and passing through its gorges, we reach *Redon* (4,955 inhabitants), at the mouth of the Oust, and on the canal which connects Nantes with Brest. Other places of interest in the department are *Montfort* (1,507 inhabitants), on the Meu, a tributary of the Vilaine, with an old castle; *Paimpont*; in the famous forest of Brocéliande, one of the reputed haunts of Merlin the enchanter; *Janzé* (1,636 inhabitants), to the south-east of Rennes; and *La Guerche* (2,612 inhabitants).





CHAPTER IX.

THE CHANNEL ISLANDS.

THOUGH a political dependency of England, these islands geographically belong to French Normandy. Their soil, climate, productions, and inhabitants are the same, and in their customs and political institutions they are even more Norman than Normandy itself. Magistrates there still raise the "hue and cry" (*clameur de haro*), as was formerly done by the people when wronged by the great, and the legislative body is still known as *cohuc*. If we would study the institutions of feudal Normandy we cannot do better than go to the Channel Islands. Ever since they sided with John Lackland against Philip Augustus, in the thirteenth century, these islands have almost uninterruptedly enjoyed the blessings of peace, for their neutrality was guaranteed. England very wisely left them in the enjoyment of their local institutions, and can boast of no subjects more faithful than these islanders.

The islets, rocks, and banks off Granville have remained in the possession of France, but only a few of the larger islets of the archipelago of Chausey are inhabited throughout the year. A few acres there are cultivated, but fishing is the principal occupation, and the sea yields a rich harvest of fish, shrimps, and seaweed, but there are no oysters. Quarrying also is carried on extensively, and the streets of Paris are for the most part paved with Chausey granite. The storm-beaten rocks of Minquiers and the Grelets, farther out, are only occasionally visited by fishermen from Granville or the Channel Islands.

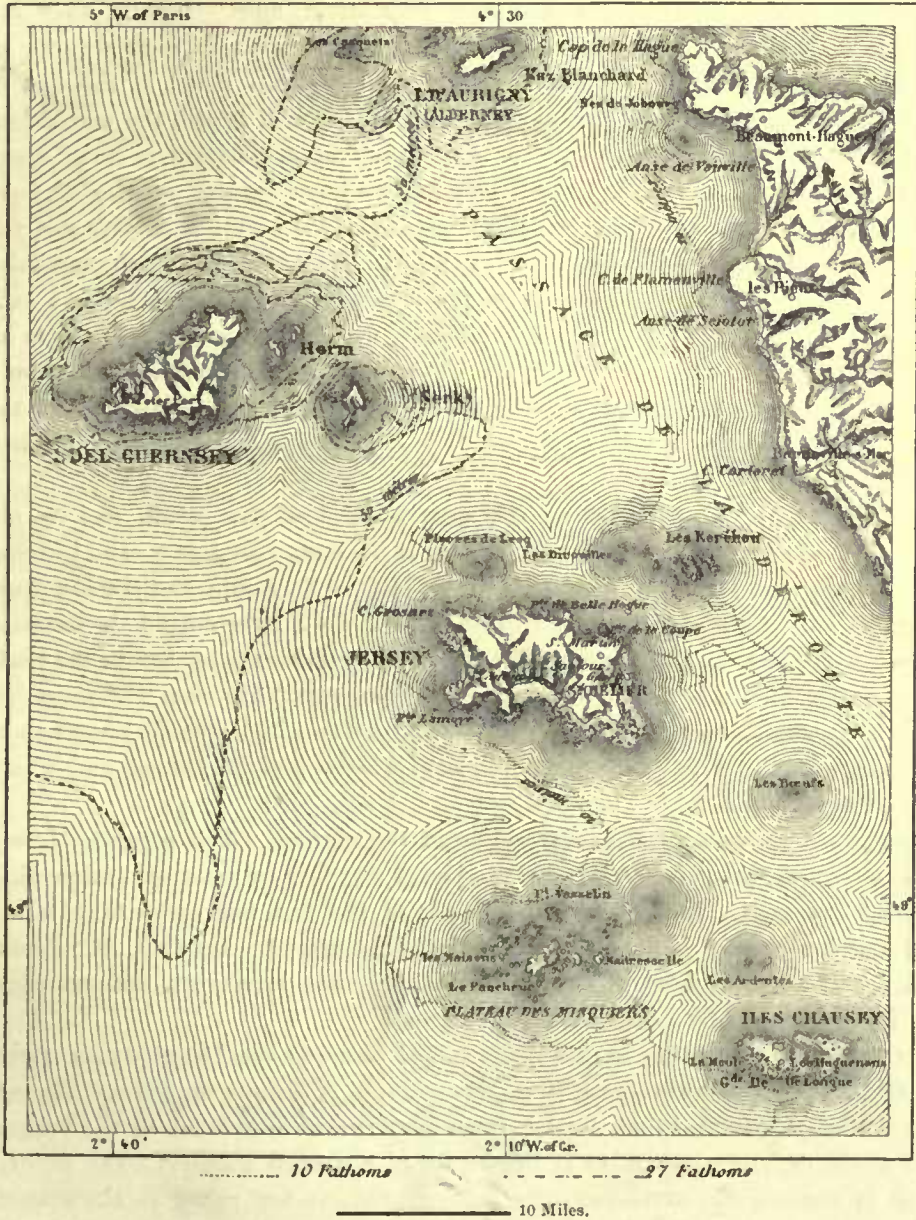
JERSEY*—that is, the island of *Jers*, or *Cæsar*: historians have identified it with the *Cæsarea* of the Antonine Itinerary—is the largest of the group. In shape it is a parallelogram, its length being nearly twice its breadth. The cliffs along its northern shores have offered more resistance to the onslaughts of the Atlantic, and from their summits (350 feet) the island slopes down to the south, nearly all its rivulets flowing into the Bay of St. Aubin. On ascending their shady valleys up to where they rise, we find ourselves upon the summit of the cliffs, with a grand outlook over the ocean.

* Jersey has an area of 45 square miles, and 56,627 inhabitants; Guernsey and the smaller islands have an area of 28 square miles, with a population of 33,968 souls.

The southern and western coasts of the island exhibit many traces of the erosive action of the ocean. Ledges of rock and sand-banks, which in former times were dry land, stretch for a mile or two from what is now the high-water line ;

Fig. 196.—THE CHANNEL ISLANDS.

Scale 1 : 700,000.



and the cliffs of Corbière have been gnawed into curious pinnacles and pillars, and pierced by caverns. The heights surrounding the beach of St. Ouen, in the west, are covered with shrubs which bend to the storm. Dunes exist in that portion of

the island, and they have occasionally overwhelmed cultivated fields, as a punishment, local tradition tells us, for the massacre of shipwrecked mariners.

Except in the north and west, where the brine-laden air destroys the vegetation, the island is naturally fertile, and being blessed by a mild climate, it produces fruits and vegetables of excellent quality. Its cows are highly valued, and cattle imported from France are invariably slaughtered for butchers' meat.

There are a few dolmens recalling prehistoric ages. Locally they are known as *poquelays*, a name recalling that of the *poulpicans*, or dwarfs, of Armorica. Skeletons and coarse cinereal vases have been found at the foot of some of these ancient stone monuments. Norman-French is still the official language of the island, and Wace, the author of the famous "Roman de Rou," was a native of "Jersui." Within the last fifty years a large number of English have established themselves upon the island, attracted by its mild climate and the cheapness of the necessaries and luxuries of life. These wealthy immigrants have gradually changed the physiognomy of the inhabitants and of their houses; and, when passing through the streets of St. Hélier, we may almost fancy being in an English town. During last century the Jerseyites were attached to England only politically, but at the present day we must look upon them as members of the great English family, in spite of the vicinity of France and the many Frenchmen domiciled upon the island.

The castle of *Montorquell*, on the eastern coast of the island, was its old capital, the fishing village of Gorey nestling at its foot. *St. Hélier* (16,715 inhabitants), the modern capital, stands on the vast Bay of St. Aubin, on the south shore of the island, and is quite English in its aspect. Two forts defend its harbour, from which the sea retires during low water. Large vessels anchor in the roadstead of St. Aubin, but an artificial harbour, covering no less than 380 acres, has been in course of construction since 1874. *St. Aubin*, which was the more important place formerly, is hardly more now than a suburb of St. Hélier, with which it is connected by rail.

SERK, whose granite cliffs rise boldly in the channel which separates Jersey from Guernsey, consists of two portions, joined together by a narrow and precipitous neck of land. Its cliffs rise to a height of 160 feet, but access to its fertile and smiling plateau is facilitated by means of a tunnel. Rabelais, in "Pantagruel," calls it the island of pirates, thieves, brigands, murderers, and assassins, but its present inhabitants are peaceable enough.

GUERNSEY, the Sarnia of the Romans, and probably the Groens-ey, or green island, of its Scandinavian conquerors, is deserving of its ancient name. Though less carefully cultivated than Jersey, green meadows, elms growing in the hedges, and apple orchards impart to it the aspect of a wooded country. The general slope is towards the north-east, the boldest promontories rising at the western extremity.

Less frequently visited than Jersey, the inhabitants have remained more faithful to their ancient customs. Small, sunburnt, with black eyes, and thick brown hair, they strike one as being true representatives of the Breton race.

Many Celtic expressions are used by them, and until quite recently they looked with superstitious awe upon the dolmens, cromlechs, and menhirs scattered over their island. They are old rivals of their neighbours on the larger island, and, when these latter sided with the Parliament during the Commonwealth they stuck firmly to the King. *St. Peter's Port* (16,150 inhabitants) occupies a sheltered situation on the east coast. Its harbour is accessible at all times. Granite, quarried in the vicinity, is the principal article exported, and there are large stores of wine.

ALDERNEY (Aurigny) is separated from the coast of France by the strait of Raz Blanchard, only 10 miles wide, but much dreaded by mariners. Steep cliffs rise on the south, and the island slopes down towards the north, where there are numerous creeks and small bays. The most considerable of these, that of Braye, was to be converted into a huge harbour of refuge, similar to that on the coast of England opposite, but the works have recently been stopped, in spite of the vast sums already expended on them. The formidable rocks known as the Casquets, to the west of Alderney, are rendered conspicuous by lighthouses.

The political institutions of the Channel Islands are still feudal in their character. The seigneurs are vassals of the Queen, the "sovereign lord of the land," and annually do homage to her at a ceremonious "assize of heritage." Their privileges are still considerable. The Legislative States of Jersey consist of thirty-eight members, viz the governor and the bailiff of the Royal Court, both appointed by the Crown; the twelve judges, or jurats, of the Royal Court, elected for life by the ratepayers; the twelve rectors of the parishes, appointed to their livings by the ratepayers; and the twelve constables, elected every three years, one for each parish, by the inhabitants. The *viconte*, or high sheriff, and the two *denonceiateurs*, or under-sheriffs, occupy seats in the Assembly as its officers. No taxes can be levied without the consent of the States. The revenue of the island amounts to £22,000, and there is a debt of £160,000.

In Guernsey there are "States of Deliberation," composed of the bailiff of the Royal Court, who is president; the procureur, the ten rectors of the parishes, the twelve jurats or judges of the Royal Court, and fifteen delegates elected by the ratepayers. The bailiff and procureur are nominated by the Crown; the jurats are chosen by "States of Election."





CHAPTER X.

LOWER NORMANDY AND COTENTIN.

GENERAL ASPECTS.

THOUGH small in extent, this section of France has made its influence felt in the history of the country. From ancient times it has served as the intermediary of commerce and ideas between France and Great Britain, and from its shores departed, in the eleventh century, the Norman conquerors of England. The inhabitants differ in physique from those of other parts of France, for the Norman conquerors maintained their ground longer there than elsewhere. Bayeux was ceded to them in A.D. 923, or twenty-five years later than Rouen, but they came to the former in larger numbers, besides which the Saxon Baiocasses or Sesnes of Bayeux, speaking a kindred dialect, had preceded them. The local dialect contains many words of Teuton origin, such as *gault*, signifying forest. The natives of Bessin, the *littus Saxonicum* of old chronicles, as well as those of Cotentin, are often tall and powerful, with flaxen hair, elongated faces, and light blue eyes.

Lower Normandy is bounded on the south by a range of hills, occasionally assuming the appearance of mountains. On the heights of Perche rise the Sarthe, the Orne, the Eure, and other rivers. A depression, through which runs the railway from Alençon to Caen, separates them from the Forests of Écouves and Multonne, both attaining the same height (1,370 feet), and forming the culminating points of the whole of North-western France. Granitic rocks here pierce the sedimentary strata of Jurassic, cretaceous, and tertiary age of the basins of the Loire and the Seine, and farther to the west, up to the extreme points of Brittany, granites and palæozoic rocks predominate.

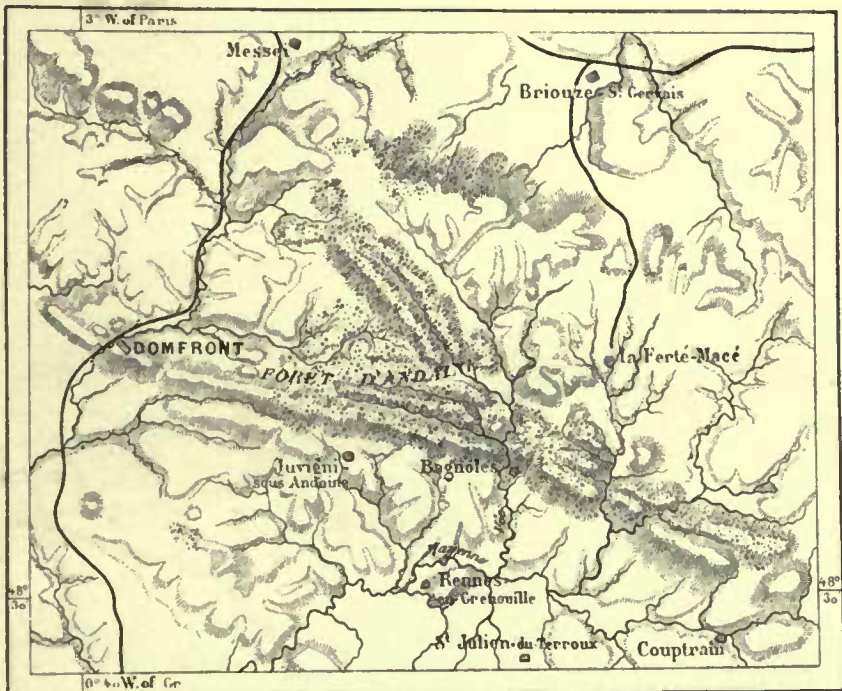
These hills near Alençon, owing to the diversity they offer, are known as "Norman Switzerland," but those to the west of them are most regular in their contours. The Forest of Andaine, though pierced by numerous tributaries of the Mayenne, rising to the north of it, presents the appearance of a veritable rampart, upon one of the promontories of which is seated the town of Domfront. The hilly country to the north is known as the "Bocage" of Normandy, and abounds in beeches and orchards, whilst the ridges of the peninsula of

Cotentin are bare, and the country owes all its attractions to the vicinity of the ocean.

The plains to the east of Bocage, irrigated by the Orne, the Dives, and the Touques, are a pastoral country. Bessin, to the east of the Vire, comprises many marshes now under cultivation. The vast meadows around Isigny might remind us of Holland, if it were not for the rows of willows, poplars, and trees which intersect them, and the low embankments covered with hawthorn and brambles. The plains of the Orne and of Calvados are admirably suited for the breeding of horses and the fattening of cattle. The finest grass, however, is reserved for the

Fig. 197.—THE FOREST OF ANDAINE.

Scale 1 : 320,000.



choicer breeds of cattle and for milch cows. The cheese and butter made enjoy a high reputation.

None of the rivers, not even the Vire or the Orne, are navigable farther than the head of the tide. Subterranean river channels are frequent, as in other limestone regions. Several "sinks," or *bétoirs*, occur in the bed of the Aure, and only in winter is the volume of the river sufficient to flow on the surface a feeble stream. The Lower Aure is fed from subterranean channels, but it, too, is partly swallowed up by sinks, and at its mouth forms a delta, one arm of which reaches the sea through an underground channel.

The granitic cliffs of Cotentin resemble those of Brittany: exposed to the attacks of conflicting tides, they have been destroyed in many places. The wide

Bay of St. Michel, to the south of Granville, has thus been formed. Elsewhere the deep bays, or *flicurs* (a corruption of the Scandinavian word *fjord*), have been silted up. The promontories forming the extremities of the peninsula do not mark its ancient limits, for Alderney and other islands were formerly attached to it. The conflicting tides give rise to phenomena resembling the maelström. The Raz Blanchard, between Cap de la Hague and Alderney, sometimes rushes along like a mighty river at the rate of 10 miles an hour. The current known as La

Fig. 198.—MEADOWS OF NORMANDY.



Déroute, farther south, though less swift, has nevertheless proved the destruction of many a mariner.

The aspect of the limestone cliffs of Calvados is very different from that of the granitic rocks. These soft rocks have been gnawed away more regularly by the waves, and their débris now forms broad beaches, surmounted here and there by rocks, anciently portions of the mainland, and still offering some resistance to the waves.

TOPOGRAPHY.

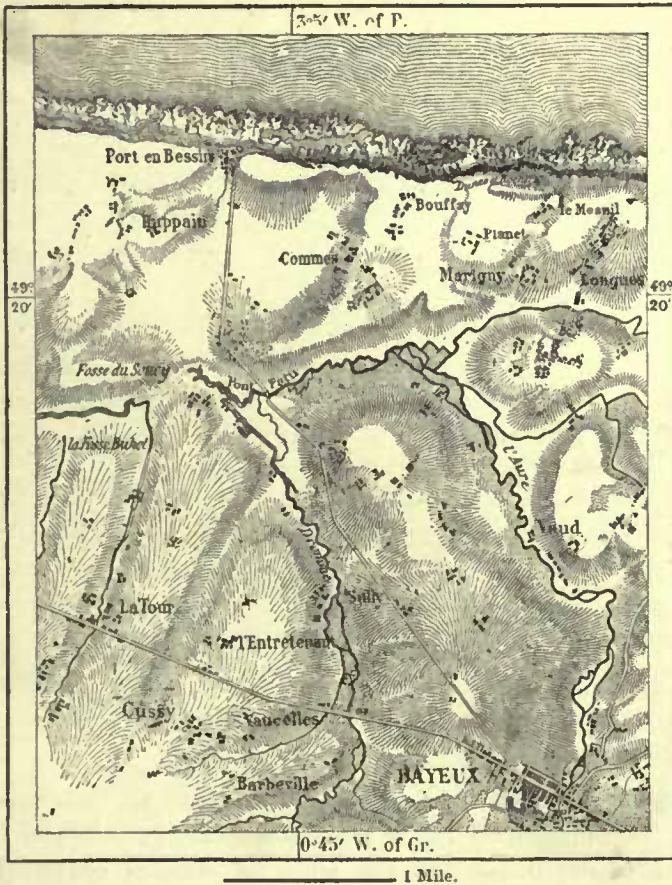
LA MANCHE includes the peninsula of Cotentin, together with adjoining portions of Normandy. Though bounded on three sides by the sea, the maritime commerce

of this department is not of much importance; industry is even less so; and the population depends almost exclusively upon agriculture for its sustenance. The soil is not very fertile naturally, but the small proprietors who share it have done much to improve it. The moist and warm climate is favourable to the growth of herbs and grasses, and the breeding of horses and cattle is carried on with much success, more especially in the east. Some parts of the department resemble huge orchards, and about 28,600,000 gallons of cider are made annually.

Cherbourg (36,338 inhabitants), the most considerable town of the department,

Fig. 199.—THE SINKS OF THE AURE.

Scale 1 : 72,000.

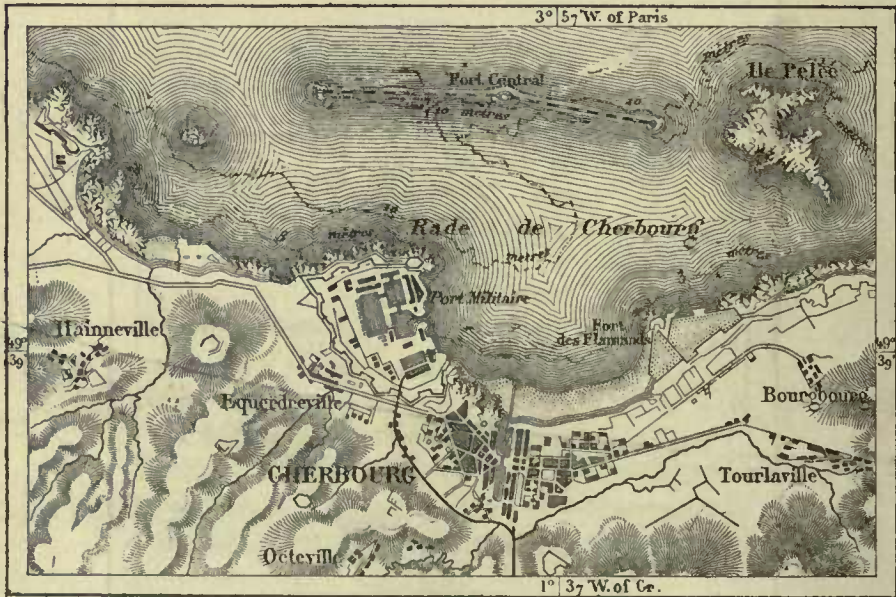


is of ancient foundation, but its importance dates from the time when Vauban converted it into one of the great naval arsenals of France. The features of the locality offered many obstacles to the accomplishment of the work, and the breakwater, begun in 1686, was only completed in the course of the present century, and at an expenditure of £3,000,000. The port, which accommodates no more than forty large vessels, would soon become silted up if dredging machines were not continually kept at work. From the fort on the hill of Roule we look down upon the docks, the dockyard, the arsenal, the vast fortifications

and the regularly built city. In the suburbs of *Équeurdreville* (2,475 inhabitants) and *Tourlaville* (1,852 inhabitants) are glass works and other industrial establishments, and stone is quarried in their neighbourhood. *Beaumont-Hague*, thus named from the promontory of La Hague, to the west of Cherbourg, has entrenchments in its neighbourhood supposed to have been constructed by the ancient Gauls. *Barfleur*, a small port, lies to the east, and on the cape near it stands the tallest lighthouse in France, which mariners keep in sight until they find themselves within the radius of that of La Hève, near Havre. *St. Vaast* (3,014 inhabitants), close to *Cap La Hougue*, is best known through the naval victory of the combined English and Dutch fleets in 1692. Ship-building and oyster-breeding are carried on. The islands of *St. Marcouf*, in the offing, were held by the English from 1793

Fig. 200.—CHERBOURG.

Scale 1 : 80,000.



to 1802, who thus intercepted all communications between Havre and Cherbourg. *Valognes* (4,910 inhabitants) lies in the centre of the peninsula of Cotentin, and at the mouth of the Douve. In the midst of marshes converted into fertile meadows stands *Carentan* (2,772 inhabitants), which exports dairy produce to England. *St. Lô* (9,519 inhabitants), the capital of the department, occupies a delightful site in the valley of the Vire, and carries on some textile industry.

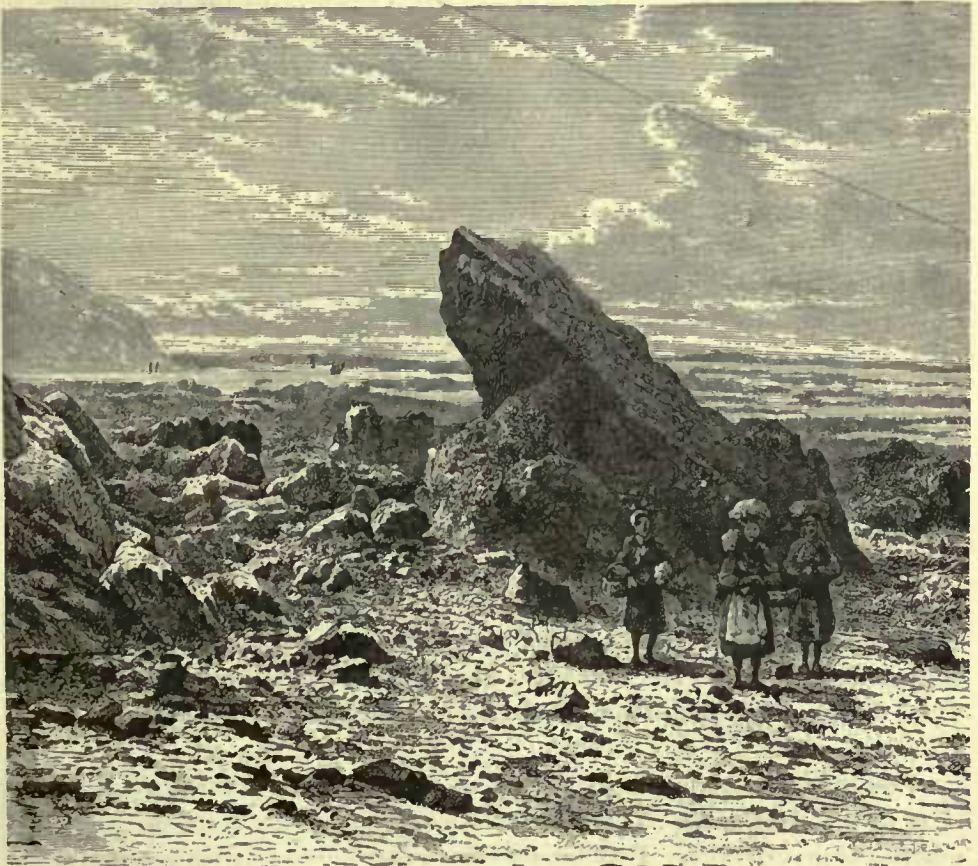
Returning to the western coast, the first place we arrive at is *Coutances* (Constantia, 8,008 inhabitants), an old episcopal city which has given its name to the entire peninsula. Its cathedral is a fine structure of the fourteenth century. *Regnéville*, the port of Coutances, has oyster beds. Higher up on the Sienne is *Villedieu-les-Poêles* (3,437 inhabitants), a town of tinkers and frying-pan makers, as is implied by its name.

Granville (12,372 inhabitants) has an excellent harbour and docks, and carries on commerce with the Channel Islands and England. The inhabitants are supposed by some to be of Iberian descent, and such a thing as slander is said to be unknown amongst them—a very curious circumstance for a provincial town.

Avranches (7,754 inhabitants), the old town of the Abrincates, occupies an admirable situation at the mouth of the Sée. It boasts a fine cathedral, and a railway, which will connect it with the curious castle of St. Michel, is being constructed.

St. Hilaire-du-Harcouet (3,148 inhabitants), on the Sélune, has tan-yards,

Fig. 201.—THE BEACH AT GRANVILLE.



spinning-mills, &c.; whilst *Mortain* (2,185 inhabitants), higher up in the same valley, is more especially noted for its picturesque position.

ORNE is named after the river which enters the Channel below Caen. It is a country of transition. Primitive rocks prevail in the west, sedimentary strata in the east. In this latter region the inhabitants breed horses and cattle; in the former they carry on some manufacturing industry.

Alençon (15,433 inhabitants), the capital, on the Sarthe, was formerly celebrated for its point-lace, the manufacture of which was introduced from Venice in 1673, but depends now mainly upon its horse markets.

Domfront (2,735 inhabitants), a picturesque old town on the Varenne, a tributary of the Mayenne, is the capital of an arrondissement; but *La Ferté-Macé* (6,392 inhabitants), on another tributary of the Mayenne, exceeds it in importance, for it carries on the manufacture of linen, cottons, and ribbons. Near it are the steel and sulphur springs of *Bagnolles*.

Argentan (5,254 inhabitants) occupies a fine site in the valley of the Orne. The surrounding country is famous for its poultry, cattle, and horses. At *Sées* (3,760 inhabitants), an episcopal city higher up in the valley, important horse fairs are held, and at *Pin*, in the district known as Merlerault, is a famous stud for breeding horses. *Flers* (8,571 inhabitants) and *Tinebrai* (2,562 inhabitants) are busy towns in side valleys of the Orne, engaged in the manufacture of cottons, linens, cutlery, and other articles.

Vimoutiers (2,775 inhabitants), in the north-east, has bleaching grounds. *Camembert*, a village noted for its cheese, is close by. Still farther east is *Laigle* (4,495 inhabitants), where needles, nails, wire, and other hardware are manufactured.

Mortagne (4,302 inhabitants) and *Bellême* (2,935 inhabitants) are the principal towns in the Forest of La Perche, within which the Abbé de Rancé founded the first monastery of Trappists. From *Tourouvre*, one of the villages, eighty families emigrated two hundred years ago, and can boast that most of the Canadian French are descended from them.

CALVADOS is named after a few rocks on the coast, and is probably a corruption of *Salvados*, one of the vessels of the Spanish Armada wrecked upon them. The western and south-western portions of the department form the district of "Bocage" (woodland), and are of palæozoic formation. Bessin includes the western maritime district, and is of Jurassic age. In the country round Caen oolitic rocks predominate. In Lieuvain and in the valley of Auge, in the east, Jurassic, cretaceous, and tertiary rocks are met with. This is eminently a cattle-breeding region, whilst Bessin is noted for its dairy farms. Bocage, which only produced oats, rye, and buckwheat formerly, is now more carefully cultivated. There are quarries and coal mines, and paper, earthenware, soap, and textile fabrics are manufactured.

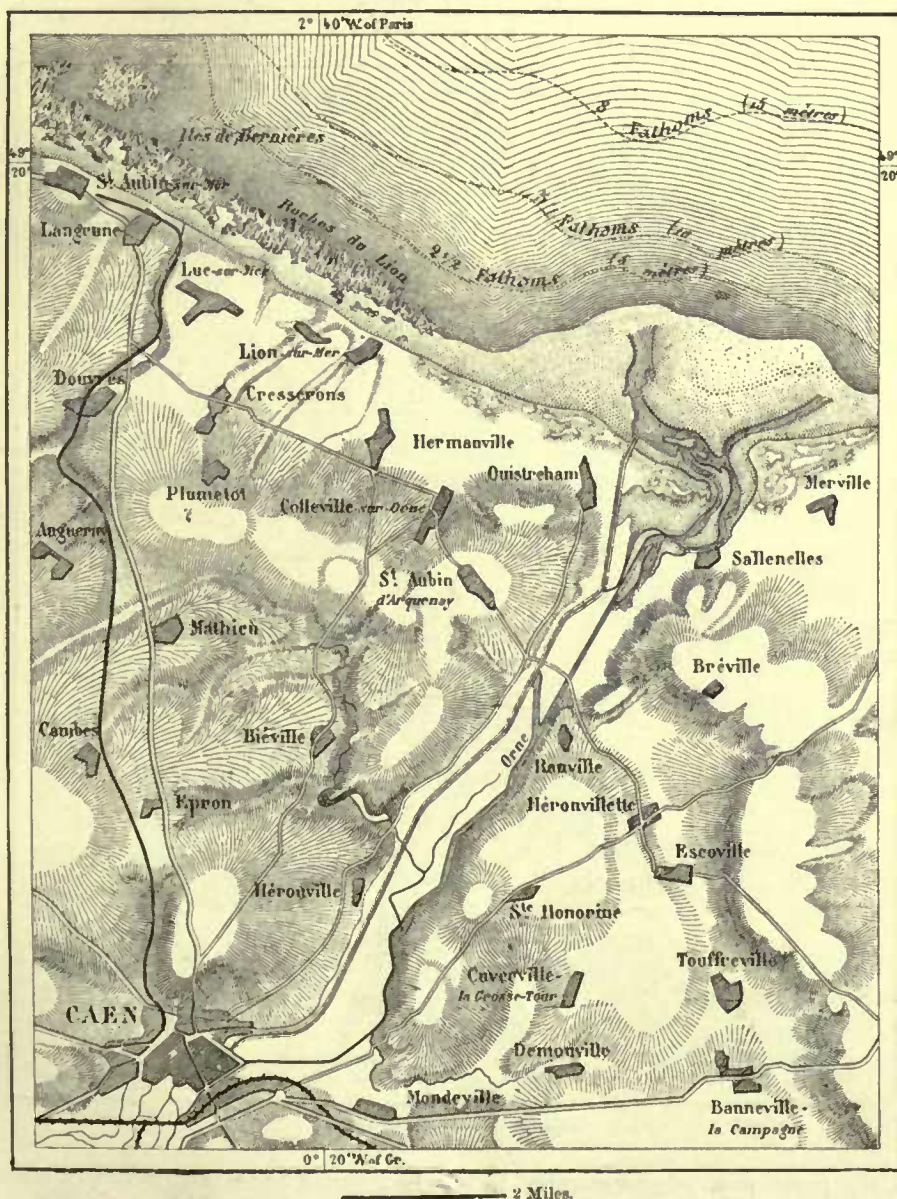
Vire (6,718 inhabitants), the capital of Bocage, is delightfully situated on a river of the same name. There are linen, cloth, and paper mills, tan-yards, and quarries of grey granite. Basselin, the song writer of the fourteenth century, was a native of the Val or Vau de Vire (valley of the Vire), which has been corrupted into our modern Vaudeville.

Bayeux (8,315 inhabitants), on the Aure, is the capital of Bessin. China, lace, and embroidered work are manufactured there, but the town bears an aspect of decay. Its Gothic cathedral, old town-hall, and curious houses with wood-carvings, remind us of better days. Descending the Aure, we pass *Trévières*, near which is *Formigny*, famous on account of the battle which put an end to the English reign in Normandy (1450). Near the mouth of the river is *Isigny* (2,104 inhabitants), which exports much butter.

Caen (33,072 inhabitants) is the only considerable town on the Orne. Its situation, in the midst of verdant meadows, at the junction of the valleys of the Orne and the Odon, and at the head of the tide, is most favourable. It boasts

Fig. 202.—CAEN AND THE MOUTH OF THE ORNE.

Scale 1 : 140,000.

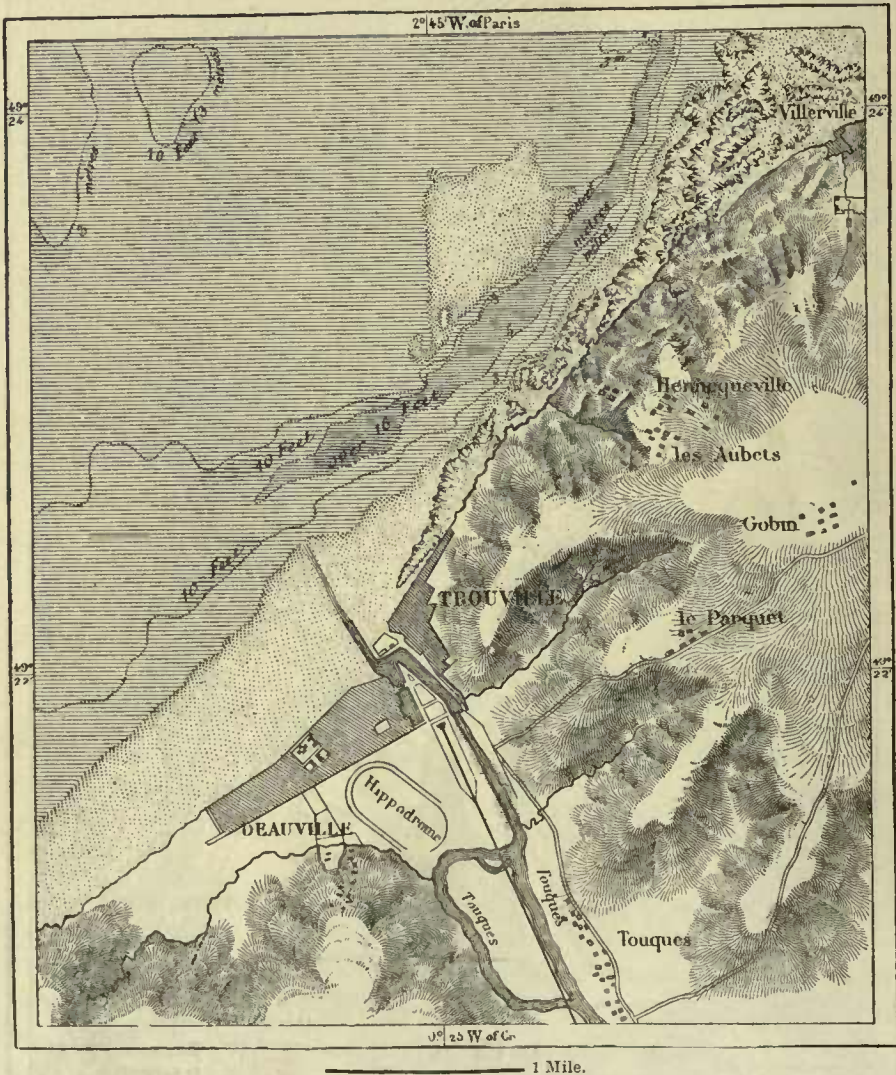


of many fine buildings, most of them constructed of the famous stone quarried in the neighbourhood. The Byzantine church of St. Pierre, at the foot of the old castle, has a fine Gothic spire. The abbey of St. Étienne, in which William the Conqueror was buried, is distinguished by its simple grandeur, and has a nave of

the eleventh century. Many of the other ecclesiastical and private buildings are remarkable on account of the architecture. The "sapiënt" city may boast of numerous educational establishments, and its library and museums are amongst the wealthiest in France. An active commerce is carried on, and the docks admit vessels drawing 16 feet of water. *Ouistreham*, at the mouth of the Orne,

Fig. 203.—TROUVILLE.

Scale 1: 50,000.



was the great port of the country in Anglo-Norman times, but is now a simple village, much frequented as a seaside resort, as are also other villages near it, amongst which *Courseulles*, with a small port and oyster beds, is the most important. In a side valley of the Upper Orne is *Condé-sur-Noiréau* (6,835 inhabitants), with cotton-mills.

The river Dives, on entering the department, is joined on the left by a small

tributary, commanded by the curious old city of *Falaise* (8,180 inhabitants), in whose castle was born William the Conqueror. There are cotton-mills and horse fairs, called after the suburb of Guibray. At *Dives*, now a poor village at the mouth of the river, the Conqueror embarked the army of 250,000 men with which he invaded England. *Livarot*, in a side valley of the Dives, is noted for its cheese.

Lisieux (18,396 inhabitants) is the most important town on the Touques. Its fat meadows nourish cattle for the Paris market, and cloth, leather, and cotton stuffs are amongst its principal manufacturing products. A Gothic cathedral is its most remarkable building. *Crèvecœur*, noted for its fowls, is near. *Pont-l'Évêque* (2,373 inhabitants) exports cheese and vegetables.

Trouville (5,161 inhabitants), at the mouth of the river, is one of the most fashionable seaside resorts of France, annually frequented by 20,000 bathers; but the town also carries on some commerce. The castle of *Bonneville*, at the neighbouring village of *Touques*, was a favourite residence of William the Conqueror.

Honfleur (9,037 inhabitants), at the mouth of the Seine, opposite Havre, rises amphitheatrically from the water-side. It was an important place formerly, before it had been eclipsed by its *parvenu* rival on the opposite bank of the river, and its mariners roamed over every sea. Its port has been silted up, but it still exports vast quantities of vegetables, fruits, poultry, and eggs, more especially to London. Fishing and ship-building are also carried on, and the gardens produce excellent melons.





CHAPTER XI.

THE VALLEY OF THE SEINE.

THE RIVER SEINE.



GEOLOGICALLY this is a well-defined portion of France. It covers three-fourths of an ancient gulf of the sea, Paris being in its centre, and the coasts of former ages can still be traced in many places. Calcareous rocks, overlying the schistose plateau of the Ardennes on the one hand, and the granitic mountains of Morvan on the other, bound the basin in the east; rocks belonging to the same formation separate Beauce and Lower Normandy from the palæozoic rocks of Brittany in the west; and only in the south does this geological basin extend beyond that of the Seine and embrace a portion of that of the Loire.

Historically this ancient country of the Sequanians has at all times proved itself the natural centre of France, towards which converge the roads from Belgium and Germany, from Southern France and the Atlantic. Add to this a favourable climate, and we need not wonder at the Seine holding a rank amongst rivers quite out of proportion to its volume.

The Seine, so called, rises on the north slope of the Côte-d'Or, but its real head-stream must be looked for in the granitic and porphyritic district of Morvan. This district forms the northern buttress of the plateau of Central France. Though nowhere exceeding 2,960 feet in height, its aspect is sometimes Alpine, and its valleys fertilised by the débris carried down by the torrents, are verdant with vegetation. Swamps (*ouches*) have been converted into fields, and yield harvest after harvest; but the forests, to which these mountains owe their Celtic name of Morvan (*i.e.* "black mountains"), have to a great extent been destroyed. Picturesque cliffs, perched upon which are the towns of Vézelay, Avallon, and Semur, terminate the district of Morvan in the north. The bare chalky hills beyond these, as far as the plain, are attractive only in summer, when the apple-trees are in blossom.

The aspect of the country is more varied in the north-east, where the hills of Côte-d'Or, the plateau of Langres, and the Faucilles ("sickle mountains"), form the water-shed as far as the Vosges. Some of the valleys in that part of Burgundy

are very attractive, but the aspect of the plateaux is sometimes dreary in the extreme, the water disappearing in their porous soil as in a sieve. The railway from Paris to Dijon, where it crosses the rampart of the Côte-d'Or, winds along the foot of the scarped heights which lead up to the vast plain deposited by the ocean as it retired to the north.

The geological differences in the formation of the Morvan and the Côte-d'Or amply account for the discrepancies in the rivers which rise in these two regions. The granites and porphyries of Morvan being impervious to rain, only surface drainage is possible, and after a heavy fall of rain the rivulets are converted into

Fig. 204.—THE RAVINED PLATEAU OF UPPER BURGUNDY.

Scale 1 : 160,000.



uncontrollable torrents. The limestone formation of the Côte-d'Or, on the other hand, sucks up the rain, and the rivers being largely fed from underground reservoirs, retain their volume throughout the year. The difference is all the more striking as the rainfall in the Morvan is exceptionally large, amounting to 48 inches, as compared with 24 inches near the so-called source of the Seine. The head-streams of the Seine, rising in the Morvan, thus present all the features of mountain torrents. The engineers have attempted to regulate the volume of the Cure and the Yonne by building a dam below the swamp of Settons, which has thus been converted into a lake, having an area of 1,000 acres, capable of holding 21,000,000 tons of water. In times of drought 25 tons a second

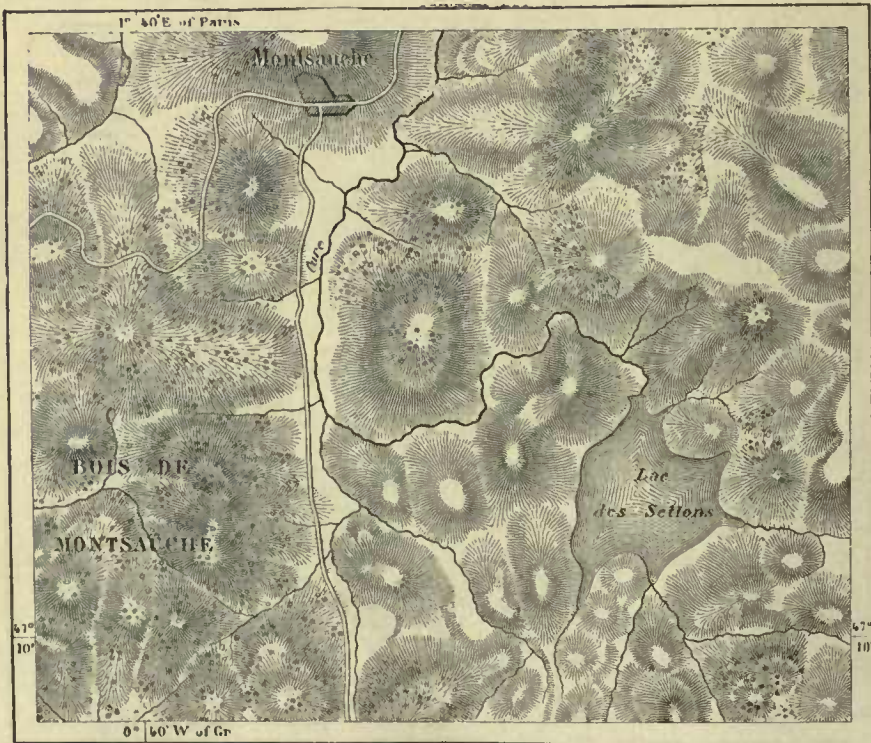
can be discharged from it consecutively for ten days, a quantity amply sufficient to float timber down the Yonne, and to feed the canals of Nivernais and Burgundy, the volume of the Lower Yonne being regulated by means of locks.

At Sens the Yonne is joined by the small river Vanne, flowing through a delightful valley, which would hardly be known amongst the outside world had not the city of Paris purchased some of the sources of the river, and conveyed their deliciously pure water, by means of a magnificent aqueduct, to Paris.

The Seine, the Aube, and its tributaries rise on the limestone plateau to the east of Morvan. The source of the Seine, so called, shifts its position according to

Fig. 205.—THE LAKE RESERVOIR OF SETTONS.

Scale 1 : 20,000.



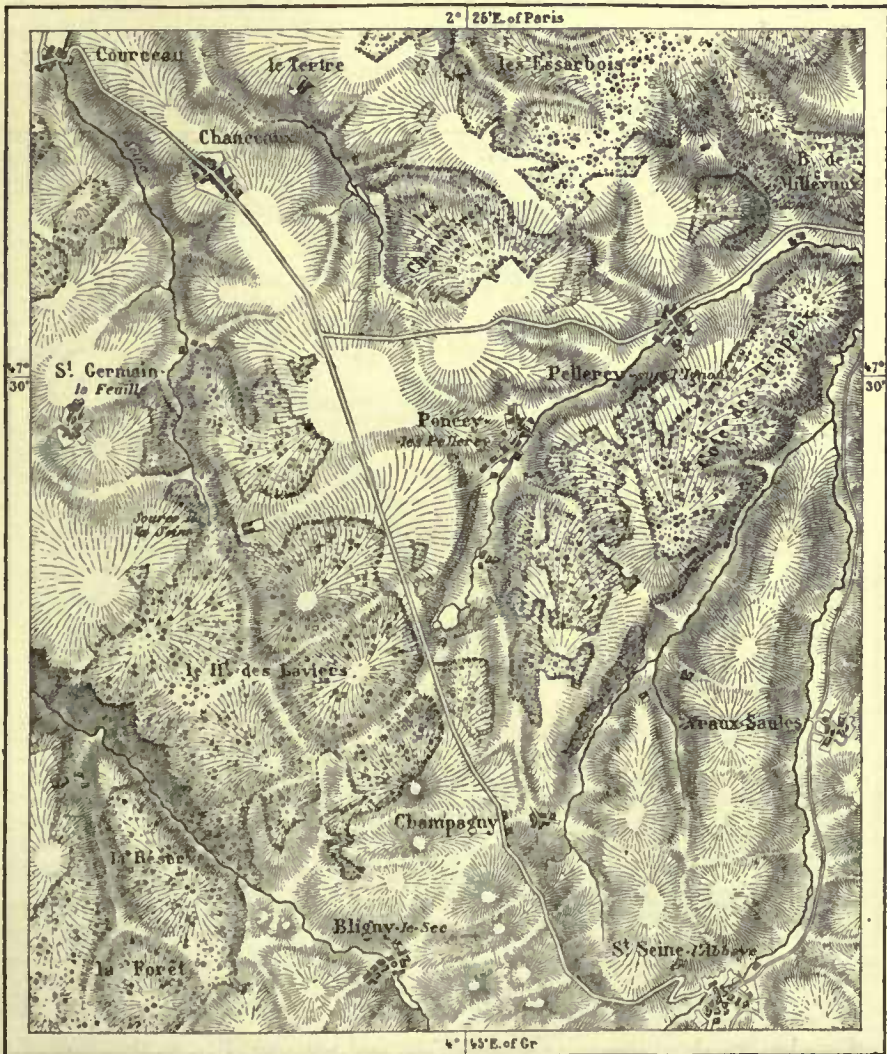
whether the supply of water is more or less ample, and it happens frequently that the tutelary statue erected by the city of Paris is not reflected in its crystal waters. The stream only becomes considerable about 15 miles farther north, where it is reinforced by two beautiful springs rising on the plateau to the west. At Châtillon, 30 miles below the "source," another *doux*, or spring, unites with the river, which lower down is joined by the Ource and the Laignes.

The whitish Aube, rising in the chalks of Champagne; the Voulzie, running through a delightful valley; the Loing, the sparkling Essonne, and other tributaries flowing on regularly throughout the year, differ essentially from the torrents

which join the Upper Yonne. No less than 75 per cent. of the surface of the basin of the Seine consists of permeable rocks, and this, together with the character of the tributaries mentioned above, accounts for the Seine being that river of France whose volume undergoes the fewest changes during the year. Of course there are exceptions; and quite recently, in the spring of 1876, the Seine

Fig. 206.—THE SOURCE OF THE SEINE.

Scale 1 : 90,000.



overflowed its banks and caused much destruction. On the 17th of March no less than 58,273 cubic feet of water passed every second beneath the bridges of Paris, being fifty times more than when the river is at its lowest. But the difference, after all, is little compared with what may be witnessed in connection with the Loire and the rivers of the south. M. Belgrand has shown, however, that during

a geological epoch coinciding with the stone age, the Seine, too, had its floods, its volume sometimes exceeding 1,000,000 cubic feet a second.

The Marne, which joins the principal river at the very gates of Paris, is of greater length than the Seine, but its volume is less, and nowhere within its basin does the annual rainfall exceed 24 inches. Between Épernay and Meaux the annual precipitation only amounts to 16 inches, and most of the rain is sucked up by the soil. This small amount of rain, however, is not attended by sterility, for that portion of the Champagne known as "lousy," on account of its

Fig. 207.—THE BASIN OF VITRY-LE-FRANÇOIS.

Scale 1 : 320,000.



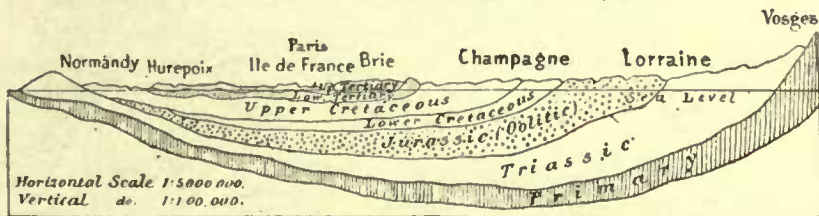
barren rocks, its short herbage, poor fields, and poverty, lies to the east of this "rainless" region. In spite of the greater precipitation, it contains tracts fitly to be described as "steppes." Upon one of these the camp of Chalons has been established. The zone of chalk is widest in that part of France, and the cultivators of the soil have to sustain a severe struggle. Only where marl occurs naturally or is applied to the chalky soil can fine crops be raised, and such localities form oases in the desert. The Marne, now discharging 2,650 cubic feet a second, was a far more considerable river in prehistoric times. All the rivers rising in the

Jurassic heights and converging upon Paris have denuded a considerable portion of the area which they drain. In this manner a wide plain of erosion, enveloped by the cretaceous rocks of Champagne, has been formed. Within it lie the towns of Auxerre, Bar-sur-Seine, Bar-sur-Aube, Vitry, Bar-le-Duc, and Ste. Menehould. M. Élie de Beaumont has likened this plain to the ditch of an exterior line of the fortifications of Paris, the hills of Brie forming the rampart. In the formation of this plain the Marne has had the greatest share. The basin of Vitry-le-François, within which the two head branches of the river join, affords one of the finest examples of the action of water as a geological agent. Over an area of 200 square miles the cretaceous rocks have been carried away, and alluvial soil conveyed down from the hills has been deposited instead. On approaching Paris, the Marne meanders in numerous curves, taking its course through a valley the delights of which have been the themes of poets and painters, and which has been encroached upon by the villas and summer houses of the citizens of Paris. The Ourcq, one of the affluents of the Marne, has partly been diverted to feed a canal which supplies Paris with water, and is at the same time navigable.

The last curve of the Marne is of recent origin. Formerly the Marne bifurcated

Fig 208 --SECTION OF THE PARIS BASIN.

Horizontal Scale 1 : 5,000,000. Vertical Scale 1 : 100,000.



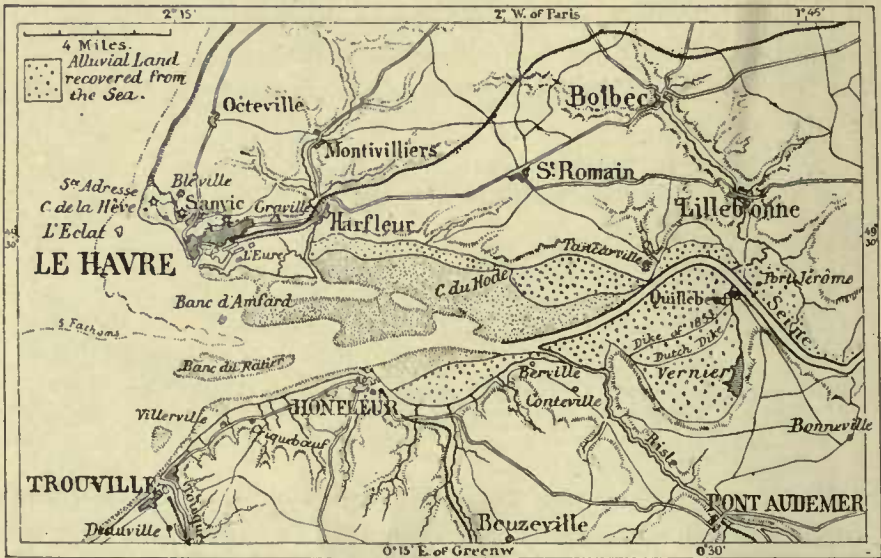
below Meaux, the northern arm flowing through the depression in which runs the canal of Ourcq, whilst the southern joined the vast lake which then covered the basin of Paris, and above which rose the islands of Montmartre, Passy, Stains, and Ormesson. Nor had the three curves which the Seine describes below Paris any existence, their future directions being merely indicated by the promontories of Vanves, Mont Valérien, and St. Germain.

The Oise, which joins the Seine above Poissy, is commercially an important river, for it rises near the coal-fields of Belgium, and traverses a region distinguished for its industry. Locks render it navigable throughout, and canals join it to the Marne, the Meuse, the Scheldt, and the Somme, one of them, that of St. Quentin, passing through several tunnels. The valleys of the Seine and the Oise meet at right angles, embracing between them the huge quadrant of a circle, the centre of which is at Paris, whilst the periphery is formed by the Jurassic zone extending from Burgundy to the Ardennes. The geological formation of the basin of Paris may here be studied most advantageously, the degrading action of the water having been least. Geologists have likened the successive beds of this basin to a number of basins placed one within the other. Where impervious

layers of clay prevent the passage of water, the latter collects underground, and thus the rain which falls on the chalky plateaux of Champagne finds its way to the surface through wells bored at Paris. The artesian springs at Grenelle rise from a depth of 1,640 feet. Beneath the Seine which flows on the surface there are other Seines far underground. Beneath the Lake of Enghien, which occupies a cup-shaped cavity in the marl, there are other lakes, which may be tapped, when their water rushes up to the surface.

About one-half of the rain falling within the basin of the Seine finds its way into the river, the other half feeding subterranean reservoirs. No large tributaries join below the Oise, but the Seine nevertheless increases in volume, for numerous springs rise in its bed. Below the confluence with the Eure the influence of the tide makes itself felt, and the river is of imposing width. The ancient gulf through

Fig. 209.—THE ESTUARY OF THE SEINE.



which it flows is for the most part bounded by sloping hills, but a few old chalk cliffs, formerly bathed by the sea, may still be seen. Below Rouen the Seine forms curves similar to those near Paris. Beyond Quillebœuf it is confined within embankments. The phenomenon of the bore (*mascaret*) may be witnessed above that town as far as Caudebec. A tidal wave, 10 feet in height, then rushes up the river at the rate of more than half a mile a minute, and the conflict between it and the river is most imposing.

The bay of the Seine has been much changed in consequence of engineering works. The mouth of the river is now 10 miles below Quillebœuf, opposite the Cap du Hode. The embankments are flooded at high water, and behind them the sea deposits the mud held in suspension. When these deposits have attained the height of the embankment the latter is increased in altitude, and the land thus protected may be cultivated. The estuary of the Rille, which joins that of the

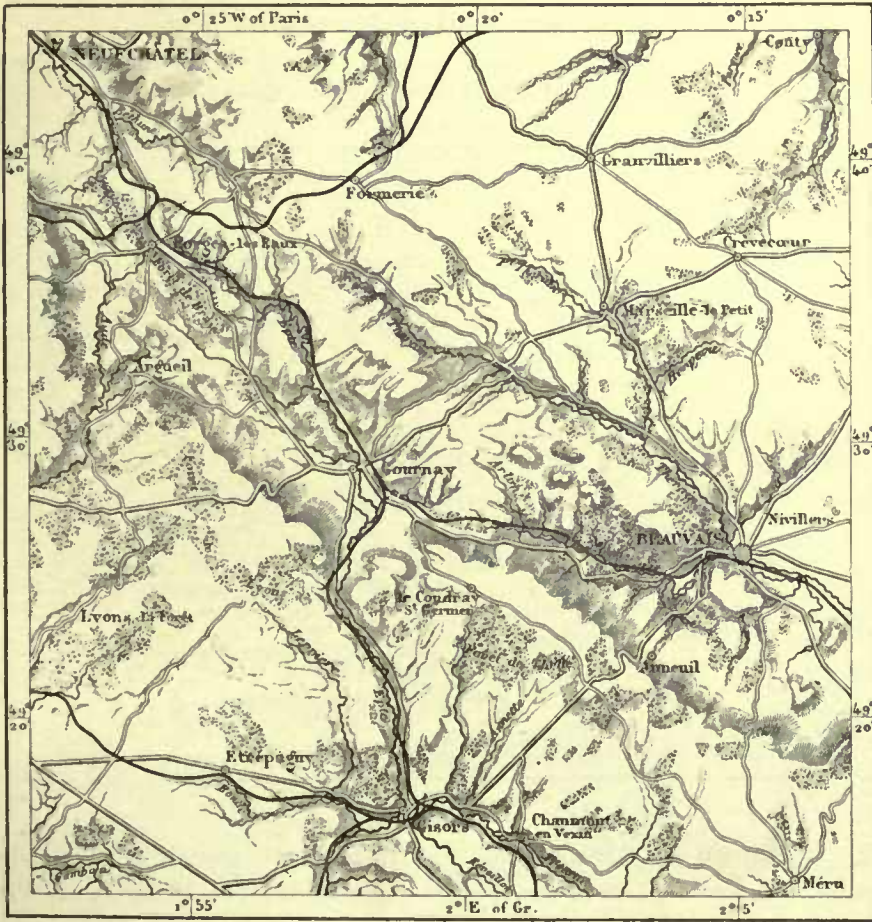
Seine on the south, is effectually treated in the same manner. Like many other rivers traversing calcareous formations, the Rille, or Risle, flows partly through underground channels.

UPPER NORMANDY.

THE plateaux of Upper Normandy, which extend from the northern bank of the Seine to the English Channel, where they terminate in Capes de la Hève and

Fig. 210.—THE DISTRICT OF BRAY.

Scale 1 : 500,000.

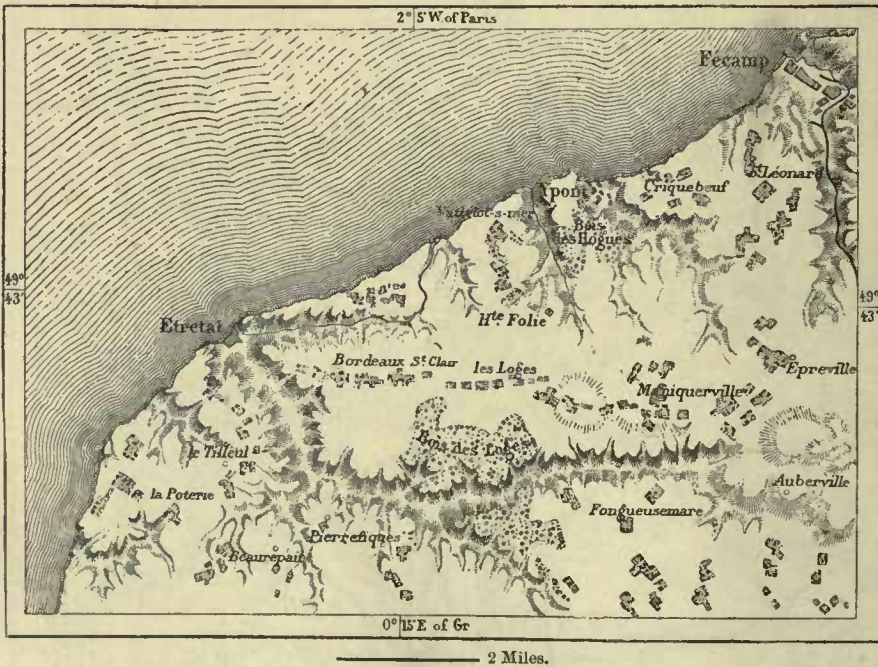


Antifer, are drained but in part into the Parisian river. They consist of cretaceous rocks covered by strata of more recent origin. The limestone crops out wherever the surface deposits have been removed by the action of the rivers, and these limestone districts differ from others adjoining them in their vegetation, agriculture, and inhabitants. In the district of Bray, the most elevated of these plateaux, the surface strata have been almost completely removed, and the limestone hills, belonging to the upper Jurassic formation, are covered to their very summits with

savoury herbs and fruit trees. The fattening of cattle is carried on there; and so luxuriant is the pasturage that, in spite of the severity of climate, cattle pasture in the open air throughout the winter, merely sheltered by sheds against the inclemencies of the weather. On the chalky plateaux of Caux and Vexin the rain-water disappears as in a sieve, but bounteous springs gush forth in the surrounding valleys, which are of rare fecundity, and frequently suffer from a superabundance of water, whilst the dwellers on the plateaux are dependent upon cisterns or pools. The air fortunately is charged with moisture, and these springless regions support a fine vegetation. Rows of beeches planted on embankments screen the apple orchards against the violent breezes blowing from the sea. Formerly the whole country was one dense forest of oaks and beech-trees.

Fig. 211.—DALES (VALLEUSES) ON THE COAST.

Scale 1 : 100,000.



The maritime slope of this plateau is intersected by numerous valleys or riverless dales. The parallelism of the rivers is remarkable: the Béthune, the Yères, the Bresle, and the Somme all flow in the same direction, dividing the country into regular parallelograms. The roads either run along the valleys or at right angles across the intervening plateaux. Most of the towns have been built lengthways along the roads, running towards the north-west. They have hardly any side streets; and one village, that of Aliermont, near Dieppe, forms a single street nearly 10 miles in length.

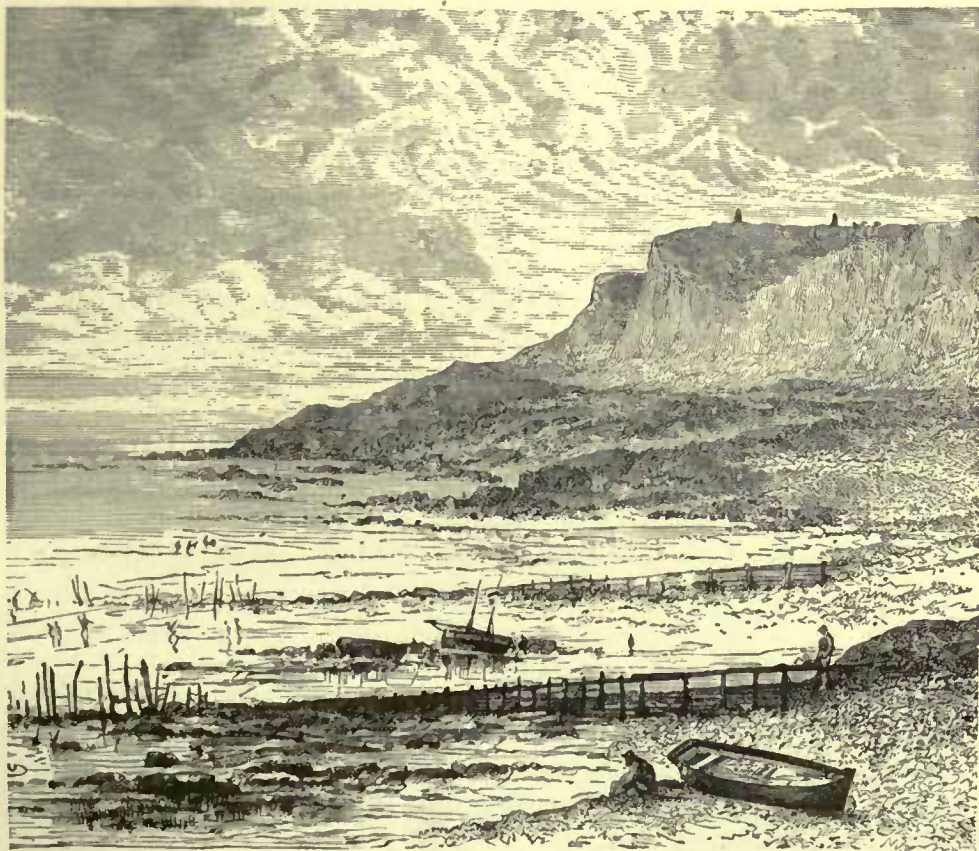
The right slope of most of the valleys of Upper Normandy is steeper than that on the left. M. de Lamblardie ascribes this curious feature to the greater rapidity with which evaporation takes place on the slopes exposed to the sun. The slopes

facing northward are more humid, and the disintegration of the rocks would consequently go on at a more rapid rate. The rotation of the earth, however, is sufficient to account for this phenomenon.

THE COAST.

THE undisturbed action of geological agencies in this part of France is exhibited by the formation of the coast, no less than by that of the plateau. The shore between Havre and Dieppe forms a convex curve, and is continued thence to

Fig. 212.—CAPE DE LA HÈVE.



Boulogne and Cape Gris-Nez by a concave one. The contour of this coast-line is most graceful, and yet few localities exist where the sea has wrought greater havoc. Between Havre and Auct, a village to the south of the Somme, bold chalk cliffs line the coast, sometimes rising to a height of 300 feet, and only interrupted at intervals by breaks through which the inland waters make their way to the sea. Sometimes, when the storm rages, masses of rock weighing thousands of tons are detached, and gradually worn down into sand.

The rain-water which filters through the fissures of the rocks is even a greater

agent of destruction than the sea. The lower portion of the cliffs generally consists of ferruginous sand, through which percolates the water of many springs. Cavities are thus formed, the superimposed mass of rock settles down, and at the next onslaught of the waves tumbles down upon the beach. The sea here continually encroaches upon the land. In the beginning of the twelfth century the church of Ste. Adresse stood 4,600 feet from the present coast, at a spot now occupied by the bank of Éclat. The sea has consequently advanced at a rate of about 8 feet annually. This rapid progress is due in a large measure to the coast current, which carries away the débris of the cliffs. For a time the fragments of rock which tumble down from the top of the cliffs form a protective barrier; but by degrees the chalk dissolves, and is carried to a distance, whilst the enclosed pebbles, unable to contend against the waves, are distributed along the beach, and even aid in the work of destruction. The ports, moreover, are being silted up by pebbles and mud carried down by the rivers and require the protection of piers.

At the Cape of Antifer the ocean current bifurcates, the principal branch running east along the coast of the country of Caux (calx, lime), whilst a lateral arm turns south, in the direction of Havre. The port of that town is thus threatened from various directions. The ocean current transports thither its pebbles; the débris carried down by the Seine gradually silts up the estuary of the river; and the rivers of Calvados convey thither the sands and pebbles of Lower Normandy. The efforts of the engineers to avert the fate threatening the port, and which has already overtaken Honfleur, on the left bank, are incessant.

Fortunately the conflicting ocean currents which meet at Havre possess attendant advantages, for they produce three tidal waves, arriving in succession, and the period of high water, instead of being limited to eleven minutes, extends over three hours. Vessels are thus afforded ample time to enter the docks.

TOPOGRAPHY.

YONNE.—This department is named after the principal tributary of the Upper Seine. It includes portions of the ancient provinces of Burgundy, Orléanais, and Champagne, and the great high-road from Paris to Lyons runs through it. Agriculture supports most of the inhabitants, and wine, cider, and beer are amongst its products.

Auxerre (15,656 inhabitants), the capital, occupies the slope of a hill on the left bank of the river Yonne. It boasts of a magnificent cathedral, the finest in all Burgundy, and carries on a considerable trade in wine, the best being grown near *Chablis* (2,185 inhabitants), to the west. *Fontenay*, noted for a great battle fought in 841, lies to the south-west.

Avallon (5,337 inhabitants), built on a rock overlooking the valley of the Cousin, has a few mediæval buildings, and carries on some trade; but in the eyes of the antiquarian it is eclipsed by the ancient capital of the district, *Vézelay*, on the Cure, now in ruins, but in the twelfth century a famous place of commerce and

pilgrimage. It was here that Richard Cœur de Lion met the King of France in 1190, when preparing to start upon the third crusade.

St. Florentin (2,256 inhabitants), *Tonnerre* (4,991 inhabitants), and *Ancy-le-Franc* are the principal places on the Armançon. *Tonnerre*, lying on the railway from Paris to Lyons, carries on some trade in wine.

La Roche, at the confluence of the Armançon with the Yonne, is a busy railway centre. Following the river, we pass *Joigny* (5,975 inhabitants) and its vineyards, and *Villeneuve-sur-Yonne* (3,606 inhabitants), and reach *Sens* (12,251 inhabitants), the old capital of the Senones. Its cathedral is a most remarkable edifice, with windows painted by Jean Cousin. A chapter-house and the episcopal palace, equally remarkable, adjoin it.

AUBE is cut in two by the river Seine, which divides it from south-east to north-west, and is named after a tributary of that river. The surface is for the most part hilly, and moderately wooded, and in the north the department merges in the monotonous plain of Champagne. The soil is generally sterile.

Troyes (41,275 inhabitants), the ancient capital of Champagne, the ancient Augustobona, on the river Seine, is altogether without natural defences, and thus fell an easy prey to every foreign invader. The town, however, took advantage of its central position, and in times of peace its commerce and industry flourished. The revocation of the Edict of Nantes nearly ruined it. It is now a great centre of the hosiery industry, and the nurseries in the neighbourhood enjoy a wide reputation. Amongst its edifices the first place must be accorded to a magnificent cathedral, one of the finest in France. An ancient abbey now serves as a library and museum. The old ramparts have been converted into delightful walks. Higher up on the Seine is *Bar-sur-Seine* (2,512 inhabitants), the insignificant capital of an arrondissement. Near it, in the valley of the Laigne, are the three *Riceys* (2,755 inhabitants). Descending the Seine, we reach *Romilly* (4,925 inhabitants) and *Nogent-sur-Seine* (3,335 inhabitants). Near the latter stood the abbey of Paraclet, the retreat of Abélard.

The river Aube, on entering the department, flows beneath the stately abbey of *Clairvaux*, now converted into a convict prison. At *Bar-sur-Aube* (4,495 inhabitants) the Aube leaves the hilly district and enters the chalky plain of Champagne, flowing past *Brienne* (1,860 inhabitants), where Napoleon first studied military science, and *Arcis-sur-Aube* (2,817 inhabitants), the birthplace of Danton.

HAUTE-MARNE is divided by the plateau of Langres into two distinct sections, of which the southern is drained into the Saône, whilst the northern, embracing the districts of Bassigny, Vallage, and Perthois, is traversed by the Upper Marne, the Upper Meuse, and the Upper Aube, these three rivers rising within the department. More than a fourth of the surface is wooded. Iron ore abounds.

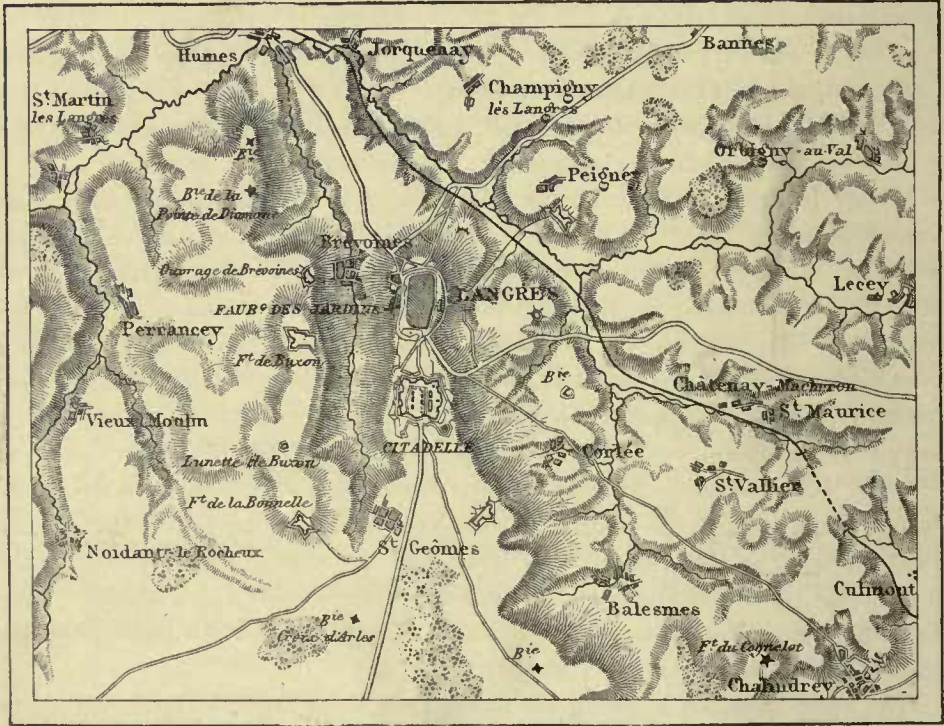
Bourbonne-les-Bains (3,705 inhabitants), famous on account of its springs, is the only town in the southern section of the department.

Langres (9,488 inhabitants) occupies a commanding position on the Upper Marne, and is strongly fortified. It is the old capital of the Lingones, has a grand

old gate constructed by the Romans, and a fine Gothic cathedral. Diderot was a native of Langres. The knives named after the city are manufactured in the neighbouring town of *Nogent-le-Roi* (3,430 inhabitants). *Chaumont-en-Bassigny* (8,791 inhabitants), on a high limestone terrace at the junction of the Suize with the Marne, is a quiet country town. A magnificent aqueduct of fifty arches supplies the town with water. Below Chaumont we enter the "black country," in the centre of which is *Joinville-en-Vallage* (3,723 inhabitants). Lower still is the

Fig. 213.—THE ENVIRONS OF LANGRES.

Scale 1 : 120,000.



valley of Osne, famous for its iron foundries. *St. Dizier* (9,453 inhabitants) is one of the great iron marts of France.

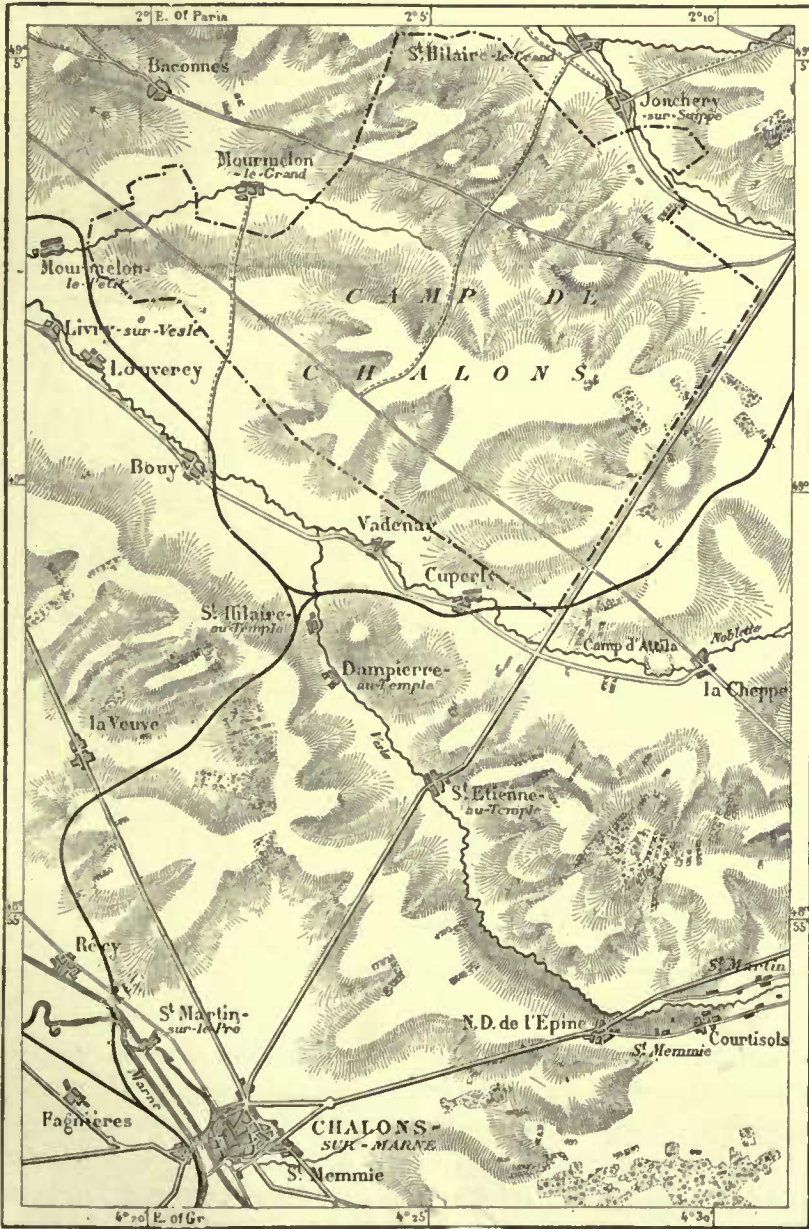
Vassy (2,799 inhabitants), in the valley of the Blaise, was an important town formerly, but has never recovered from the massacre of its Protestant inhabitants in 1562. Iron mills and foundries are in the vicinity, and higher up in the same valley lies the castle of *Crey*, where Voltaire resided for several years.

MARNE, named after its principal river, consists of several well-marked geographical regions. The Bocage, Perthois, and Argonne, in the south-east and east, belong to the lower cretaceous formation, and are partly wooded; Champagne proper, in the centre, consists of chalk and marls; whilst the district of Rémois and the hills of Épernay and Sézanne are of tertiary origin. The population around the industrial city of Reims is dense, but in the monotonous plains it is sparse.

Vitry-le-François (7,590 inhabitants), on the Marne, is the terminus of the canal which joins that river to the Rhine. The town has been destroyed repeatedly, and was last rebuilt by François I. *Chalons-sur-Marne* (20,215

Fig. 214.—CHALONS AND ITS CAMP.

Scale 1 : 160,000.



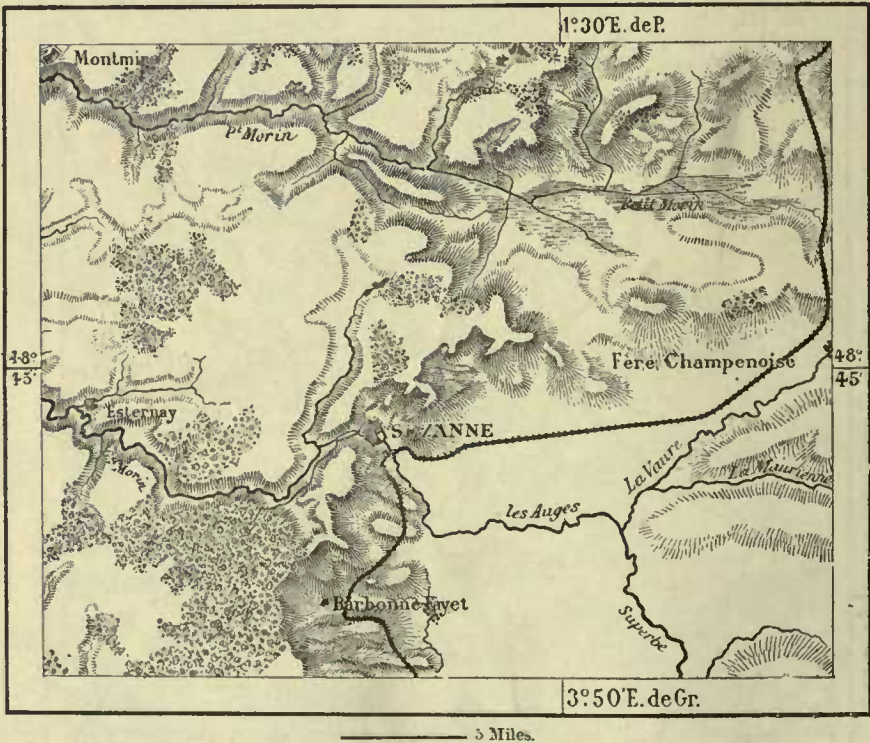
inhabitants), the capital of the department, has several fine churches, but the most remarkable edifice of the town is the old sanctuary of Notre-Dame de l'Épine, about 6 miles to the north-east of it. The industrial art school is one

of the most flourishing in France, and a vast trade is done in champagne. The old fortifications have been converted into public walks. Near a site now known as Attila's Camp was fought the battle of the Catalaunian Fields, which broke the power of the Huns. The "camp of Chalons" is no longer occupied.

Épernay (15,414 inhabitants), one of the two great centres of the commerce in champagne, lies on the Marne, embosomed in vineyards. The wine from which veritable champagne is manufactured is grown on the hills bounding the river, and in a district extending from *Sillery*, near Reims, to *Arize* (2,113 inhabitants) and *Vertus* (2,371 inhabitants), in the south. *Ay* (4,007 inhabitants), close to *Épernay*, is most famous for its *crus*. In 1873 more than 22,000,000 bottles

Fig. 215.—THE BIFURCATION OF THE GRAND MORIN AT SÉZANNE.

Scale 1 : 320,000.



of champagne were manufactured in the department, and the profit derived from its sale has furnished the means for erecting the luxurious châteaux dotted over the country. Several of the towns in the hills to the south of *Épernay* have become known through the military events of 1814; as, for instance, *La Fère-Champenoise*, *Sézanne* (4,690 inhabitants), and *Montmirail* (2,077 inhabitants). *Sézanne*, moreover, is interesting on account of the bifurcation of the river Grand Morin, which rises to the north of the town, a phenomenon similar to that in connection with the Cassiquiare in South America.

Reims (80,098 inhabitants), the ancient capital of the Remi, does not enjoy the advantage of lying on a navigable river, but a canal connects it with the Marne

and the Aisne, and five railways converge upon it. It is one of the great historical cities of France. Clovis was baptized there, and the Kings of France, ever since

Fig. 216.—REIMS AND ÉPERNAY.

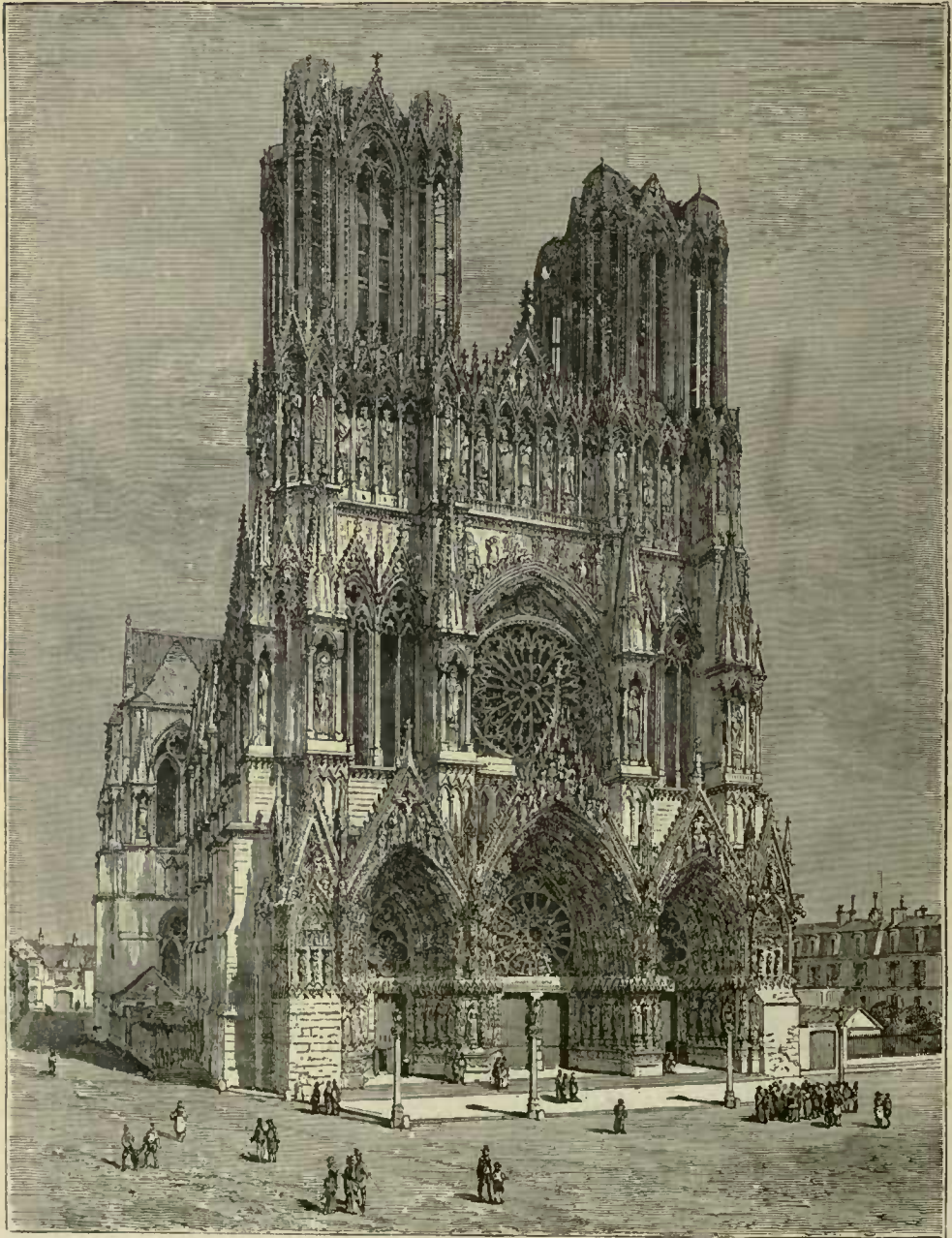
Scale 1 : 225,000.



Philip Augustus, were anointed there by the successors of St. Remy, its first bishop. The cathedral is one of the most perfect Gothic edifices in the world.

Begun in 1212, it was only completed, as we now see it, two centuries afterwards. Amongst other remarkable buildings are the church of St. Remy, even older than

Fig. 217.—THE CATHEDRAL OF REIMS.



the cathedral ; the archiepiscopal palace ; the town-hall, with a library and museum ; and a Roman arch of triumph known as the " Gate of Mars." Modern Reims has the old Roman city of Durocortorum for its nucleus, and extensive suburbs stretch

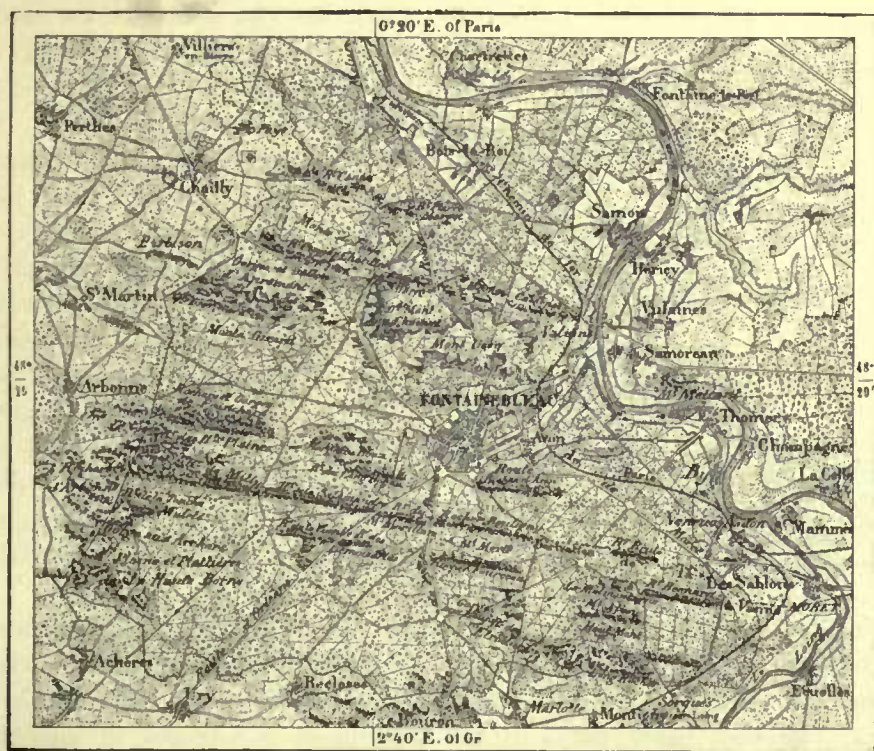
out in all directions. It is a prosperous seat of industry. Champagne is manufactured on a scale even vaster than at Épernay; the woollen industry is of great importance and there are dye works, glass works, and beet-root sugar manufactories. The pastrycooks of Reims maintain their reputation to the present day. Colbert was a native of the city.

Ste. Menchould (3,376 inhabitants), on the Aisne, defends the most important defile leading through the wooded heights of Argonne, and like *Valmy*, farther west, is frequently referred to in military history.

SEINE-ET-MARNE lies completely within the basins of the two rivers after which

Fig. 218.—FONTAINEBLEAU.

Scale 1 : 200,000.



it is named. Brie, between the Seine and the Marne, consists of an eocene plateau, almost arid in its character, whilst the district of Gâtinais, to the south of the Seine, consisting of miocene sandstones, being better supplied with water, is more fertile. A few large forests remain, but the greater portion of the department is divided amongst a multitude of small landowners, busily employed in supplying the neighbouring city of Paris with corn, vegetables, and cheese. There are many quarries and clay pits, and the manufacture of paper is of considerable importance.

Melun (11,215 inhabitants), the capital, is the first large town on the Seine

above Paris, of which it is almost a rural suburb. The most remarkable building of the town is a huge prison. Near it is the château of *Vaux-Praslin*, with a collection of paintings, and a park laid out by Le Nôtre.

Fontainebleau (11,545 inhabitants), at a distance of a couple of miles from the Seine, and in the midst of a vast forest, is one of the favourite pleasure resorts of the Parisians. The palace is associated in our memory with the revocation of the Edict of Nantes, the assassination of Monaldeschi, the captivity of Pius VII., and the abdication of Napoleon. Sandstone is quarried; sand for the manufacture of glass is dug; and the neighbouring village of *Thomery* is noted for its delicious white grapes. *Moret*, at the mouth of the Loing, carries on a brisk trade, but is inferior in that respect to *Montereau-fault-Yonne* (6,847 inhabitants), higher up

the Seine, at the mouth of the Yonne, which has also a huge china manufactory, employing more than six hundred workmen.

Provins (7,176 inhabitants), the old capital of Brie, lies in the delightful valley of the Voulzie, which joins the Seine from the north, and is commanded by a citadel dating back to the thirteenth century. Near *Nemours* (3,857 inhabitants), on the Yonne, is *Bignon*, the birthplace of Mirabeau.

Brie-en-Comte (2,685 inhabitants), on the Yerres, a tributary of the Seine, is altogether dependent upon Paris, which its inhabitants supply with building stones, lime, vegetables, roses, and cheese.

Meaux (11,739 inhabitants) is the most important town on the Marne, its houses clustering around an unfinished Gothic cathedral. The treaty putting an end to the war against the Albigenses was concluded here. *Meaux*, like most other towns of the department, is engaged in supplying Paris with provisions. *Lagny* (4,247 inhabitants) and *Chelles* (2,351 inhabitants), both on the Marne below *Meaux*, are dependent upon Paris. The château of *Ferrières*, to the south of the former, is one of the most sumptuous in France.

La Ferté-sous-Jouarre (3,657 inhabitants), above *Meaux*, is the centre of the most fertile district of the department. The millstones procured from its quarries are exported as far as America. *Jouarre* (1,747 inhabitants), near it, has the ruins of a famous convent.

Coulommiers (4,239 inhabitants) and *La Ferté-Gaucher* (1,849 inhabitants) are the only places of note in the valley of the Grand Morin. The former exports cheese, and near the latter are several paper-mills.

Fig. 219.—PARIS AND THE GREAT HIGHWAYS OF FRANCE.





PARIS, AS SEEN FROM THE CHURCH OF ST. GERVAIS.

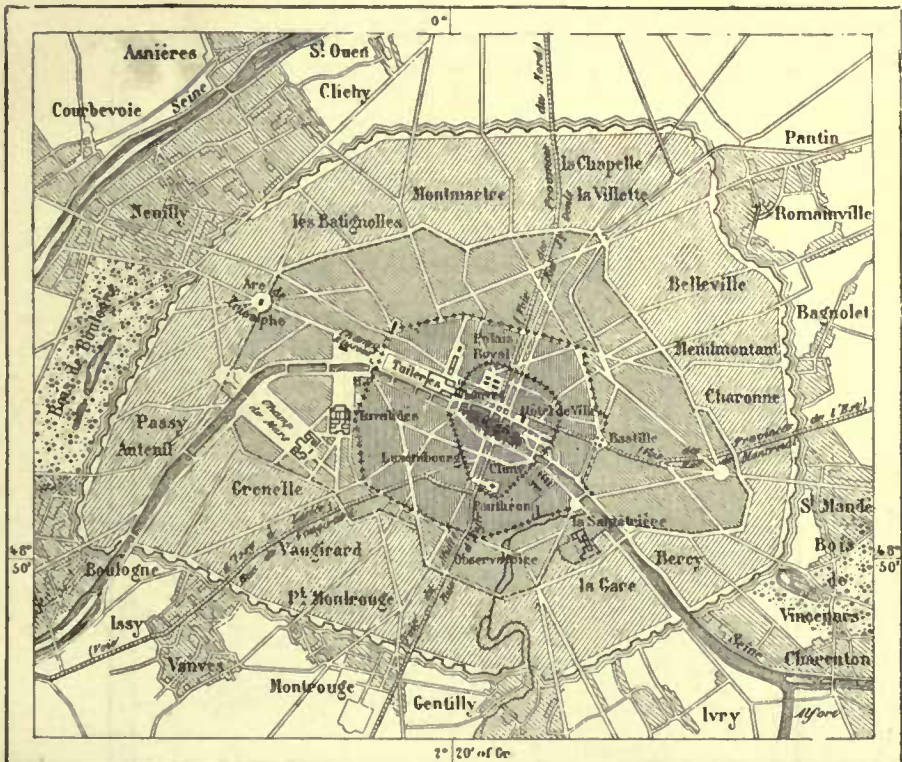
PARIS and the DEPARTMENT OF THE SEINE are almost identical, for the latter in reality only consists of that great city and a portion of its environs.

Paris, more than any other city of the world, has been alternately cursed or raised to the skies by poets and prose-writers; and, whilst Barbier scornfully speaks of it as an "infernai vat," Victor Hugo chants its glories as those of the "mother of cities."

Paris may not be the moral superior of other capitals of the civilised world,

Fig. 220.—THE GROWTH OF PARIS.

Scale 1 : 125,000.



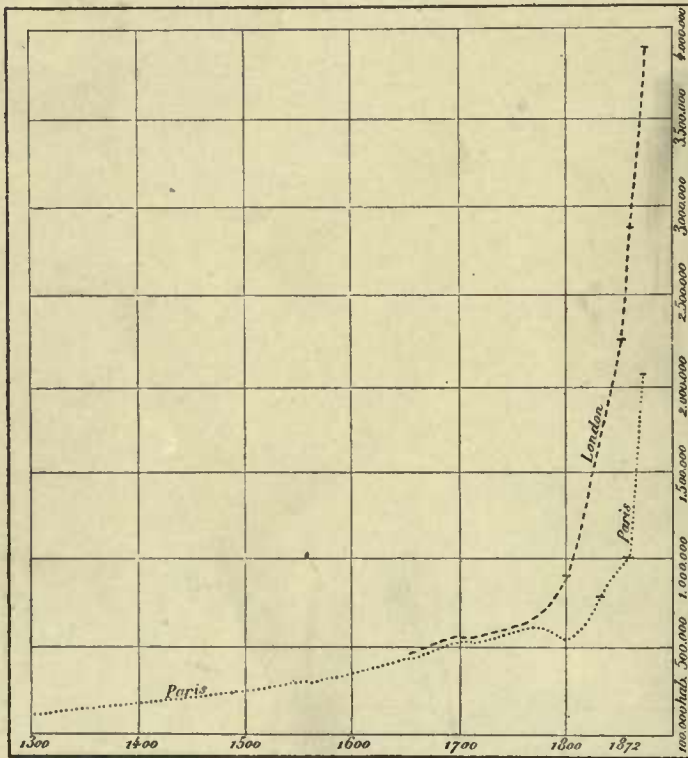
..... Encinte of Philippe Auguste 1211. - - - - - Encinte in 1789.
 Increase under Louis XIV 1702 ~~~~~ id. of 1870.
 ——— Ancient Roman Roads according to A. Lenoir
 ——— 2 Mile.

but it cannot be denied that at various epochs it proved itself the most active focus of human thought. Next to Athens, Rome, and Florence, no other city is so frequently in our thoughts as Paris. No other city has done more to transmit to us the lights of other days. As an intermediary between the Latin races and the rest of Europe, it fulfils functions of the utmost consequence, and is in some sort the arbiter between the civilised nations of the earth. In certain respects Paris is the capital of the world. The strangers who flock to it in thousands

proclaim it to be so. No other city of the world offers equal attractions to persons of the most varied tastes. Paris consists of a hundred distinct cities welded into one, and yet, as a whole, it is full of individuality. London, in comparison with it, is wanting altogether in cohesion. In London the various classes of society exist side by side; in Paris, by imperceptible gradations, one class merges into the other.

Curiously enough, the great geographical advantages enjoyed by Paris have frequently been overlooked. M. Saint-Marc Girardin says that "the site occupied by Paris was not intended by nature to become the site of a great city." But M. Elie de Beaumont and Dufrenoy, in the commentary accompanying their map of

Fig. 221.—THE COMPARATIVE GROWTH OF LONDON AND PARIS IN POPULATION.



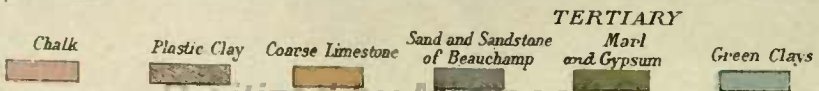
France, point out that features of the soil and subsoil facilitated its growth. Common sense, not guided even by the lights of science, is able to appreciate the advantages offered by the geographical position of Paris.

Old Lutetia was built upon a group of islands, near the confluence of two navigable rivers. The elevated hill of Montmartre served its inhabitants as a watch-tower, whence they were able to espy the approach of an enemy. Paris not only lies on the great national highway which joins the Atlantic to the Mediterranean, but likewise on the route connecting Spain and Aquitaine with Northern Europe. It is the natural centre of the valley of the Seine and of the districts bordering upon it. Strategically its position is a strong one, and the semi-

GEOLOGICAL MAP OF



Drawn by A. Vuillemin.



TERTIARY

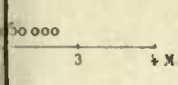
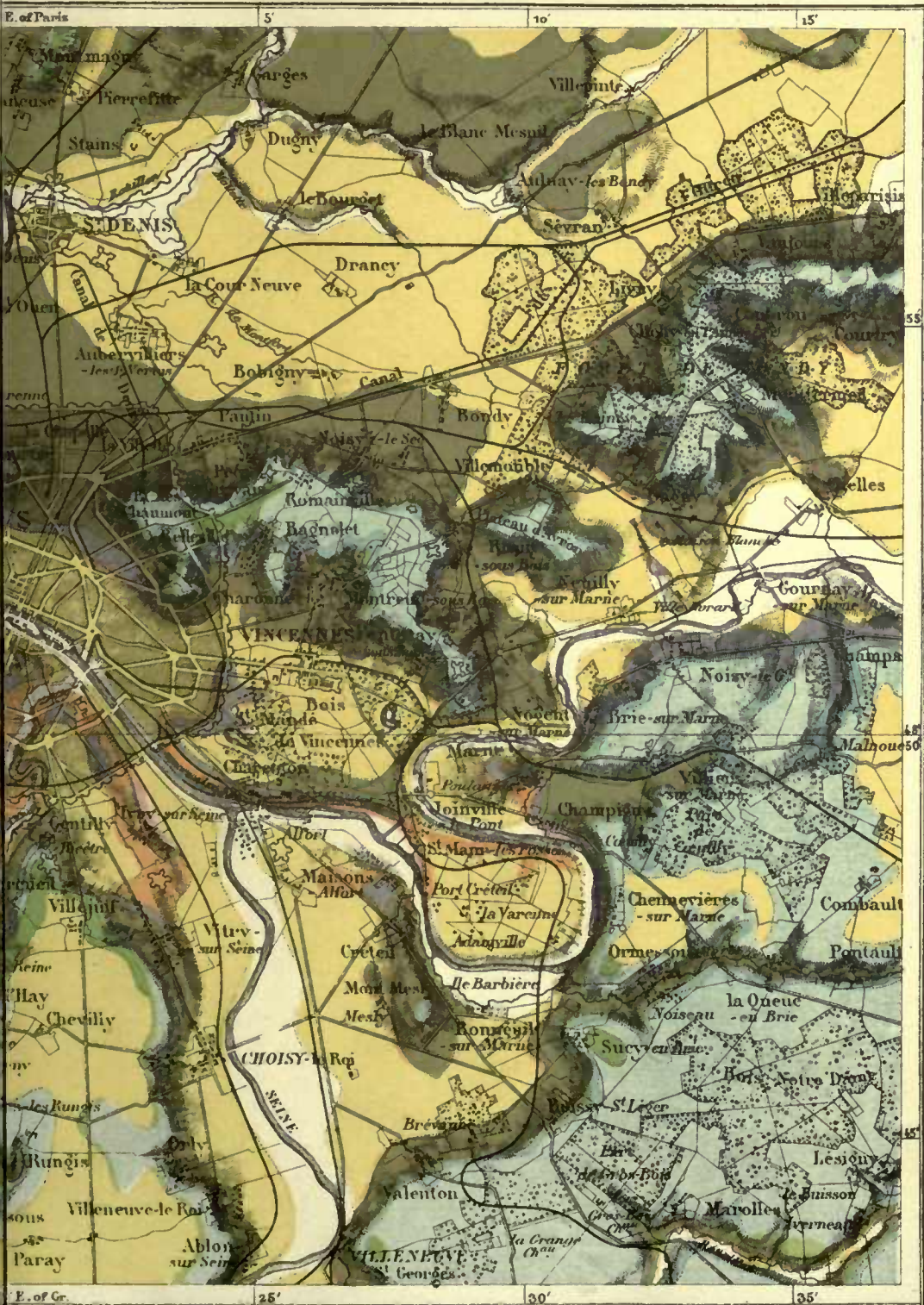
Scale



Digitized by Microson

NEW YORK.

E ENVIRONS OF PARIS



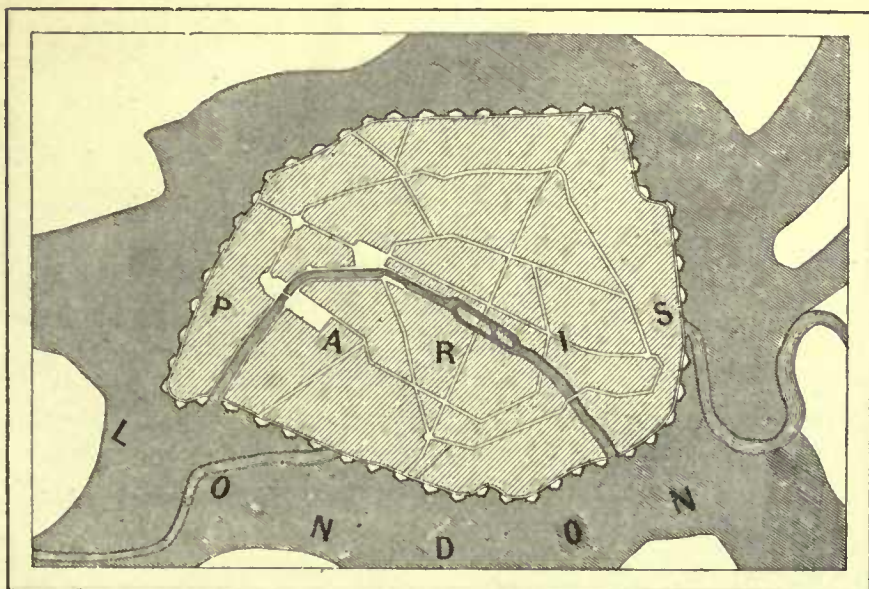
FORMATIONS			Alluvium	
Clay-Marl	Sandstone & Sand of Fontainebleau	Millstones and Flint	Mud, Sand & Gravel	Modern Alluvium

circle of hills extending from the Morvan to the Ardennes has very aptly been likened to the huge outwork of a fortress. These advantages marked out Paris as the capital of France, but also led to the much-talked-of centralization of the latter. Paris, being the seat of Government, paid dearly for its privileges by being deprived of its municipal liberties, and exposed to the risks of foreign invasions and intestine revolutions.

Amongst the causes which have contributed to the rapid growth of ancient Lutetia must be mentioned the facilities for provisioning a large town. Beauce and Brie are both rich granaries, and materials for building exist on the site of the city, or in its immediate neighbourhood. The coarse limestones composing the

Fig. 222.—THE AREAS OCCUPIED BY LONDON AND PARIS.

Scale 1 : 150,000.



2 Miles.

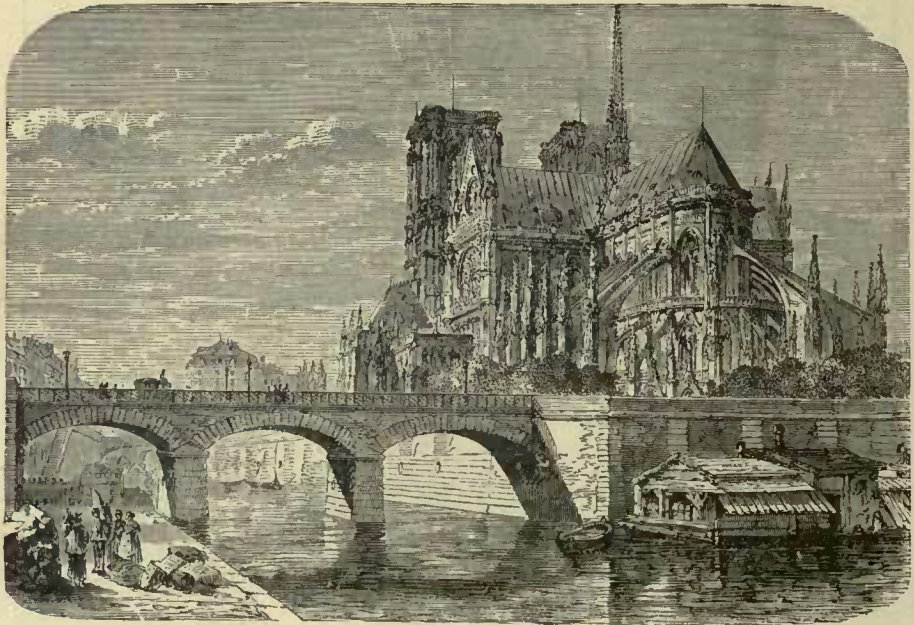
surrounding hills are easily quarried, and to their existence Paris is indebted for the fine architectural show it makes.

As early as the Roman age, the island city inhabited by the Gallic tribe of the Parisians had its suburb on the southern bank of the river, whilst a detached group of houses crowned the summit of Ste. Geneviève. In the thirteenth century Paris had outgrown Rome. In the beginning of the eighteenth century its population exceeded half a million, but it diminished during the Revolution. In 1800 Paris was finally beaten by London, the former having only 550,000 inhabitants to oppose the 900,000 of the latter. In 1817 Paris had 714,000, London 1,500,000 inhabitants, and since that time both have more than doubled their population, the increase of London being most rapid. Paris in 1876 numbered 1,988,806 inhabitants residing within the enceinte, but if we add the suburbs stretching

beyond, its population by far exceeds 2,000,000. Paris, consequently, is the most populous city of the world next to London.*

Architecturally Paris is one of the finest cities of the world; and though the palace of the Thermes is the only building dating back to the age of the Romans, the number of magnificent structures erected since the rise of the Gothic style is very large, and the accumulated art treasures challenge comparison, in spite of the frequent devastations and "restorations" to which the city has been subjected in the course of nine centuries. In its very centre rises the church of *Notre-Dame*, a noble edifice of the twelfth and thirteenth centuries, illustrating one of the most remarkable epochs in the history of architecture. On the same island stands the *Sainte-Chapelle*, a marvel of decoration, erected in the space of two years (1245—

Fig 223.—THE CHURCH OF NOTRE-DAME.



1247). The church of *St. Germain des Prés*, on the left bank of the Seine, dates back to the eleventh century, and has been decorated in a masterly style by Hyppolite Flandrin.

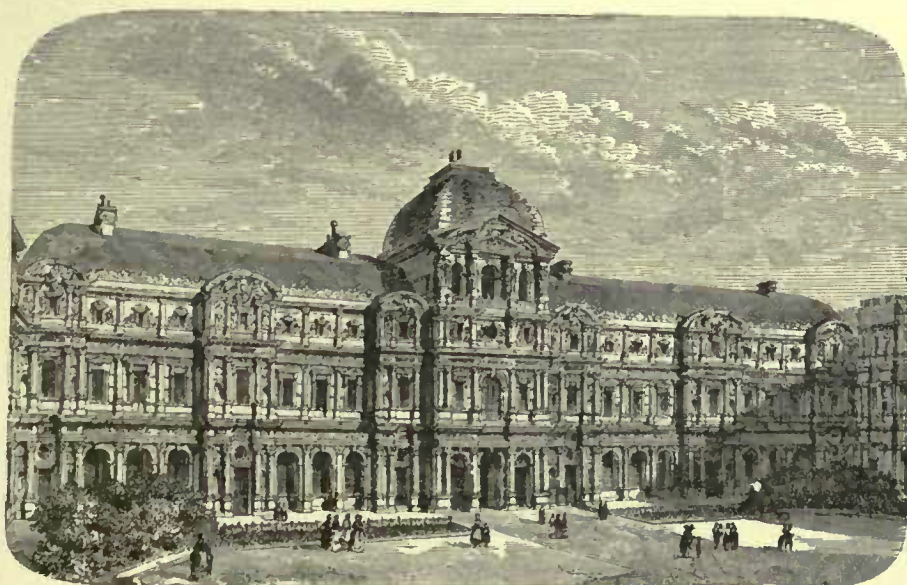
St. Germain-l'Auxerrois, near the right bank of the river, is a curious jumble of the Gothic styles of all ages. Its bell gave the signal for the massacre of St. Bartholomew. St. Séverin, St. Merri, and the tower of St. Jacques are interesting monuments of the Middle Ages. The *Hôtel de Clugny*, erected at the close of the fifteenth century upon the site of the Roman palace of the Thermes, shelters one of the most interesting archaeological museums of the world.

* The largest cities of the world are London, 3,533,484 inhabitants; Paris, 1,988,806 inhabitants; New York, with suburbs, 1,649,370 inhabitants; Berlin, 1,062,008 inhabitants; Vienna, 1,001,999 inhabitants.

The architecture of the Renaissance is represented at Paris by several master-pieces, amongst which the *Louvre*, together with what remains of the adjoining *Tuileries*, is one of the most noteworthy. Its eastern façade, designed by Pierre Lescot, and decorated with caryatides and bas-reliefs by Jean Goujon, is one of the marvels of the sixteenth century. In the church of *St. Eustache* we observe with astonishment the great height of the vaults. *St. Étienne du Mont* is enriched by sculpture and painted windows. The *Town-hall*, destroyed during the reign of the Commune, is being rebuilt. Near it, and close to the large market halls, is the Fountain of the Innocents, a *chef-d'œuvre* of Jean Goujon, the sculptor.

Amongst more modern buildings there are many which challenge admiration. The fine colonnade added to the Louvre; the dome of the Invalides, Mansart's

Fig. 224.—THE COURT OF THE LOUVRE.



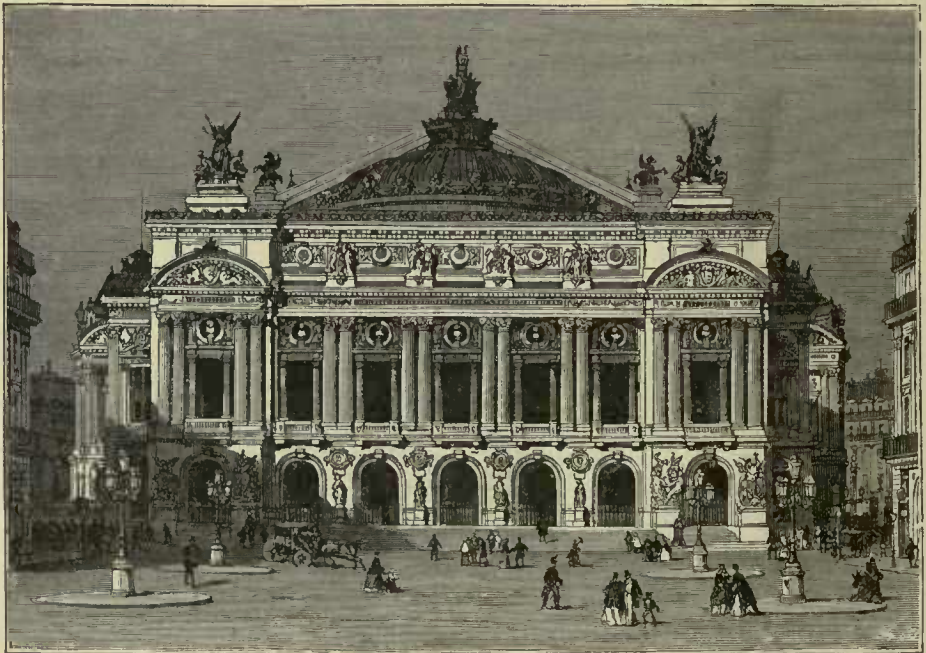
chef-d'œuvre; the Panthéon; the palace of Luxembourg; the Greek temple of the Madelaine, designed by Napoleon to perpetuate his glory; the new Opera House; and the Arc de Triomphe, forming a fitting terminus to the noble avenue of the Champs-Élysées, would each separately constitute the fame of a less wealthy town. Most of the public buildings of Paris are, moreover, associated with great historical events. The Hôtel de Ville, the Tuileries, the Palais-Royal, and the Sorbonne are rich in historical associations.

Scientific and art collections abound. The museum attached to the Jardin des Plantes is one of the most valuable in Europe. Most of the numerous scientific societies and schools have their museums and libraries. At the Conservatoire des Arts et Métiers (Museum of Arts and Industry) may be seen a collection illustrating the progress of the mechanical arts. The galleries of the Luxembourg and

the Louvre are rich beyond measure in works of art of every age. The National Library contains over 2,000,000 volumes—many more than are to be found in the British Museum.

At the head of the scientific associations must be placed the *Institut*, with its five academies. The 300 elementary schools, supported by the town, are attended by 190,000 pupils; the number of students is 9,200, of whom 5,000 study medicine; and the number of illiterate persons in Paris is exceedingly small. The Polytechnic School, the Mining School, the Schools of Fine Arts and of Medicine, enjoy a world-wide celebrity. Several of the theatres, and notably the Théâtre Français,

Fig. 225.—THE NEW OPERA HOUSE.



may fitly be enumerated amongst art institutions. The number of scientific societies is exceedingly large.

Public improvements are being carried out on a vast scale and at an immense expenditure.* Industrial establishments belonging to the State or private individuals are numerous. Sugar, soap and candles, glass, copper-ware, iron castings and steel, and woollen stuffs are manufactured on a large scale; but Paris excels rather in its art workmanship than in its manufactures, and the Parisian *ouvrier* is distinguished for his intelligence and good taste. Jewellery, bronzes, engravings, photographs, surgical instruments, watches, and a great variety of other *articles de Paris* are produced.

Those portions of the department of the Seine which are not covered with

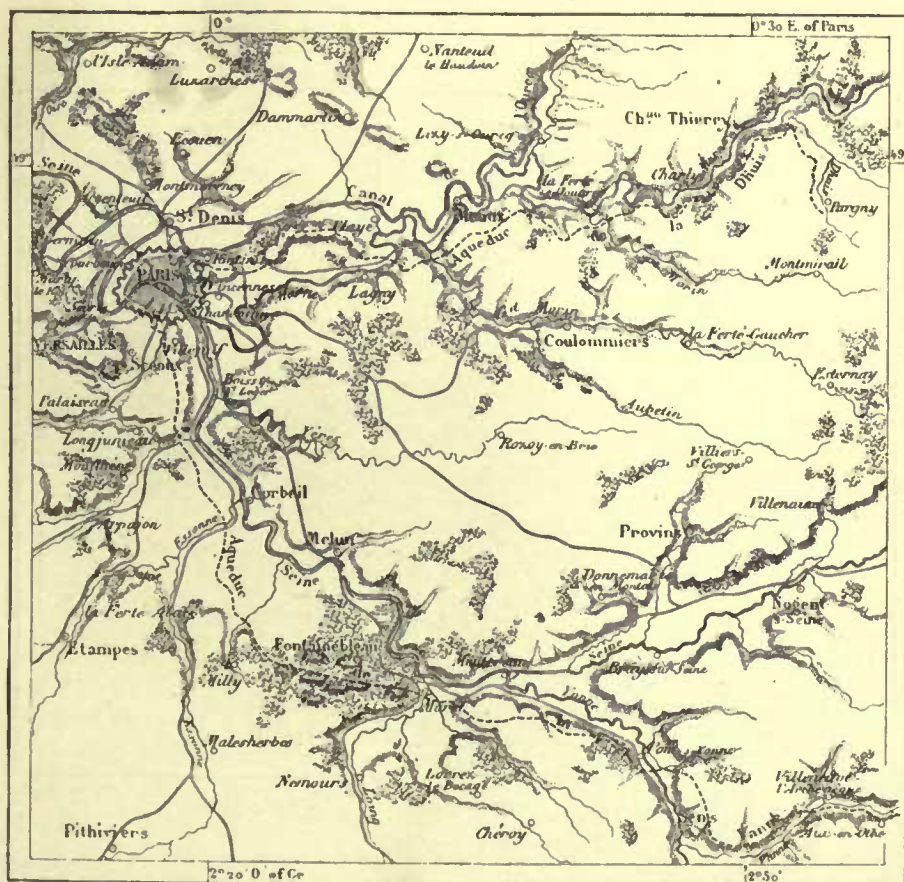
* Town revenue, 1830, £1,800,000; 1874, £9,066,000. Town debt, 1852, £4,640,000; 1876, £8,000,000.

houses or parks are most carefully cultivated. Five or six, and in some instances as many as eleven, crops are frequently gathered from the same plot of land. The marsh gardens of Paris, covering an area of 3,500 acres and divided amongst 1,800 proprietors, are tilled with marvellous care, but they are not sufficient to supply the demands of the population. Corn, vegetables, and other articles are imported from all parts of France and from trans-oceanic countries.

As a place of commerce Paris occupies the foremost position in France. Even

Fig 226.—PARIS AND ITS AQUEDUCTS.

Scale 1 : 100,000.



as a port it only yields to Marseilles and Havre; but most of its trade is carried on by the railways. Sea-going vessels frequently ascend the Seine to the quays of the city; and a project for deepening the Seine, and thus converting Paris into a seaport, accessible to large vessels, is under consideration.*

Three aqueducts supply Paris with water, the oldest, that of Arcueil, having been inaugurated in 1624. The canal of the Dhuis has a length of 81, and that of the Vanne 107 miles, and the covered reservoirs which they supply hold

* Annually about 20,000 vessels of 2,000,000 tons burden arrive at Paris.

100,000 tons of water. Artesian wells have been bored at Grenelle and Passy, and the daily supply of water amounts to 99,000,000 gallons. A labyrinth of sewers conveys the waste water into the Seine at Asnières, the solid matter contained in the sewage being spread over the naturally sterile land around Gennevilliers, which has thus been rendered productive. Much remains yet to be done before the sanitary condition of Paris can be called satisfactory. The mortality (1861—69) was 25·5 per 1,000 inhabitants, as compared with 21·7 in the rural parts of France.

In addition to several beautiful parks within its walls, Paris owns the fine woods

Fig. 227.—PARIS AND ITS FORTS.

Scale 1 : 500,000.



of Vincennes and Boulogne outside of them. In the latter are the racecourse of Longchamp and a garden of acclimation. Farther away from the town, but still easy of access, are the parks and forests of St. Cloud, Versailles, St. Germain, Montmorency, Chantilly, Compiègne, and Fontainebleau. Three great cemeteries—those of Montmartre, Mont Parnasse, and Père-Lachaise—lie within the walls, but the future necropolis of Paris occupies the sterile plateau of Méry, beyond the river Oise.

The enceinte of Paris has a circumference of 22 miles, and its approaches are defended by two circles of detached forts, forming a vast entrenched camp of 350 square miles.

Amongst the many other towns and villages of the department of the Seine three are several which are mere suburbs of the great city. Of these the most important is *Vincennes* (18,273 inhabitants), joined to Paris by *St. Mandé* (7,499 inhabitants). The castle of Vincennes is historically interesting. The manufacturing town of *St. Denis* (29,500 inhabitants), to the north of Paris, is best known through its abbey church, the old burial-place of the Kings of France. The following are the principal places in the arrondissement of St. Denis:—*Pantin* (13,646 inhabitants) and *Aubervilliers* (14,340 inhabitants), two manufacturing towns; *Bondy* (1,402 inhabitants), famous for its forest; *Le Bourget*, which recalls a French defeat; *St. Ouen* (11,255 inhabitants), with a castle built by Louis XVIII. and a huge railroad dépôt; *Clichy-la-Garenne* (17,354 inhabitants), *Levallois-Perret* (22,733 inhabitants), *Asnières* (5,692 inhabitants), and *Colombes* (2,691 inhabitants), with numerous villas; *Neuilly* (20,781 inhabitants) and *Courbevoie* (11,811 inhabitants), two suburbs of Paris separated by the Seine; *Puteaux* (11,387 inhabitants), a town of dye works and factories; *Suresnes* (5,097 inhabitants), at the foot of Mont Valérien; *Nanterre* (3,890 inhabitants), noted for its holy well of Ste. Geneviève, its cakes and *rosières*; and *Boulogne* (21,556 inhabitants), beyond the wood of the same name.

Seaux (2,460 inhabitants) is the capital of the arrondissement, to which belong the towns and villages to the south and east of Paris, the most important amongst which is Vincennes. The others are:—*Montreuil* (13,607 inhabitants), famous for its orchards; *Charenton* (8,744 inhabitants), with a lunatic asylum; *Maisons-Alfort* (7,115 inhabitants), with its veterinary college; *Nogent-sur-Marne* (7,481 inhabitants), where the river is spanned by a viaduct 2,600 feet in length; *Ivry* (15,247 inhabitants), with huge factories; *Vitry* (3,718 inhabitants), abounding in nursery gardens; *Choisy-le-Roi* (5,829 inhabitants), with the tomb of Rouget de l'Isle; *Gentilly* (10,378 inhabitants); *Arcueil* (5,299 inhabitants), with its two aqueducts; *Montrouge* (6,371 inhabitants), *Vanves* (8,812 inhabitants), *Issy* (7,356 inhabitants), and *Clamart* (3,333 inhabitants), near wooded heights, supplying building stones; and *Fontenay-aux-Roses* (2,804 inhabitants), which supplies the markets of Paris with flowers and fruits.

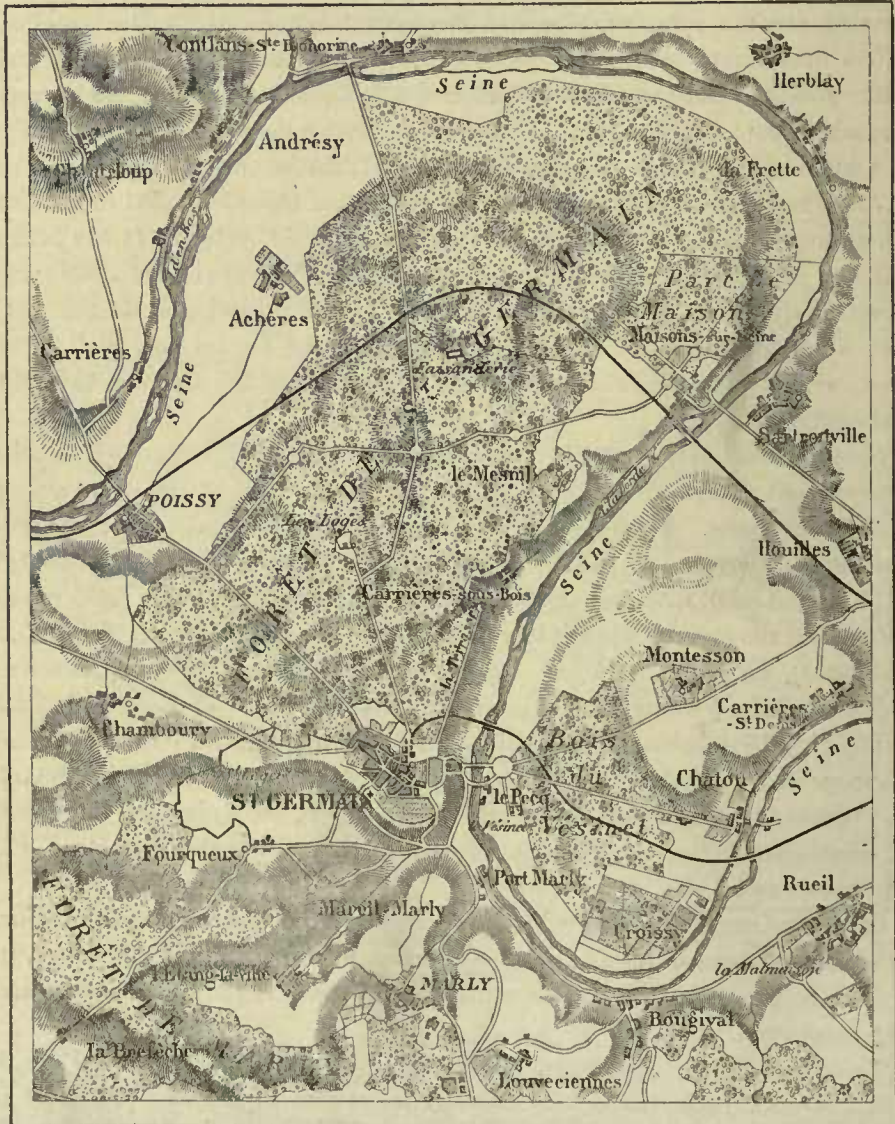
SEINE-ET-OISE, the centre, which is occupied by the department of the Seine, is in the main a dependency of Paris, and, except in the vicinity of the latter, it is very thinly populated. Its paper-mills and beet-root sugar manufactories are of some importance.

Versailles (49,552 inhabitants) is now the most sumptuous suburb of Paris, but when Louis XIV. selected its site for the construction of his vast palace, he had no idea that the two would ever be attached to each other by a chain of suburban villages. The recent selection of Versailles as the seat of Government has done much to accelerate this junction. The palace, which formerly was the residence of the King and his court, now accommodates the Senate and the Chamber of Deputies, and an almost interminable suite of its rooms is occupied by paintings designed to perpetuate the glories of France. Like its dependent mansions, the Great and Little Trianon, it has served as a pattern to nearly every sovereign throughout Europe,

but not one amongst them has succeeded in building an edifice or creating a park at all comparable with it. Versailles is associated generally with the old monarchy, but some of the revolutionary events also have taken place there. It was the birth-

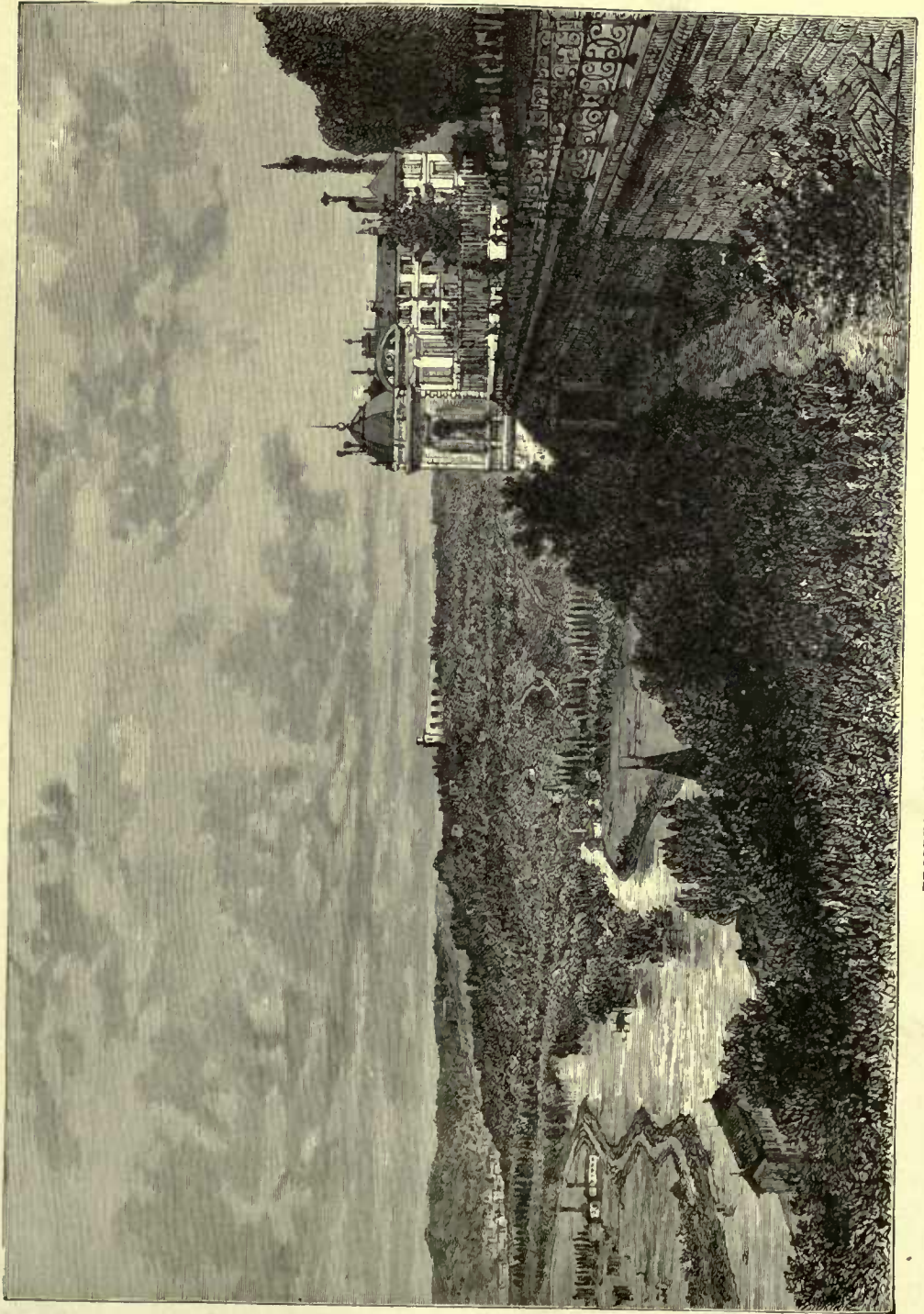
Fig. 228.—ST. GERMAIN-EN-LAYE.

Scale 1 : 110,000.



place of Hoche, Houdon, Berthier, and others. Louis XV., Louis XVI., and Louis XVIII. were born in the palace.

Many of the neighbouring towns and villages enjoy some reputation. *Sèvres* (6,512 inhabitants) is famous for its porcelain; *St. Cloud* (4,767 inhabitants) has a fine park and numerous villas; *St. Cyr* (2,870 inhabitants) is the seat of a



PROSPECT FROM THE TERRACE AT ST. GERMAIN.

military college; at *Grignon* is an agricultural school; *Ville-d'Aray*, *Bougival* (2,121 inhabitants), *Louveciennes* (1,946 inhabitants), and *Marly* are favourite summer resorts; *Rueil* (7,980 inhabitants), at the foot of Mont Valérien, is an important suburb of Paris, in which Richelieu had his château. Near it, below the hills of Marly, is the pumping station which supplies Versailles and its water works with the waters of the Seine.

St. Germain (16,978 inhabitants) occupies the summit of a hill, and from the terrace of its château may be enjoyed one of the finest views in the vicinity of Paris. James Stuart resided in this castle, Louis XIV. was born in it, and it now contains one of the most precious historical museums in the world. The pine forest of Ledia stretches north of the town; *Maisons-Laffitte* (2,824 inhabitants) has a famous castle built by Mansart; and *Poissy* (4,677 inhabitants), an old town, is often mentioned in history. Louis IX. was born there, and the curious bridge over the Seine was built by him. *Argenteuil* (7,934 inhabitants), another old town, is more especially noted for its early vegetables, its gypsum quarries, and its inferior wines.

The arrondissement of *Corbeil*, above Paris, is far less populous than that of Versailles. Its capital (6,187 inhabitants), at the confluence of the Seine and Essonne, has corn-mills, a printing office, and other industrial establishments, and at *Essonne* (3,669 inhabitants), above it, are the most important paper-mills of the department. Mediæval buildings abound in the vicinity, the most famous amongst them being the castle of *Montlhéry* (2,965 inhabitants), on the banks of the Orge. *Étampes* (7,399 inhabitants), on the Juine, in the rich corn district of the Beauce, has several curious old churches, one of them with a leaning tower. It was the birthplace of Geoffroy St. Hilaire.

Rambouillet (4,294 inhabitants) lies in a wooded country within the basin of the Eure. Francis I. was born there, and the old royal castle is deserving of notice. The first merino sheep introduced into France were taken to the farm attached to it. Most of the other towns of the arrondissement have old castles. At *Dourdan* (2,719 inhabitants), on the Orge, is the donjon of Philip Augustus; *Houdan* (1,976 inhabitants) has a picturesque old tower; *Montfort-l'Amaury* boasts of an old citadel, imposing even in its ruined condition; and near *Chevreuse*, in the delightful valley of the Yvette, we come upon the château of Dampierre, rich in art treasures. The abbey of Port-Royal-des-Champs was razed to the ground in 1710, as a place accursed, for Antoine Arnauld and other Jansenistes had composed their works within its walls.

Descending the Seine, we pass the small town of *Mantes-la-Jolie* (5,649 inhabitants), at the mouth of the Vaucouleurs, its pretty church being reflected in the water of the river. In its vicinity are the castle of *Rosny*, where Sully was born, and the sumptuous mansion of *Roche-Guyon*, with an old feudal castle partly carved out of the rock. To the north of these, on the Epte, stands the village of *St. Clair*, with an old Norman castle.

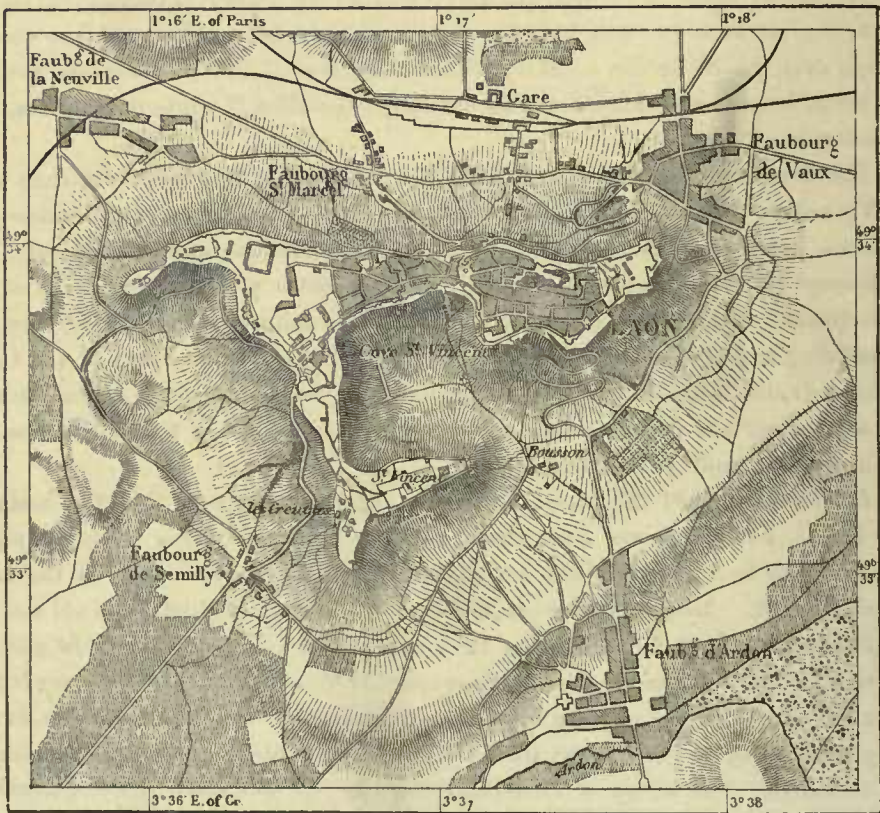
The arrondissement of Pontoise lies to the north of Paris. *Enghien* is much frequented for the sake of its sulphur springs, its lake, and its shaded walks.

Montmorency, which almost adjoins it, is famous for its cherry gardens. Châteaux and country seats abound in the neighbourhood, the most famous being that of *St. Leu-Taverny*, with the tombs of the last Condé and of Louis Bonaparte. *Pontoise* (6,301 inhabitants), on the Oise, is one of the great provision marts of Paris. The Estates met here in 1561, and Louis XIV. sought a refuge in the town during the troubles of the Fronde. On the opposite bank of the river is *St. Ouen-l'Aumône* (1,638 inhabitants), with the ruins of an old abbey; and farther east is *Méry-sur-Oise*, with the new Parisian necropolis.

AISNE lies almost completely within the basin of the Seine, being traversed by

Fig. 229.—LAON.

Scale 1 : 30,000.



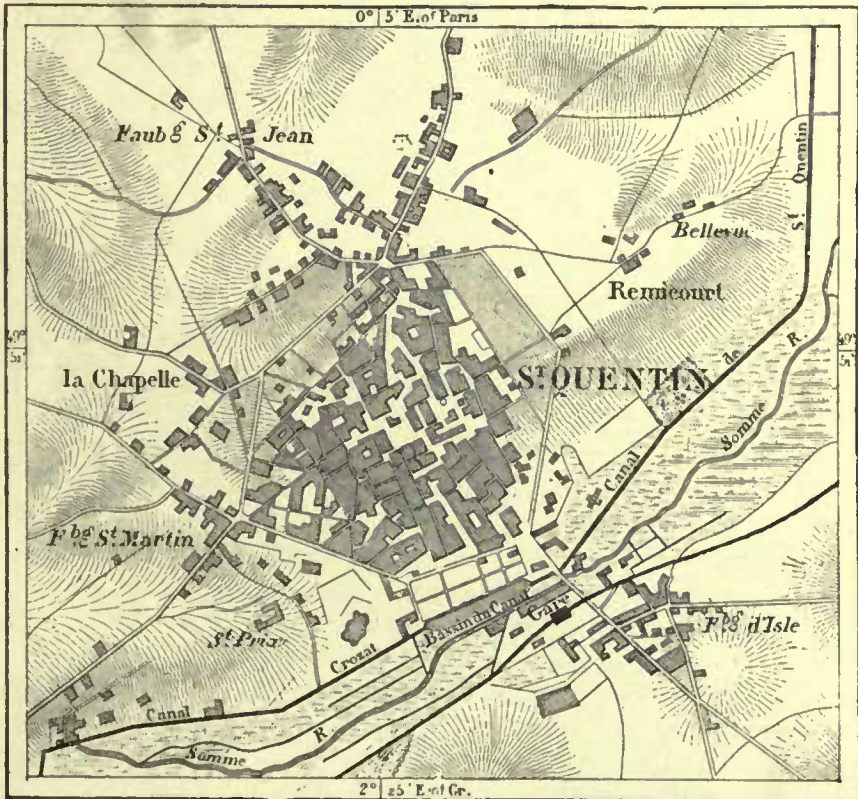
the rivers Marne and Oise, and is named after the Aisne, a tributary of the latter. The rivers Somme, Escaut (Scheldt), and Sambre rise within its limits, and in the north-east it borders upon Belgium. Anciently the department formed part of the provinces of Ile-de-France and Picardy. The naked plateau of Brie in the south, the wooded hills of Tardenois, the vicinity of Soissons, Valois, and the chalky country around Laon belonged to the former, whilst Vermandois and the hill country of Thiérache depended upon Picardy. Agriculture is in an advanced state. Hemp, flax, beet-roots, and rape seed are extensively cultivated, and the number of

sheep is very large. The glass works are amongst the most important in Europe, and there are also sugar refineries, cotton and woollen factories, and other industrial establishments.

Château-Thierry (5,713 inhabitants), on the Marne, is commanded by the ruins of a fine old castle. It was the birthplace of La Fontaine. *La Fère-en-Tardenois* (2,068 inhabitants), on the Ourcq, has become known through the large number of prehistoric remains discovered in the grave-hills in its vicinity. At *Port-aux-Perches* the Ourcq becomes navigable, and a railroad connects the place with

Fig. 230.—ST. QUENTIN.

Scale 1 : 30,000.



Villers-Cotterets (3,116 inhabitants), the birthplace of Alexandre Dumas, where Francis I. published, in 1539, an edict which made the use of French compulsory in all public documents. *Ferté-Milon*, a village lower down on the Ourcq, was the birthplace of Racine.

Soissons (10,754 inhabitants), the ancient Noviodunum, on the Aisne, no longer ranks as one of the foremost cities of France, but the Middle Ages have left it a fine Gothic cathedral and several other ecclesiastical buildings, and its gardens have lost none of their freshness.

Laon (12,036 inhabitants), the capital of the department, rivals Soissons in antiquity and population. Being on the high-road which connects Paris with the Meuse, the town has been besieged many times. It boasts of a Gothic cathedral, and of a museum rich in antiquities, many of them having been discovered in the old underground villages of the neighbourhood. Artichokes and cabbages are amongst the most important articles exported to Paris.

Hirson (4,285 inhabitants), on the Upper Oise, as well as *Vervins* (2,889 inha-

Fig. 231.—COMPIÈGNE.

Scale 1 : 180,000.

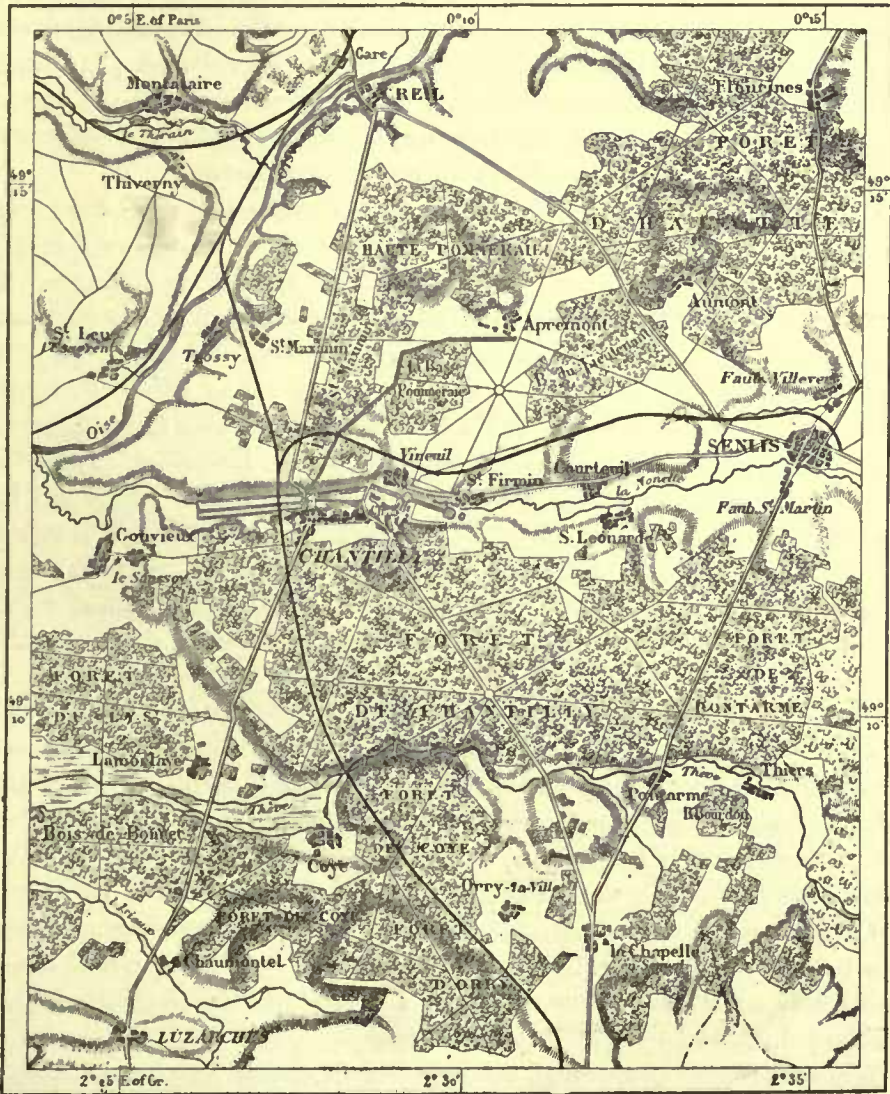


bitants) and other towns of Thiérache, engage much in basket-making. *St. Michel-Rocheport* (3,231 inhabitants), near the former, has forges and cotton-mills. *Guise* (6,242 inhabitants), lower down on the Oise, the native place of Camille Desmoulin and the seignorial seat of an illustrious family, has huge china and stove works, as well as other factories. Descending the river, we pass *La Fère* (4,896 inhabitants) and *Tergnier* (3,079 inhabitants), and reach *Chauny* (8,982 inhabitants), with its cotton and woollen mills, tan-yards, and other factories. A short railway conveys us thence to *St. Gobain* (1,957 inhabitants), famous on account of its glass works

ever since the thirteenth century. The country around is wooded. *Prémontré* is a small village to the east, with a famous old abbey, converted into a lunatic asylum. *Coucy*, another village, boasts of one of the finest feudal castles of the

Fig. 232.—CHANTILLY.

Scale 1 : 130,000.



Middle Ages. Another castle stood at *Quierzy*, on the Oise: it originally belonged to the lords of Héristal.

St. Quentin (37,980 inhabitants), on the Somme, is the capital of the department, a canal, much frequented by coal barges, connecting it with the Scheldt and the Oise. There are numerous cotton and woollen mills, machine shops, beet-root sugar refineries, and other industrial establishments. Among the public buildings a

Gothic town-hall and a collegiate church of the twelfth century are most deserving of notice. *Fresnoy-le-Grand* (3,849 inhabitants) and *Bohain* (5,975 inhabitants) are smaller towns in the neighbourhood, carrying on the same branches of industry.

OISE, like Aisne, has been formed out of portions of Ile-de-France and Picardy. The river Oise bisects it, the chalk region of Beauvaisis occupies the centre, whilst more recent tertiary formations predominate in the north. There still remain a few pine forests, but nearly the whole of the surface is cultivated. Industry is highly developed. In china, earthenware, and fire-proof bricks the department occupies the foremost rank; its iron mills and foundries are of great importance; and there are also cotton and woollen mills and sugar refineries.

Noyon (5,785 inhabitants), Noviomagus of the Romans, is the first town on the Oise, and one of the most ancient of France. Charlemagne was crowned in it; it was the birthplace of Calvin; and its cathedral is one of the finest in France. The old abbey of *Ourseamp*, below Noyon, has been converted into a factory of cotton velvets. *Compiègne* (12,923 inhabitants), below the mouth of the Aisne, is best known in connection with its forest, ever since the days of Clovis the hunting ground of the Kings of France. The existing château was built in the eighteenth century, and contains a valuable collection of Cambodian antiquities. *Pierrefonds*, at the eastern skirt of the forest, has mineral baths and a castle constructed by a Duke of Orleans. Still descending the Oise, we pass the old towns of *Verberie* and *Pont Ste. Maxence* (2,225 inhabitants), and reach *Creil* (5,438 inhabitants), one of the great railway junctions of France, and, together with the adjoining town of *Montataire* (4,864 inhabitants), the seat of iron works, machine shops, and china manufactories.

Of the places to the east of the Oise, *Senlis* (6,537 inhabitants), in the delightful valley of the Nonette, is the most important. The ruins of a Merovingian palace and an old cathedral point to better days. *Ermenonville*, with its tomb of J. J. Rousseau, is higher up in the valley, and *Chantilly* (3,476 inhabitants), the French Newmarket, is lower down. Much lace is made in the vicinity. *Crépy* (2,646 inhabitants), close to the eastern frontier, is the old capital of Valois.

Clermont (6,101 inhabitants), the capital of the centre arrondissement, has a large prison and a lunatic asylum. The town has some manufactories of hosiery, and so have a few other places near it, as *Liancourt*, *St. Just-en-Chaussée* (2,395 inhabitants), and *Breteil* (3,034 inhabitants).

Beauvais (16,591 inhabitants), the largest town on the Thérain, a famous old city, with an unfinished cathedral, a town-hall, and other curious buildings, has been known from the most remote times for its cloth, tapestry, earthenware, and fireproof bricks. Cloth and buttons are also manufactured in the towns below Beauvais, amongst which are *Noailles*, *Mouy* (3,118 inhabitants), and *Bury* (1,172 inhabitants), as also at *Méru* (3,517 inhabitants), to the south-east of it.

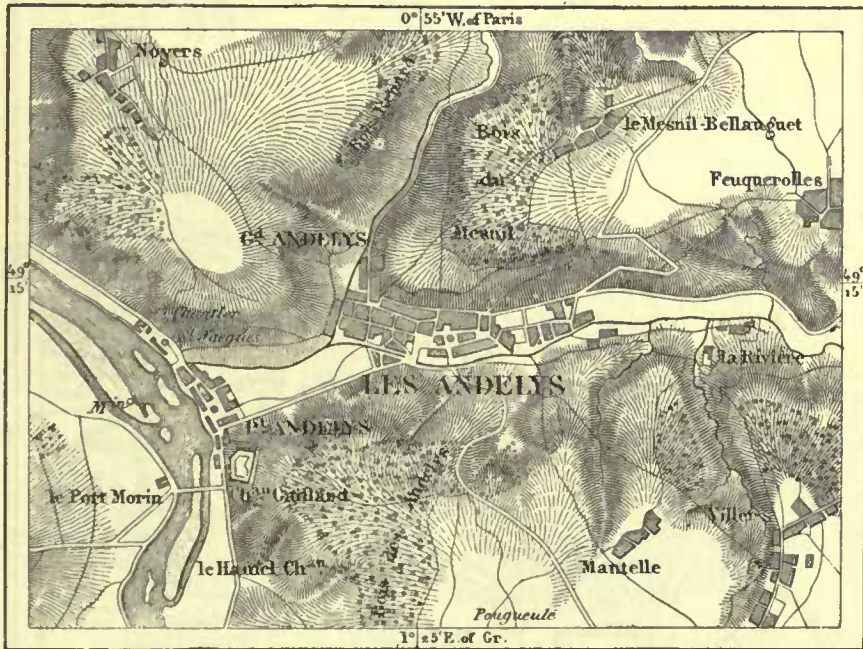
EURE is named after a river which enters the Seine within the limits of the department. Norman Vexin lies to the east. The plain of St. André occupies the south, the fertile plain of Neubourg adjoining it in the north. The

lowlands on the estuary of the Seine are known as Roumois. The fertile meadow lands of Lieuvin are in the west, beyond the Rille. Eure depends mainly upon agriculture and cattle-breeding, but there are also copper, brass, and zinc works, sugar refineries, cotton and woollen mills.

Vernon (6,384 inhabitants), *Gaillon* (3,126 inhabitants), and *Les Andelys* (3,257 inhabitants) are the only towns of note on the banks of the Seine. The first of these has quarries, vineyards (the last met with on the Seine), and a huge Government cloth factory. Gaillon exports much fruit to Paris and England, but is best known on account of the ruins of a fine castle, built in 1515 by Georges d'Amboise, the cardinal. Les Andelys consists of two towns, one on the river,

Fig. 233.—LES ANDELYS.

Scale 1 : 50,000.



the other a short distance inland. The latter has manufactories; the former is essentially a place of commerce, and the river there is commanded by Château Gaillard, erected by Richard Cœur de Lion. Blanchard, the first aeronaut who crossed the Channel, was a native of the town, and Nicolas Poussin was born in a neighbouring village.

The river Epte enters the Seine from the right, flowing through a delightful valley, the principal town within which is *Gisors* (3,590 inhabitants), with a famous old castle. Lower down the Seine is joined by the Andelle, which supplies motive power to numerous mills.

The first town reached on ascending the Eure is *Louviers* (10,097 inhabitants), a busy manufacturing place, producing cheap cloth and other woollen stuffs.

Évreux (11,453 inhabitants), on the Iton, a tributary of the Eure, the capital of the department, is noted for its cutlery and hardware. At *Breteuil*, higher up on the same river, are iron works and rolling-mills. The valley of the Avre, another tributary of the Eure, is the seat of a considerable industry. Its principal town is *Verneuil* (3,267 inhabitants). *Ivry-la-Bataille*, on the Eure itself, is noteworthy for the defeat inflicted upon the League by Henri IV. (1590).

The river Rille traverses the western portion of the department. *Rugles*, on its upper course, has manufactures of copper, brass, nails, and needles; whilst

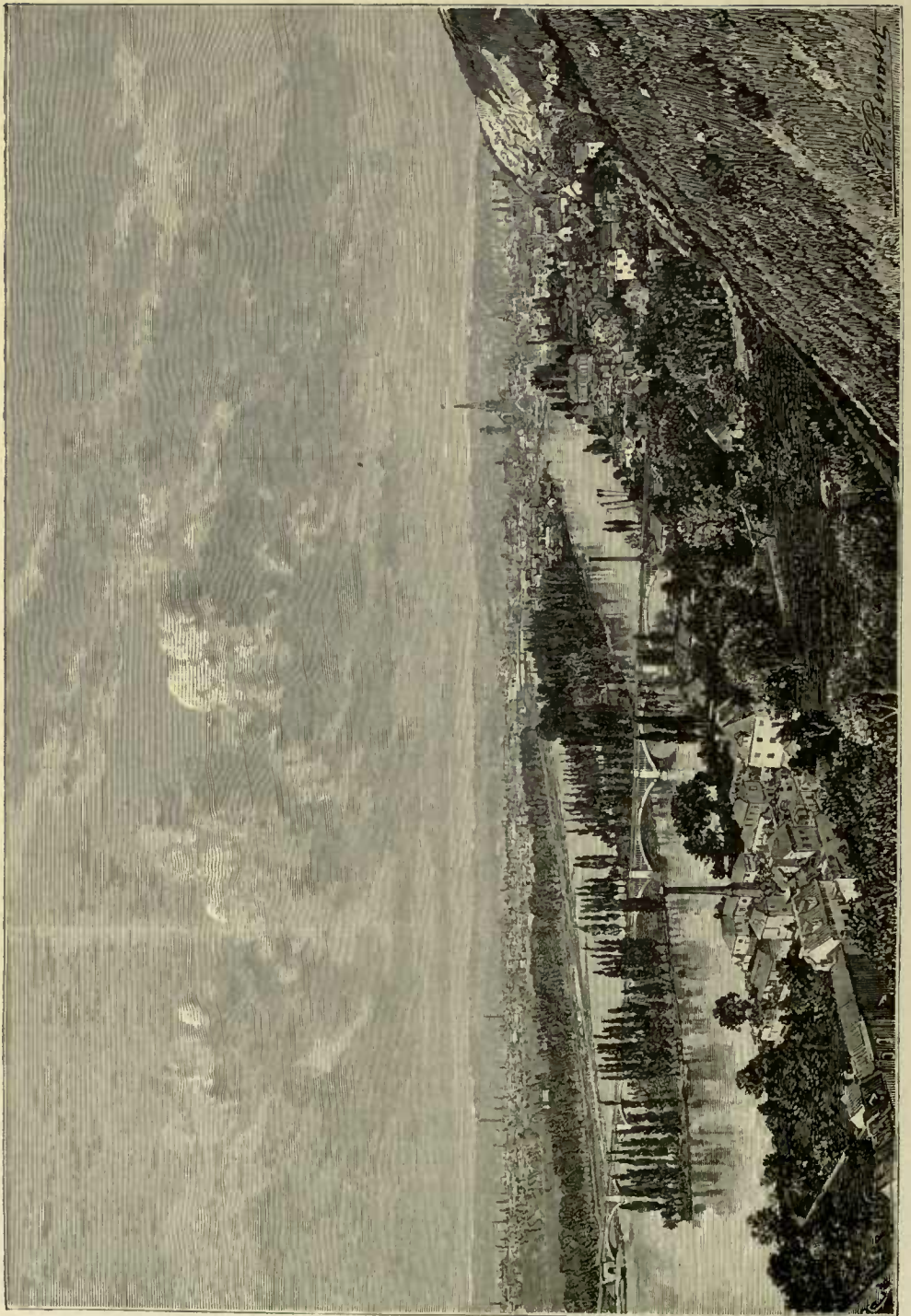
Fig. 234.—ROUEN AND ITS ENVIRONS.

Scale 1 : 320,000.



Bernay (6,087 inhabitants), in the side valley of the Charentonne, is noted for its cottons, woollens, ribbons, and linen. Its horse fairs are famous throughout Normandy, and in the vicinity are several castles of note, amongst which that of Broglie is the most remarkable. Still descending the river, we pass *Brienne* (3,229 inhabitants), a manufacturing town, and reach *Pont Audemer* (5,557 inhabitants), at the head of the tide, and the only seaport of the department, *Quillebauf*, on the estuary of the Seine, being merely a pilot station.

SEINE-INFÉRIEURE (Lower Seine) includes nearly the whole of the chalky plateau of Caux. The hilly district of Bray lies in the south-east. The depart-



ROUEN, AS SEEN FROM BON-SECOURS.

ment ranks high for its agriculture, its industry, and its commerce. Rouen and Elbeuf are great seats of the cotton and woollen industries, whilst Havre only yields to Marseilles in the extent of its commerce.

Elbeuf (38,343 inhabitants, including its suburbs) is the first town of the department on the Seine. Its woollen manufactories annually consume £2,000,000 worth of raw material, and, in addition to them, there are print works, machine shops, and other industrial establishments. There are no remarkable buildings, two churches with stained windows excepted, but the environs of the town are picturesque, the Seine being bounded by steep cliffs and extensive forests. Descending the river, we pass *Oiesel* (3,405 inhabitants), *St. Étienne-de-Roucray* (2,788 inhabitants), *Sotteville* (11,278 inhabitants), and the chemical works of St. Paul, above which rise the bold cliffs of Bon Secours, surmounted by an old church, and find ourselves within sight of Rouen.

Rouen (104,863 inhabitants), the old capitol of the Véliocasses, the Rotomagus

Fig. 235.—LE HAVRE.

Scale 1 : 100,000.



of the Romans, is most favourably situated near the mouth of a great navigable highway, which places it in communication with the sea as well as with the interior of the country. The city lies within a basin surrounded by steep hills, but two valleys facilitate communication with the plateau. Rouen is famous for its fine Gothic buildings. The cathedral is richly decorated, has beautifully stained windows, and is rich in ancient tombs, including that of Richard Cœur de Lion. Its spire rises to a height of 494 feet. The church of St. Ouen almost surpasses the cathedral in magnificence, whilst the church of St. Maclou is valued for its sculptured portal, one of the best works of the Renaissance, attributed to Jean Goujon. The courts of justice are one of the most finished examples of the Gothic architecture of the end of the fifteenth century. There are other buildings which almost convert Rouen into an architectural museum, such as the clock-tower of the old town-hall, the tower of Joan of Arc, and the Hôtel Bourgtheroulde. A valuable gallery of paintings and a library of 150,000 volumes are contained in

the town-hall, and the number of scientific societies and superior schools is considerable. Corneille, Boëeldieu, Fontenelle, and La Salle, the discoverer of the mouths of the Mississippi, were born in the town, and statues have been erected in memory of most of them, as well as in honour of Joan of Arc, who perished here at the stake.

Vessels drawing 16 feet of water can reach the quays, and Rouen carries on a lucrative commerce in spite of the competition of Havre, which guards the mouth of the river. As one of the great centres of cotton industry it is now without a rival in France. Its manufactures mainly produce simple and durable stuffs, and

Fig. 236.—THE CLIFFS OF ÉTRETAT.



in years of prosperity over a million spindles are at work at Rouen and the neighbouring towns of *Petit-Quevilly* (5,719 inhabitants), *Darnétal* (5,618 inhabitants), *Déville* (4,183 inhabitants), and others, and the cotton stuffs produced attain a value of nearly £4,000,000.

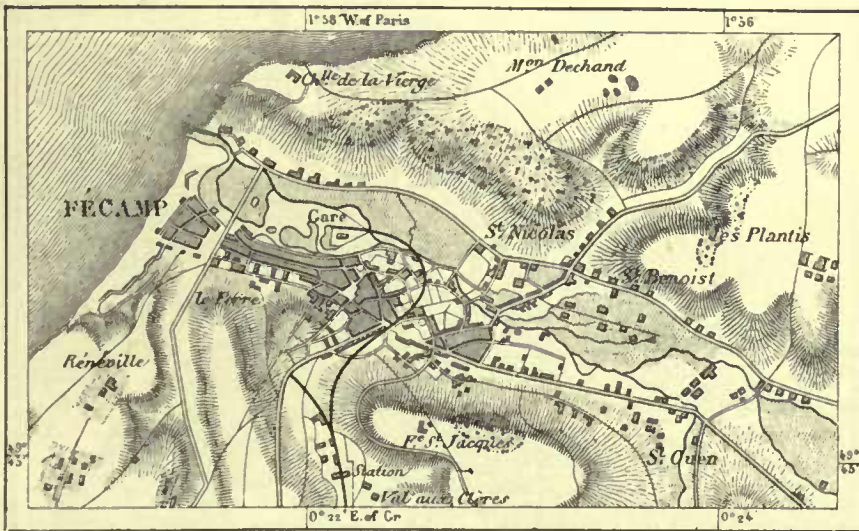
Following the windings of the river, the traveller skirts the cliffs of Canteleu and the Forest of Roumare, passes the small port of Duclair, and encompasses the peninsula of Jumiéges, with its fine old abbey. It was here the Normans landed on their first arrival in France. *Caudebec-en-Caux* (1,951 inhabitants), with its tall tower, the port of the old manufacturing town of *Yvetot* (7,636 inhabitants), whose seigneurs enjoyed the title of king, is left behind us. *Lillebonne* (4,570

inhabitants), the old capital of Caux, near the mouth of the river Bolbee, boasts of a few Roman ruins, but *Bolbec* (9,778 inhabitants), higher up in the valley, is now the leading town of the country. It is clean and well built, and its inhabitants are engaged in the manufacture of cottons.

We pass *Harfleur* (1,908 inhabitants), a decayed port, and the castle of *Tancarville*, built on a commanding cliff near the mouth of the Seine, and reach *Havre* (85,407 inhabitants), the great port of Western France. This town is of modern date, for it was founded by Francis I., as a successor to older towns higher up the river whose ports had become silted up. Havre has not only taken care to keep its navigable channels open, but has also constructed docks, and to the enterprise of its citizens it is indebted for the supremacy it holds as a maritime city. It is essentially a seat of commerce, and the only buildings of note are its town-hall and its museum—the latter with statues of Bernardin de St. Pierre and Casimir

Fig. 237. - FÉCAMP.

Scale 1 : 40,000.



Half a Mile.

Delavigne, the most famous children of the town. The docks and quays are on a vast scale. Le Havre principally imports cotton, coffee, copper, timber, wool, skins, corn, and coals. It exports silks, woollen stuffs, cottons, and "articles de Paris," and England is its chief customer. Lines of steamers connect it with Northern Europe, the Mediterranean, and America. The town no longer engages in the cod and whale fisheries, but the conveyance of German emigrants to America has recently proved a source of profit. There are ship-yards, machine shops, rope-walks, sugar refineries, a tobacco manufactory, and a few cotton-mills, besides which the town is much frequented by seaside visitors, a fine beach for bathing extending as far as Ste. Adresse and the lighthouses of La Hève.*

* In 1875 vessels of 1,377,150 tons burden entered in the foreign trade, and 140,750 tons in the coasting trade. The exports and imports were valued at £67,200,000.

Montirilliers (3,554 inhabitants) is the only place of any importance close to Havre. Along the coast, towns and villages occupy the mouth of each valley. Just beyond the bold cliffs of Antifer we reach *Étretat* (1,976 inhabitants), a delightful seaside village, "discovered" by the landscape painter Isabey. Then follow *Yport*, a small village of fishermen, and *Fécamp* (12,074 inhabitants), which extends for several miles up a narrow valley, and has many cotton-mills. Its port

Fig. 238.—DIEPPE.

Scale 1 : 17,000.



is accessible at all states of the tide to vessels drawing no more than 13 feet of water, and over a hundred vessels, employed in the Newfoundland, mackerel, and herring fisheries, belong to it.

Passing *St. Valery-en-Caux* (4,090 inhabitants) and a few small villages, we reach *Dieppe* (19,471 inhabitants), one of the great towns of the department, and, next to Havre and Rouen, its busiest seaport. During the Middle Ages the mariners of Dieppe were amongst the boldest rovers of the sea, and the town,

enriched by commerce, became very powerful. But civil wars and the silting up of the port, which no longer deserved its Norman name of Diep ("deep"), destroyed its prosperity. Recently the town has somewhat recovered. Docks have been constructed; steamers ply daily between the town and Newhaven; the fishery is of importance; and the carving of ivory, the manufacture of tobacco, and the entertainment of seaside visitors prove sources of wealth. The fishermen in the suburb of Le Pollet are supposed to be of foreign, perhaps Venetian, origin. A statue has been erected to Duquesne, the naval hero who defeated De Ruyter. An old castle commands the town, and a few miles inland may be seen the ruins of that of *Arques*.

Tréport, at the mouth of the Bresle, is a seaport of some importance. Higher up on the same river is *Eu* (4,169 inhabitants), an old Gallo-Roman city, with a castle built by Henri de Guise, and frequently inhabited by Louis Philippe.

Amongst noteworthy places in the eastern portion of the department are *Aumale* (Albemarle, 2,052 inhabitants), on the Upper Bresle; *Neufchâtel* (3,586 inhabitants), famous for its cheese, on the Béthune; *Forges-les-Eaux*, with ferruginous springs; and *Gournay* (3,056 inhabitants), on the Epte, a tributary of the Seine, which exports much butter.





CHAPTER XII.

NORTHERN FRANCE.

BASINS OF THE SOMME AND THE SCHELDT; PICARDY, ARTOIS, AND FLANDERS.



THE north-western corner of France, between the Channel and the German Ocean, is by no means of wide extent, but it is nevertheless one of the most important districts of the country. Nations, differing in language and customs, have repeatedly struggled for its possession; and the narrow strait, or *pas* (stride), which there separates France from the British Islands, has become one of the most frequented highways in Europe.

Geologically this region is interesting on account of the cretaceous and oolitic heights of Boulogne, which rise like an island in the midst of the tertiary plains of Artois and Flanders. These heights were joined at some former epoch to the Wealden of Kent, from which they are separated now by the Strait of Dover, or Pas de Calais. They abound in ores and coal, and have added much to the wealth of the country.

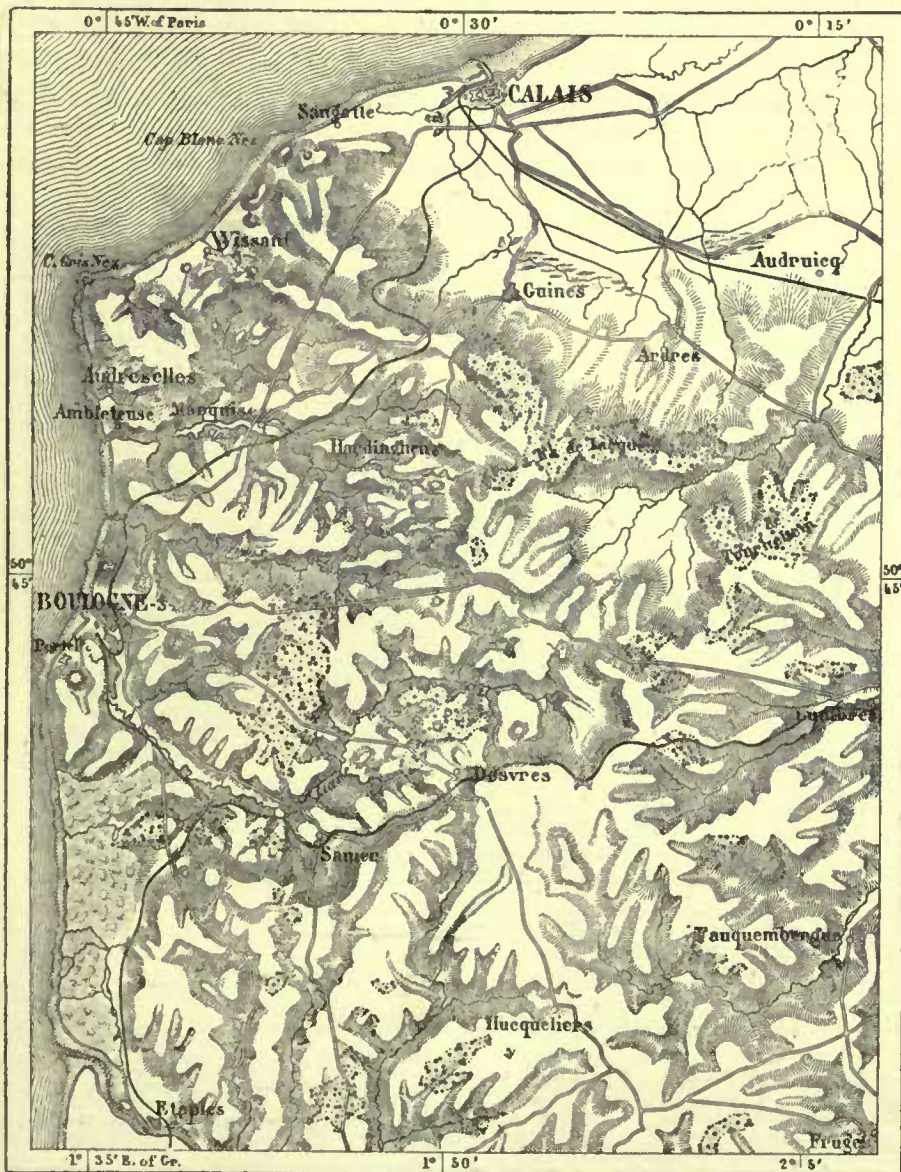
The heights of Boulogne divide the rivers of Northern France into two groups. Those on the southern slope, such as the Somme, the Authie, and the Canche, like those of Caux, take their parallel course to the ocean, whilst the rivers descending from the eastern slopes have more sinuous courses, and partly find their way into the Scheldt.

The Somme is the most considerable river of the country. It rises near St. Quentin, flows at first in the same direction as the Oise, from which it is separated by a narrow belt of country, hardly more than 6 miles across. Near Ham it turns to the north, and having been reinforced by the Avre above Amiens, it enters a deep and rectilinear channel cut into a low plateau. The valley of the Somme distinctly exhibits traces of ancient floods. The river formerly filled up the whole of the valley, carrying down with it immense quantities of sand and gravel. It was in one of these heaps of gravel that Boucher de Perthes discovered, in 1838, the stone implements which have revolutionised anthropological science. Much of the valley of the Somme consists now of bogs, and more turf is dug here than in all the remainder of France.

The tide ascends the river as far as Abbeville; and, by constructing embankments, the estuary of the river has been reduced to 27 square miles, and much of the land formerly invaded by the sea converted into pastures. The army of

Fig 239.—THE HILLS OF BOULOONE.

Scale 1 : 350,000.



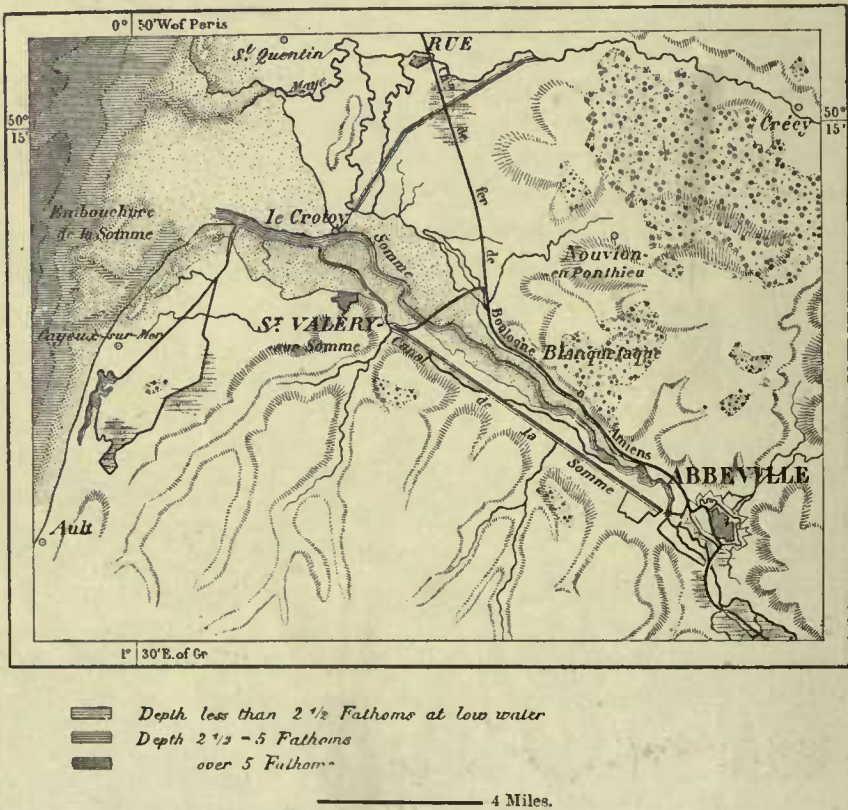
Edward III. crossed this estuary by the ford of Blanquetaque two days before the battle of Crécy (1346). Crotoy, near the mouth of the river, was used as a harbour up to the beginning of this century, but the engineers have "regulated" the river, and excavated a navigable canal which leads past St. Valery. The bay,

unfortunately, is silting up, in spite of all their efforts, and sea-going vessels are able to reach St. Valery only on ten or twelve days every month.

The coast in this neighbourhood has certainly undergone many changes during historical times. The swamp or lagoon of the Hable, to the south of the Somme, is clearly an old mouth of that river, the neck of land which now separates it from the sea having anciently been a bar closing its mouth. The whole of the shore region, from the bay of the Somme to that of the Canche, and inland as far as the hills of Artois, is of recent formation. Rue, formerly a seaport, now lies 6 miles inland, and the old port of St. Quentin (Grand-Gouffre) is dry land.

Fig. 240.—THE ESTUARY OF THE SOMME.

Scale 1 : 300,000.



The peasants of Picardy, in imitation of their neighbours, the Flemings, have won much land from the sea. They have constructed dykes and drainage works, and planted the dunes with reeds.

Cape Gris-Nez, which separates the German Ocean from the British Channel, occupies an important position with reference to the geological changes going on along the coast. On either side of the cape the ocean currents deposit large quantities of silt, and the land gains upon the sea, whilst farther away from it, along the coast of Caux and in Holland, the sea encroaches upon the land. An upheaval or subsidence of the land has something to do with these changes. To

the west and south of a line passing through Nieupoort the land slowly rises, whilst in the east it subsides. At the same time it should be remembered that the land may subside without the sea encroaching upon it, as long as the alluvium deposited by ocean currents along the coast is of considerable amount. Such happens to be the case along the coast of Dunkirk. M. Gaspard has discovered there a layer of turf containing prehistoric remains at a depth of 10 feet beneath the marine sands. The land consequently must have subsided there since the formation of these ancient turf beds. The researches of M. Day at Sangatte and Wissant, near Cape Gris-Nez, prove that a similar subsidence has taken place to the west of Calais. He has discovered there a submerged forest, with bones of the aurochs and fresh-water shells, which clearly demonstrate this fact. At an epoch

Fig. 241.—THE ANCIENT GULF OF FLANDERS.

Scale 1 : 700,000.



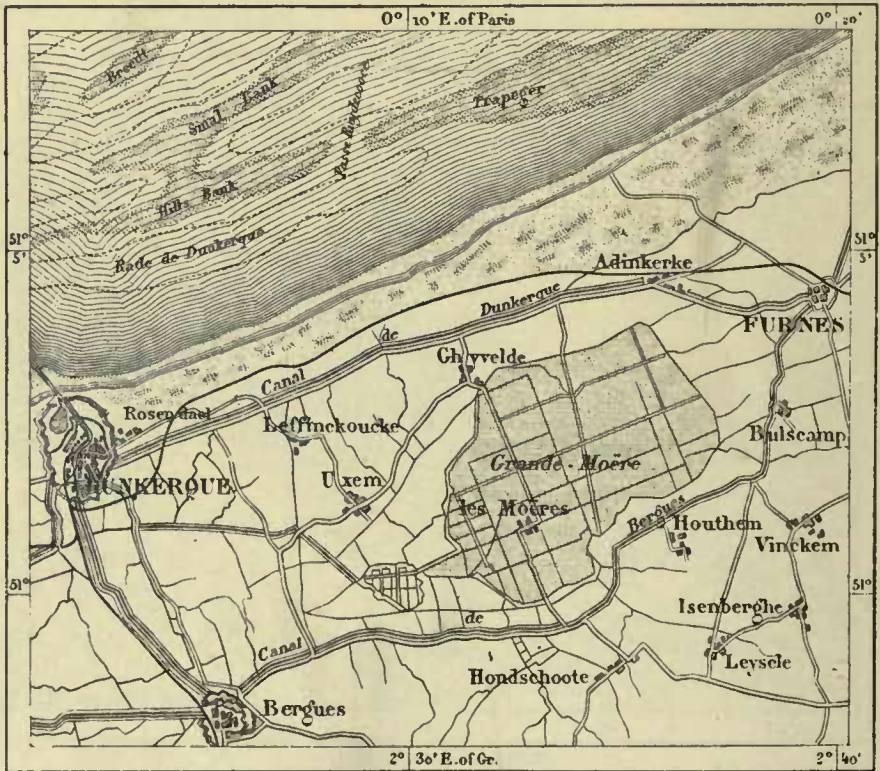
still more remote an upheaval appears to have taken place, for beneath the dunes traces of old sea beaches have been discovered far beyond the reach of the actual tides.

However this may be, during the last thousand years the long-shore men of Artois and French Flanders have enjoyed a period of conquest in their struggle with the sea. In the time of the Romans the lowlands lying to the north-east of the hills of Artois along the Belgian frontier were covered by the sea. As lately as the ninth and tenth centuries the sea extended as far as St. Omer. Even now the alluvial fields around that town are beneath the level reached by the spring tides, and a few deep ponds, fringed with willows, still mark the greatest depressions of this ancient gulf. The promontories which rose on the western shore of this

gulf still retain the names they received from Norman mariners, such as Mark Ness, Boker Ness, and Long Ness, and here and there may be recognised ancient islands rising above the general level of the polders which environ them. In the Middle Ages the towns of Calais, Gravelines, Dunkirk, Nieuport, and Ostend occupied a line of dunes, which separated this ancient Gulf of Flanders from the open sea. The alluvium brought down by the Aa and its tributaries gradually converted the lagoon sheltered by these dunes into a swamp; and a swamp it would have remained to the present day had it not been for the labour of man.

Fig. 242.—THE MOËRES OF DUNKIRK.

Scale 1 : 200,000.



..... 5 Fathom Line

————— 2 Miles.

As early as the seventh century the first embankments were thrown up around the islands of the ancient gulf. The islands became attached to the mainland, canals were added to canals, until they intersected the whole of the country. These drainage works, which rival those accomplished by the Hollanders and Frieslanders, are locally known as *wateringues*.

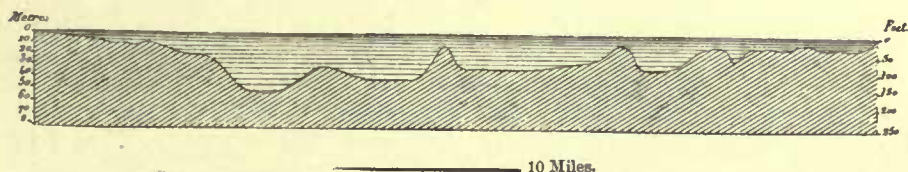
In time of war the sluices were frequently opened to inundate the country surrounding the fortresses along the coast of Flanders, and it requires years of labour to repair the injury thus done. Sometimes, when the rains are exceptionally heavy, the lowlands to the north of St. Omer are covered with water to a

depth of 3 feet. When this happens the water has to be drawn off at the ports, and this produces so swift a current in the canals as to interrupt navigation for three or four months at a time. On the other hand, in years of drought the small canals, or *watgands*, dry up, or become converted into fever-breeding, stagnant pools. This likewise leads to an interruption of navigation, for the sluices must be kept closed along the rivers, in order to store up water for refilling the canals. Wells sunk near the coast have been observed to rise and fall with the tides.

The Aa is the principal river of this region, and its channel is altogether an artificial creation. Since the middle of the eighteenth century the river enters the sea at Gravelines, but before that time its mouth was 3 miles to the east of that town, and earlier still, up to 1170, it was a couple of miles to the west of it. The old port of Mardyck was a creation of man, as is that of Dunkirk. The labour involved in converting the whole of this region into productive land has been immense, and would never have been accomplished had not the proprietors of the wateringues been permitted to band together for the common management of their estates. In 1793 the dykes were cut, as a measure of defence, and all that portion of the arrondissement of Dunkirk lying below the level of the sea was

Fig. 243.—SECTION OF THE STRAIT OF DOVER BETWEEN DUNKIRK AND BROADSTAIRS.

Scale 1 : 650,000.



inundated. The "Moères" became lagoons, but the inhabitants, not being impeded by official interference, very soon succeeded in recovering the ground they had lost. In works of this kind care must be taken to prevent the mingling of fresh and brackish water, which inevitably results in murderous fevers.

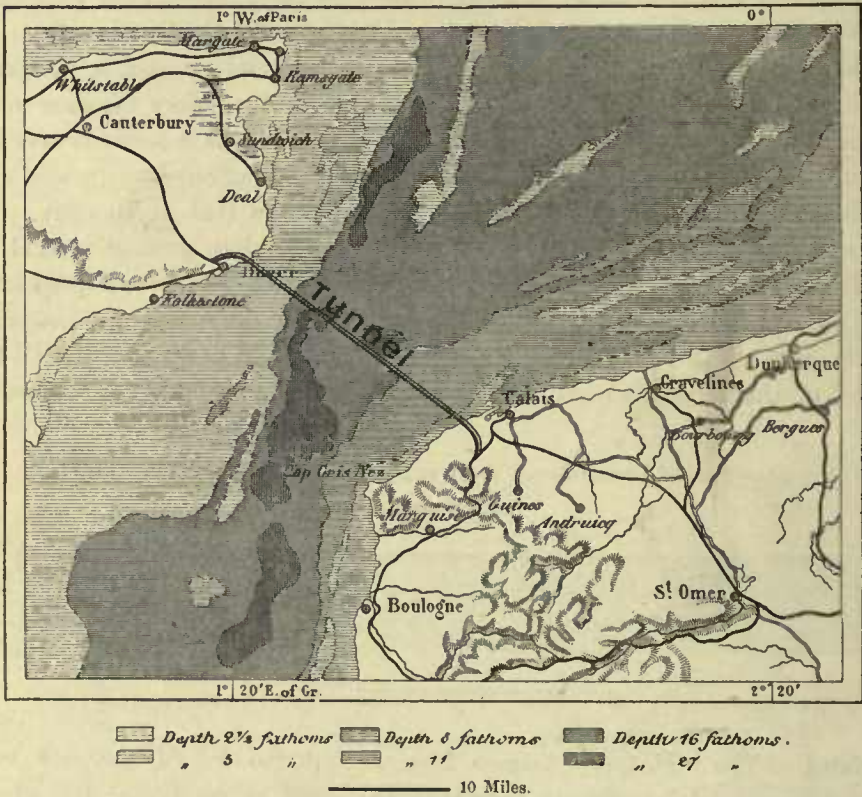
The shelving beach of sand which bounds the whole of this coast has undergone but few changes since 1776. At the mouths of the harbours it has certainly increased in width towards the west, for the sediment brought down by the rivers is carried in that direction by the ebb. Nor do the sand-banks lying parallel with the coast appear to have changed much in the course of a century. They are numerous, and form a veritable labyrinth, all the more dangerous to the navigator, as the course to be taken varies according to tide and wind. These banks are undoubtedly due to the set of the currents, which is generally towards the German Ocean. In the Strait of Dover the tide sets towards the east, and westerly winds predominate. The matter held in suspension is thus carried towards the north, and deposited for the most part along the coast of Flanders. The depth of the sea has decreased 3 to 6 feet since the commencement of this century, but well-sheltered roadsteads extend along both the English and the French coasts. That of the Downs, on the English coast, is protected by the Goodwin Sands; that of

Dunkirk, on the French coast, lies within a chain of sand-banks fringing the coast of Flanders.

The centre of the Strait of Dover, between Gris-Nez and the South Foreland,

Fig. 244.—THE STRAIT OF DOVER AND THE PROPOSED TUNNEL.

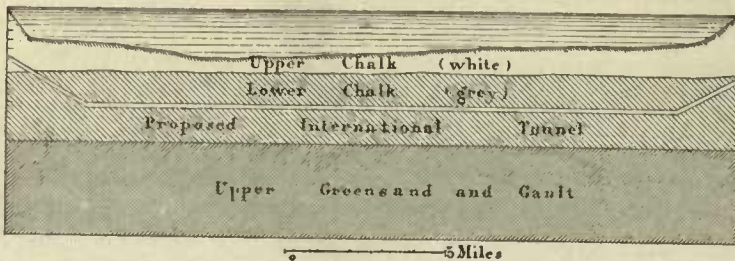
Scale 1 : 1,000,000.



is almost free from obstacles. The greatest depth does not exceed 177 feet. To the west of this line lie the Varne and Colbart banks, and the engineer who first

Fig. 245.—SECTION OF THE PROPOSED TUNNEL.

Scale 1 : 375,000.

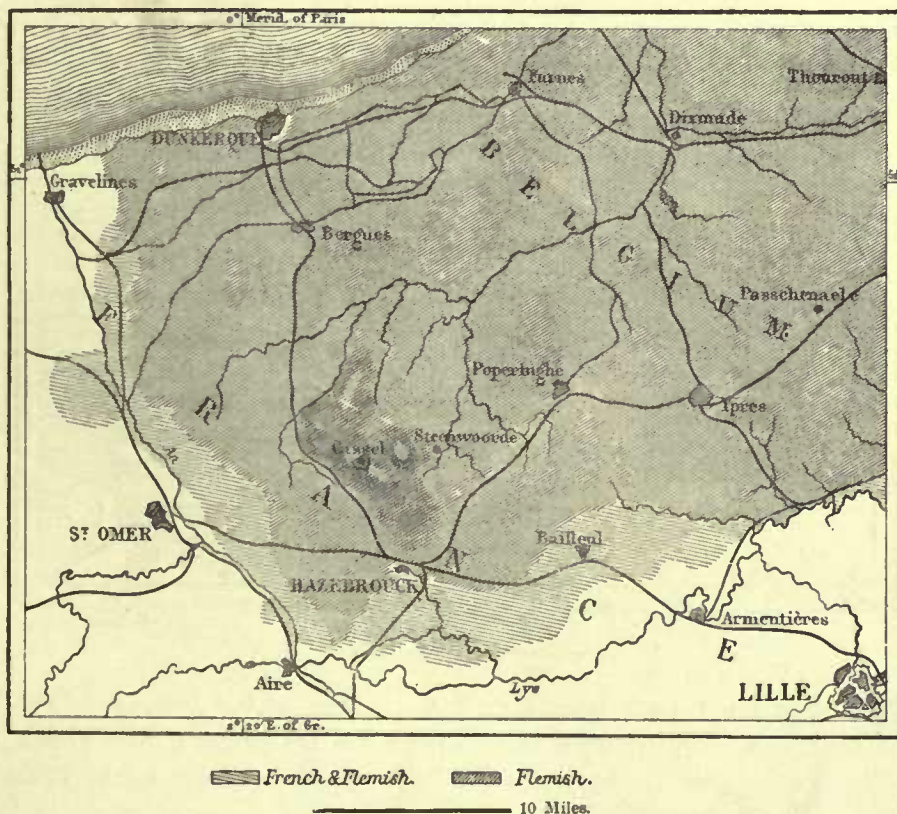


proposed to connect England and France by a submarine railway intended to utilise the former of these for the construction of an international city and a harbour of refuge.

No less than 200,000 vessels pass the Strait of Dover annually, and when the weather is clear it is sometimes difficult to count the sails within view. The width of this strait not exceeding 20 miles, it is but natural that propositions should have been made to bridge it. In 1802 M. Mathieu proposed to construct a submarine tunnel, but was laughed at. In 1838 M. Thomé de Gamond carefully studied the locality, and arrived at the conclusion that a tunnel might be constructed. Others suggested a huge bridge; others, again, gigantic ferry-boats, capable of conveying entire railway trains. In 1868 the English and French

Fig. 246.—EXTENT OF FRENCH AND FLEMISH.

Scale 1 : 185,000.



Governments took up the question, and since 1875 some progress has been made in the great work. The tunnel will pass through the impermeable lower chalk, at a depth of 414 feet below the level of the sea.

Except its seaboard, the densely populated region now under review has no well-defined natural boundaries. From the line of water-parting separating the Somme, the Scheldt, and the Oise, the country slopes insensibly almost in every direction. We can cross the frontier from Belgium into France without noticing it, and the only obstacles met with by an invading army consist of rivers and canals, with fringes of large trees, which sometimes impart some beauty to this

monotonous country. A triple line of fortresses defends the frontiers of France, and the inhabitants of this ethnological border-land have at all times been remarkable for their warlike spirit. The Nervians, who opposed Cæsar, and the Flemings of the Middle Ages, were renowned for their bravery. The Picardians, who live to the south of the Flemings, are equally brave, and in some measure they combine the solid qualities of the north with the quickness of the south. Nowhere does the political boundary agree with the ethnological one. Near the coast, the Flemings, or *flamingants*, occupy both sides of the boundary, whilst farther east French is spoken in Belgium as well as in France. The Flemish language has lost ground since Artois, Picardy, and a portion of Flanders have become a part of France. It was spoken formerly as far as the gates of Abbeville and Amiens. In the seventeenth century its use was common to the north of a line drawn from Boulogne to St. Omer. The country between Lille, Valenciennes, and Cambrai

Fig. 247.—THE COAL BASIN OF NORTHERN FRANCE.

Scale 1 : 700,000.



did not adopt the French language till the middle of last century. Even in those districts where Flemish is spoken, the towns are bilingual, and French is rapidly gaining ground. Only about 150,000 persons actually speak Flemish still.

The population in Northern France is very dense, but the resources of the country are considerable. The soil, in many instances of very inferior quality, is most carefully tilled, and Montesquieu's remark, that the fecundity of a country depends less upon the natural fertility of the soil than upon the civil liberty enjoyed by its inhabitants, is fully borne out by what may be seen in the vicinity of Lille. The soil there is naturally sterile, but the inhabitants having formerly been exempted from the payment of indirect taxes and statute labour, were able to devote the whole of their resources to the improvement of the land. The agriculture of Picardy and Flanders ranks high, and excepting in the densely populated department of the Nord, the produce not only suffices for local wants, but also supplies

considerable quantities for exportation to other parts of France and to England. Calais, Boulogne, and Gravelines export much agricultural produce, the peasants themselves frequently freighting the ships with eggs, fowls, and cheese, and maintaining regular agencies in London, Rotterdam, and Antwerp.

For centuries the country has been pre-eminent for its manufactures, and the

Fig. 248.—PÉRONNE-SUR-SOMME.



almost inexhaustible beds of coal will secure it that pre-eminence for centuries to come. Coal was first discovered in 1717 at Fresnes, close to Valenciennes, and since then an exact geological exploration of the entire basin has been made.

TOPOGRAPHY.

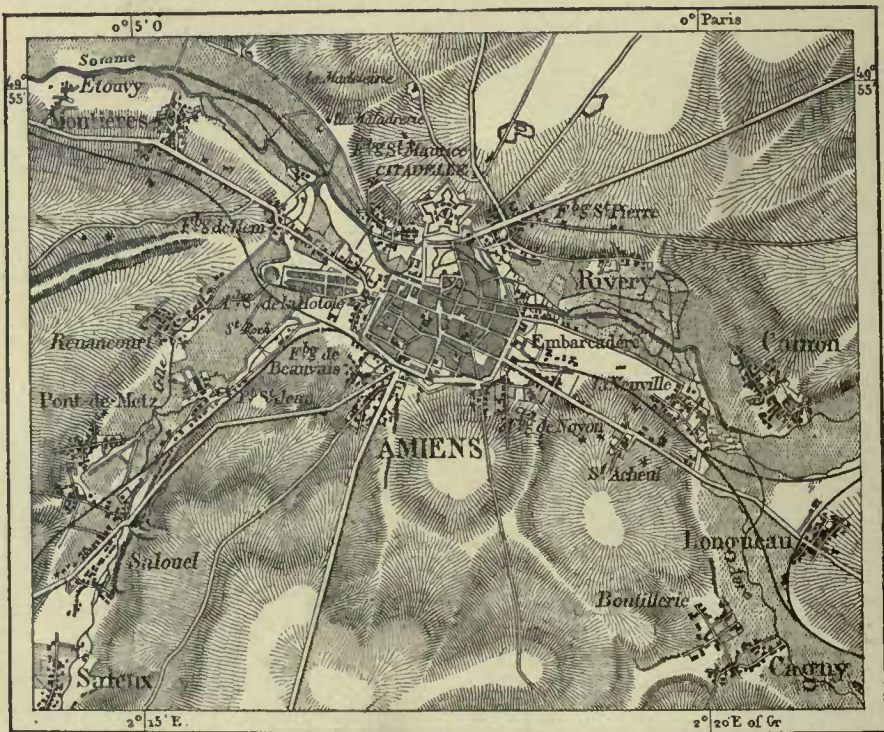
SOMME is named after the river which traverses the entire department, and enters the Channel below Abbeville. The soil is carefully cultivated by peasant

proprietors; the breeding of horses, cattle, and sheep is carried on in the west; and nowhere else are the poultry-yards so carefully attended to. There is no coal, but much turf is cut (1,420,000 tons in 1873). The manufactures include woollen and cotton stuff, linen, hosiery, and beet sugar.

The Somme, on entering the department, flows past *Ham* (3,122 inhabitants), known for its castle, frequently used as a prison of state. It then flows north, in the direction of *Péronne* (4,210 inhabitants), one of the most famous fortresses of France. At the village of *Tertry*, close by, Pépin of Héristal won the battle which secured to him the dominion over Austra-ia (687). At the old abbatial

Fig. 249.—AMIENS.

Scale 1 : 80,000.



town of *Corbie* (3,977 inhabitants) the Somme is joined by the river Ancre, on which stands the small manufacturing town of *Albert* (4,414 inhabitants).

The district of *Santerre* lies to the south of the Somme, its capital being *Montdidier* (4,266 inhabitants), a dismantled fortress. This town, as well as the others in the same district, such as *Roye* (3,810 inhabitants), *Rosières* (2,437 inhabitants), and *Villers-Bretonneux* (5,356 inhabitants), engages in the manufacture of hosiery. The tenure of the land is still the same as in the Middle Ages, and no farm can be sold without the consent of the tenant.

Amiens (61,606 inhabitants), at the confluence of the Arve with the Somme, the ancient capital of the Ambiani and the Roman Samarobriua, is a town of con-

siderable importance. Its cathedral is one of the most sumptuous edifices of the thirteenth century, and by the side of it all other buildings of the town shrink into

Fig. 250.—THE CATHEDRAL OF AMIENS.



insignificance. There are a museum, a library, and a botanical garden. The old walls have been converted into public walks, but the citadel is still maintained in

an efficient condition. The manufactures include linens, woollens, cottons, silks, and velvets, and there are iron foundries, machine shops, and chemical works. The market gardens around the town are most productive, and supply even England with vegetables.

The Somme, below Amiens, has been converted into a navigable river. Passing *Piequigny* and *Longpré*, in the midst of turf pits, we reach *Abbeville* (19,328 inhabitants), a great commercial port during the Middle Ages, but now, owing to the silting up of the estuary of the Somme, of little note. There are a fine Gothic church and the anthropological museum of M. Boucher de Perthes. The manufacturing industry produces carpets, linen, iron castings; and there are rope-walks and boat-yards. A viaduct, 4,484 feet in length, crosses the estuary of the Somme, and connects *St. Valery-sur-Somme* (3,406 inhabitants) with the railway system of France. William the Conqueror put in at St. Valery before he crossed over to England, but the harbour is hardly accessible now. Fishing-boats generally start from *Crotoy*, opposite, or from the village of *Cayeux* (2,480 inhabitants), on the open sea. The villages of the district of Vimeu, which extends to the south as far as Tréport, are much frequented for sea-bathing.

The river Maye, which enters the sea to the north of the Somme, flows through the forest of *Crécy*, where the windmill which sheltered Edward I. during the famous battle is still pointed out. Lower down on that river is *Rue*, a small town.

The river Authie bounds the department on the north. On it is *Doullens* (3,886 inhabitants), with an old citadel converted into a convict prison for women.

PAS-DE-CALAIS is named after the strait which separates France from England, and is known to us as the Strait of Dover. The department includes the greater portion of the old province of Artois, and, excepting the hilly tract near Boulogne, it consists of monotonous plains of great fertility, traversed by tributaries of the Scheldt, and by the Aa, the Authie, and the Canche, which flow into the Channel. The agricultural produce more than suffices for local consumption, and calves, sheep, poultry, eggs, corn, and vegetables are exported. The discovery of coal (annual yield 3,000,000 tons) has led to the establishment of numerous factories; and there are iron works, sugar refineries, cotton, woollen, and paper mills, copper works, and machine shops. The fisheries, likewise, are very productive.

There are no towns on the river Authie, but *Bercq-sur-Mer* (4,107 inhabitants), behind the dunes to the north of the estuary of that river, is a place of some importance, with a sea-bathing establishment for 500 scrofulous children, maintained by the city of Paris.

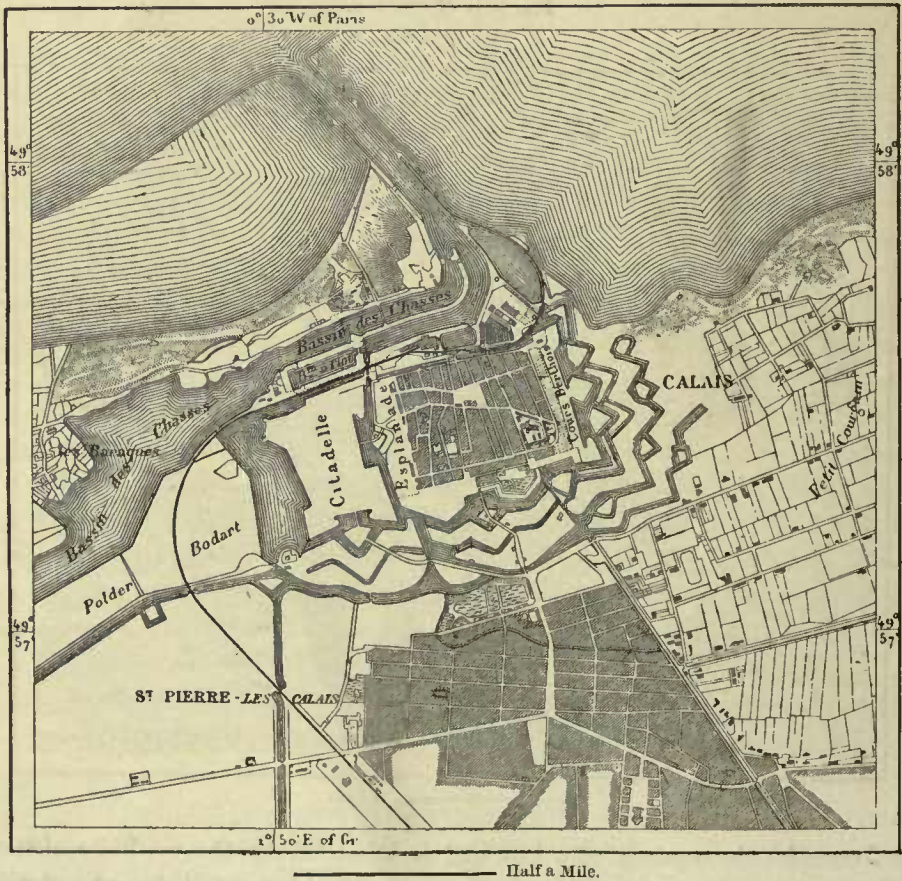
The valley of the Canche is densely peopled. *Frévent* (3,792 inhabitants), near the source of that river, has iron works. *Hesdin* (3,083 inhabitants) was fortified formerly; and *Azincourt*, where the French were defeated in 1415, is a few miles to the north of it. *St. Pol* (3,872 inhabitants) lies in a side valley of Canche. Still descending the latter, we pass *Montreuil* (3,474 inhabitants), an old member of the Hanseatic League, and reach *Étaples* (2,948 inhabitants), near the mouth of the river, the small port of which is occasionally visited by coasting vessels.

On the road from Boulogne to Calais we pass a column erected to celebrate Napoleon's proposed invasion of England; *Marquise* (3,923 inhabitants), with iron works and marble quarries; *Ambleteuse*, where James I. disembarked in 1688; and *Audresselles*, where an English company proposed to construct a large port.

Calais (34,922 inhabitants), the rival of Boulogne, consists of a fortified town and of the industrial suburb of *St. Pierre-lès-Calais*. The town for more than two centuries (1346—1558) was held by the English, but the bulk of the inhabitants are Flemish, and the public buildings remind us of Flanders. *St. Pierre*

Fig. 252.—CALAIS.

Scale 1 : 30,000.



manufactures more especially cotton and silk tulle, a branch of industry introduced in 1819 by English capitalists, and still partly directed by English workmen. There are likewise linen-mills, steam saw-mills, and other establishments. The exports to England consist mainly of Parisian articles, horses, vegetables, eggs, poultry, and a variety of manufactures. The harbour of the town is quite inadequate, and contrasts very unfavourably with that of Dover, on the opposite side of the Channel, which is here annually crossed by more than 200,000 travellers. *Guines* (3,644 inhabitants), 5 miles to the south of Calais, has bleaching grounds,

and a pyramid near it marks the spot where Blanchard and Jefferies alighted on January 7th, 1785, after having crossed the Channel in a balloon. On going from Guines to *Ardres* (1,195 inhabitants), we pass, near Balingham, the Field of the Cloth of Gold, where Henry VIII. and Francis I. met in 1520.

St. Omer (21,404 inhabitants), on the river Aa, has a mediæval church, the ruins of an abbey, and manufactures tulle, muslin, common cloth, and pipes of every kind. *Arques* (3,701 inhabitants) is almost a suburb of St. Omer. *Théroutanne*, on the Lys, is a poor village now, but it was an important town until Charles V. destroyed it in 1554. Near it, at Enguinegatte (*Guingatte*), was fought the famous Battle of the Spurs (1513). At *Aire* (5,058 inhabitants) the Lys becomes navigable. All the towns in the neighbourhood are centres of industry. *Béthune* (9,315 inhabitants) has sugar refineries; *Lens* (9,383 inhabitants), *Neux* (4,219 inhabitants), and *Hénin-Liétard* (5,491 inhabitants), have coal mines; whilst *Lillers* (4,701 inhabitants) is famous for its boots. The first artesian well was bored near it, and its yield has never diminished.

Arras (26,764 inhabitants), the old capital of Artois, on the Scarpe, a tributary of the Scheldt, does not yield to Calais or Boulogne in historical interest. It was famous during the dominion of the Romans for its industry, but the tapestry which once was produced there is found now only in museums. The most noteworthy building is a town-hall of the sixteenth century, with a fine belfry. The abbey of St. Waast, a structure of the eighteenth century, has been converted into a museum. The manufactures include beet sugar, soap, earthenware, and lace. The town is strongly fortified, and its fortifications occupy more space than do its houses. It was the birthplace of Robespierre. *Bapaume* (3,190 inhabitants), to the south of Arras, is a small fortress of little note.

NORD ("north") is the name of the most northern department of France, and includes portions of the ancient provinces of Cambrésis and Hainaut. The river Lys bisects it where it is narrowest. The south is hilly and partly wooded. The centre, intersected by tributaries of the Scheldt, consists of an undulating plain, whilst the maritime portion presents itself as a dead flat, above which rise a few isolated hillocks. Agriculture, industry, and commerce flourish. Cereals, beet-root, oil-yielding plants, flax, tobacco, hops, and vegetables are cultivated. The coal mines yield 3,500,000 tons a year. Industry is highly developed. The textile industries of Valenciennes and Cambrai employ 2,807,600 spindles, 25,810 power-looms, and 85,848 hand-looms. In 1873 were produced 200,000 tons of beet sugar; 353,600 tons of cast iron, steel, and hardware; 32,000 tons of zinc; 81,750 tons of earthenware and glass; 22,500 tons of soap; and 36,600 tons of soda. The population has more than doubled since the beginning of the century.

Avesnes (4,636 inhabitants), the capital of the eastern arrondissement, a portion of the old province of Hainaut, is only a small town, with picturesque fortifications; but *Fourmies* (8,151 inhabitants), to the south of it, has grown into a considerable town, where the first glass works of Northern France were established in 1599. *Laudrecies* (3,693 inhabitants) and *Maubeuge* (5,110 inhabitants) are the principal towns on the Sambre. They are both fortified. At Maubeuge and the neigh-

bouring town of *Hautmont* (5,180 inhabitants) are numerous iron foundries and rifle factories. The villages of *Malplaquet* and *Wattignies*, both famous in the annals of battles, are near. *Feignies* and *Jeumont* (2,190 inhabitants) are customs stations on the Belgian frontier. *Bavai*, the ancient *Bavacum*, capital of the *Nervians*, to the west, was an important Roman station formerly, but is now merely a village.

Cambrai (16,969 inhabitants), like *Bavai*, has suffered much during every war, but has always risen from its ruins, and fought stoutly, too, for its municipal liberties. Several treaties were signed in the old capital of *Cambrésis*. The

Fig. 253.—VALENCIENNES.

Scale 1 : 50,000.

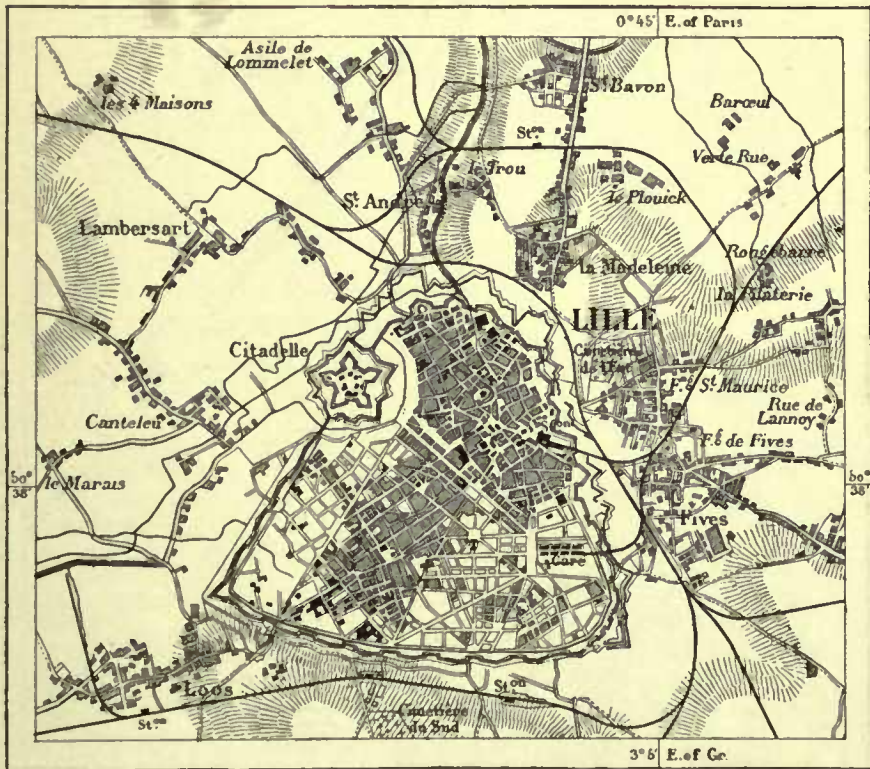


principal buildings are a town-hall and a cathedral. A monument has been erected in honour of *Baptiste*, the inventor of a species of cambric known as *batiste*. The principal articles manufactured are cambrics, tulle, and cotton lace. *Candry* (4,548 inhabitants), *Quiéry* (3,467 inhabitants), and *Caleau-Cambrésis* (9,444 inhabitants), the famous treaty town, in the south-east, manufacture linen, cotton, and woollen stuffs. *Solesmes* (5,723 inhabitants), in the east, has sugar refineries. Descending the *Scheldt*, we pass *Iwuy* (3,890 inhabitants), the fortress of *Bouchain*, *Lourches* (3,590 inhabitants), and *Denain* (11,849), the latter with coal mines, iron works, and rolling-mills.

Valenciennes (22,686 inhabitants) is a first-rate fortress, but the manufacture of lace, which rendered the place famous during the Middle Ages, has almost ceased to exist, cambrics and lawn being manufactured instead. The neighbourhood of the town abounds in coal mines, iron works and sugar refineries. At *Ansin* (6,920 inhabitants), close to the gates of the town, more than 2,000,000 tons are raised yearly by a single company, employing 16,000 workmen, to whom they pay annually £400,000 in wages. Large workmen's cities have sprung up in the vicinity of these coal-pits, which extend from Denain to the fortified town of *Condé-sur-Escaut* (3,282 inhabitants), on the Belgian frontier. Even at *St. Amand-*

Fig. 264.—LILLE.

Scale 1 : 70,000.



les-Eaux (7,243 inhabitants), a fashionable watering-place on the Scarpe, the sky is obscured by the smoke rising from hundreds of chimneys.

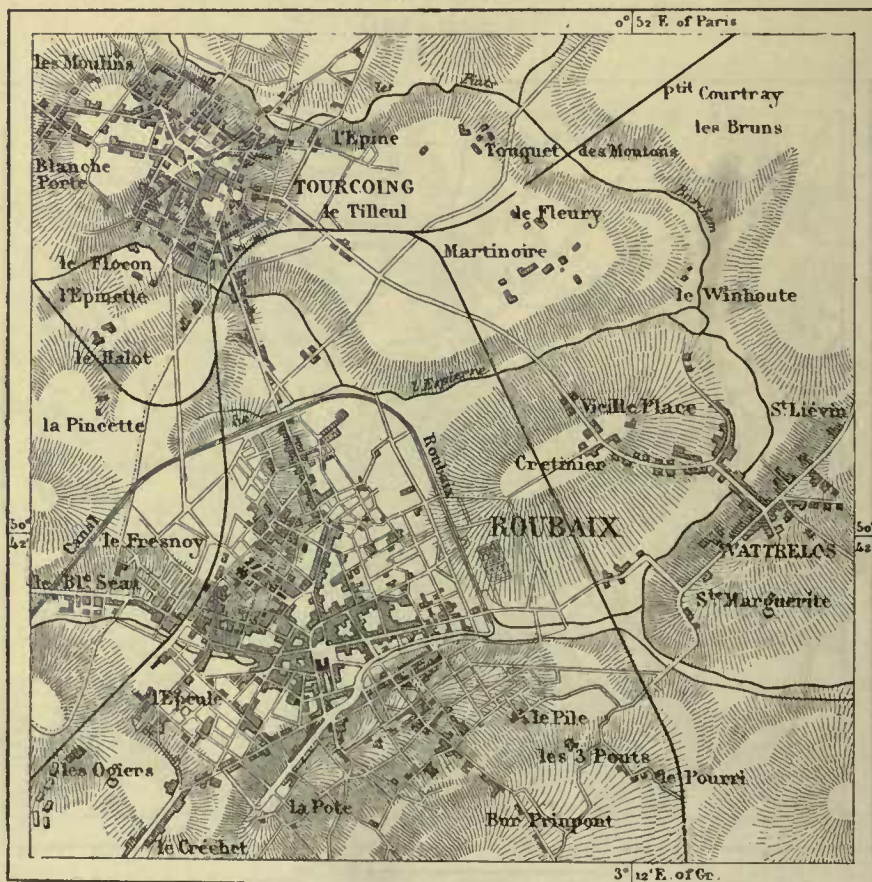
Douai (23,348 inhabitants), until recent times one of the most important features of France, is the seat of a university, of courts of justice, and of military establishments, including an arsenal and a gun foundry; but it also engages in the manufactures common to the country, and, like the neighbouring towns of *Aniche* (4,686 inhabitants), *Orchies* (3,318 inhabitants), and *Marchiennes* (2,648 inhabitants), it has its cotton-mills, sugar refineries, distilleries, and machine shops. The old Flemish Parliament House is used now as a Court of Appeal.

The town-hall is a remarkable structure. Douai was the birthplace of Jean de Boulogne, one of the most famous successors of Michael Angelo.

Lille (137,150 inhabitants), on the Deule, a small tributary of the Scheldt, is the fifth city of France in population. It is strongly fortified, and full of workshops and manufactories; but, with the exception of the Exchange and of a Gothic church of the fourteenth century, this ancient capital of Flanders cannot boast of remarkable public buildings. The public gallery of paintings is one of

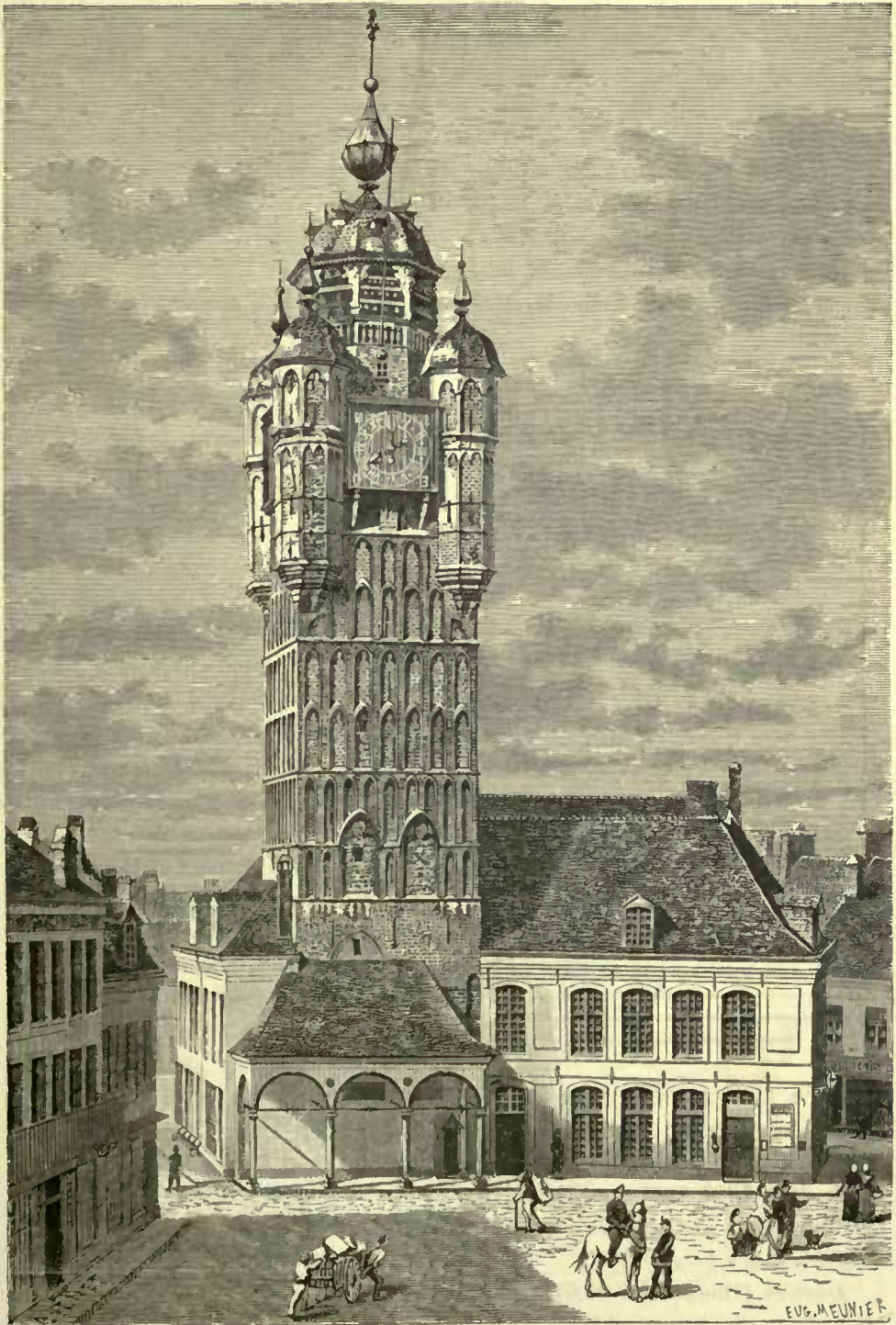
Fig. 255.—ROUBAIX AND TOURCOING.

Scale 1 : 50,000.



the richest in the world, containing 200 designs by Michael Angelo, 68 by Raphael, and many others by the masters of the Renaissance. The manufactures include cotton stuffs, ribbons, ticking, damask, and woollen stuffs. There are likewise oil and sugar refineries, chemical works, machine shops, and breweries. The railway workshops and goods stations are in the suburb of Fives. Many towns in the neighbourhood carry on the same branches of industry as their powerful neighbour. Amongst these are *Marcq-en-Barceul* (4,843 inhabitants); *Armentières-sur-Lys* (20,565 inhabitants), famous for its linens; and *Comines* (4,011

Fig. 256.—THE BELFRY OF BERGUES.



inhabitants) and *Halluin* (8,584 inhabitants), the two latter close to the Belgian frontier. Two other towns in the north, namely, *Roubaix* (79,446 inhabitants) and

Tourcoing (33,013 inhabitants), engage almost exclusively in all branches of the woollen industry, and are the rivals of Bradford, in Yorkshire, which excels them in quantity and strength, but must yield to them in beauty of design. The suburbs of these two towns, *Wattrelos* (4,102 inhabitants), *Croix* (2,586 inhabitants), and others, likewise engage in the woollen industry. Roubaix alone consumes daily 100 tons of wool. The towns have nothing to show beyond their factories, and the environs are wanting altogether in the picturesque. The Lys, into which numerous factories discharge their refuse, flows 5 miles to the north-west. Two villages on the small river Marcq, one of its tributaries, are noteworthy on account of the battles fought near them. These are *Bourvines*, where Philip Augustus defeated the Emperor of Germany (1214), and *Mons-en-Pevèle*, where Philip the Fair took revenge for the defeat sustained at Courtray.

Fig. 257.—GRAVELINES.
Scale 1 : 50,000.



When we cross the Lys we enter the Flemish-speaking portion of the department. *Hazebrouck* (6,363 inhabitants) and *Bailleul* (8,180 inhabitants) are both manufacturing towns, the latter being the centre of the trade in the so-called Valenciennes lace. *Cassel* (3,224 inhabitants), on an isolated hill, from which may be enjoyed a most extensive prospect, is a famous old *castrum*. Other towns of some importance are *Steenwerk* (4,309 inhabitants) and *Steenvoorde* (4,018 inhabitants).

The arrondissement of Dunkirk has but few manufactures, but carries on a considerable commerce by sea. *Bergues* (5,368 inhabitants) is an old fortress, defending the approaches to Dunkirk. Its famous belfry and the two towers of an abbey are visible

from the high sea. *Bourbourg* (2,448 inhabitants) is the principal mart for Flemish cart-horses. *Gravelines* (4,184 inhabitants), a small fortress, has important fisheries, and exports eggs, apples, and vegetables to England. Fort Philippe was built in 1812, to prevent the smuggling carried on by English vessels employed by Rothschild; and the town which sprang up near it was known as the town of *smoggleurs*, or *schmokkeler*.

Dunkirk (Dunkerque, 35,012 inhabitants) is a Flemish town, its belfry rising high above the houses which surround it. The town has sustained more sieges than any other in the neighbourhood. Its most glorious epoch dates back to the time of Louis XIV., when its mariners, led on by Jean Bart, often held their own

against whole fleets. But the English at last obtained the upper hand, and it was destroyed in accordance with the treaty of Utrecht (1713). It has been

Fig. 258.—DUNKIRK.

Scale 1 : 25,000.



restored since, and even enlarged. There are now three wet docks, capable of receiving vessels of 1,000 tons burden, and a fourth dock, of larger dimensions and greater depth, is being constructed. The roadstead of Dunkirk is one of

the safest in the Channel, quite equal to that of the "Downs," on the coast opposite. The commerce of the town flourishes, and is increasing, and saw-mills, cotton-mills, oil refineries, and other manufacturing establishments have been founded. The mariners of the town engage in the Newfoundland fisheries. Close to the walls of Dunkirk was fought the battle of the Dunes (1558), when Turenne beat Condé and his Spaniards. At *Hondschoote* (1,870 inhabitants), a neighbouring village, the Austrians were defeated in 1793.





CHAPTER XIII.

THE VOSGES.

BASINS OF THE MEUSE AND THE MOSELLE.

GENERAL ASPECTS.



NORTH-EASTERN France, within its present limits, may almost be looked upon as a continuation of the basin of Paris. There, too, as in Champagne, we meet with old beaches from which the sea has gradually retired, and many of the rivers, in their upper course, exhibit a remarkable parallelism with the Seine. The two great rivers of the country, however, the Meuse and the Moselle, flow to the Rhine.

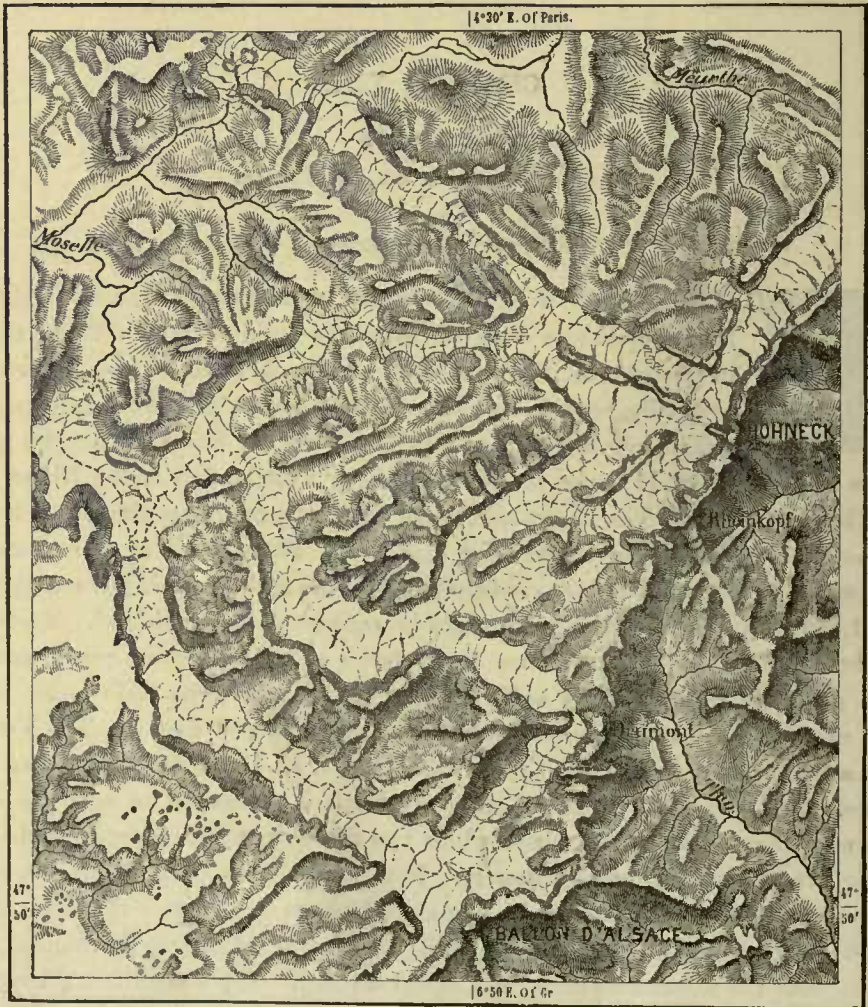
The system of the Vosges extends, under various names, from the Upper Saône to the great bend of the Rhine near Mayence. The nucleus of this mountain system consists of a triangular citadel of crystalline rocks, and if the sea were to rise 1,500 feet, this mountain mass would be converted into an island. Amongst the sedimentary rocks which form the inferior slopes sandstone predominates. It is generally tinged red by oxide of iron, frequently forms bold cliffs, or is split up into huge blocks resembling fantastically shaped castles. The Vosges bear a striking resemblance to the Black Forest, on the opposite bank of the Rhine. The geological formation of both chains is the same; in each we meet with magnificent pine forests, above which rise dome-shaped summits clothed with tender grasses and a carpet of flowers. Both chains rise steeply from the wide valley of the Rhine, but slope down gradually towards the interior of the country.

The low range of the Faucilles and the plateau of Langres connect the Vosges with the mountain system of Central France. The Faucilles are wooded, intersected by numerous rivulets, and easy of access. They are of Jurassic age, whilst the plateau of Langres is covered with chalk. In the south, a deep depression, known as the "gap of Belfort," separates the Vosges from the Jura. This gap, through which run a road, a railway, and a canal, has at all times played an important part in history. Immediately to the north of it rise some of the highest summits, or *ballons*, of the Vosges, including the Ballon d'Alsace (4,100 feet). For 75 miles the present boundary between France and Germany follows the crest of the Vosges; but to the north of the Grand Donon

(3,313 feet), a huge mass of sandstone, with a gigantic stone ring upon its summit, the victorious Germans have adjudged themselves both slopes. In the Vosges, as in many other mountain chains, the culminating summits rise at some distance from the crest. The most elevated mountain of the entire chain, the Ballon, or "Belchen," of Sulz (4,677 feet), rises about 8 miles to the

Fig. 259.—GLACIERS OF THE VOSGES.

Scale 1 : 350,000.



east, being almost cut off from the main range by the delightful valley of St. Amand. Standing upon this mountain, our eye ranges as far as the snowy summits of the Bernese Oberland. Eleven fine roads run across this southern portion of the Vosges, the most famous amongst them being that known as the "Schlucht" (*i.e.* gorge), which connects Gérardmer with Munster.

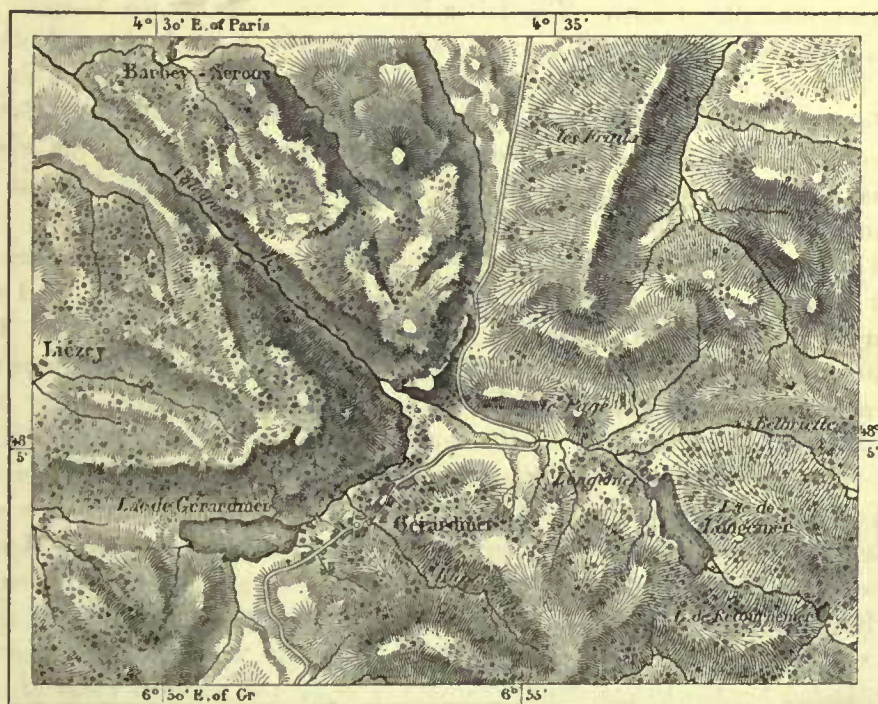
The contrasts between the French and the Alsatian slopes of the Vosges are

not confined merely to a difference in the gradient, but extend likewise to climate and vegetation. The rains are heavier on the western slope than on the eastern. At Strasburg and Colmar the annual rainfall does not exceed 27 inches, whilst at Mirecourt and Vesoul it amounts to 50 inches. The cause of this is evident. The westerly winds, on reaching the Vosges, part with most of their moisture. In Lorraine the sky is often clouded; and whilst the vine flourishes in Alsatia up to a height of 1,300 feet, its cultivation is impossible along the western slope of the mountains, owing to the rigours of the climate.

To the same cause must be traced the great extent of the glaciers, which in

Fig. 260.—THE LAKES OF GÉRARDMER AND LONGEMER.

Scale 1 : 125,000.



1 Mile.

a former age covered the western slope of the mountains, and descended into the ocean, which then reached to their foot. One of these glaciers occupied the valleys of the Upper Moselle, and that of the Moselotte, and extended beyond Gemiremont as far as Éloyes. A gigantic dyke, nearly 200 feet in height, and partly destroyed by the floods of the Moselle, still marks the site of the terminal moraine. In area this glacier far exceeded that of Aletsch, now the most considerable in Europe, and M. Hogard thinks that at one epoch it spread likewise into the valley of the Meuse, where erratic blocks of Vosgesian origin abound.

Old moraines, rock-scratchings, and other evidences of glacial action abound.

The country around Giromagny, to the north of Belfort, is strewn with huge blocks, as if a battle of giants had been fought there. In the west, towards Luxeuil, the streams of ice have worn away the surface of the hills, and small lakes or meres abound, one of them discharging one stream into the Moselle, and another into the Saône. Small lakes, some of them reflecting dark pines, and others embedded in verdant meadows, are also met with in the upper valleys of the Moselle and its tributaries. Most of them owe their existence to moraines, which dam up the rivers. Some of the best known of these lakes are near the Pass of the Schlucht. The small Lake of Retournemer occupies a cup-shaped cavity, whilst the larger Longemer occupies the valley lower down, giving rise to the Vologne, which, not far from the lake, rushes headlong over a ledge of granite, and then swallows up the emissary of the lake of Gérardmer (2,180 feet). This latter is the largest lake in the Vosges. It is shut in, on the west, by a moraine 230 to 260 feet in height, has a depth of 246 feet, and overflows towards the east. The surrounding country, with its sombre forests and emerald meadows, is one of the most charming to be found in the Vosges, and in comparing the beauties of nature with those of the works of man the inhabitants of the country may well say, "What would Lorraine be without Gérardmer and a bit of Nancy?"

That portion of the Vosges which was formerly covered with glaciers is most plentifully irrigated. The Moselle, the Moselotte, the Vologne, and the Meurthe have all forced themselves a passage through ancient moraines. The Hohneck (4,460 feet), at the head of the ancient glacier of Gérardmer, forms the centre of dispersion of the rivers of the Vosges. Most of these rivers flow into the Alsatian Ill, or into the Moselle, both of which are tributary to the Rhine. The Meuse, too, flows now into the Rhine, but at some former epoch it appears to have been a separate river, and it actually retains its name down to the sea. It first describes a large curve, almost parallel with the Moselle or Little Meuse. Its course, as is the case with many rivers flowing through a limestone region, is partly underground. In summer the river is almost entirely swallowed up near the village of Bazoilles, and reappears 2 miles below, at Noncourt. Having been joined by the Chiers, the Meuse winds along the schistose rocks of the Ardennes. Below Charleville it pierces the plateau, forming a succession of picturesque gorges, equally attractive to the artist and the geologist. The river meanders 600 or 1,000 feet below the level of the plateau, sometimes hemmed in by steep cliffs, at others bounded by tree-clad slaty slopes, presenting a charming contrast to the reddish or variegated cliffs. The valley offers but scanty accommodation for towns and villages, and one of the former, Monthermé, is so much shut in that the rays of the sun only reach it during part of the day. Where the Meuse crosses the French frontier it discharges 27 tons of water a second during summer, and twenty or twenty-five times that quantity when in flood.

The plateaux which bound the valley of the Meuse are covered with woods, pastures, bogs, or naked rocks, and cultivable little valleys are few and far



LAKES OF RETOUENEMER AND LONGEMER, AS SEEN FROM THE "SCHLUCHT."

between. The schistose heights of the Fagnes, or Fanges, to the east of the river, are most melancholy of aspect and very thinly populated. Their name has reference to the pools of stagnant black water which abound there. Formerly the "sombre and formidable" Forest of the Ardennes occupied the whole of the country between the Scheldt and the Rhine. Wild boars and other beasts were numerous then, and the forest was much dreaded. Most of it has been destroyed, towns and villages now occupy the valleys, and the stubborn soil is made to yield harvests.

The Ardennes and the Vosges have played no inconsiderable part in the

Fig. 261.—MEANDERINGS OF THE MEUSE.

Scale 1 : 160,000.



history of France. The Ardennes more especially have at all times proved a formidable obstacle to invading armies, not so much on account of their width and their deep valleys, but because of their being very thinly populated. The roads open to an invader either lead through the valley of the Moselle, to the east of the Ardennes, or through the valley of the Oise and the plains of Flanders, to the west of them.

Ethnologically the Ardennes and Vosges are even more important than in a military point of view, for they form a linguistic boundary, and have prevented the Germanisation of North-eastern France.

Lorraine, or Lotharingia, thus named after Lothar, the grandson of Charlemagne, is French in spite of its German name. The inhabitants, as far as records can prove the fact, have always spoken a Latin dialect. Physically the Lorrainers differ from the Germans by having short and nearly round skulls. Their minds, too, are differently constituted. Cool, reflective, calculating, and circumspect, they have none of the mysticism of their neighbours the "Swabians." These latter have at all times designated them as "Welsh."

TOPOGRAPHY.

MEUSE is named after the river which, rising on the plateau of Langres, traverses the department in a north-westerly direction. A portion of it is drained into the Seine. Jurassic and cretaceous rocks cover the whole of the country, and the hills are for the most part wooded, more especially in the Argonne, on both banks of the Meuse. The naked plain of the Woëvre, intersected by the Orne and its tributaries, lies to the east. Horse-breeding is carried on extensively, and there are iron and steel works.

Bar-le-Duc (16,643 inhabitants), on the river Ornain, is the most populous town of the department. It has many manufactories, and the canal which connects it with the Rhine and the Marne offers great facilities for the export of wine and other products. The town is noted for its candied fruits and pastry. The museum of the town contains a few Roman antiquities discovered near *Ligny-en-Barrois* (4,128 inhabitants), on the Upper Ornain.

Vaucouleurs (2,475 inhabitants), associated with the history of Joan of Arc, is the first town met with on descending the Meuse. Then follows *Commercy* (4,960 inhabitants), with a fine castle, now used as barracks. The pastrycooks of Commercy are famous for their "madeleines." *St. Mihiel* (5,146 inhabitants), the old capital of Barrois, boasts of two fine churches, with sculptures by Ligier Richier, who was born here. It is defended by a modern fort. *Verdun* (15,433 inhabitants), lower down on the Meuse, is one of the most important fortresses of France, defending the defiles of the Argonne. In history it is famous for the treaty of 843, which partitioned the Carolingian Empire. The town is noted for its confectionery and liqueurs. *Étain* (2,815 inhabitants) lies to the east of Verdun, in the plain of Woëvre, and on the road to Metz. *Stenay* (2,376 inhabitants), on the Meuse, has iron works and biscuit bakeries. *Montmédy* (2,219 inhabitants), on the Chiers, is merely a fortified village, whilst *Clermont* and *Varennnes*, on the river Aire, and near the great Forest of Argonne, are places of no importance whatever. Louis XVI. was arrested at the latter in 1791.

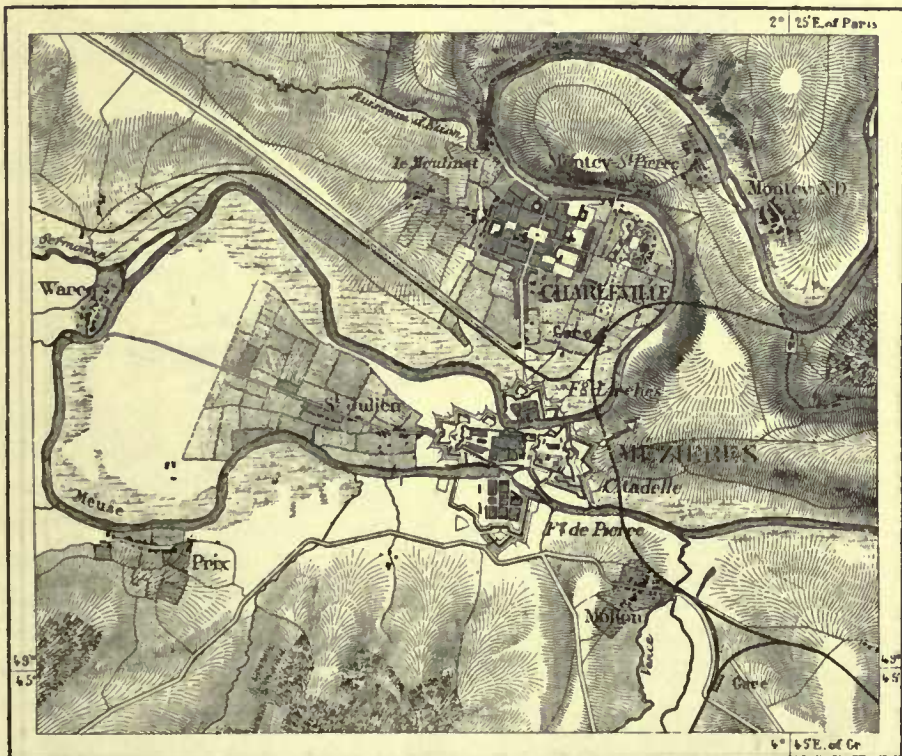
ARDENNES is named after the old forest which still covers about one-fifth of its area. Champaign plains of cretaceous formation extend in the south; the Jurassic hills of Argonne occupy the centre; and the cold schistose plateau of Ardenne spreads out in the north, traversed by the deep gorge of the Meuse. There are iron mines, slate quarries, beds of phosphatic nodules, iron works, and woollen-mills.

Sedan (15,862 inhabitants), on the Meuse, below its confluence with the Chiers, first rose into importance in the thirteenth century, when the Dukes of Bouillon made it their capital. The town suffered much in consequence of the revocation of the Edict of Nantes; but its cloth manufacture revived soon after, and is now of very great importance. There are likewise iron foundries; and the valley of the Chiers, in which lies *Carignan* (1,874 inhabitants), is one of the great centres of the iron industry of the department. Turenne and Macdonald were natives of Sedan. Its capitulation on September 2nd, 1870, put a termination to the Second Empire.

Charleville (12,881 inhabitants) and *Mézières* (5,204 inhabitants) are twin

Fig. 262.—CHARLEVILLE AND MÉZIÈRES.

Scale 1 : 50,000.



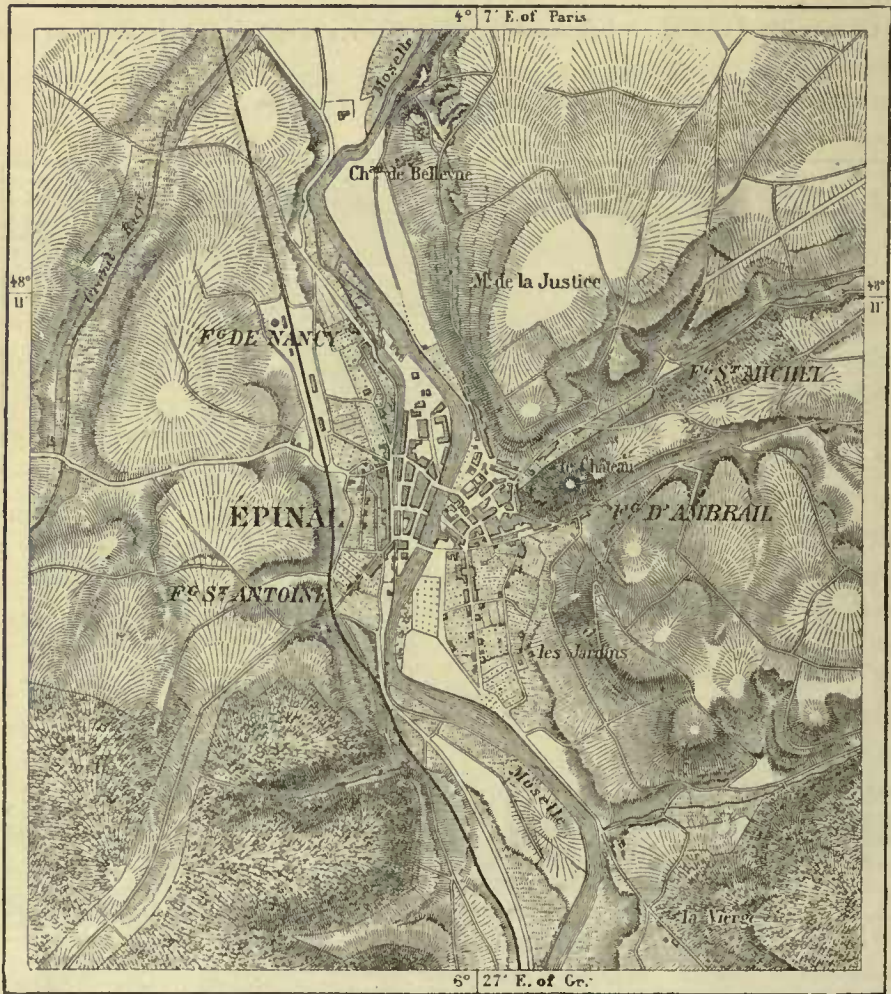
cities. The latter, occupying the neck of a peninsula formed by the Meuse, is a strong fortress, often besieged, but rarely taken. Bayard, in 1521, successfully defended it against Charles V. Charleville, only founded in 1606, is a place of commerce and industry, with foundries, nail works, and manufactories of tools. In the valley of the Sormonne, which joins the Meuse near Mézières, are the slate quarries of Rimogne. Still descending the Meuse, we pass *Nouzon* (5,225 inhabitants), which manufactures nails, railway rolling stock, and agricultural machines, and *Fumay* (4,589 inhabitants), with immense slate quarries, and finally reach the

triple town of *Givet* (6,272 inhabitants), with its citadel of Charlemont, constructed by Charles V. Pipes, pencils, sealing-wax, glue, and hardware are manufactured. *Rocroy* (1,052 inhabitants), on the cold plateau to the east of the Meuse, is an important fortress.

The south-western portion of the department is drained by the river Aisne. Its most important town is *Rethel* (7,364 inhabitants), formerly a fortress, with

Fig. 263.—ÉPINAL.

Scale 1 : 30,000.



manufactures of merinos. Ascending the river, we pass *Attigny*, where the Merovingian and Carolingian kings frequently resided, and Wittekind, the chieftain of the Saxons, was baptized, and reach *Vouziers* (3,425 inhabitants), at the head of navigation. *Gerson*, the birthplace of the famous Chancellor of the Paris University, stood a few miles to the north of Rethel.

VOSGES is the name of a department bounded by the Vosges Mountains in the

east, but occupied for the greater part by the *Monts Faucilles*, which form the water-shed between the Rhine and the Saône. Its northern portion is drained by the rivers *Meurthe*, *Moselle*, and *Meuse*, whilst the Saône and several of its tributaries rise in the south-west. The climate is inclement, and one-fourth of the country is covered with forests. The manufacture of paper and of cotton stuffs is of importance.

Neufchâteau (3,920 inhabitants) is the only town on the *Meuse*, which crosses the western corner of the department. It is the *Néviomagus* of the Romans, and Roman remains abound throughout this region. Files, nails, and tools are manufactured. *Domremy-la-Pucelle*, the birthplace of Joan of Arc, is close by. In the valley of the *Vair*, which joins that of the *Meuse*, are the mineral springs of *Contrexéville* and *Vittel*. The neighbourhood of the latter is noted for its fine oak forests, and there are glass works and iron forges.

Mirecourt (5,169 inhabitants), on the *Madon*, a tributary of the *Moselle*, has tan-yards, and manufactures violins, organs, and other musical instruments. Much lace is made in its neighbourhood.

The river *Moselle*, not far from its source, flows past *Bussang* (798 inhabitants), noted for its gaseous springs. *Remiremont* (7,211 inhabitants), delightfully situated at the confluence of the *Moselle* with the *Moselotte*, has a fine old abbey, now used as a court of justice, a library, and a town-hall. *La Bresse* (1,506 inhabitants), in the picturesque valley of the *Moselotte*, is known for its cheese, butter, and wood carvings. There are several cotton-mills lower down on the river. The *Valley of Ajol*, near *Remiremont*, with its numerous villages, is famous for its picturesque beauties. Still descending the *Moselle*, we arrive at *Épinal* (13,827 inhabitants), the capital of the department. The town possesses a fine picture gallery and rich geological and archæological museums. Coarsely painted images of saints are manufactured, and the number of cotton-mills has largely increased since the annexation of Alsatia by Germany. *Chamagne*, a village lower down on the *Moselle*, is famous as the birthplace of *Claude Gelée*, known as *Claude Lorraine*.

Gérardmer (2,331 inhabitants), a town in the valley of the *Vologne*, which joins the *Moselle* above *Épinal*, is the principal seat of the wood-carvers, and a hand-loom is found in nearly every house.

Rambervillers (4,910 inhabitants), on the *Mortagne*, a tributary river of the *Meurthe*, is surrounded by factories and hop gardens; but *St. Dié* (12,020 inhabitants), on the *Meurthe* itself, far exceeds it in importance. The cathedral and several of the other churches are venerable for their age. Cotton stuffs, carpets, hardware, and paper are manufactured, and there are numerous saw-mills. *Raon-l'Étape* (3,601 inhabitants) is the principal place in the *Vosges* where paper is manufactured from aspen-wood.

Moyenmoutier (1,622 inhabitants) and *Senones* (2,542 inhabitants) are two old towns in the valley of the *Rabodeau*, each with a cotton-mill installed in an ancient castle.

There are no large towns in that portion of the department which lies within

the basin of the Saône. *Plombières*, to the south-west of Remiremont, is noted for its hot and cold springs, which attract thousands of visitors annually. *Bains*, a village farther west, has springs equally efficacious as those of its more popular neighbour. *Xertigny* (2,025 inhabitants), *Fontenoy-le-Château* (1,738 inhabitants), and other villages in the neighbourhood engage in the manufacture of nails, cutlery, and tools, and embroider lace for Paris houses.

MEURTHE-ET-MOSELLE, the principal river of which is the Moselle, with its tributary the Meurthe, includes two-thirds of the old department of Meurthe and about one-fifth of that of the Moselle, the remainder having been surrendered to Germany. The country is generally well cultivated, its mineral wealth considerable, and its industry flourishing. Iron and steel, glass, china, and paper are the principal articles produced.

Baccarat (5,128 inhabitants) is the first town on the Meurthe lying within the department, and is famous on account of its glass. *Lunéville* (15,878 inhabitants), at the confluence of the Meurthe and the Vezouze, manufactures watch glasses, and carries on much commerce. The treaty of 1801 was signed here, and in the eighteenth century Lunéville was the residence of the Duke of Lorraine, whose palace has been converted into barracks. *Blamont* (2,337 inhabitants) and *Cirey* (2,324 inhabitants), both on the Vezouze, are small manufacturing towns, the former having a cotton-mill, the latter glass works.

Once more descending the Meurthe, we pass *St. Nicolas-du-Port* (4,109 inhabitants), from which the salt obtained from the mines in the vicinity is exported, and reach *Nancy* (66,303 inhabitants), the ancient capital of Lorraine. In the seventeenth century this was a small ill-built town, for modern Nancy, with its wide and straight streets, was in reality founded by Stanislas, father-in-law of Louis XV. A triumphal arch, numerous statues, a ducal palace, now converted into an archæological museum, remind us that Nancy formerly had a court of its own; but the most interesting building of the town is the Franciscan church, in which are several fine monuments of the Dukes of Lorraine. Nancy has its university, a library, a natural-history museum, and botanical gardens, and is ambitious of becoming the mediator of scientific thought between France and Germany. Several of the great cotton lords of Alsatia have transferred their mills to Nancy and its vicinity, besides which the manufacture of cloth, of hats, and of artificial flowers is busily carried on.

Frouard (2,404 inhabitants), at the confluence of the Meurthe with the Moselle, has been strongly fortified since the war. *Pont-à-Mousson* (9,904 inhabitants), on the Moselle, was the seat of a university up to 1763. It is important now on account of its iron works and needle manufactories. *Pagny*, on the German frontier, is an important customs station. The ruins of the feudal fortress of *Prény*, the finest in all Lorraine, are near, and Roman antiquities abound throughout this region.

Toul (9,566 inhabitants), on the Moselle, an old episcopal city, boasts of two fine Gothic churches. As a fortress defending one of the great historical high-ways of France it has been frequently besieged, and often taken and devastated.



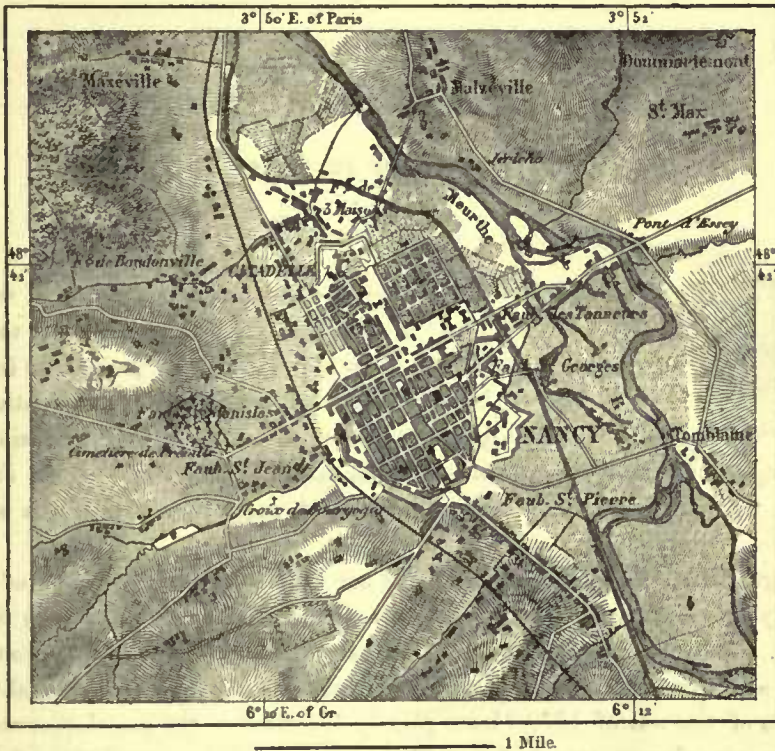
NANCY.

Above the town the canal connecting the Marne with the Rhine is carried across the Moselle.

The narrow slip of territory in the north, all that remains to France out of the old department of Moselle, has *Briey* (2,099 inhabitants), to the north-west

Fig. 264.—NANCY.

Scale 1 : 50,000.



of Metz, for its capital. South of it is the village of Mars-la-Tour, remembered in connection with the events of 1870. *Longwy* (2,939 inhabitants) and *Longuyon* (2,020 inhabitants), both on the Chiers, close to the Belgian frontier, have iron works, forges, and other industrial establishments. Longwy is defended by a citadel.





CHAPTER XIV.

STATISTICS OF FRANCE.*

POPULATION.



IN order to enable us to judge of the strength of a nation we must carefully inquire into the statistics available with respect to it, and weigh their import. Such an inquiry we now propose to institute. History may exhibit the genius peculiar to each nation, but statistics certainly make known to us the resources available for continuing the struggle for existence. "The future of a nation," says a Japanese proverb, "lies in its present, as the unfledged eagle lies within the shell of its egg."

One great fact meets us at the outset of our inquiry. The population of France has vastly increased since the Revolution, and men live longer now than they did formerly. Still that increase has not been as rapid as in most other countries of Europe, and there were actually periods when the population decreased.† The calamities of the war of 1870-71 are plainly indicated in the population statistics. But there are other causes which retard the increase of the population of France. The number of births in excess of deaths was 172,950 in 1872, 101,775 in 1873, and 131,920 in 1876, which is far less than in other countries; and whilst at the beginning of the century Frenchmen constituted one-fifth of the European population of the world, they now constitute only one-tenth.

Physical degeneration is not the cause of this slow increase, for the number of exemptions from military service granted on account of physical infirmities is decreasing from year to year. The large number of bachelors and spinsters is certainly one of the causes, for 500,000 soldiers and sailors are not allowed to marry, 200,000 priests and nuns have taken vows of chastity, and many others are compelled by circumstances to lead a life of celibacy.‡ But there are other causes,

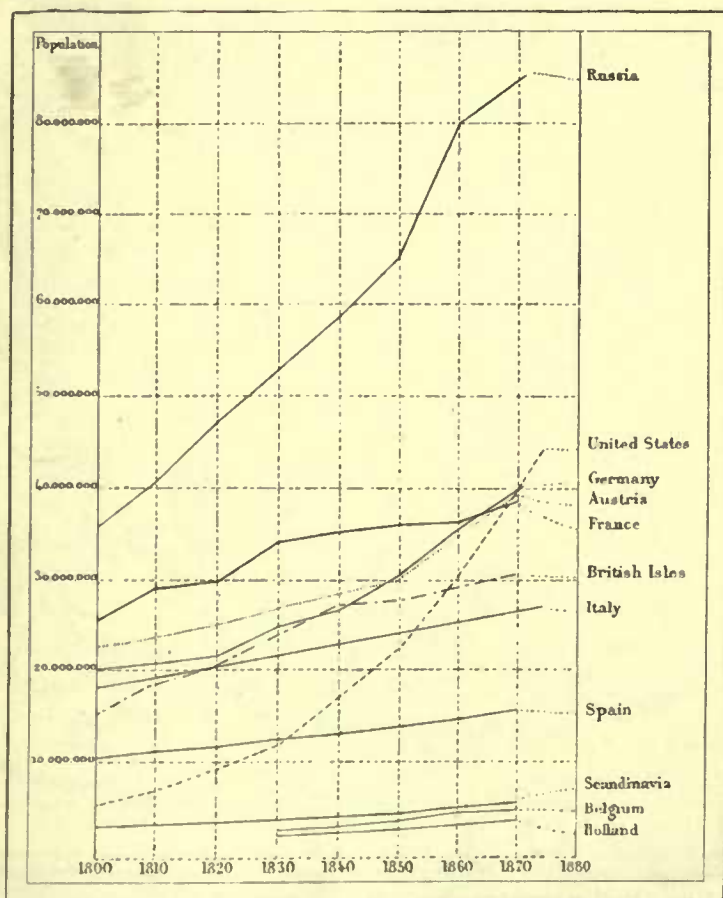
* M. Block, "Annuaire de l'Économie Politique" and "Statistique de la France;" E. Levasseur, "La France avec ses Colonies;" *L'Économiste Français*; *Journal des Économistes*.

† Population within present limits of France:—36,469,836 in 1866; 36,102,921 in 1872; 36,905,788 in 1876.

‡ Of every 100 Frenchmen 21 years of age and upwards, 51 are bachelors, 41 are married, and 5 are widowers; of every 100 women of the same age, 48 are spinsters, 40 are married, and 11 are widows.

of a moral nature, and far more deep-seated. Parents, led by the very laudable desire of leaving their children well provided for, take care that their number is limited. Some philosophers may approve of this solicitude, but it clearly exhibits much want of faith in the future, and substantially weakens the strength of the country, as compared with other countries. In poor departments more children are born, as a rule, than in rich ones. A poor man may teach each of his children a trade; a rich one is expected to divide his capital amongst them when he dies.

Fig. 265.—INCREASE OF POPULATION IN THE PRINCIPAL COUNTRIES OF THE WORLD.



In Normandy this voluntary limitation of families is carried to the greatest length; in the department of Eure one-eighth of the inhabitants lead a life of celibacy, and there are few families with more than two children. Need we wonder that the population decreases?

Frenchmen are the most sedentary of Europeans. The "trappers" and "voyageurs" of Canada prove that they are quite able to accommodate themselves to the rough life of a colony; but, for all that, they prefer to remain at home. Even in Algeria, which lies within easy reach, but few Frenchmen

are met with as voluntary settlers.* In fact, the number of foreigners who annually immigrate into France far exceeds that of Frenchmen who leave the country.

Migration is going on actively within the limits of France. The rural population is steadily moving into the large towns. In 1830 three-fourths of the inha-

Fig. 266.—DENSITY OF THE POPULATION IN FRANCE (1872).



bitants lived in small parishes; nowadays hardly two-thirds do so. The great manufacturing towns increase more and more, whilst the small villages are being

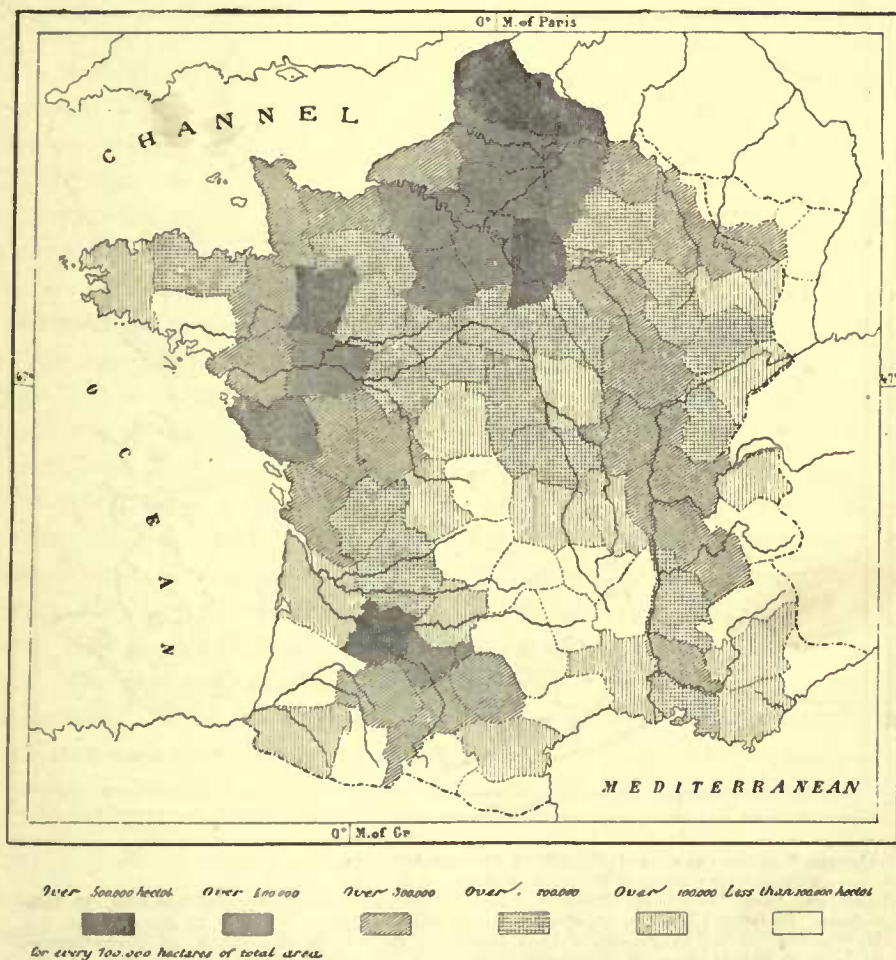
* From 1865 to 1874 only 32,500 Frenchmen emigrated; in 1874, 4,253. The total number of natives of France in the United States is 116,040 (1870); in Australia, 2,400 (1875); in Algeria, 129,600 (1872). In 1851 379,300 foreigners were enumerated in France; in 1876 801,700, including 374,500 Belgians, 165,000 Italians, 66,500 Germans, 62,500 Spaniards, 50,000 Swiss, and 30,000 English.

deserted. In seven departments the town population already exceeded that of the rural, and the time is not distant when the majority of Frenchmen will live in cities.*

AGRICULTURE.

THE rural population diminishes, but the productions of the soil increase, for the division of labour, agricultural machinery, and better education have proved potent factors. The quantity of cereals produced has doubled within the last

Fig. 267.—CROP OF WHEAT IN FRANCE (1874).



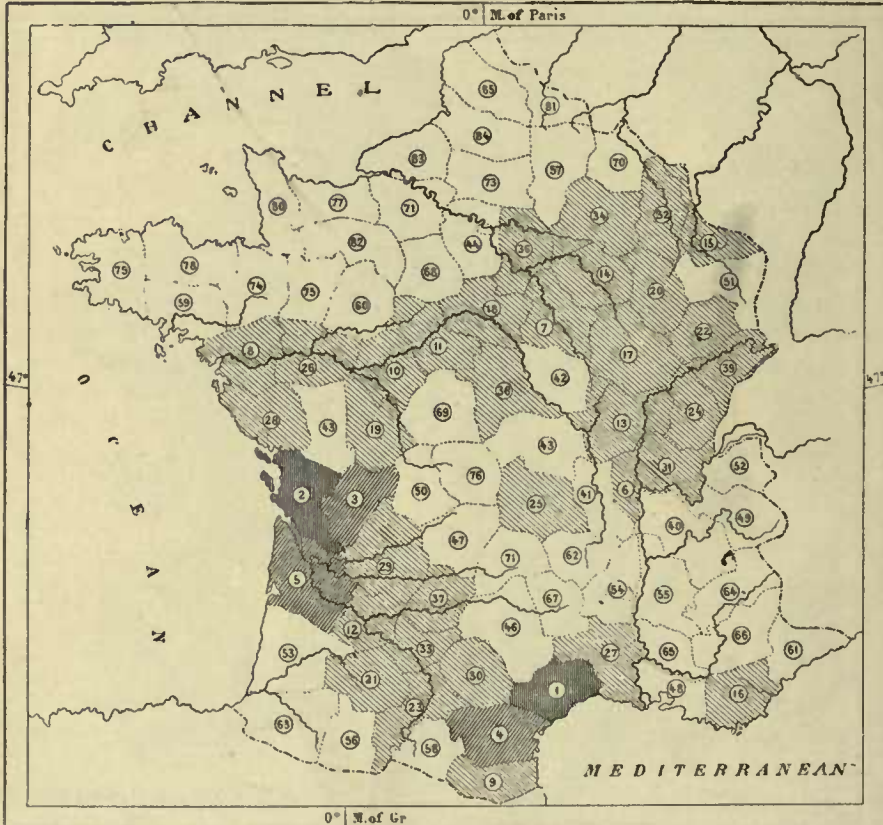
fifty years, though the area under cultivation is but little more than it used to be. Crops are far heavier than formerly, and a poor harvest would have been looked upon as a most abundant one in the beginning of the century. In bad years France imports corn from the East, from Algeria, and from America.† The

* Population of Paris according to birthplaces (1872):—642,718 Parisians; 1 013,865 provincial Frenchmen; 177,208 foreigners.

† Cereal crops in 1815, 55,500 000 quarters, valued at £104,000,000; in 1872, 94,950,000 quarters, valued at £204,230,000, including the straw; in 1876, 80,562,400 quarters. In 1875 cereals were grown on 36,761,000 acres (wheat on 17,166,000 acres, oats 7,878,000, &c.). Average consumption of wheat per head, 4·1 bushels in 1815, 5·8 bushels in 1872.

north produces more wheat than the centre or the south, the latter possessing great advantages for raising other crops. France, owing to its central position, has a greater variety of agricultural productions than any other country in Europe. Corsica and eleven Mediterranean departments produce the best olive oil in the world.* There, and elsewhere in the south, the mulberry flourishes, and sericulture, in spite of the ravages of disease, still forms a source of wealth. But far

Fig. 268.—THE PRODUCE OF THE VINEYARDS OF FRANCE.



*Produce over 90 gallons to an acre:—*1. Hérault. 2. Charente-Inférieure.

*Produce over 45 gallons to an acre:—*3. Charente. 4. Aude. 5. Gironde.

*Produce over 9 gallons to an acre:—*6. Rhône. 7. Yonne. 8. Loire-Inférieure. 9. Pyrénées-Orientales. 10. Indet-Loire. 11. Loir-et-Cher. 12. Lot-et-Garonne. 13. Saône-et-Loire. 14. Aube. 15. Meurthe. 16. Var. 17. Côte-d'Or. 18. Loiret. 19. Vienne. 20. Haute-Marne. 21. Gers. 22. Haute-Saône. 23. Haute-Garonne. 24. Jura. 25. Puy-de-Dôme. 26. Maine-et-Loire. 27. Gard. 28. Vendée. 29. Dordogne. 30. Tarn. 31. Ain. 32. Meuse. 33. Tarn-et-Garonne. 34. Marne. 35. Seine. 36. Seine-et-Marne. 37. Lot. 38. Cher. 39. Doubs.

*Produce 1 to 9 gallons to an acre:—*40. Isère. 41. Loire. 42. Nièvre. 43. Deux-Sèvres. 44. Seine-et-Oise. 45. Allier. 46. Aveyron. 47. Corrèze. 48. Bouches-du-Rhône. 49. Savoie. 50. Haute-Vienne. 51. Vosges. 52. Haute-Savoie. 53. Landes. 54. Ardèche. 55. Drôme. 56. Hautes-Pyrénées. 57. Aisne. 58. Ariège. 59. Morbihan. 60. Sarthe. 61. Alpes-Maritimes. 62. Haute-Loire. 63. Basses-Pyrénées. 64. Hautes-Alpes. 65. Vaucluse. 66. Basses-Alpes. 67. Lozère. 68. Eure-et-Loire.

more important than either of these are the vineyards. The wine can be cultivated almost everywhere, and the product of Champagne, in the north, is

* Production of olive oil (1872), 275,000,000 gallons, valued at £5,080,000; of cocoons, 14,500,000 lbs. in 1760; 79,000,000 lbs. in 1853; 21,761,000 lbs. in 1872.

highly esteemed throughout the world ; but it is the south which produces most wine. The vineyards cover 4,986,000 acres ; and in 1875 (the most productive year of the century) no less than 1,840,000,000 gallons of wine were made, of an estimated value of £120,000,000. No other country of Europe can compare with France as regards the variety and quality of her wines and brandies. Nearly all the wine made is consumed in the country, for the exports do not ordinarily exceed 88,000,000 gallons. The ravages of the phylloxera threaten to destroy this important branch of agriculture, but the peasants, in their struggle against adversity, which calls forth their latent energy and compels them to seek out new paths, must morally be the gainers.

All productions of the temperate zone meet with a congenial soil in France. Potatoes are grown to a larger extent than anywhere else in Europe. Oil plants are widely cultivated, especially in the north, where flax and hemp also are ordinary crops. Beet-root is cultivated around the sugar refineries in the north. Every town and village has its orchards and market gardens. But far more important than all these crops are the grasses, herbs, and other plants grown as fodder for animals.

The increased facilities for transport have exercised a most beneficial influence upon the breeding of cattle. Every department now breeds the animals best adapted to its soil and climate. The northern and north-western departments are most noted for their horses. The mountainous districts of the south excel in mules and asses, but Poitou surpasses even these. Horned cattle are most numerous in the grassy departments adjoining the Atlantic, and in the hilly pastures of the Pyrénées, Limousin, the Jura, and the Vosges. Sheep, flourishing best in a drier climate, abound in the Eastern Pyrénées, the Cévennes, on the central plateau, in the plains of Berry, around Orléans, in Champagne, Eastern Picardy, and in the Landes. The goat feels more at home on the scarped heights bounding the Rhône valley. The pig is met with everywhere. Poultry is being kept more generally than formerly, and in Brittany and elsewhere the beehive is made to contribute towards the wealth of the peasant. The chase of wild animals can scarcely be said to pay, and the birds are disappearing fast ; yet the number of wolves still at large is estimated at 2,000 !*

The fisheries of France are of great importance, and the "cultivation" of oyster and mussel beds is annually increasing.† France, upon the whole, occupies a respectable position as regards the breeding of animals, although some of the neighbouring countries may occasionally excel it. The dairy and other farm produce annually exported is the best proof of this.

It has been said that the peasants are the real masters of France, and this is certainly true of the numerous small proprietors, who cultivate the land which formerly belonged to the nobles, and keep the cities alive by supplying them with

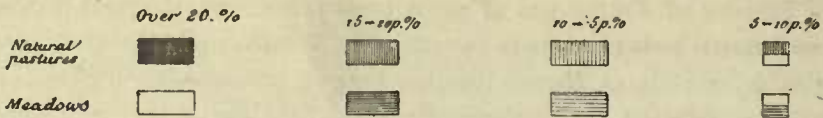
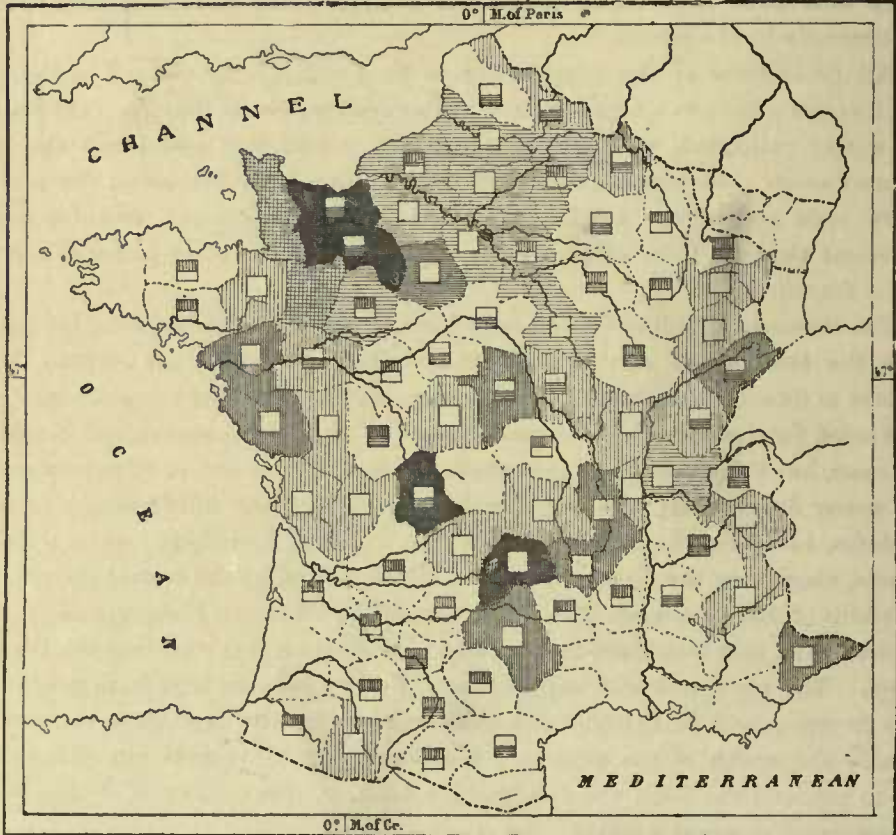
* In 1872 there were 2 882,850 horses, 299,150 mules, 450 600 asses, 11,284,400 head of cattle, 24,707,400 sheep, 5,177,500 pigs, 1,791,700 goats, 58,280,000 fowls. In 1866 there were 3,045,000 beehives.

† The fisheries in 1874 employed 20,800 boats and vessels of 154,000 tons, and 780,000 fishermen. The yield in 1876 was estimated at £3,236,000.

bread, meat, and wine. In politics their influence is equally marked ; and if they do not make revolutions, they sometimes prevent them.

This influence is due solely to their being the owners of the land. There are nearly eight millions of landed proprietors in France, and five millions amongst them hold estates of sufficient extent to enable them to live in comfort. On the other hand, nearly four millions live in poverty, and their "estates," when sold, do not

Fig. 269.—NATURAL PASTURE-LANDS AND MEADOWS (1862).



Area of pastures, 12,415,000 acres ; of meadows, 6,727,884 acres.

cover the costs of transfer. In some parts of France large estates are increasing, and most of the land is cultivated by farmers. Elsewhere the subdivision of the soil is progressing at an increasing rate. Upon the whole, however, the number of proprietors is becoming larger from year to year. Wealthy peasants certainly endeavour to increase their estates, but they understand very well that land only repays their outlay if they are able to cultivate it themselves. "Agricultural

distress" really exists only amongst the large proprietors, who are called upon to pay much higher wages now than formerly.*

Small properties have their advantages, no doubt; but they do not admit of agricultural operations on a large scale, and the soil produces less. In France the subdivision of the land is excessive. The number of "plots," or patches, is no less than 127,000,000, divided amongst 3,025,877 cultivators, of whom each owns on

Fig. 270.—AVERAGE VALUE OF AGRICULTURAL PRODUCE, THAT OF THE VINEYARDS EXCEPTED.

According to Delesse.



Clear Revenue from each Hectare in 1852.

100 francs & over	80 f.	60 f.	40 f.	20 f.	Less than 20 francs
£4 and over.	£3 4s.	£2 8s.	£1 12s.	16s.	Less than 16s.

an average about 36 acres. No less than 2,435,401 own less than 25 acres each, and only 154,167 more than a hundred. This multitude of small fields necessitates a multitude of roads, and agricultural machinery, such as the steam plough, cannot be employed with advantage. The yield is less than in countries where large estates are the rule; and whilst in England an acre yields from 20 to 28 bushels of

* Agricultural wages for men daily in 1700, 5d.; in 1811, 9d.; in 1852, 1s. 4d.; in 1872, 1s. 6d.

wheat, it only yields from 14 to 17 in France. If French agriculture is to attain a position comparable with French industry, the land must be cultivated on sounder principles than now. The peasant proprietors must either combine for the common cultivation of their plots, or they will have to be ousted by the State or by companies of capitalists. Drainage and irrigation works on a large scale cannot be carried out under existing conditions. All that has been done hitherto in this direction in France is patchwork.

But tradition is strong among the peasantry. The model farms, thirty-three in number, appear to be appreciated, but the three agricultural schools at Grignon, Montpellier, and Grand Jouan are but indifferently attended. More than half the area of France is cultivated in an antiquated manner. There are vast stretches of heaths in the Pyrenees, in Gascony, and Brittany, which might easily be converted into arable land. The swamps on the Atlantic coast have only in part been converted into meadow land; the Camargue and the littoral region of Languedoc still breed fevers; the rivers almost annually inundate their banks; and in the Alps, the Cévennes, and the Pyrenees the country is becoming uninhabitable on account of the forests no longer preventing the vegetable soil being carried away by the torrents. Nearly 20,000,000 acres are covered with forests, but most of the timber used is imported from abroad, the country annually paying four millions for that commodity. It is supposed that there are 2,718,000 acres of land which might advantageously be planted with forests, but even supposing this work to be taken in hand with vigour, a century must pass before its full benefit will be felt.

MINING.

THE mineral wealth of France is perhaps less than that of any other country of equal extent. Neither platina, gold, silver, nor mercury is found, or at most in very small quantities. The mines of zinc, nickel, tin, lead, antimony, manganese, and copper yield but little, and France consumes ten times as much as they yield. The iron ores are of importance, but unfortunately they are found, as a rule, far away from coal, which is indispensable for their conversion into iron.

The coal raised does not cover the home demand. The coal basins, though inferior to those of England or Belgium, are sufficiently extensive, but being for the most part situated in the interior of the country, the cost of transporting the coal to the centres of industry is very heavy.

In building materials of every kind France is exceedingly rich, and most of the towns are built of solid stone. Clays suited to the manufacture of earthenware abound. Beds of phosphate were discovered in 1857 in Southern France and in the North, where they cover 494,000 acres. Salt-pans abound on the coast; saline and all kinds of mineral springs in the interior of the country, more especially in the Pyrenees, in Auvergne, in the Alps, and in the Vosges.*

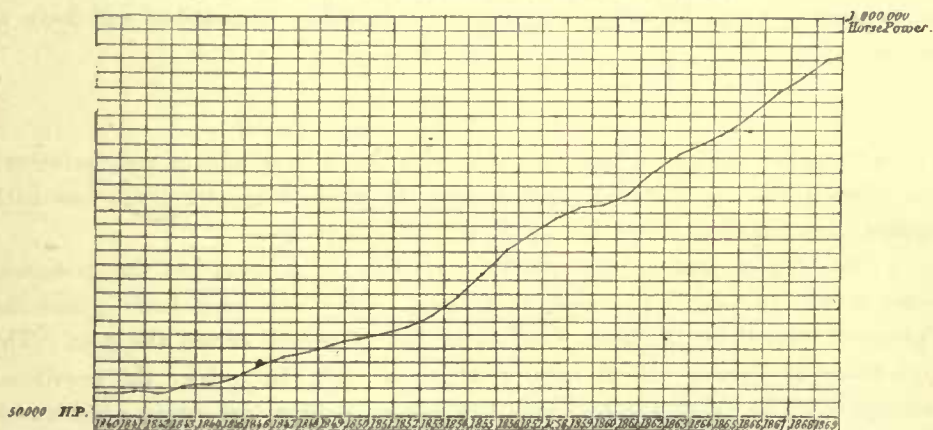
* Mineral productions about 1876:—Pig iron, 1,449,538 tons; iron bars, 733,272 tons; steel, 254,191 tons; coal, 7,047,761 tons; copper, zinc, lead, tin, &c., value £380,000; salt, 754,506 tons.

MANUFACTURES.

THE industrial progress made by France has been enormous. In articles requiring taste and deft workmanship that country preserves its traditional pre-eminence, and in many other objects, including machinery, it has become a rival of England. In 1820 there were only 20 steam-engines in all France; in 1869, 32,827, including locomotives and ships' engines. These engines do the work of 25,000,000 labourers. Nearly 40,000 mill streams set in motion the wheels of 80,000 mills, and recently even the tides have been pressed into the service of man as a motive power.

The great centres of industry are Paris, Lyons, and Lille, but not a department exists now where the steam-engine is not at work. Wherever coal mines are opened factories spring up overnight. The beds of iron ore, of clay, or kaolin, likewise attract manufacturers, and so do the commercial towns on the sea coast. The mountaineers, whom long winters debar from their usual occupations,

Fig. 271.—THE INCREASE OF STEAM ENGINES SINCE 1840



engage in various industries. The women of Velay, Auvergne, and the Vosges are famous as lace-makers; in the Jura the men carve in wood or make watches.

The textile industries alone occupy more than 2,000,000 hands. The silks of France are the best in the world; in woollen stuffs, cloth, carpets, and flannels it successfully competes with England; whilst in cottons it excels in quality, if not in quantity. The lace manufactured in France probably equals in value that produced in any other country; and the manufacture of linens and other textile fabrics is likewise of considerable importance. M. Block estimates the textile fabrics and the clothing produced annually at the enormous sum of £192,100,000.*

In all other branches of manufacture France holds a distinguished position. Its iron industry is far inferior to that of England, but enormous progress has been made. Up to 1830 nearly all machinery was imported from England, whilst

* Silks, 200,000 hands, £36,000,000; woollen stuffs, 180,000 hands, £48,000,000; cottons, 250,000 hands, 5,200,000 spindles, £20,000,000; linen, &c., 150,000 hands, £12,000,000; mixed stuffs, 100,000 hands, £16,000,000; lace, 240,000 hands, £1,800,000; clothing, 1,200,000 hands, £56,000,000.

French machinery now finds its way into every quarter of the world.* The manufacture of beet-root sugar, which originated during the First Empire, now employs 73,000 workmen, who produce more than 400,000 tons of sugar annually, as compared with 7,000 tons in 1827. The great chemical works are another creation of our century, and annually increase in importance. Chemistry, indeed, has exercised a most potent influence upon every kind of industry, unfortunately not in every instance for the best.

In every branch of art industry, such as the manufacture of furniture, jewellery, china and glass, bronzes, and engravings, France still maintains her superiority, though Germany excels in china and glass, and England, where many of the workmen are French, in ceramic productions.

M. Maurice Bloek in 1875 estimated the productions of French industry at £511,680,000, not including ships or heavy machinery.† The factories and small workshops contribute almost equally toward this vast sum. These latter, however, are fast disappearing, not being able to sustain the struggle against powerful capitalists. This concentration of the working population in huge establishments is the greatest social feature of our century, and future generations will have to deal with it.‡

COMMERCE.

THE progress of commerce has kept pace with that of agriculture and industry; and three towns, viz. Paris, Marseilles, and Havre, do a greater trade now with foreign countries than the entire nation did fifty years ago.

A network of roads covers nearly the whole of France, but the mountain districts are as yet ill provided with them. Only one road leads across the Pyrenees; two, those of Mont Cenis and Mont Genève, across the Alps. The high-roads of France (1872) have a length of 102,870 miles; the provincial carriage roads of 156,030 miles; and 138,900 miles more are being constructed. The rivers and rivulets of France are spanned by 2,000 large, and more than 200,000 small bridges.

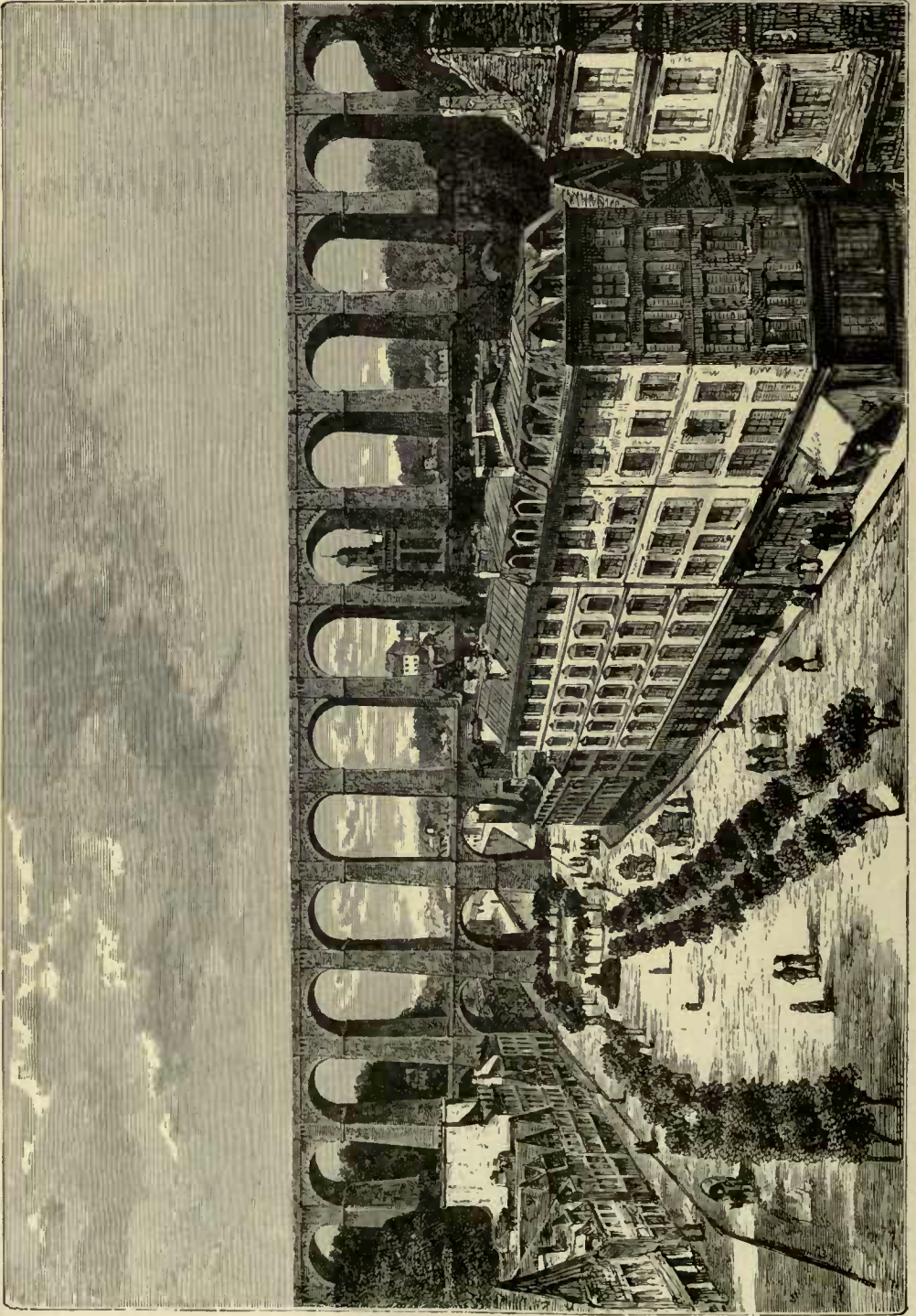
The railway age only began in France in 1832, when a line connecting Lyons with St. Étienne was opened for traffic. Railway building up to 1842 made but little progress, and even now much remains to be done before the system of railways can be called complete. Lines radiate from Paris in all directions, but many provincial towns are still deprived of this means of locomotion. In 1878 France

* Iron industry (1875):—Castings, 14,157,000 tons; fashioned iron, 7,554,000 tons; steel, 2,516,000 tons.

† Textile fabrics and clothing, £188,800,000; articles of food, £117,180,000; buildings, £67,200,000; metals, £34,600,000; chemical products, including soap and candles, £30,000,000; furniture, £22,000,000; leather and skins, £16,000,000; jewellery, £8,000,000; earthenware and glass, £6,000,000; paper and instruments, £6,000,000; various, £12,000,000.

‡ Distribution of French workmen in 1874 according to M. Ducarre:—

Mines	14,117 masters	164,819 workmen	} Including families, 8,400,000 persons.
Factories	183,227 „	1,420,006 „	
Small Workshops	596,776 „	1,060,114 „	
Total	794,120 „	2,644,960 „	



VIADUCT OF MORLAIX.

had 13,072 miles of railway, constructed, for the most part, in a very substantial and conscientious manner. On an average each mile cost £28,800. Plans for the construction of additional lines, and more especially of great trunk lines, affording the most direct, and consequently the cheapest, communications for the transit of passengers and merchandise, are now under consideration. One of these projected lines is to connect Calais with Dijon, without passing through Paris. Another, piercing the Alps at the Simplon Pass, will place Paris in direct communication with Upper Italy.

The railways of France are the property of six great companies, and this

Fig. 272.—THE RAILWAYS OF FRANCE.



centralization is by no means an unmixed good. Rival lines are opposed, and arbitrary rates charged for the conveyance of merchandise. The charges of the Great Southern Line, for instance, are so exorbitant that it is cheaper to forward goods from Paris to the East by way of Liverpool than by way of Marseilles. General interests thus suffer to promote private ends.

The progress of railways has withdrawn public attention from the canals, which afford a much cheaper means of conveyance. No new canals have been constructed since 1820, and those existing are for the most part of local importance only. In

their construction no general guiding principle has been adhered to, and transhipment is frequently required. Of late years, however, the importance of canals and other navigable highways has attracted public attention, and M. Krantz has suggested a scheme, the execution of which would meet every reasonable want at an expenditure of £33,200,000, and would likewise provide for the "regulation" of some of the most erratic rivers. The existing canals have a length of 3,051 miles, and cost £32,740,000; the length of the navigable rivers is only 3,541

Fig. 273.—THE CANALS AND NAVIGABLE RIVERS OF FRANCE.

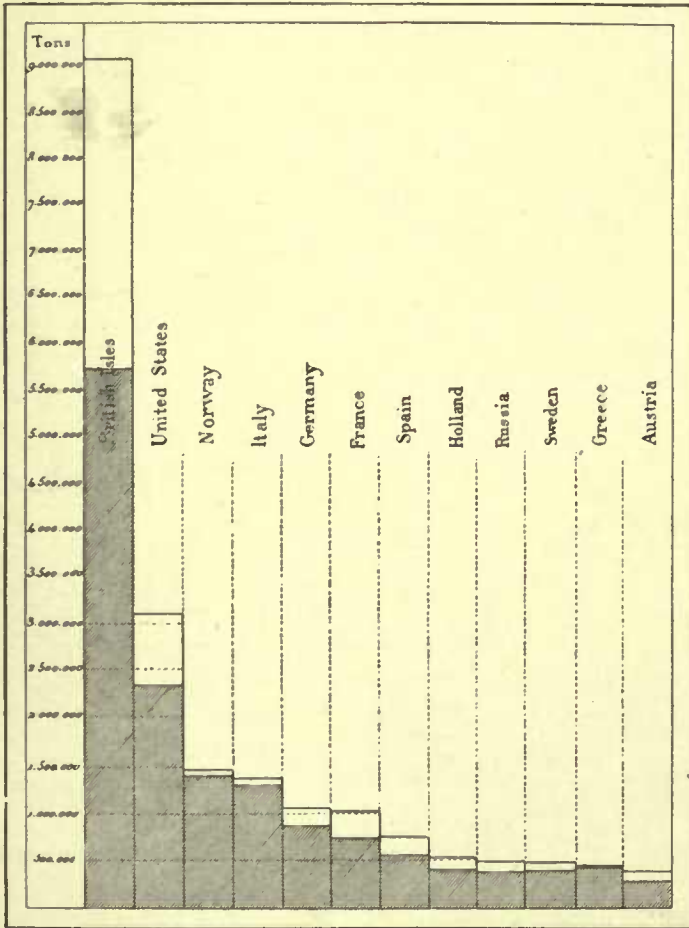


miles; and 1,564,666,000 tons of merchandise were conveyed by water in 1872, the conveyance of a ton per canal costing 0.8d. a mile, including interest upon the capital expended.

France is poor in good natural harbours, and it is therefore all the more necessary that artificial ones should be created. This subject, too, has recently received attention, and one great artificial port, very much needed, is being constructed at Boulogne.

France is admirably situated for commerce, and though poor in ports, two-thirds of its foreign trade are carried on by sea. Looking at the Mediterranean and Atlantic seabords of France, and at the excellent high-roads connecting both, one might fancy that France held the foremost place amongst maritime nations. But France does not. The commercial marines of England, the United States, Norway, Italy, and Germany surpass hers; and since 1860, when the differential

Fig. 274. DIAGRAM EXHIBITING THE COMMERCIAL MARINES OF THE WORLD.



The shaded portion of each column indicates the tonnage of sailing vessels; the blank space that of steamers.

duties formerly levied upon foreign vessels were abolished, there has been no progress. About one-fifth of the tonnage is the property of mail-ship companies in receipt of Government subventions.* In 1875 71 per cent. of the home productions of France was exported in foreign vessels, and this proportion appears to be increasing from year to year. The French vessels are, as a rule, much older than

* Shipping of France (1876), 14,861 sailing vessels of 793,000 tons, and 546 steamers of 215,450 tons. Total, 1,008,450 tons.

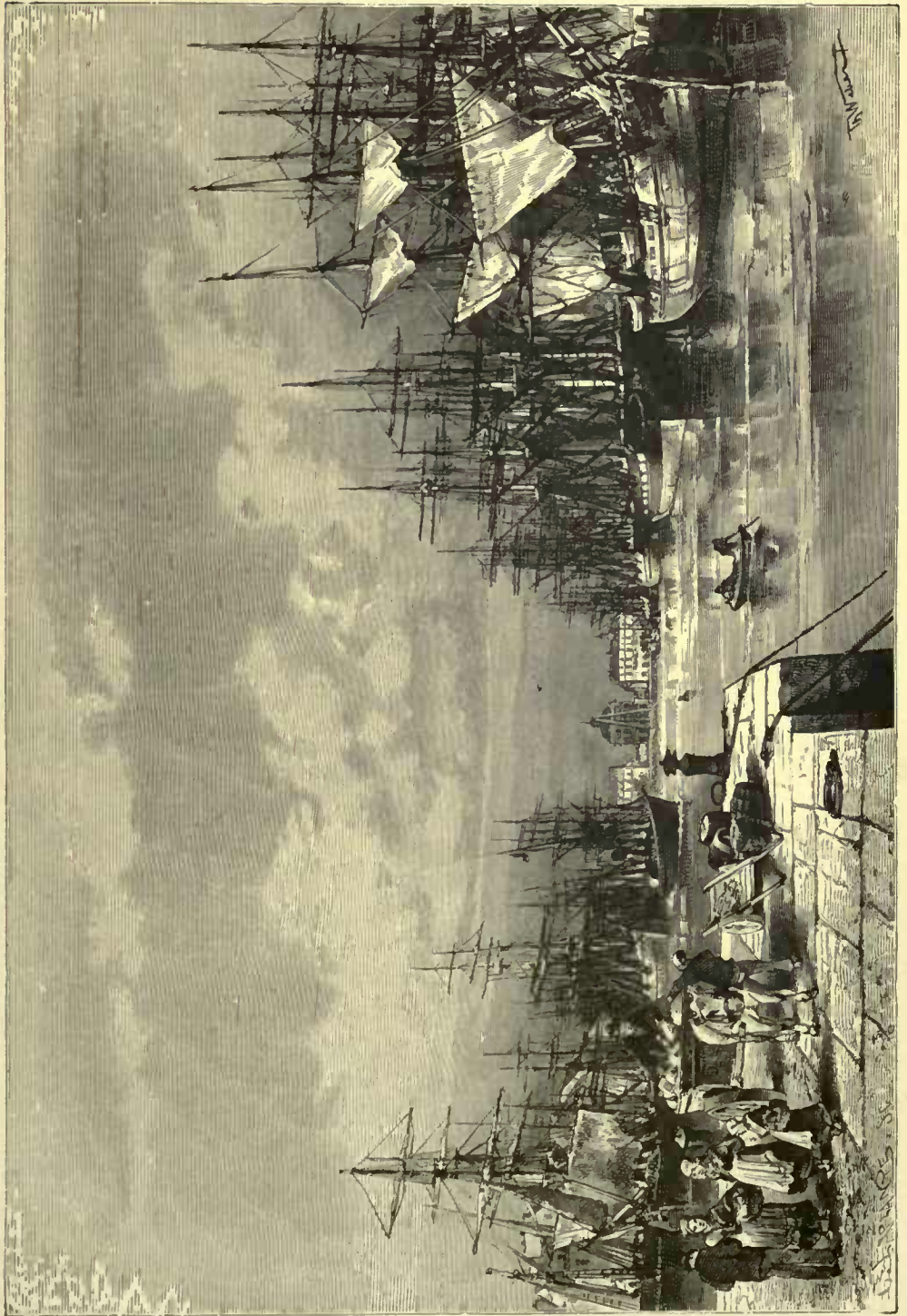
those of other nations, and are consequently more liable to accidents. Those lost at sea or broken up are only partially replaced, and the marine necessarily decreases, always excepting the vessels of the State-paid mail companies. It is absurd to make the supposed aversion of the French to a seafaring life accountable for this decadence. In a former age the mariners of Gascony and Provence, of Brittany and Normandy, have given proof of their aptitude as seamen. This

Fig. 275.—DIAGRAM EXHIBITING THE NAVIGATION OF VESSELS AT EACH PORT.



decadence must be explained on economical reasons. The French, unlike the Norwegians, are not confined to a narrow seaboard, but a large and fertile country holds out to them many resources. They are not driven to seek a living on the sea, and prefer to stay at home, allowing the English and other nations to act as their ocean carriers.

But though the French marine is decreasing, French commerce has vastly increased since 1830, and even the most serious events have only momentarily checked



LE HAYEE.

this progress. Immediately after the conclusion of the late war French commerce recovered; and though postage and telegrams are dearer in France than in some neighbouring countries, the number of letters and of telegrams is ever increasing.* In looking at the articles exported and imported, the great superiority of France as a manufacturing country will be perceived. The imports consist to a very large extent of raw silk, cotton, and wool; of hides and skins; of unrefined sugar; of oil seeds and rags. The exports consist mainly of silk, cotton, and woollen stuffs; leather; boots and gloves; furniture; soap and oil; refined sugar; and paper. France likewise imports cattle to feed its population, and coal for its manufactories. It exports wines, vegetables, cereals, coals, cheese, butter, eggs, and poultry.†

The foreign commerce of France is chiefly with Great Britain, Belgium, Germany, and Italy. The trade with French colonies, of which France enjoys a monopoly, amounts to very little if compared with the transactions with the above-named countries, as is clearly seen from the following statement (in pounds sterling):—

	1873.		1877.	
	Imports.	Exports.	Imports.	Exports.
England	30,356,000	47,440,000	26,000,000	41,320,000
Belgium	21,556,000	20,192,000	16,160,000	17,840,000
Germany	13,612,000	20,900,000	15,560,000	17,420,000
Italy	16,428,000	14,128,000	16,600,000	8,640,000
Switzerland	13,736,000	16,400,000	4,400,000	11,160,000
United States	8,568,000	16,332,000	10,600,000	9,200,000
Turkey	9,356,000	4,956,000	7,520,000	3,750,900
Spain	7,168,000	7,108,000	4,400,000	6,200,000
Algeria	6,024,000	6,424,000	4,920,000	5,960,000
Russia	7,628,000	1,840,000	6,040,000	1,500,000

Next to these leading countries rank the Rio de la Plata, Brazil, the East Indies, and China.

SOCIAL STATISTICS.

WE do not exaggerate when we estimate the aggregate income of all Frenchmen at £1,000,000,000 a year, being equal to the interest, at the rate of 5 per cent., upon a capital of £20,000,000,000. This national income, there can be no doubt, is steadily increasing, say at the rate of 2 or 3 per cent. a year, or far more rapidly than the population. If it did not, the country could not defray the ever-increasing expenses of Government, build new factories, and even invest capital abroad. The progress of wealth is most marked in some of the rural districts, where fortunes

* General trade of France, including transit (but not coin or bullion). in pounds sterling:—

	Imports.	Exports.		Imports.	Exports.
1830	26,520,000	22,520,000	1860	106,280,000	125,880,000
1840	42,080,000	40,440,000	1873	183,040,000	192,880,000
1850	46,960,000	61,240,000	1876	196,000,000	180,000,000

Imports for home consumption (1876), £158,006,960; exports of home produce, £142,795,640.

Letters sent through the Post Office in 1851, 170,000,000; in 1862, 283,000,000; in 1876, 367,443,837; periodical and book packets do., 34,000,000, 202,000,000, and 376,005,934.

Telegraphs (1877), 32,320 miles. Telegrams forwarded:—463,000 in 1857; 6,223,000 in 1872; 11,412,161 in 1876.

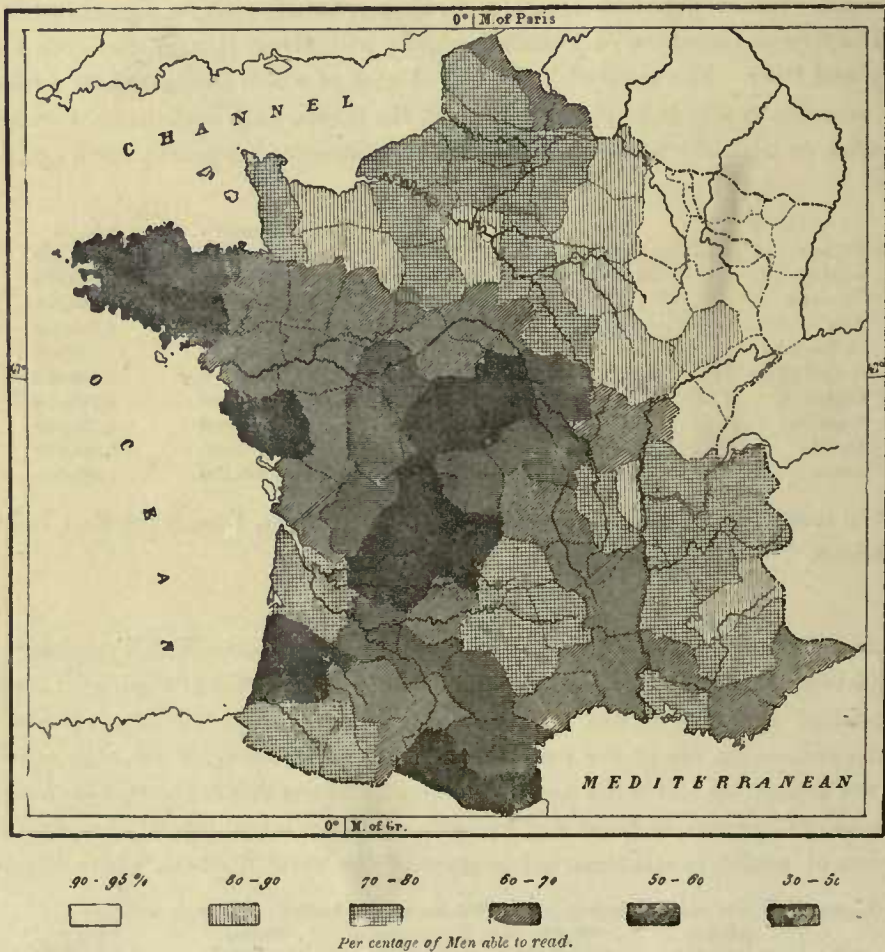
† Imports (1876):—Articles of food, £38,372,280; raw materials, £92,400,480; manufactures, £19,051,000; other articles, £7,383,200.

Exports (1876):—Manufactures, £77,279,160; articles of food and raw produce, £57,948,200; other articles, £7,568,280.

have more than doubled within the last fifty years. The average income of each family is £120, or £28 a head, and the number of small capitalists (*rentiers*) in the enjoyment of this average income is very large. On the other hand, there are men of vast revenues, as well as paupers dependent upon public charity for their subsistence.*

Our statisticians take notice of every contravention of the moral or police laws, while good deeds and noble actions find no place in their records. The number of

Fig. 276.—DIAGRAM EXHIBITING THE EDUCATIONAL CONDITION OF FRANCE.



illegitimate births or of criminals may enable us to judge to some extent of the moral and social condition of a nation; but our inquiries must have a wider range if we would know what is really moving the mind of the masses, and preparing the events of the future.†

* Paupers supported by the parishes, 1829, 1,329,659; 1853—61, 1,145,000.

† Crimes investigated by the magistrates (1874), 365,577; offences against police regulations, 431,669. Average prison population, exclusive of political prisoners, 52,984; illegitimate births, 76,678 out of a total of 929,508; infants deserted, 9,470; suicides, 5,617.

Officially there are in France 60,000 Jews (most of them of foreign birth), 600,000 Protestants, and 35,500,000 Roman Catholics. The Protestants, owing to mixed marriages and other causes, appear to be diminishing. As to the so-called Roman Catholics of the official returns, very many of them are either perfectly indifferent as to Church questions, or openly hostile to the Church which claims them. That Church, however, is a great power in France. The clergy are well organized, and convents are more numerous than before the great Revolution: in 1878 no less than 30,000 monks and 170,000 nuns were engaged in educational, charitable, or contemplative work, and the property of the monasteries and convents was estimated at £20,000,000.

In matters of education France lags far behind some of the neighbouring states. Officially the professors of the university rank after Government clerks, though public opinion has learnt to appreciate their services. Many parishes are still without schools. Teachers are scarce, for the emoluments offered are small. About one-third of the adults are unable to read. The education of the girls more especially is very much neglected.*

Still, progress is being made. The advantages of education are becoming more and more appreciated; periodicals increase in number and circulation; books find ready purchasers; public libraries are founded in all parts of the country; and scientific societies multiply. There appears to have grown up a vague idea since the termination of the war, that a nation can be strong only if the men composing it are thinkers. Superior education improves, and the youth of France look full of hope and confidence towards the future.

* Educational statistics for 1872:—70,179 elementary schools, with 4,722,000 pupils enrolled; 324 lycées and colleges, with 69,500 pupils; 657 superior lay schools, with 43,000 pupils; and 278 clerical schools, with 34,000 pupils. In 1866 25·80 per cent. of the married men and 41·00 per cent. of the wives were unable to sign their names, and only 66·63 per cent. of the adult population (over twenty years of age) were able to read and write.





CHAPTER XV.

GOVERNMENT AND ADMINISTRATION.

LOCAL AND CENTRAL GOVERNMENT.



IN France the *commune*, or parish, does not hold a rank equally important as in some of the neighbouring countries. In countries frequently ravaged by war, as Italy and Spain, the inhabitants sought strength in union and under the protection of walled towns. In France and Germany the peasants settled down close to the feudal castles; in Gascony, Brittany, and some other parts of France, where the clang of arms was heard but rarely, the peasants scattered themselves over the country, each living under his own oak or chestnut tree.

As a fact, the rural communes are either very small, or their population, where more numerous, is scattered over a wide area. The average number of inhabitants of each of the 36,056 French communes is 1,025, but there exist over 600 having a population of less than 100 souls.

The communes are grouped together into 2,863 cantons, and these into 362 *arrondissements* and 87 departments. The formation of these latter was proposed in 1786 by Robert de Hesseln, a map-maker, and adopted a few years afterwards by the National Assembly, which intended thereby to break with ancient traditions and to crush provincialism. But the inhabitants of the country, in spite of the arbitrary boundaries of the old provinces of feudal times, or of the departments of our own age, have not yet lost sight of the great natural divisions of the country, which coincide in a remarkable manner with the old *pagi minores* of the Gallo-Romans.

The existing political divisions are a creation of officials, and have no root in the public sentiment. They have been maintained because they enable the Central Government to multiply its direct representatives throughout the country to an extent not required by the interests of the public. The power which the State thus arrogates to itself the provincial populations are deprived of, and the administrative machinery of the smallest village is set in motion from the capital. France would long ago have been converted into a huge barrack for Government functionaries if there were not causes at work which counteract the influence of the bureaucracy.

France, by a law of February 25th, 1875, has been constituted a republic, but most of the institutions of the country are monarchical by origin and in spirit. The legislative power is vested in an Assembly of two Houses, or Chambers—the Chamber of Deputies and the Senate; and the executive in a President. The Chamber of Deputies is elected by universal suffrage, each *arrondissement* being represented by one deputy, or by more if its population exceeds 100,000 souls. The Senate is composed of 300 members, of whom one-fourth are elected by the Senate itself for life, and three-fourths are elected for nine years by “electoral colleges,” formed in every department and colony. These colleges include the deputies of the *arrondissements*, the councillors of the departments and *arrondissements*, and representatives of the communes. One-third of the senators retire every three years. The President is elected by the Senate and the Chamber, sitting conjointly, for seven years. Senators and deputies are paid £360 a year; the President £24,000, in addition to certain allowances.

The President promulgates the laws voted by the Chamber, disposes of the armed forces of the country, appoints all functionaries and officers, and negotiates treaties; but he cannot declare war without consulting the Chambers. He convokes or adjourns the Chamber of Deputies, and the Senate consenting, he can even dissolve it. He appoints his ministers, who alone are responsible to the Chambers. Financial laws must first be presented to and voted by the Chamber of Deputies.

A Council of State, presided over by the Minister of Justice, and consisting of 37 councillors and 24 masters of requests, nominated by the President, and of 30 auditors nominated concurrently, advises on laws referred to it by the Chambers or by the ministers, and on all matters submitted by the President.

Each department has its General Council, the members of which (generally one for each *canton*) are elected by universal suffrage for six years. These councils meet annually to discuss the department budget, and to act as advisers of the Prefect. Politics are excluded from their discussions. The Prefect is appointed by the President on presentation by the Minister of the Interior. His powers are extensive, and, with the assent of the Central Government, he can annul the resolutions of the General Council over which he presides.

Each *arrondissement* has its Sub-prefect and a Council elected by universal suffrage. The *cantons* merely constitute judicial districts.

Each commune has a Municipal Council of from 12 to 80 members, elected by universal suffrage. In all matters of importance the decisions of these councils require to be approved by the Prefect before they are carried out. The Mayor (*maire*) is appointed by Government, but must be a member of the Municipal Council. He is the representative of the State as well as of the commune, and finds it sometimes difficult to reconcile their conflicting interests. His office is honorary. In large towns he is assisted by deputy mayors.

JUDICIAL AUTHORITIES.

EACH canton has its Justice of the Peace, who decides in civil cases up to the value of £4, and in police cases. A court of the first instance exists in each department, and is presided over by a Judge and at least two Assistant Judges. Its jurisdiction is final in civil cases up to £60, and cases of misdemeanour are decided by it. The Commercial Tribunals, with Judges elected by the leading merchants, exercise a similar jurisdiction in commercial matters, but they exist only in the principal towns. There are 26 Courts of Appeal, to which civil cases and misdemeanours of a more serious character are referred from the inferior courts. Criminal cases are decided in Courts of Assize, one for each department, with the aid of a jury. The Supreme Court of Justice (Cour de Cassation), for civil as well as for criminal cases, has its seat in Paris.

Society, or rather the State, is represented in all these courts by Procureurs, or Advocates General, whose duty it is to watch over the strict execution of the laws. All magistrates, judges, and others employed in the courts of justice are absolutely dependent upon the Minister of Justice.

Disputes between Government and private individuals are decided by the Council of the Prefect, from which an appeal may be carried to the Council of State. Disputes between masters and workmen are decided by a council of wise men (*prud'hommes*), the members of which are nominally elected by the interested parties. Courts of Accounts have jurisdiction over persons engaged in the collection or expenditure of public moneys.

Military courts, though they generally confine themselves to offences committed by soldiers, are all-powerful whenever a state of siege has been declared. Permanent naval courts are located at the five naval head-quarters.

There exist, moreover, certain disciplinary councils, whose operation is limited to a few corporations, such as those of barristers, notaries, or advocates.

The convict establishments in France having been suppressed, convicts are now sent to New Caledonia, or to Guiana if they are men of colour or Arabs. Each arrondissement has its house of detention; but criminals condemned to more than a year's imprisonment are sent to one of the twenty-four central prisons. There exist also about sixty reformatories, maintained partly by private societies. Political offenders are transported, imprisoned in a fortress, or banished the country.

ECCLESIASTICAL AUTHORITIES.

THE State officially recognises the Roman Catholic Church, the Lutheran and Reformed Protestants, and the Jews, and contributes largely towards the payment of the ministers of these religions, who are, moreover, exempted from military service.

Catholic France is governed by seventeen archbishops and sixty-nine suffragan bishops. Cardinals, archbishops, and bishops are appointed by the Pope and the

French Government conjointly, the latter, moreover, reserving itself the right to repel all encroachments upon its temporal authority. Vicars General, appointed in the same manner as the prelates, assist these latter in their functions. The cathedral chapters are appointed by the prelates, whose nominations must be submitted to Government for approval. The inferior clergy include parish priests (*curés*), officiating ministers (*desservants*), and vicars.

The Lutherans are governed by a general consistory, having its seat at Paris. The Reformed Protestants, or Calvinists, have placed themselves under about a hundred independent consistories, but occasionally meet in synods. The Protestant clergy are presented by the congregations and appointed by Government.

The Jews are governed by a consistory of eight lay members, presided over by a Grand Rabbi appointed for life, and having its seat at Paris.

EDUCATION.

A SUPERIOR COUNCIL OF EDUCATION assists the Minister of Public Education in his functions. France, for educational purposes, is divided into sixteen Academies, each presided over by a rector.

Each commune of 500 inhabitants is bound to establish a boys' and a girls' school, deficiencies in the receipts being made up by the department or the State. A training school for elementary teachers exists in nearly every department.

Secondary education of a classical or industrial nature is provided by communal colleges, lyceums, and voluntary schools, many under the direction of the clergy. Pupils at lyceums pass examinations as bachelors of science or of letters.

Numerous establishments are engaged in supplying a superior education. A training college at Paris trains masters for secondary schools. There are theological colleges, law and medical schools, science schools, a pharmaceutic college, and numerous preparatory schools. A high school for the study of mathematics, natural philosophy and chemistry, natural history and physiology, history and philology, has been established at Paris; and numerous institutions there, and elsewhere throughout France, provide facilities for studying science.

Amongst special schools depending upon Government are those of oriental languages, fine arts, music (Conservatoire), industrial arts, agriculture, mining, veterinary science, forestry, engineering (Polytechnique), and several others. France supports an art school at Rome and an archæological college at Athens. The leading military schools are those of St. Cyr, of the staff, of engineers and artillery, and of cavalry, a naval college at Brest, and a school of naval architects.

ARMY AND NAVY.

THE army was reorganized by a decree dated July 27th, 1872. Liability to serve in the army is now universal. The conscripts remain five years in the standing army, four years in the reserve, and eleven years in the "territorial" army. But out of 300,000 men who annually complete their twentieth year, hardly more than

one-half are actually called upon to render military service, the remainder being either physically unfit, or exempted as being employed in the public service, engaged in education, &c. Of those actually embodied very few remain five years with the colours. Many are discharged after six months' drill, others after a year's service, on condition of their being able to read and write. Young men of education are admitted to one year's voluntary service, and if they acquit themselves creditably they are, on their discharge, appointed officers of reserve. Men of the standing army and the reserve cannot marry without leave.

The whole of the army, including that of Algeria, is formed into nineteen territorial army corps. It includes 144 regiments of infantry (3 battalions each), 30 battalions of Chasseurs; 4 regiments of Zouaves (4 battalions each), 3 regiments of Algerian Tirailleurs (of 4 battalions each); 1 foreign regiment (4 battalions), 3 battalions of African light infantry; 77 regiments of cavalry, including 4 of Chasseurs d'Afrique and 3 of Spahis, 38 regiments of field artillery (247 batteries), 20 battalions of Sappers, 2 regiments of Pontooneers, 57 companies of army train, &c. The gendarmerie (27,132 men) forms a part of the army, as do the Sapeurs-pompier (firemen). The National Guard has been suppressed.

The effective strength of the army, on a peace footing (1879), is 496,442 men, with 124,279 horses: of this number 52,424 men are stationed in Algeria. Of the 165,674 recruits who are expected to enter the army in 1879, 62,000 will remain with the colours for six months only. In addition to these recruits, there will be 6,810 one year's volunteers. On a war footing the army consists of an active army of 1,150,000 men, and a territorial army of 580,000 men.

The navy is powerful, but its strength is comparatively much smaller than what it was before the last war, for other nations have increased their armaments at a much more rapid rate than France has done. The seafaring population of France is liable to serve from the twentieth to the fiftieth year of age. The number of these men is supposed to be 152,000, but in case of war 110,000 at most would be available. The number actually in the service is 25,000, besides 16,000 marines, and 33,000 workmen and non-combatants. The navy consists of 56 ironclads (185,847 h. p., 461 guns), 264 screw steamers (55,812 h. p., 1,547 guns), 62 paddle steamers (8,665 h. p., 154 guns), and 113 sailing vessels (672 guns). Total, 492 vessels (250,324 h. p., 2,834 guns). The most powerful of the French ironclads is the *Redoubtable*, launched at Lorient in 1876. Its armour has a thickness of 9 inches; its armament consists of two 38-ton and four 24-ton guns, and its engines are of 6,000 horse-power. The great naval arsenals are at Cherbourg, Brest, Lorient, Rochefort, and Toulon.

FINANCE.

THE French pay more taxes than any other people in the world; for not only must the expenses of a complicated administrative machinery be paid for, but interest must be paid on debts resulting from wars. Including local and indirect taxes, no less than £125,000,000 are raised every year. But the French are rich enough to support this burden without much suffering. Only about a third of this sum

is raised by direct taxes, the remainder being derived from customs dues, excise duties, and other imposts hardly felt by the consumer. Tobacco alone, the manufacture of which is a Government monopoly, and is allowed to be grown only in twenty departments, yields nearly £12,000,000 a year.

The annual budget is prepared by the ministers, and, before being discussed in public, is examined by a commission of the Chamber of Deputies.

Fig. 277.—MONACO.



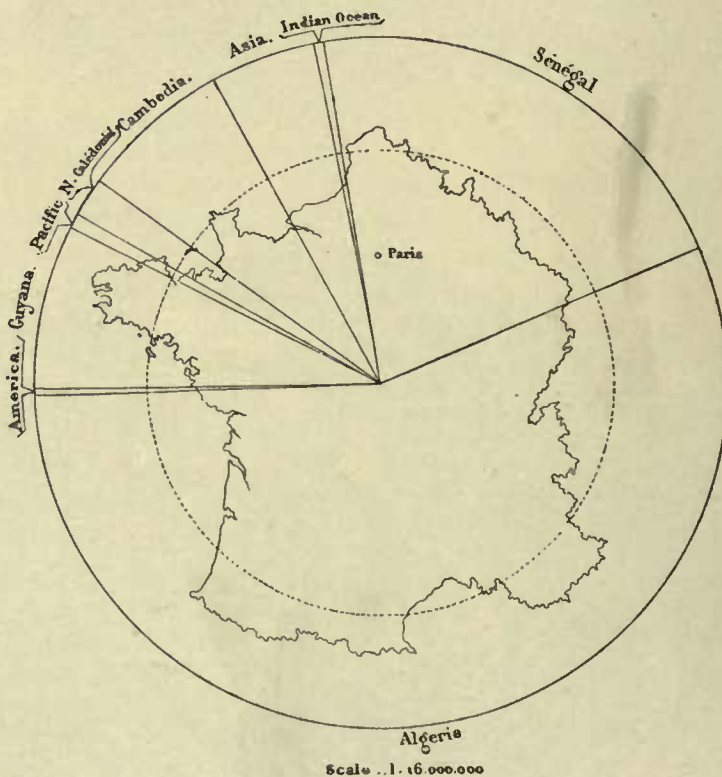
Government, with its tobacco factories, ship-yards, prisons (for the prisoners are required to work), is the greatest manufacturer in France. It is likewise the wealthiest landed proprietor, for no less than 2,451,000 acres of forest belong to it, and it exercises a sort of supervision over 4,703,000 acres of forest land belonging to the communes and public institutions.

The Public Debt of France, in 1875, amounted to £937,584,280, distributed

amongst no less than 4,380,933 holders. The city of Paris has a debt of £93,600,000; the departments and other local bodies of £30,000,000; and the total indebtedness of France, national and local, amounts thus to £1,061,184,280.

The annual revenue, which in 1830—48 did not exceed £48,855,040, rose to £78,507,730 during the Second Empire (1852—69), and was estimated for 1877 at £106,885,620. Of this large sum £41,630,680 was raised by direct taxes, £24,824,760 by registration duties and stamps, £15,527,160 by direct taxes, and £10,949,200 by customs. In the same year £48,057,133 were paid in interest on the national debt and in annuities, £21,426,530 were expended upon the army,

Fig. 278.—DIAGRAM EXHIBITING THE COMPARATIVE AREAS OF FRANCE AND OF HER COLONIES.



and £7,439,000 upon the navy and the colonies. The cost of collecting the revenue exceeded £10,000,000.*

COLONIES.

THERE still exists within French territory a small "state," enjoying a feeble sort of independence, viz. the rock-city of Monaco, between Nice and Mentone.

* In 1878 the local taxation yielded £18,133,500. This, added to the central revenue, gives a proportion per head of the population amounting to about £3 10s., or more than in England. Of the total revenue of the communes, £8,000,000 is contributed by Paris, where every inhabitant pays £4 annually in local taxes, the rest of France paying only about 6s. per head. Lyons has a revenue of £417,900.

This state, with its Court and Diplomats, however, appears to exist merely in order to give shelter to the gambling-tables no longer permitted in Germany. Andorra, too, maintains a gambling-hell on that slice of its territory which lies on the French slope of the Pyrenees.

But though France suffers these feeble powers to retain small bits of land within her natural frontiers, territories of large extent have been acquired in other parts of the world. This colonial empire of France was of great extent in the last century, when Canada, Louisiana, and vast tracts in India formed a part of it.

Fig. 279.—THE LANGUAGES OF FRANCE.



But the fate of war went against France, and these colonies were lost. Amongst the present colonies of France, Algeria is the most important. Including the protected states of Cambodia, Tahiti, &c., the total area of the French colonies is 299,517 square miles, with a population of 6,533,954 souls. The colonies cannot be said to prosper, and they add but little to the strength of the mother country.

The expansive force of France cannot, indeed, be measured by the extent of her colonies. The true colonies of France are those countries where French ideas are propagated, French books are read, and the French language is spoken. In France itself the differences of dialect disappear by degrees; and the time is approaching when even Basque, Flemish, and Low Breton will cease to be spoken within its boundaries. Passing beyond these boundaries, we find that French is the language of one-half of Belgium and of Eastern Switzerland; of Haiti; of portions of Canada, New Brunswick, and the United States. French is spoken, moreover, by the educated classes of every civilised country, more especially in the south of Europe; and whatever conquests may be made by English in transoceanic countries, the nations of the old world are not likely to abandon French as the most ready medium for exchanging their ideas.

FRANCE AND COLONIES.

AREA AND POPULATION OF FRANCE.

Departments.	Area. Engl. Sq. Miles.	Population.		Inha- bitants to a Sq. Mile.	Arron- disse- ments. No.	Cantons. No.	Com- munes. No.	Capital.
		May, 1872.	Dec. 31, 1876.					
Ain	2,239	363,290	365,462	163	5	36	452	Bourg.
Aisne	2,839	552,439	560,427	198	5	37	837	Laon.
Allier	2,822	390,812	405,783	145	4	28	317	Moulins.
Alpes (Basses-) .	2,685	139,332	136,166	50	5	30	251	Digne.
Alpes (Hautes-).	2,158	118,898	119,094	50	3	24	189	Gap.
Alpes-Maritimes	1,482	199,037	203,614	138	3	25	150	Nice.
Ardèche	2,136	380,277	384,378	183	3	31	339	Privas.
Ardennes	2,020	320,217	326,782	163	5	31	501	Mézières.
Ariège	1,890	246,298	244,795	127	3	20	336	Foix.
Aube	2,317	255,687	255,217	111	5	26	446	Troyes.
Aude	2,438	285,927	300,065	124	4	31	436	Carcassonne.
Aveyron	3,376	402,474	413,826	122	5	42	289	Rodez.
Bas Rhin	235	56,781	68,600	292	1	6	106	Belfort.
Bouches-du- Rhône }	1,971	554,911	556,379	278	3	27	108	Marseille.
Calvados	2,132	454,012	450,220	214	6	38	764	Caen.
Cantal	2,217	231,867	231,086	104	4	23	264	Aurillac.
Charente	2,294	367,520	373,950	162	5	29	426	Angoulême.
Charente- Inférieure }	2,635	465,653	465,628	179	6	40	479	La Rochelle.
Cher	2,780	335,392	345,613	123	3	29	291	Bourges.
Corrèze	2,265	302,746	311,525	138	3	29	287	Tulle.
Corse	3,377	258,507	262,701	78	5	62	364	Ajaccio.
Côte-d'Or	3,383	374,510	377,663	111	4	36	717	Dijon.
Côtes-du-Nord . .	2,659	622,295	630,957	234	5	48	387	St. Brieux.
Creuse	2,150	274,663	278,423	132	4	25	263	Guéret.
Dordogne	3,546	480,141	489,848	138	5	47	582	Périgueux.
Doubs	2,018	291,251	306,094	153	4	27	637	Besançon.
Drôme	2,518	320,417	321,756	128	4	29	370	Valence.
Eure	2,300	377,874	373,629	162	5	36	700	Evreux.
Eure-et-Loir . . .	2,268	282,622	283,075	123	4	24	426	Chartres.
Finistère	2,595	642,963	666,106	256	5	43	285	Quimper.
Gard	2,253	420,131	423,804	192	4	40	347	Nîmes.
Garonne (Haute-)	2,429	479,362	477,730	199	4	39	584	Toulouse.
Gers	2,425	284,717	283,546	118	5	2	455	Auch.
Gironde	3,761	705,149	735,242	194	6	4	551	Bordeaux.

Departments.	Area. Engl. Sq. Miles.	Population.		Inha- bitants to a Sq. Mile.	Arron- disse- ments. No.	Cantons. No.	Com- munes. No.	Capital.
		May, 1872.	Dec. 31, 1876.					
Hérault	2,393	429,878	445,053	185	4	36	335	Montpellier.
Ille-et-Vilaine . .	2,597	589,532	602,712	232	6	43	352	Rennes.
Indre	2,624	277,693	281,248	108	4	23	245	Châteaureux.
Indre-et-Loire . .	2,361	317,027	324,875	136	3	24	281	Tours.
Isère	3,201	575,784	581,099	181	4	45	555	Grenoble.
Jura	1,928	287,634	284,823	152	4	32	584	Lons-le-Saunier.
Landes	3,599	300,528	303,508	117	3	28	331	Mont-de-Marsan.
Loir-et-Cher . . .	2,452	268,801	272,634	111	3	24	297	Blois.
Loire	1,838	550,611	590,613	321	3	30	328	St. Étienne.
Loire (Haute-) . .	1,916	308,732	313,721	164	3	28	262	Le Puy.
Loire-Inférieure .	2,654	602,706	612,972	231	5	45	215	Nantes.
Loiret	2,614	353,021	360,903	138	4	31	349	Orléans.
Lot	2,012	281,404	276,512	137	3	29	321	Cahors.
Lot-et-Garonne . .	2,067	319,289	316,920	153	4	35	319	Agen.
Lozère	1,996	135,190	138,319	69	3	24	194	Mende.
Maine-et-Loire . .	2,749	518,471	517,258	189	5	34	380	Angers.
Manche	2,289	544,776	539,910	236	6	48	643	St. Lô.
Marne	3,159	386,157	407,780	129	5	32	665	Châlons.
Marne (Haute-) . .	2,402	251,196	252,448	105	3	28	250	Chaumont.
Mayenne	1,996	350,637	351,933	176	3	27	274	Laval.
Meurthe-et- Moselle }	2,025	365,137	404,609	201	4	27	596	Nancy.
Meuse	2,405	284,725	294,059	122	4	28	587	Bar-le-Duc.
Morbihan	2,625	490,352	506,573	193	4	37	248	Vannes.
Nièvre	2,632	339,917	346,822	132	4	25	313	Nevers.
Nord	2,193	1,447,764	1,519,585	694	7	61	661	Lille.
Oise	2,261	396,804	401,618	177	4	35	701	Beauvais.
Orne	2,354	398,250	392,526	167	4	36	511	Alençon.
Pas-de-Calais . . .	2,551	761,158	793,140	311	6	44	904	Arras.
Puy-de-Dôme . . .	3,070	666,463	670,207	186	5	50	456	Clermont-Ferrand.
Pyrénées (Basses-)	2,943	426,700	431,525	147	5	40	558	Pau.
Pyrénées (Hautes-) }	1,749	235,156	238,037	136	3	26	480	Tarbes.
Pyrénées- Orientales }	1,592	191,856	197,940	124	3	17	231	Perpignan.
Rhône	1,077	670,247	705,131	653	2	29	264	Lyon.
Saône (Haute-) . .	2,062	303,088	304,052	147	3	28	583	Vesoul.
Saône-et-Loire . .	3,302	598,344	614,309	186	5	50	588	Mâcon.
Sarthe	2,396	446,603	446,239	186	4	33	386	Le Mans.
Savoie	2,224	267,958	268,361	121	4	29	327	Chambéry.
Savoie (Haute-) . .	1,667	273,027	273,801	164	4	28	313	Annecy.
Seine	184	2,220,060	2,410,849	13,102	3	8	72	Paris.
Seine-Inférieure . .	2,330	790,022	798,414	343	5	51	759	Rouen.
Seine-et-Marne . .	2,215	341,490	347,323	157	5	29	529	Melun.
Seine-et-Oise . . .	2,164	580,180	561,990	260	6	36	685	Versailles.
Sèvres (Deux-) . .	2,317	331,243	336,655	145	4	31	356	Niort.
Somme	2,379	557,015	566,641	235	5	41	833	Amiens.
Tarn	2,217	352,718	359,232	162	4	35	317	Alby.
Tarn-et-Garonne . .	1,436	221,610	221,364	154	3	24	194	Montauban.
Var	2,349	293,757	295,763	121	5	28	145	Draguignan.
Vaucluse	1,370	263,451	255,703	187	4	22	160	Avignon.
Vendée	2,588	401,446	411,781	160	3	30	298	Roche-sur-Yon.
Vienne	2,691	320,598	330,916	123	5	31	300	Poitiers.
Vienne (Haute-) . .	2,130	322,447	336,061	157	4	27	212	Limoges.
Vosges	2,266	392,988	407,082	179	5	29	531	Épinal.
Yonne	2,868	363,608	359,070	125	5	37	485	Auxerre.
Total	204,091	36,102,921	36,905,788	181	362	2,863	36,056	

AREA AND POPULATION OF FRENCH COLONIES.

	Area. Engl. Sq. Miles.	Population.	Inhabitants to a Sq. Mile.
AFRICA:—			
Algeria	122,912	2,867,626	23
Senegal	62,000	221,000	3
Gabon	100	5,000	50
Réunion	764	183,163	239
Mayotte, &c.	257	25,196	98
ASIA:—			
India	196	271,460	1,385
Cochinchina	21,707	1,600,000	74
Cambodia (protected)	32,380	890,000	27
AMERICA:—			
St. Pierre and Miquelon	81	5,481	68
Guadeloupe	720	173,149	240
Martinique	381	160,831	422
French Guiana	46,948	32,500	0.7
POLYNESIA:—			
New Caledonia	6,785	58,300	9
Loyalty Islands	830	13,334	16
Marquesas	478	6,011	13
Clipperton	2	no inh.	
Tahiti (protected)	438	10,703	25
Tubuai, Vavitu, Oparo (do.)	56	700	13
Tuamotu Arch. (do.)	2,570	8,000	3
Gambier Islands (do.)	12	1,500	125
Total Colonies	299,517	6,533,954	22
France	204,091	36,905,788	181
Grand Total	503,608	43,439,742	86

FRANCE ;

ITS DEPARTMENTS, NATURAL REGIONS, AND PRINCIPAL COMMUNES IN 1876.

Each Commune consists of a town and its environs. Its population, therefore, is greater than that of the town bearing the same name. In the text the population of the towns is given.

Departments's.	Arrondissements.	Natural Regions.	Communes of over 5,000 Inhabitants.
CORSE (COR-SICA).	AJACCIO, BASTIA, CALVI, CORTE, SARTENE.	Banda di Dentro, Banda di Fuori.	Bastia (17,572), Ajaccio (17,050).

THE PYRENEES, THE LANDES, AND THE BASIN OF THE GARONNE.

PYRÉNÉES-ORIENTALES.	PERPIGNAN, CÉRET, PRADES.	Capsir, Val de Sègre, Vallespir, Aspres, Valleys of the Têt, the Agly, Salanque, &c.	Perpignan (23,353), Rivesaltes (6,329).
ARIÈGE.	FOIX, PAMIERS, ST. GIRON.	Valley of the Ariège, Couserans &c.	Pamiers (8,967), Foix (6,362).
HAUTE-GARONNE.	TOULOUSE, MURET, ST. GAUDENS, VILLEFRANCHE.	Lauraguais, Couserans, Comminges, Nébouzan, Quatre-Vallées, Lomagne, Toulousain.	Toulouse (131,642), St. Gaudens (5,955), Revel (5,613).
PYRÉNÉES (HAUTES-).	TARBES, AROELÈS, BAGNÈRES.	Valleys of the Aure and the Adour; Plateau of Lannemezan, Nébouzan, Astarac.	Tarbes (21,293), Bagnères (9,508), Lourdes (5,471).
PYRÉNÉES (BASSES-).	PAU, BAYONNE, MAU- LEON, OLORON, ORTHEZ.	Valley of the Gaves of Béarn, Soule, Labourd, Lower Navarre, Landes, Touyas.	Pau (28,908), Bayonne (27,416), Oloron Ste. Marie (8,644), Orthez (6,624), Hasparren (5,566), Biarritz (5,507), Salies (5,140).
GERS.	AUCH, CONDOM, LECTOURE, LOM- REZ, MIRANDE.	Comminges, Astarac, Armagnac.	Auch (13,785), Condom (7,873), Lectoure (5,507).
TARN-ET-GARONNE.	MONTAUBAN, CASTEL- SARRASIN, MOISSAC.	Plateau of Quercy, Valley of the Garonne, Lomagne.	Montauban (26,952), Moissac (9,137), Castel-Sarrasin (6,906).
LOT-ET-GARONNE.	AGEN, MARMANDE NÉRA C, VILLE- NEUVE-D'AGEN.	Agenais, Lomagne, Armagnac.	Agen (19,503), Villeneuve (14,448), Marmande (8,961), Tonneins (8,199), Nérac (7,586).

THE PYRENEES, THE LANDES, AND THE BASIN OF THE GARONNE—(Continued).

Departments.	Arrondissements.	Natural Regions.	Communes of over 5,000 Inhabitants.
LANDES.	MONT-DE-MARSAN, DAX, ST. SEVER.	Landes, Buch, Marausin, Chalosse.	Dax (10,250), Mont-de-Marsan (9,310).
GIRONDE.	BORDEAUX, BAZAS, BLAYE, LA RÉOLE, LESPARRÉ, LIBOURNE.	Landes, Médoc, Bordelais, Bazadais, Bénange, Entre-Deux-Mers, Libournais, Blayais.	Bordeaux (215,140), Libourne (15,231), Bègles (6,202), Caudéran (5,306), La Teste (5,314), Bazas (5,073).

THE ALPS, THE RHÔNE, AND THE MEDITERRANEAN COAST REGIONS.

AUDE.	CARCASSONNE, CASTELNAUDARY, LIMOUX, NARBONNE.	Montagne Noire, Corbières, Razès, Lauraguais, Valley of the Aude, Lagoons (Étangs).	Carcassonne (25,971), Narbonne (19,968), Castelnaudary (9,042), Limoux (6,661).
HÉRAULT.	MONTPELLIER, BÉZIERS, LODÈVE, ST. PONS.	Cévennes, Valleys of the Lez, the Hérault, the Orb, and the Aude, Lagoons.	Montpellier (55,258), Béziers (38,227), Cette (28,696), Lodève (10,528), Lunel (8,315), Agde (8,251), Pézenas (7,966), Bédarieux (7,961), Méze (6,825), Clermont-l'Hérault (5,964), St. Pons (5,809).
GARD.	NÎMES, ALAIS, LE VIGAN, UZÈS.	Cévennes, Valleys of the Gardons, Vaunage, Garrigues, Marshes, and Dunes.	Nîmes (63,001), Alais (20,893), Bessèges (10,668), La Grand-Combe (10,152), Beaucaire (8,777), St. Gilles (6,302), Uzès (5,585), Le Vigan (5,389), Anduze (5,110).
ARDÈCHE.	PRIVAS, LARGENTIÈRE, TOURNON.	Mountains of Vivarais, Coiron, Valley of the Rhône.	Annonay (15,848), Aubenas (7,781), Privas (7,753), Tournon (6,083).
BOUCHES-DU-RHÔNE.	MARSEILLE, AIX, ARLES.	Camargue, Crau, Valley of the Durance, Hill Region, Shore Region.	Marseille (318,868), Aix (28,693), Arles (25,095), Tarascon (10,409), La Ciotat (10,058), Aubagne (8,027), Salon (7,021), Martigues (6,963), St. Remy (5,999).
VAR.	DRAGUIGNAN, BRIGNOLES, TOULON.	Basin of the Argens, Mountains of the Moors, Valley of the Gapeau, Shore Region.	Toulon (70,609), Hyères (12,289), La Seyne (10,655), Draguignan (9,223), Brignoles (5,840).
ALPES-MARITIMES.	NICE, GRASSE, PUGET-THÉNIERS.	Valleys of the Roya, the Vésublic, the Tinée, and the Var, Shore Region.	Nice (53,397), Cannes (14,022), Grasse (13,087), Menton (7,819), Antibes (6,752).
VAUCLUSE.	AVIGNON, APT, CARPENTRAS, ORANGE.	Ventoux, Léberon, Palus, Valleys of the Rhône and of the Durance.	Avignon (38,008), Carpentras (10,479), Orange (10,212), Cavaillon (8,454), L'Isle (6,508), Apt (5,687), Pertuis (5,649), Bollène (5,478).
ALPES (HAUTES-).	GAP, BRIANÇON, EMBRUN.	Queyras, Oisans, Champsaux, Dévoluy.	Gap (9,294).
ALPES (BASSES).	DIGNE, BARCELONNETTE, CASTELLANE, FORCALQUIER, SISTERON.	Mountains of Upper Provence, Valley of the Durance.	Digne (7,222), Manosque (6,136).
DRÔME.	DIE, MONTÉLIMART, NYONS, VALENCE.	Dévoluy, Diois, Forest of Saou, Tricastin, Valley of the Rhône.	Valence (23,220), Romans (12,923), Montélimart (11,946), Crest (5,600).
ISÈRE.	GRENOBLE, LA TOURDU-PIN, ST. MARCELLIN, VIENNE.	Oisans, Dévoluy, Lans, Vercors, Grande-Chartreuse, Grandes-Rousses, Sept-Laux, Graisivaudan, Bièvre.	Grenoble (45,426), Vienne (26,502), Voiron (11,064), Bourgoin (5,021).
SAVOIE.	CHAMBÉRY, ALBERTVILLE, MOUTIERS, ST. JEAN-DE-MAURIENNE.	Plain of Savoy, Bauges, Msurienne, Tarentaise.	Chambéry (18,545).
SAVOIE (HAUTE-).	ANNECY, BONNEVILLE, ST. JULIEN, THONON.	Génois, Faucigny, Chablais.	Annecy (10,976), Thonon (5,501).

THE JURA AND THE BASIN OF THE SOMME.

Departments.	Arrondissements.	Natural Regions.	Communes of over 5,000 Inhabitants.
AIN.	BOURG, BELLEY, GEN, NANTUA, TRÉVOUX.	Jura, Bugey, Dombes, Bresse.	Bourg (15,692).
JURA.	LONS - LE - SAUNIER, DÔLE, POLIGNY, ST. CLAUDE.	Mountains and table-land of the Jura, Bresse, Finage.	Dôle (12,924), Lons-le-Saunier (11,311), St. Claude (7,550), Salins (6,271), Morez (5,419), Arbois (5,027), Poligny (5,010).
DOUBS.	BESANÇON, BAUMELLES-DAMES, MONTBÉLIARD, PONTARLIER.	Mountains and table-land of the Jura.	Besançon (54,404), Montbéliard (8,938), Pontarlier (5,714).
RHIN (BAS-). SAÔNE (HAUTE-). CÔTE-D'OR.	BELFORT. VESOUL, GRAY, LURE. DIJON, BEAUNE, CHÂTILLON-SUR-SEINE, SEMUR.	Gap of Belfort. Vosges, Faucilles, Mountains of Lure, Valley of the Saône. Morvan, Auxois, Châtillonnais, Côte-d'Or, Plain of the Saône.	Belfort (15,173). Vesoul (9,206), Gray (7,401), Fougerolles (5,459). Dijon (47,939), Beaune (11,421), Auxonne (6,532).
SAÔNE - ET - LOIRE.	MÂÇON, AUTUN, CHÂLON - SUR - SAÔNE, CHAROLLES, LOUHANS.	Morvan, Autunnais, Charollais, Brionnais, Bresse.	Le Creusot (26,432), Châlon-sur-Saône (20,895), Mâcon (17,570), Autun (12,889), Montcau-les-Mines (11,011), Tournus (5,527).
RHÔNE.	LYON, VILLEFRANCHE.	Mountains of Lyonnais and Beaujolais, Valleys of the Saône and the Rhône.	Lyon (342,815), Tarare (14,383), Villefranche (12,485), Givors (11,910), Villeurbanne (9,033), Caluire - et - Cuire (8,702), Amplepuis (6,915), Cours (6,157), Oullins (5,674), Venissieux (5,224), Ste. Foylès-Lyon (5,118).

THE CENTRAL PLATEAU.

LOZÈRE.	MENDE, FLORAC, MARYEJOIS.	Plateau of Gévaudan.	Mende (7,300).
LOIRE (HAUTE-). AVEYRON.	LE PUY, BRIOUDE, YSSINGEAUX. RODEZ, ESPALION, MILLAU, ST. AFFRIQUE, VILLEFRANCHE.	Plateau of Velay. Causses, Ségales, Hills of Rouergue.	Le Puy (19,250), Yssingaux (8,371). Millau (15,695), Rodez (13,375), Villefranche (10,124), Aubin (9,864), Decazeville (9,547), St. Affrique (7,622).
TARN.	ALBY, CASTRES, GAILLAC, LAVAUR.	Montagne Noire, Hills of Lacaune, Sidobre, Albigeois.	Castres (25,856), Alby (19,169), Mazamet (14,168), Gaillac (8,124), Lavaur (7,563), Graulhet (6,940), Carmaux (6,160), Rabastens (5,161), Paylaurens (5,141).
LOT.	CAHORS, FIGEAC, GOURDON.	Causse of Lot, Valleys of the Dordogne and the Lot.	Cahors (13,660), Figeac (7,333), Gourdon (5,098).
CANTAL.	AURILLAC, MAURIAU, MURAT, ST. FLOUR.	Cézallier, Cantal, Planèze.	Aurillac (11,211), St. Flour (5,381).
PUY-DE-DÔME.	CLERMONT-FERRAND, AMBERT, ISSOIRE, RIOM, THIERS.	Plateau of Auvergne, Mountains of Forez, Valley of the Limagne.	Clermont (41,772), Thiers (16,343), Riom (10,801), Issoire (6,250), St. Rémy (5,572).
CORRÈZE. DORDOGNE.	TULLE, BRIVE, USSEL, PÉRIGUEUX, BÉNGÉAC, NONTRON, RIBÉAC, SARIAT.	Plateau of Limousin. Périgord, Nontronnais, Sarladais, Valley of the Dordogne, Double.	Tulle (15,342), Brive (11,920). Périgueux (24,169), Bergéac (13,120), Sarlat (6,554).
VIENNE (HAUTE-).	LIMOGES, BELLAC, ROCHE - CHOUART, ST. YRIEIX.	Plateau of Limousin.	Limoges (59,011), St. Junien (8,221), St. Yrieix (7,429), St. Léonard (5,989).
CREUSE.	GUÉRET, AUBUSSON, BOURGANEUF, BOUSSAC.	Plateaux of Marche and Limousin.	Aubusson (6,847), Guéret (5,859).
ALLIER.	MOULINS, GANNAT, LA PALISSE, MONTLUÇON.	Plateaux of Bourbonnais, Valleys of the Loire and the Allier.	Montluçon (23,416), Moulins (21,774), Commentry (12,978), Vichy (6,428), Gannat (5,568), Cusset (6,308), Montvicq (6,242).

THE CENTRAL PLATEAU.—(Continued).

Departments.	Arrondissements.	Natural Regions.	Communes of over 5,000 Inhabitants.
LOIRE.	ST. ÉTIENNE, MONTBRISON, ROANNE.	Hills of Forez, Valley of the Loire, Beaujolais.	St. Étienne (126,019), Roanne (22,797), Rive - de - Gier (15,004), St. Chamond (14,420), Firminy (11,972), Chambon-Fengerolles (8,314), Ricamarie (6,700), Terrenoire (6,378), Montbrison (6,363), St. Julien-en-Jarrot (6,230), Chazelles-sur-Lyon (5,915), Issieux (5,194), Panissières (5,017).

CHARENTE AND VENDEÉE.

CHARENTE.	ANGOULÈME, BARREZIEUX, COGNAC, CONFOLENS, RUFFEC.	Confolennais, Terres-Chaudes, Pays-Bas, Bois, Champagne, Double.	Angoulême (30,513), Cognac (14,900).
CHARENTE-INFÉRIEURE.	LA ROCHELLE, JONZAC, MARENNES, ROCHFORT, ST. JEAN - D'ANGÉLY, SAINTES.	Double, Champagne, Bocage, Marais.	Rochefort (27,012), La Rochelle (19,533), Saintea (13,725), St. Jean - d'Angély (7,172), St. Georges (5,208), Royan (5,155).
VIENNE.	POITIERS, CHÂTELLERAULT, CIVRAY, LOUDUN, MONTMORILLON.	Plateau, Valleys of the Vienne and the Charente.	Poitiers (33,253), Châtellersult (18,053), Montmorillon (5,105).
SÈVRES (DEUX-).	NIORT, BRESSUIRE, MELLE, PARTHENAY.	Bocage, Plain, Marsh.	Niort (20,923), Parthenay (5,091).
VENDEÉE.	LA ROCHE-SUR-YON, FONTENAY - LE - COMTE, SARLES-D'OLONNES.	Bocage, Plain, Marsh, Islands.	Roche - sur - Yon (Napoléon) (9,755), Sables - d'Olonne (9,347), Fontenay-le-Comte (8,453), Luçon (6,247), Noirmontier (5,787).

THE BASIN OF THE LOIRE.

NIÈVRE.	NEVERS, CHÂTEAUX-CHINON, CLAMECY, COSNE.	Morvan, Valleys of the Yonne and the Loire.	Nevers (22,704), Cosne (6,851), Fourchambault (5,884), Clamecy (5,432), La Charité (5,086).
CHER.	BOURGES, ST. AMAND-MONT-ROND, SANCERRE.	Plateau, Sologne.	Bourges (35,785), Vierzon-Ville (8,995), St. Amand-Mont-Rond (5,499), Vierzon-Village (6,731), Mehun-sur-Yèvre (6,326), Dun-le-Roi (5,001).
INDRE.	CHÂTEAURoux, LE BLANC, LA CHÂTRE, ISSOUDUN.	Champagne, Bois - Chaud, Brenne.	Châteauroux (19,442), Issoudun (13,703), Le Blanc (6,122), Buzançaia (5,109), Argenton (5,582).
LOIRET.	ORLÉANS, GIEN, MONTARois, PITHIVIERS.	Sologne, Val. Puisaye, Gâtinais, Forest of Orléans, Beauce.	Orléans (52,157), Montargis (9,175), Gien (7,555), Briare (5,152), Pithiviers (5,006).
LOIR-ET-CHER.	BLOIS, ROMORANTIN, VENDÔME.	Beauce, Val, Sologne.	Blois (20,515), Vendôme (9,221), Romorantin (7,826).
EURE-ET-LOIR.	CHARTRES, CHÂTEAUDUN, DREUX, NOGENT-LE-ROTHOU.	Beauce, Dunois, Drouais, Thy-mérais, Perche.	Chartres (20,468), Dreux (7,922), Nogent - le - Rotrou (7,633), Châteaudun (6,694).
INDRE-ET-LOIRE.	TOURS, CHINON, LOCHES.	Gâtine, Varenne, Champeigne, Plateau of St. Maure, Brenne.	Tours (48,325), Chinon (6,301), Loches (5,085).
MAINE-ET-LOIRE.	ANJERS, BAUGÉ, CHOLET, SAUMUR, SGRÉÉ.	Anjou, Vallée, Mauges, Bocage.	Angers (56,846), Cholet (14,288), Saumur (13,822), Chalonnes-sur-Loire (5,530), Trelazé (5,264).
SARTHE.	LE MANS, LA FLÈCHE, MAMERS, ST. CALAIS.	Coëvrons, Lower Maine, Belinois, Gâtine.	Le Mans (50,175), La Flèche (9,405), Sablé (5,947), Mamera (5,342).
MAYENNE.	LAVAL, CHÂTEAUGONTIER, MAYENNE.	Coëvrons, Upper Maine, Craonnais.	Laval (27,107), Mayenne (10,098), Châteaue - Gontier (7,218), Ernée (5,336).

THE BASIN OF THE LOIRE—(Continued).

Departments.	Arrondissements.	Natural Regions.	Communes of over 5,000 Inhabitants.
LOIRE - INFÉ- RIEURE.	NANTES, ANGENIS, CHATEAUBRIANT, PAIMBEUF, ST. NAZAIRE.	Plateau of Brittany, Valley of the Loire, Brière, Guérande, Retz.	Nantes (122,247), St. Nazaire (18,300), Chantenay (9,953), Rezé (6,849), Blain (6,807), Guérande (6,804), Guéméné- Penfao (6,167), Nort (5,765), Vertou (5,471), Chateaubriant (5,228), Vallet (5,200), An- genis (5,177), Plessé (5,154).

BRETAGNE (BRITTANY).

MORBIHAN.	VANNES, LORIENT, PLOËRMEL PON- TIVY.	Landes of Lanvaux, Vannetais, Coast Region, Islands.	Lorient (35,165), Vannes (17,946), Ploermeur (10,600), Pontivy (8,252), Languidic (6,433), Hennebont (6,050), Sarzeau (5,718), Caudan (5,707), Ploërmel (5,505).
FINISTÈRE.	QUIMPER, BREST, CHATEAULIN, MOR- LAIX, QUIMPERLÉ.	Cornouaille, Montagne Noire, Valley of the Aulne, Landes of Carhaix, Hills of Arrière, Léon.	Brest (66,828), Morlaix (15,183), Quimper (13,879), Lambé- zellec (12,379), Douarnenez (8,637), Landerneau (8,195), Crozon (7,763), St. Pol de Léon (7,005), Quipavas (6,802), Quimperlé (6,533), Plougastel-Daoulas (6,506), St. Pierre-Quilbignon (6,301), Briec (5,906), Plougerneau (5,951), Pleyben (5,229).
CÔTES-DU- NORD.	ST. BRIEUC, DINAN, GUINGAMP, LAN- NION, LOUDÉAC.	Monts Menez, Léon, Trégorrois.	St. Brienc (16,355), Dinan (8,180), Guingamp (7,895), Lannion (6,294), Loudéac (5,901), Plévin (5,664), Plouha (5,229).
ILLE-ET- VILAINE.	RENNES, FOUÈRES, MONTFORT, REDON, ST. MALO, VITRÉ.	Basin of the Vileine, Marsh of Dol, Pays Malouin.	Rennes (57,177), St. Servan (12,281), Fougères (11,873), St. Malo (10,295), Vitry (9,870), Le Grand Fougeré (6,370), Cancale (6,239), Red- on (6,446), Combourg (5,558), Pleurtuit (5,238).

LOWER NORMANDY AND COTENTIN.

MANCHE.	ST. LÔ, AVRANCHES, CHERBOURG, COUTAN- CES, MORTAIN, VALOGNES.	Avranchin, Cotentin, Hague, Marais (Marsh).	Cherbourg (37,186), Granville (12,527), St. Lô (9,706), Avranches (8,157), Coutances (8,008), Valognes (5,831), Tourlaville (5,757).
ORNE.	ALENÇON, ARGENTAN, DOMFRONT, MOR- TAGNE.	Perche, Merlerault, Alençon- nais, Marches.	Alençon (16,615), Flers (11,155), La Ferté-Macé (9,769), Ar- gentan (5,788), Laigle (5,196).
CALVADOS.	CAEN, BAYEUX, FA- LAISE, LISIEUX, PONT - L'ÉVÊQUE, VIRE.	Bocage, Campagne of Caen, Auge, Lieuvin, Ouche.	Caen (41,181), Lisieux (18,396), Hénfleux (9,425), Bayeux (8,614), Falaise (8,428), Condé-sur-Noireau (7,350), Vire (6,718), Trouville (5,886).

BASIN OF THE SEINE.

YONNE.	AUXERRE, AVALLON, JOIGNY, SENS, TONNERRE.	Avallonnais, Auxerrois. Pui- sue, Gâtinais, Sénonais.	Auxerre (16,239), Sens (12,309), Joigny (6,317), Avallon (5,930), Tonnerre (5,536), Villeneuve-sur-Yonne (5,084).
AUBE.	TROYES, NOGENT- SUR-SEINE, ARCIS- SUR-AUBE, BAR- SUR-AUBE, BAR- SUR-SEINE.	Champagne.	Troyes (41,375), Romilly-sur- Seine (5,190).

BASIN OF THE SEINE—(Continued).

Departments.	Arrondissements.	Natural Regions.	Communes of over 5,000 Inhabitants.
MARNE (HAUTE-). MARNE.	CHAUMONT, LANORES, VASSY. CHÂLONS, ÉPERNAY, REIMS, STE. MENE- HOULD, VITRY-LE- FRANÇOIS.	Plateau of Langres, Bassigny, Vallage, Perthois. Bocage, Perthois, Argenne, Champagne Pouilleuse, Brie, Rémois, Tardenois.	St. Dizier (12,754), Langres (10,376), Chaumont (9,226). Reims (81,328), Châlons-sur- Marne (20,236), Épernay (15,506), Vitry-le-François (7,616), Ay (5,063).
SEINE-ET- MARNE.	MELUN, COULOM- MIERS, FONTAINE- BLEAU, MEAUX, PROVINS.	Brie, Gâtinais.	Meaux (11,739), Fontainebleau (11,653), Melun (11,241), Provins (7,593), Montereau- fault-Yonne (7,041), Coulem- miers (5,240).
SEINE.	PARIS, ST. DENIS, SCEAUX.	Paris Basin.	Paris (1,988,806), St. Denis (34,908), Levallois-Perret (22,744), Boulogne (21,556), Neuilly (20,781), Vincennes (18,243), Clichy (17,354), Ivry (15,247), Aubervilliers (14,340), Montreuil (13,607), Pantin (13,665), Putaux (12,181), Courbevoie (11,934), St. Ouen (11,255), Gentilly (10,378), Issy (9,484), Charen- ton-le-Pont (8,822), Vanves (8,812), St. Maur (8,433), Asnières (8,278), Maisons- Alfort (7,619), Nogent-sur- Marne (7,559), St. Mandé (7,499), Colombes (6,640), Montrouge (6,371), Suresnes (6,149), Choisy-le-Roi (5,821), Arenail (5,299).
SEINE-ET- OISE.	VERSAILLES, CORBEIL, ÉTAMPES, MANTES, PONTOISE, RAM- BOUILLET.	Gâtinais, Hurepoix, Beauce, Mantois, French Vexin.	Versailles (49,847), St. Germain- en-Laye (17,199), Argenteuil (8,990), Rueil (8,867), Étampes (7,840), Sèvres (6,552), Meu- don (6,425), Pontoise (6,412), Corbeil (6,392), Mantes (5,649), Essennes (5,334), Poi-sy (5,063).
AISNE	LAON, CHÂTEAU- THIERRY, SOISSONS, ST. QUENTIN, VERVINS.	Brie, Valois, Tardenais, Laon- nais, Vermaudois, Soissonnais, Thiérache.	St. Quentin (38,924), Laon (12,132), Soissons (11,089), Chauny (9,198), Château- Thierry (6,902), Guise (6,250), Bobain (6,005).
OISE.	BEAUVAIS, CLERMONT, COMPIÈGNE, SEN- LIS.	Noyonnais, Beauvaisis, Sau- terre, Bray, Vexin.	Beauvais (16,600), Compiègne (13,393), Senlis (6,545), Noyon (6,439), Clermont (6,101), Creil (5,737), Montataire (5,105).
EURE.	ÉVREUX, LES ANDE- LYS, BERNAY, LOU- VIERS, PONT-AUDE- MER.	Norman Vexin, Campagne of Évreux and St. André, Ouche, Lieuvin, Roumois.	Évreux (14,627), Louviers (10,913), Bernay (7,644), Ver- non (6,636), Pont-Audemer (5,942), Les Andelys (4,574).
SEINE-INFÉ- RIEURE.	ROUEN, DIEPPE, LE HAVRE, NEUCHÂ- TEL, YVETOT.	Roumois, Great and Little Caux.	Rouen (104,902), Le Havre (92,068), Elbeuf (22,213), Dieppe (20,333), Fécamp (12,684), Sotteville-lès-Rouen (11,763), Caudebec-lès-Elbeuf (11,338), Bolbec (11,105), Yvetot (8,444), Petit-Quévilly (6,250), Darnétal (5,618), Lillebonne (5,396).

NORTHERN FRANCE.

SOMME.	AMIENS, ARBEVILLE, DOULLENS, MONT- DIDIER, PÉRONNE.	Vermandois, Santerre, Amié- nois, Vimeu, Ponthieu, Mar- quenterre.	Amiens (65,866), Abbeville (19,381), Villers-Bretonneux (5,356).
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NORTHERN FRANCE—(Continued).

Departments.	Arrondissements.	Natural Regions.	Communes of over 5,000 Inhabitants.
PAS-DE-CALAIS.	ARRAS, BÉTHUNE, BOULOGNE, MONTREUIL-SUR-MER, ST. OMER, ST. POL.	Artois, Penthiou, Boulonnais, Calaisis, Pays-Bas (Lowlands).	Boulogne (40,075), Arras (26,764), St. Pierre-lès Calais (25,853), St. Omer (21,855), Calais (12,573), Béthune (9,315), Lens (9,383), Carvin (7,471), Lillers (7,003), Hénin-Liétard (5,491), Liévin (5,463).
NORD.	LILLE, AVESNES, CAMBRAI, DOUAL, DUNKERQUE, HAZEBROUCK, VALENCIENNES.	French Hainaut, Cambrésis, Pévèle, Wallon Flanders, Flemish Flanders, Waeteringhes, Moères, Dunes.	Lille (162,775), Roubaix (83,661), Tourcoing (48,634), Dunkerque (35,071), Douai (26,999), Valenciennes (26,083), Cambrai (22,079), Armentières (21,746), Wattrelos (15,325), Maubeuge (14,398), Denain (14,419), Halluin (13,771), Bailloul (12,968), Fourmiers (11,888), Hazebrouck (9,857), Le Cateau (9,597), Anzin (9,009), Marq-en-Barœul (8,411), Gravelines (7,833), La Madeleine (7,461), Estaires (6,949), Hautmont (6,973), Merville (6,912), Loos, (6,706) Commines (6,409), Solesmes (6,443), Fresnes (6,045), Croix (5,741), Vieux-Condé (5,681), Aniches (5,484), Haubardin (5,379), Bergues (5,368), Somain (5,110), Seclin (5,022), Quesnoy-sur-Deule (5,014).

THE VOSGES. BASINS OF THE MEUSE AND THE MOSELLE.

MEUSE.	BAR-LE-DUC, COMMERCEY, MONTMÉDY, VERDUN.	Barrois, Verdunois, Argonne, Woëvre.	Bar-le-Duc (16,728), Verdun-sur-Meuse (15,781), St. Mihiel (5,178), Commercy (5,151).
ARDENNES.	MÉZIÈRES, RETHEL, ROCROY, SEDAN, VOUZIERS.	Champagne, Argonne, Rethelois, Plateau of Ardenne.	Sedan (16,593), Charleville (13,759), Rethel (7,415), Givet (5,575), Mézières (5,319), Nouzon (5,411).
VOSGES.	ÉPINAL, MIRECOURT, NEUCHÂTEAU, REMIREMONT, ST. DIÉ.	Vosges, Faucilles, Slope towards the Saône, Slope towards the Moselle.	Épinal (14,894), St. Dié (14,511), Remiremont (7,866), Val d'Ajol (7,173), Gérardmer (6,543), Rambervillers (5,281), Mirecourt (5,266).
MEURTHE-ET-MOSELLE.	NANCY, BRIEY, LUNÉVILLE, TOUL.	Valleys of Lorraine, Teulois, Woëvre.	Nancy (66,303), Lunéville (16,041), Pont-à-Mousson (10,970), Toul (10,035), Baccarat (5,764).



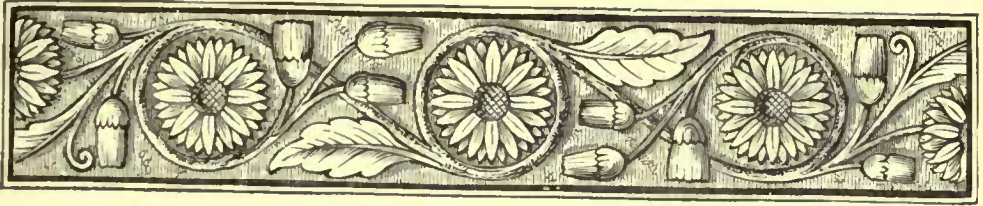
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SWITZERLAND.*

CHAPTER I.

GENERAL ASPECTS.—THE ALPS.†



THE Helvetian Republic, or Switzerland, named after Schwitz, one of the least of its cantons, occupies a small area in comparison with that of the neighbouring states. Two hundred Switzerlands would scarcely equal Europe in area; and in huge empires, such as Russia or Brazil, a territory so small in extent would hardly be deemed deserving of notice, and on some maps even its name would be looked for in vain.

Yet, notwithstanding its smallness, Switzerland, owing to its geographical position, is one of the most important countries of Europe. Taken as a whole, and in spite of its erratic boundaries, the result of wars and political vicissitudes, it occupies the very centre of what must be looked upon as the true Europe. Within it rise the most important, though not the highest, ranges of the Alps, having a large portion of their surface covered with perpetual snow and ice. Within it rise some of the most considerable rivers of Central Europe. Swiss lakes and glaciers are reservoirs of the water which fertilises many of the surrounding plains; and to these snow-clad Helvetian Alps the plains of Lombardy, the valley of the Rhône, and Southern Germany are largely indebted for their prosperity.

In a former age these bold mountains were much dreaded, and travellers avoided the savage gorges and difficult roads of Switzerland, preferring to make wide détours in order that they should not be obliged to cross the Alps where they are highest. All this is changed now; and travellers in thousands annually visit Switzerland to admire its glaciers, its mountain scarps and waterfalls, and

* Berlepsch, "Schweizer Kunde;" Studer, "Geologie der Schweiz;" Tschudi, "Thier leben der Alpenwelt;" Max Wirth, "Beschreibung und Statistik der Schweiz;" Egli, "Schweizer Kunde;" Hepworth Dixon, "The Switzers."

† "Annals of the Swiss Alpine Clubs;" "Bulletin Vaudois des Sciences Naturelles;" G. Studer, "Ueber Eis und Schnee;" Oswald Heer, "Le Monde Primitif de la Suisse;" Theobald, "Natur-Bilder aus den Rhätischen Alpen;" Jaccard, "Matériaux pour l'Histoire Géologique de la Suisse."

a country which formerly proved so deterrent now exercises a most powerful attraction. A new passion has arisen amongst men, that of mountain climbing, and hence the multitudes who now admire Lake Lemán, the glacier of the Rhône, the falls of Handeck, and the snows of the Jungfrau, virgin no longer. Switzerland has become the common meeting-place of all these whose hearts beat with emotion when contemplating the superb spectacles there offered by nature, and something seems to be wanting until we have looked upon the Alps at least once in our lives. The very name of Switzerland evokes in our mind the idea of incomparable landscapes; and many districts all over Europe are known as "Little" Switzerlands, because their scenery recalls some of the majesty or beauty of that wondrous land.

But Switzerland also deserves to be studied on account of its history, political institutions, and inhabitants. The geographical position of that country has preserved it from many vicissitudes which visited its neighbours, Italy, France, and Germany. In their mountain recesses the inhabitants were not only better able than the dwellers in the plains to preserve ancient customs and traditions, but, being in the enjoyment of greater political liberty, they were enabled to secure a prominent position as regards material wealth and education. Statistics prove that Switzerland occupies a foremost place amongst civilised nations, and it is the duty of the geographer to search out the causes of this pre-eminence.*

Great, apparently, is the disorder which reigns in the arrangement of the mountain masses, spurs, and precipices of the Helvetian Alps. But though oscillations of the soil, avalanches, torrents, and other geological agencies have been actively at work for centuries, we are still able to perceive that as a whole the mountains of Switzerland radiate from a central group.

This group, the key of the entire system, is the St. Gotthard; and the ranges of Ticino, the mountain masses of the Simplon, the Bernese Oberland, the Titlis, the Tödi, and the Grisons all converge upon it. As recently as the middle of the last century the summits of the St. Gotthard were thought to be the culminating points, not only of Switzerland, but of the whole of Europe. Colonel Michel du Crêt, in 1755, estimated their height at 18,000 feet; and it was thought absolutely necessary that mountains from which descended so many rivers must be of corresponding height. Further investigation has established the fact that the volume of a river is altogether independent of the height at which it rises. Still there cannot be a doubt that the elevation of the St. Gotthard was much greater formerly than it is now. In proof of this geologists refer us to the actual shape of the mountain, whose granitic core and outer envelope of schists and limestone have been exposed to an immense amount of destruction, causing its summit to have the appearance of a wrecked dome of huge proportions. Even in our own days geological agencies are busily at work reducing the height of

* Area of Switzerland, 15,992 square miles, of which 26,830 square miles are habitable. Population (1877), 2,780,000 souls, or 172 to the square mile. Average height of the entire country above the sea-level, 4,260 feet.

the mountain. The rounded, water-worn rocks which cover its slopes, and numerous small depressions filled with ice or water, according to the season, are evidences of the work of erosion. The torrents which rise in the snows of this mountain mass have carried away the débris that filled up the ancient lakes, and the lower plains have been covered with a layer of alluvial soil.

In our own days, the St. Gotthard, instead of being the culminating point of the Central Alps, is one of the least elevated of their summits. Its peaks barely reach a height of 10,000 feet, and they scarcely pierce the snow-line. Even if we joined to the group of the St. Gotthard the crescent-shaped mountain rampart extending for a distance of 20 miles between the Passes of Nufenen and Lukmanier, we should not meet with mountain giants of the first rank, whilst the glaciers of that portion of the Alps are altogether inferior.* Thanks to this depression in the crest of the Alps, and to the valleys which converge towards it, the region of the St. Gotthard affords the greatest facilities for crossing the mountains. The heads of the great valleys which the Rhine and the Rhône have excavated for themselves meet here, as do the transversal valleys of the Reuss and the Ticino. The high valley of Andermatt, an ancient lake basin, now alternately covered with luxuriant grass or with a winding-sheet of snow, thus occupies the real orographical centre of all Switzerland; and it is not a mere accident if the four cardinal roads of the Alps converge upon it. A great town would have grown up there were it not for the rigours of the climate. But towns, and even villages, can prosper only in more southern climes at such a height, and hence the political centre around which the cantons of Switzerland have grouped themselves has grown up at the mouth of the gorge of the St. Gotthard. It is there we meet with the famous village of Altdorf, the capital of the proud and uncultured people of Uri, who adopted a wild bull for their symbol, and in many a campaign marched at the head of the Confederates.

The valleys which open out to the south of the St. Gotthard, and which are traversed by tributaries of the Po, were the first conquests made upon foreign soil by the people of Uri. Politically these valleys form part of Switzerland, and their inhabitants are undoubtedly contented with their lot; but Ticino is, nevertheless, Italian by climate, vegetation, and inhabitants, no less than the Valteline and the other valleys on the Piemontese and Lombard slopes of the Alps. The upper valley of the Ticino, resembling a huge fosse excavated at the foot of the St. Gotthard, forms a well-defined geographical boundary. The mountains of Central Switzerland rise abruptly above it, whilst in the north they slope down more gently. One portion of this southern slope, however, spreads out into a wide plateau before it sinks down abruptly towards the valley of the Ticino. We refer to the beautiful Val Piora, with its lakes embosomed amidst a carpet of flowers during summer. The eastern prolongation of this plateau abuts upon the pastures of the Lukmanier, where the central crest of the Alps can scarcely

* Average height of summits (according to Studer), 9,414 feet; culminating peak of the St. Gotthard (Pizzo Rotondo), 10,463 feet; Pass of St. Gotthard, 6,937 feet; Pass of Nufenen, 8,003 feet; Pass of Lukmanier, 6,290 feet.

be traced, only a few isolated rocks remaining as geological witnesses of a mountain range which time has swept away.

The group of the Ticino is composed, for the most part, of the crystalline rocks also met in the St. Gotthard. It is more elevated than the latter, the Basodino rising to a height of 10,649 feet, but only a small number of the other peaks exceed 8,200 feet. Southern in aspect, and receiving a very considerable amount of rain, the mountains of Ticino are worn and ravined more rapidly than any others in Switzerland. Every peak there resembles a huge ruin, its sides eaten into by the erosive action of water, and its foot encumbered with masses of fallen rocks. Traces of ancient lakes are frequent, but the pent-up waters have long

Fig. 280.—VAL PIORA AND THE LUKMANIER.

Scale 1 : 100,000.



ago succeeded in sweeping away the obstacles which confined them. Elsewhere the sites of villages buried beneath avalanches of rock are pointed out, and there are some even which slid down the mountain slopes together with the soil upon which they were standing. The "Cento Valli," which joins that of the Maggia a short distance above its embouchure into the Lago Maggiore, has been named thus on account of its innumerable ravines and heaps of débris resulting from the combined action of snow and rain. The torrents on the Italian side of the Alps do greater mischief than those on the north, whose current is far more gentle; and, when in flood, they carry vast masses of rock down with them from the mountains. But, in spite of this, the people of Ticino, intent merely upon a present advantage, go on devastating the forests still covering their mountain

actually passes through several very elevated mountains, including those of the Mischabel-Hörner, the highest summits situated wholly upon Swiss soil. But this ancient mountain crest, being formed of mica slate, limestone, and felspathic rocks, not capable of offering a continued resistance to the action of water, was speedily destroyed by the mountain torrents. The water-shed recoiled more and more to the south, as far as the solid crystalline rocks of the Monte Rosa; and the imposing masses of the Mischabel, which formerly rose upon the main crest, look down now upon lateral valleys. Thus has the persistent action of water, continued for ages, succeeded in displacing the crest of an entire mountain system.

Fig. 282.—THE SOURCES OF THE RHÔNE, THE TICINO,
AND THE TOCE.
Scale 1 : 250,000.



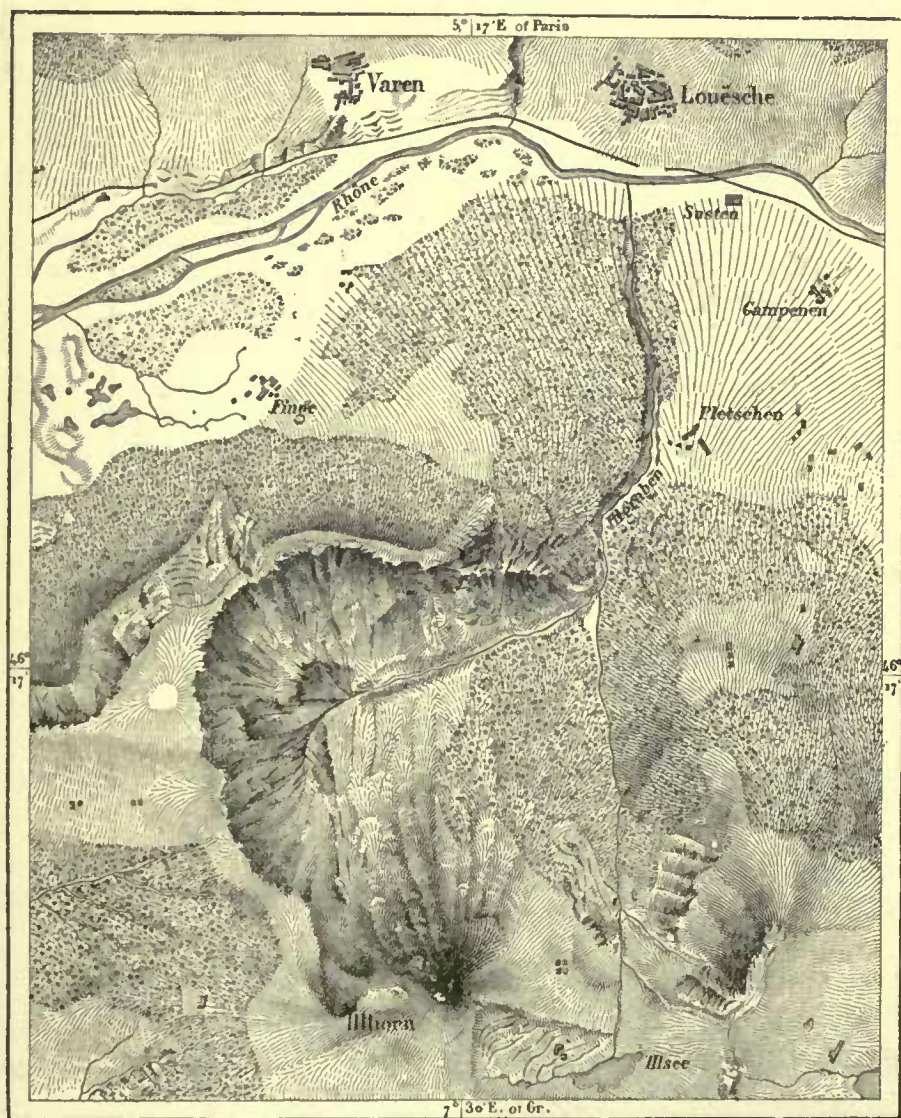
Destructive agencies are still at work amongst these mountain giants, and a traveller passing along the valley of the Rhône can scarcely fail to observe the heaps of *débris* resulting from them. Now and then the river is hemmed in by accumulations of this kind, having the appearance of veritable mountains. On ascending them we find ourselves face to face with gigantic amphitheatres of erosion, carved out of the mountain sides, and growing in size from year to year, owing to the continued action of snow and rain combined with frost. One of the most remarkable of these amphitheatres is that known as the Illgraben. It measures nearly 2 miles across, and few volcanic craters can bear comparison with it. A similar amphitheatre occupies the southern face of the beautiful mountain of Pierre-à-Voie, thus named on account of an ancient pilgrim's path paved with flagstones which leads right up to its summit. If we would form a just idea of the extent to which the mountains in that part of Switzerland have been

demolished, we cannot do better than contemplate the jagged "Dents" du Midi and of Morcles, which face each other on opposite banks of the Rhône. The magnificent portal opening between these mountains, rising to a height of more than 10,000 feet, has been carved out of the solid rock by atmospheric agencies alone. The mountain rampart which formerly connected these two peaks, joining the Bernese Oberland to the main chain of the Alps, has been swept away. The Dent du Midi is crumbling to pieces before our eyes. Frequently after heavy rains or sudden thaws, or in consequence of earthquakes, cataracts of

rocks descend its flanks into the valleys, and sometimes these obstruct the course of the Rhône, and would lead to disastrous inundations if labourers were not at once hurried to the spot to clear away the obstruction, and to open a way to the pent-up waters. In 1855 showers of stones fell for weeks and months, and

Fig. 283.—AMPHITHEATRE OF THE ILLGRABEN.

Scale 1 : 50,000.



artillerymen were placed upon a conspicuous promontory, who watched the mountain and fired off a gun whenever a rock detached itself from its summit, thus giving timely warning to travellers and the inhabitants of the valley.

The valley of the Rhône, with its barren soil and tracts covered with pebbles

and swamps, would hardly lead us to expect that so much beauty should be hidden in the valleys of the main chain of the Alps, which cliffs, hills of *débris*, and sudden turns in the road conceal from view. We almost wonder how the inhabitants of the mountain villages are able to reach their homes, for many of their valleys are so completely shut in that the wind is hardly felt there, storms are almost unknown, and the quantity of rain is far less than in the wide valley of the Rhône. But having once surmounted the obstacles presented by the mouths of these

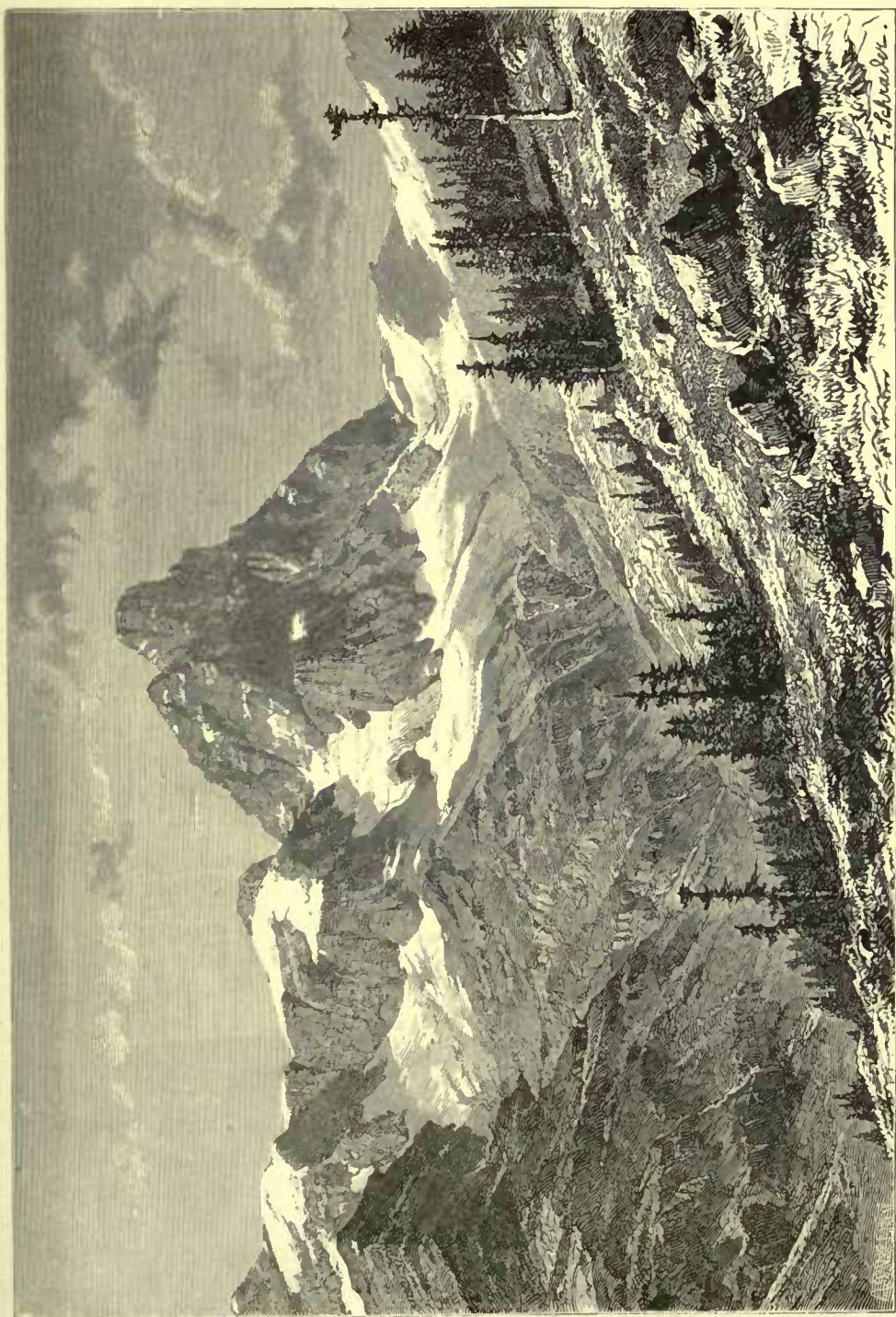
Fig. 284.—THE MATTERHORN (MONT CERVIN).

Scale 1 : 150,000.



valleys, where the rivulets escape through narrow gorges, we find ourselves in quite another world.

Amongst the lateral valleys ascending towards the main range of the Alps there are some to which groves of trees, small lakes, rivulets meandering amid a carpet of flowers and a covering of turf, impart a character of privacy. Others there are, of greater width, where the eye can range afar over barren mountain summits, fields of snow, and glaciers. One of the most charming of the latter, and, indeed, one of the most beautiful in the world, is the valley traversed



MONT CERVIN, AS SEEN FROM PLÉTÉ, VAL TOURNANCHE.

by the Visp of Zermatt, where the beauty of the Alps is most fully revealed to us. Beneath us spread verdant meadows and woods, with numerous cottages scattered along the foot of the cliffs; above us rise snowy summits glittering with ice. From the G6rnergrat the eye ranges from the Matterhorn (Mont Cervin) to Monte Rosa. At our feet we look upon a sea of ice, from which rises the bold pyramid of the Matterhorn right in front of us, its bare and sombre slopes, with a speck of snow here and there in a few cavities of the rocks, contrasting most strikingly with the glittering white snow-fields which environ them. Less elevated than Monte Rosa, but more imposing from its isolated position, the Matterhorn is one of the great storm-breeders of the Alps. The winds, refrigerated in their passage over fields of ice and snow, meet there the warm a6rial currents coming from the plains of Italy. The clouds at times discharge themselves in snow; at others they drift round the summit of the mountain like smoke. But frequently, too, the Matterhorn reveals itself in all its glory, standing out boldly against the deep blue sky, and then the paths which mountain climbers desirous of reaching its top will have to follow can be traced distinctly. There are other summits in the vicinity whose precipices and glaciers exercise a powerful attraction upon the members of our Alpine clubs, but, in spite of the daring exhibited, some of them remain yet virgin ground.*

The range of the Bernese Alps, usually designated as the Bernese Oberland, which faces the summits of Monte Rosa from beyond the depression of the valley through which the Rh6ne takes its course, is likewise attached to the mountain knot of the St. Gotthard, or, at all events, is only separated from it by the pass of the Grimsel and the glacier which gives birth to the Rh6ne. The boldest summits of the Oberland rise right opposite to the gap formed by the Simplon—that is, to the north of where the southern chain is least elevated—whilst the summits facing Monte Rosa are of inferior height. These mountains form a continuous chain, the most regular in all Switzerland. Nor are they much inferior in height to the mountains rising along the Italian frontier. The Finsteraarhorn, the Jungfrau, and others amongst their summits are famous throughout the world; whilst Meyringen, Interlaken, Lauterbrunnen, and Grindelwald exercise as great an attraction upon the admirers of nature as does the valley of Zermatt. Looked at from their base, or from the vantage-ground afforded by some promontory, these mountain giants leave an impression upon the mind which fully satisfies our sense of the beautiful. The bold contours of the mountain, the valleys at their foot, the fields of snow and ice which hang upon their slopes, and the cascades to which they give birth, combine themselves into a picture which, once beheld, impresses itself indelibly upon the mind. The Jungfrau, the Wetterhorn (Stormy Peak), and the Wellhorn can never again be forgotten.

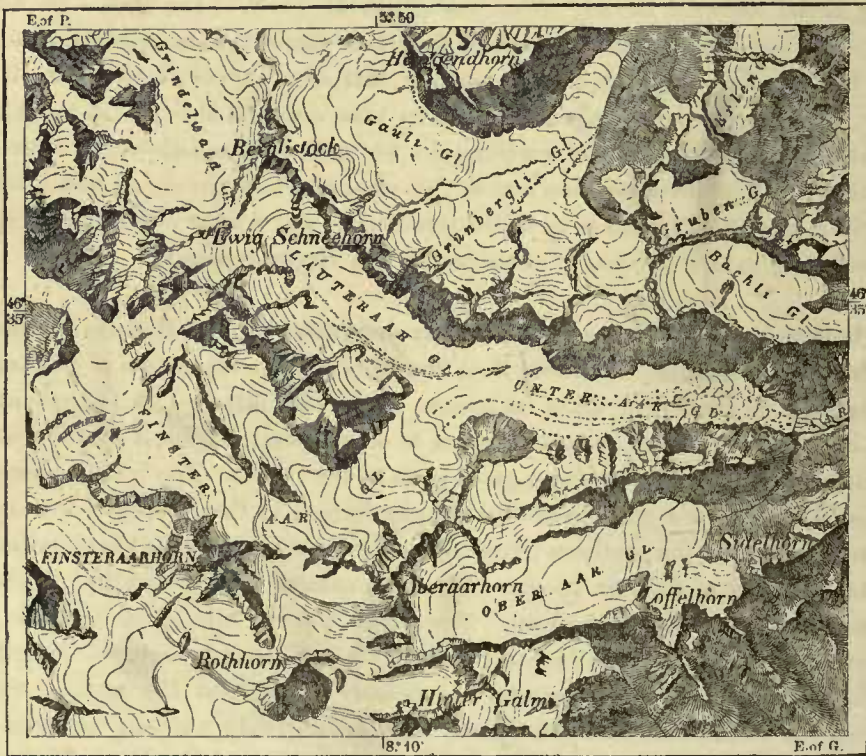
The glaciers of the Bernese Oberland are the most extensive in the European Alps. From the valley of the Aar we may travel for a distance of 30 miles to

* Dufour Peak, the culminating summit of Monte Rosa, 15,213 feet; Mischabelhorn (wholly on Swiss soil), 14,937 feet; Matterhorn (Mont Cervin), 14,701 feet.

the west, as far as the Lötschen Pass, without once leaving the ice or the perennial snow. Still more to the west, as far as the Dent de Morcles, not a mountain peak is seen without a glacier descending from its slopes towards the pasture-grounds. The largest of the glaciers, curiously enough, is met with on the southern slope of these mountain masses, facing the sun. This glacier, the largest not only of the Oberland, but of the whole of Europe, is that of the Aletsch. It is tributary to the Rhône, and covers an area of nearly 40 square miles. M. Ch. Grad estimates it to contain 40 milliards of eubic yards of ice, which, if it were to melt, would

Fig. 285.—GLACIERS OF THE BERNESE OBERLAND.

Scale 1 : 160,000.

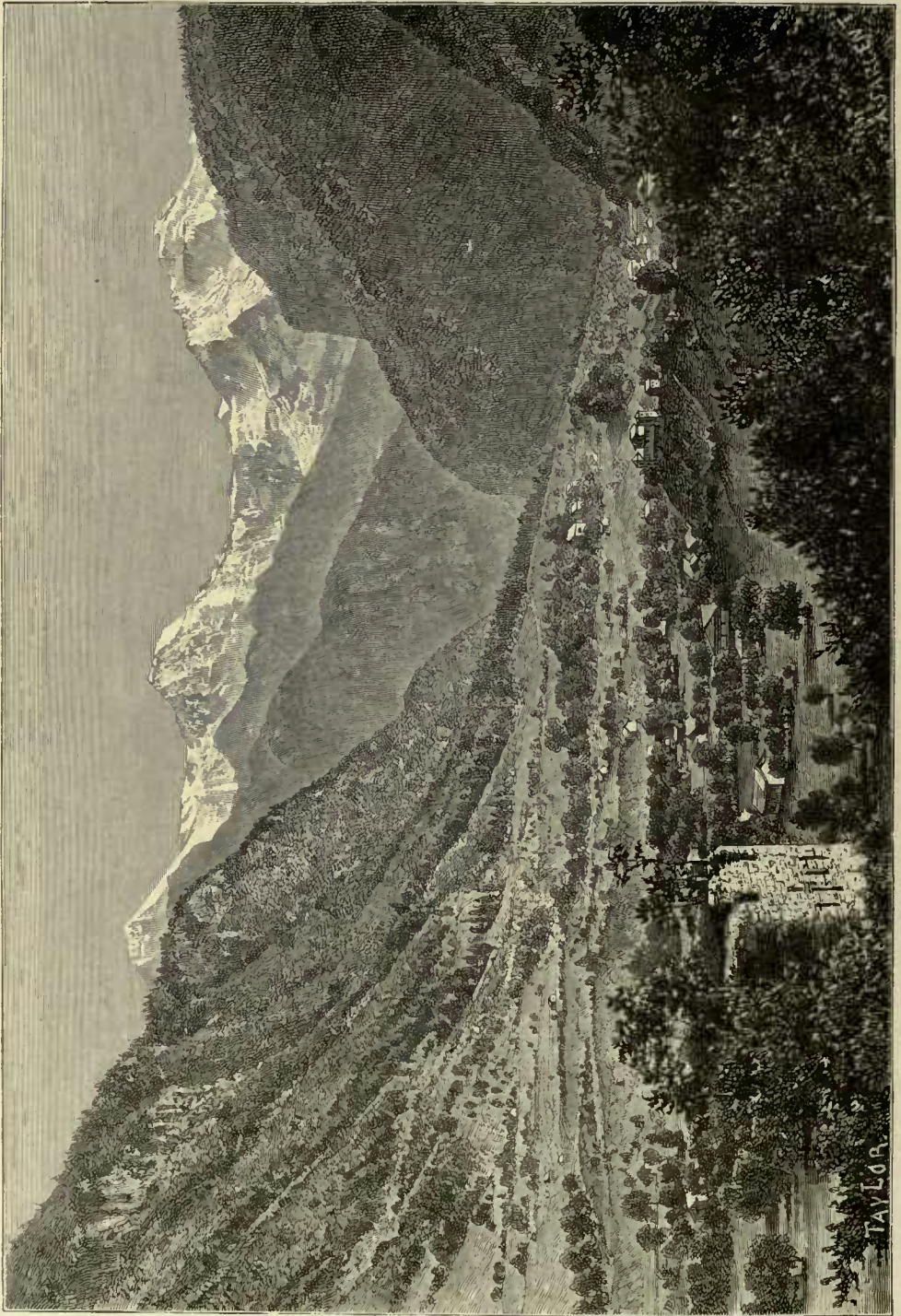


sustain the average volume of a river like the Seine for eighteen months. In comparison with this formidable glacier, those on the northern slope of the Oberland are but of secondary importance. They do not present the same spectacle of sublime calm, but being more rugged, and descending farther down their steep valleys, they are more attractive to the beholder. They almost look as if they flowed down from the mountain summits. Seen from below, their white or bluish tints contrast with the green of the meadows and the forests. Sometimes they almost invade fields and orchards, and the inhabitants of Grindelwald have seen cherries ripen close to huge detached blocks of ice. The lower glacier of Grindel-

Eiger.

Mönch.

Jungfrau.



TAYLOR

THE JUNGFRAU, AS SEEN FROM UNSPUNNEN CASTLE.

wald, though recently its end has been melting away, and it appears to be retiring into the mountains, is still that amongst the glaciers of Switzerland which penetrates farthest towards the lowlands.

The glaciers of the Aar, at the eastern extremity of the Oberland, though comparatively small and sometimes almost concealed beneath mud and stones, possess an interest of their own. It was there the famous Agassiz, with some of his friends, established himself during several summers in succession in order to watch the phenomena of the glaciers. The rock which sheltered this band of conscientious explorers, facetiously called the "Hôtel des Neuchâtelois," exists no longer. It was incapable of resisting the persistent assaults made upon it by the glaciers. Its fragments were precipitated upon the glacier, and are now descending upon its

Fig. 286.—THE GLACIER OF THE BLUMLISALP.

Wilde Frau.

Blumlisalpstock



back into the valley, to become in the end the prey of torrents which will triturate them into sand. The spot where these important researches into the nature of glaciers were instituted will always be hallowed to men of science.

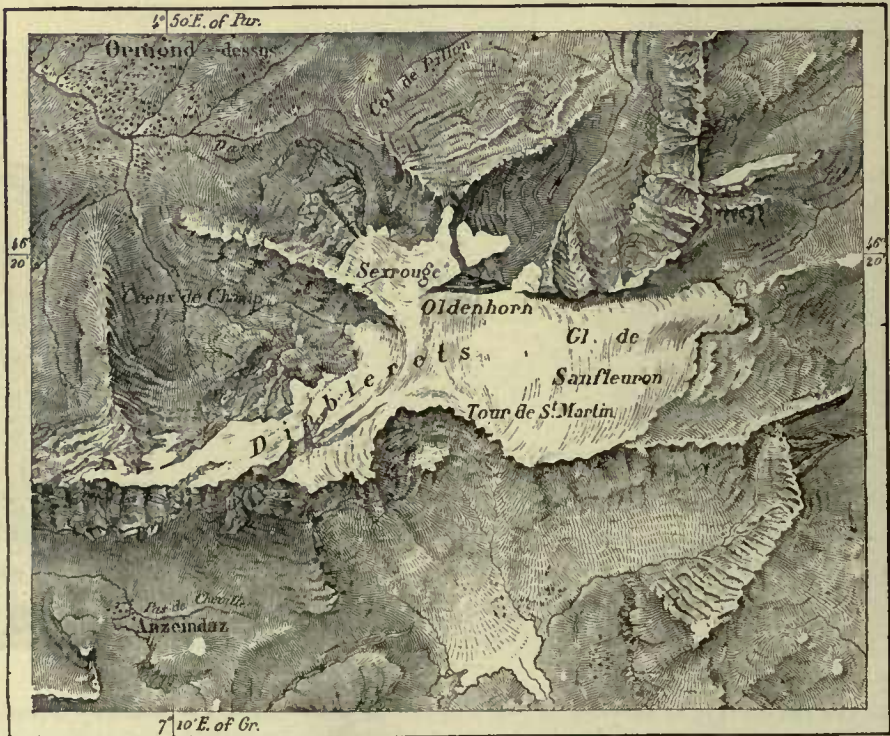
The formidable schistose summits of the Oberland, which for a long time were looked upon as inaccessible, now form the goal of the more ambitious amongst our Alpine climbers; but the limestone mountains to the west of them, and more especially the advanced buttresses of the Faulhorn, the Niessen, and the Stockhorn, though less elevated, afford prospects of equal beauty. These were first visited by tourists in the sixteenth century, and do not, consequently, exercise the same attraction upon our modern tourists as the Jungfrau, the first ascent of which was accomplished in 1811. Standing upon one of these promontories, we are suspended, as it were, between the valley and the snowy giants which tower above

it. At one glance we embrace the bold profile of the mountains, fields of snow, glaciers, pastures and forests, smiling valleys, and placid blue lakes, either reflecting the cliffs which bound them, or embedded in gardens and meadows. Equally beautiful are the landscapes which present themselves to the tourist in the valley of the Aar, whether near its head, where the torrent forms the fine waterfall of the Handeck; lower down in the delightful valley of Hasli, with its gushing cascades, where the sculptured châteaux of Meyringen nestle under the shelter of steep rocks; or lower down still, in the plain of the Boedeli, upon which rises Interlaken, the leading town of pleasure of entire Europe.

The mountains of the western Oberland consist almost entirely of oolitic lime-

Fig. 287.—THE DIABLERETS.

Scale 1 : 100,000.



stone and chalk, capable of offering but small resistance to the combined chemical and mechanical action of water, and are fast crumbling to pieces, producing in their decay some of the most magnificent spectacles to be witnessed in the Alps. Two of the jagged grey "teeth" of the Diablerets, a group rising superbly above the green pasture-lands, detached themselves in the last century, and tumbled down into the valley of Deborence, 6,000 feet beneath, where their broken fragments now cover an area of several square miles. Similar catastrophes have evidently occurred farther north, but in so remote a time that no tradition respecting them survives amongst the inhabitants of the country. The huge circular valley known as the

Creux-du-Champ may be likened to a gigantic punch-bowl, not unlike in its shape to the famous amphitheatre of Gavarnie, in the Pyrenees. Like the latter, it forms a natural fortress of great strength, being surrounded on all sides by cliffs rising in terraces, and surmounted by extensive glaciers, from which descend numerous cascades.

In the north and west the Bernese Alps ramify into numerous spurs and subsidiary chains, which gradually sink down into the plain. This is one of the great pasturing regions of Switzerland, the grass and herbage on these calcareous hills being most savoury. It is, too, a region of flowers. In spring the slopes of the mountains of Montreux are covered with narcissi, which are visible from a distance of 15 miles. An inexperienced traveller, on first seeing these carpets of flowers from afar, might be inclined to mistake them for particles of snow forgotten by the sun. Their odour, wafted by the wind to a considerable distance, is no less penetrating than that of the orange groves on the coast of Sicily.*

Once more returning to the St. Gotthard as to the natural centre of the Swiss Alps, we perceive a distinct mass of mountains to the north-east of those of the Oberland, and on the same axis. This group gives birth to the glacier of the Rhône. Its principal summit is the Dammastock, rising in the midst of glaciers, and a range extends from it in a northerly direction. In these ranges rise some of the most glorious summits of Switzerland, such as the Titlis, with its vast pasture-grounds, and the Uri-Rothstock, bounded on all sides by steep precipices. These mountains of Unterwalden and Uri are formed of granite, oolitic limestone, chalk, and strata of eocene age. They ramify in the most extraordinary manner the labyrinthine Lake of the Four Cantons (see Fig. 324), being their exact counterpart. The summits, which rise to the north of the lake, appear to have formed part of the same mountain system at some former period. The principal summit is the Rigi, the most famous and most frequented Belvedere in the world. This mountain, rising in solitary grandeur from the lakes and plains lying at its foot, and affording a magnificent prospect of the snowy summits towards the east and south, forms, in truth, an admirable natural observatory, and tens of thousands of travellers are attracted to it annually. Railways not only convey these visitors to its summit, but also to many favourite points of view. In summer the top of this mountain exhibits more animation than many a town, and the telegraph wires which connect the numerous hotels with the dwellers in the plain are incessantly at work.† The Rigi is the first mountain in Europe which the engineers have rendered accessible by means of a railway, but it is no longer the only one. Sooner or later, all those mountains in Switzerland which annually attract crowds of tourists will be treated similarly, and Mount Pilatus, the ancient Fract-Mont,

* Altitudes in the Bernese Oberland (in feet):—Main range: Finsteraarhorn, 14,028; Jungfrau, 13,671; Mönch, 13,439; Schreckhorn, 13,386; Diablerets, 10,667. Outliers: Faulhorn, 8,800; Niesen, 7,760; Stockhorn, 7,196.

† In 1876 there were thirteen telegraph offices on the top of the Rigi. The season of 1878 is supposed to have proved disastrous to several of the proprietors of hotels, the number of travellers having been very small, owing to the commercial crisis in Germany.

whose craggy points are visible to the south of Luzern, is sure to have its railway at an early date.*

The Rigi covers an area of about 15 square miles, and is formed almost solely of *nagelfluh*; that is, a soft conglomerate enclosing an immense number of pebbles, derived, not from the Alps, but from the Black Forest, and carried thither and deposited in regular layers during the miocene period. The Rossberg, to the north of the Rigi, belongs to the same formations. It has become widely known through a landslide which occurred in 1806, when 52,000,000 cubic yards of rock slid down the mountain side, burying the village of Goldau, with its smiling fields, and filling up a portion of the Lake of Lowerz.†

The mountain mass of the Tödi, to the east of the valley of the Reuss, forms with the mountains of the Rhône that region of Switzerland which exhibits the most extensive traces of geological disturbance. The contortion and inversion of the strata are more considerable there than in any other part of the world hitherto examined by geologists. From the Glärnisch to the Hausstock, a distance of 10 miles, the beds have been uplifted and bent back in such a way that the lower beds rest apparently upon those which were originally deposited upon them, and the lower appears to be the higher part of the series. Similar features may be observed also in the valley of the Rhine beyond the Glärnisch. A most remarkable instance is afforded by the Windgälle, a mountain rising above the valley of Altorf. Upon its summit it bears a cap of porphyry, which has not been erupted, as Studer supposed, but has been uplifted by lateral pressure, together with the limestone beds upon which it reposes. The mountains to the north of the Tödi are formed, like those of Unterwalden, of Jurassic and cretaceous rocks. Tertiary slates, locally known as *flysch*, are also met with; and these must have been deposited in a sea of considerable depth, for they abound in fossils of fish, but are altogether devoid of fossil molluscs and sea-urchins. The mountains belonging to this formation have gentle slopes, and their valleys are of exceeding fertility. The limestones, on the other hand, frequently form vertical cliffs. The Glärnisch, which rises in terraces above the town of Glarus, still belongs to the Alps, for glaciers descend from its upper slopes. They are the northernmost of Central Switzerland. Others, still farther to the north, are met with in the range which extends from the Tödi towards the north-east, and terminate above Chur, in Mount Calanda, famous on account of its crumpling rocks. That mountain is formed of fissured dolomite, resting upon beds of soft rock, incapable of resisting the action of denudation. The waste washed down from the mountain has formed huge sloping mounds at the foot of the cliffs, which constitute a characteristic feature of the landscape. Landslips are of frequent occurrence. One of these partially destroyed the village of Felsberg, at the foot of the Calanda. The inhabitants built themselves another village at a spot not menaced

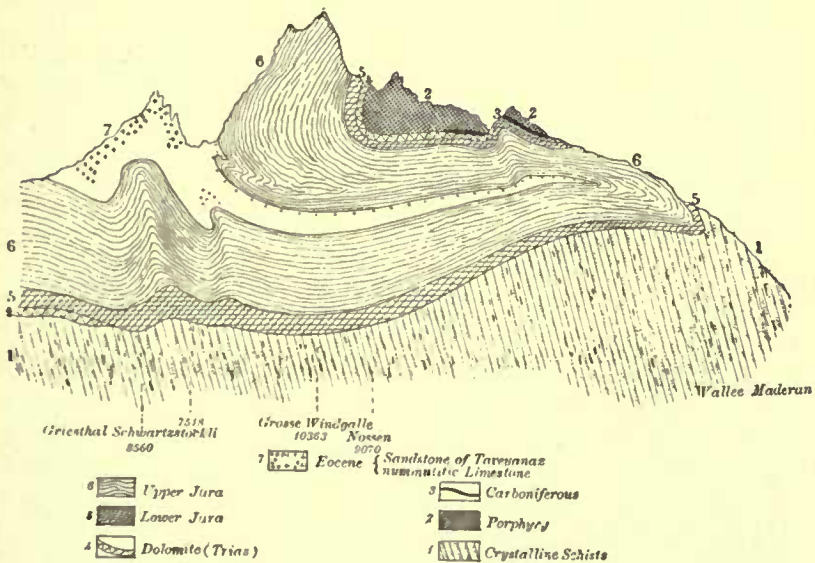
* According to Gatschet the name of Pilatus is derived from the old German word *billota*; that is, "split mountain." Popular legends connect it with Pontius Pilate, whose spirit is said to haunt a small lake near the summit.

† Altitudes in feet:—Dammastock, 11,937; Rhonestock, 11,822; Galenstock, 11,805; Titlis, 10,623; Uri-Rothstock, 9,610; Pilatus, 6,792; Rigi, 5,906; Rossberg, 5,190.

by falling rocks, but finding the situation too much exposed, they have returned to their old village, preferring to run the risk of a possible disaster rather than submit to an ever-present inconvenience.*

The Calanda has been the goal of mountain climbers for centuries past. The mountains of St. Gall and Appenzell, which occupy the north-eastern corner of Switzerland, enclosed between the Rhine and the Lake of Constance, have proved equally attractive to admirers of nature on account of the fine prospects which may be enjoyed from their summits. One of them, the Speer (6,418 feet), is formed of the same conglomerate as the Rigi. Another, the famous Sentis (8,213 feet), is justly admired for its fine buttresses, sweet pastures, piled-up rock masses, and small lakes hidden away in its upper valleys. Farther to the south, the jagged crest of the Churfirsten (7,554 feet), as seen from the shore of the

Fig. 288.—THE INVERTED STRATA OF THE WINDOÄLLE.
According to A. Hein.



Wallen Lake, presents a truly formidable appearance. So precipitously do the rocks rise from the lake that a site for only a single village could be found at their foot.

The chaotic mountains of the Grisons, cut up as they are by innumerable gorges and valleys, almost defy classification. Their geological structure is most complicated; their crests more sinuous than elsewhere in Switzerland; and the two hundred valleys and their ramifications form a veritable labyrinth. Yet these mountains, too, are joined to the central group of the St. Gotthard, and that by one of the boldest and most formidable mountain masses of Switzerland, the granitic pinnacles of which form the culminating points between the valleys of

* Altitudes in English feet:—Tödi, 11,887; Hausstock, 10,355; Gläris h., 9,554; Calanda, 9,210.

the Reuss and of the Inn. This group of the Adula, which alone of all the mountains of the Central Alps retains its ancient name, is partly buried beneath glaciers which feed the Further Rhine (Hinter Rhein). Other mountains of great height, likewise bearing glaciers upon their shoulders, continue the principal crest which bounds the upper valleys of the Rhine in the south.

Beyond we enter a natural region of the Alps which lies within the basin of the Danube. The deep depression through which the Inn flows towards the north-east, and which is separated from the head-waters of the Adda by no marked natural feature, forms one of the most curious breaks in the system of the Alps. Bounded on either side by irregularly grouped mountains, some of

Fig. 289.—THE GROUP OF THE BERNINA.

Scale 1 : 300,000.



5 Miles.

them naked rocks, others covered with perennial snow and ice, this depression, for a distance of over 10 miles, is almost horizontal. The waters collect there in lakes, and it needed but the removal of a few yards of ground to divert the head-waters of the Inn into the Italian valley of Bregaglia. This "gap" of the upper Engadin is remarkable, too, on account of its direction. Unlike most other passes, which cross the main crest at right angles, it has the same direction as the axis of the Swiss Alps, and coincides with the limits between different geological formations.

One of the grand mountain masses of Europe, that of the Bernina, rises in the Engadin immediately to the east of the head-waters of the Inn. This group of

mountains, with its boldly contoured granitic rocks, and its glaciers creeping low down into the valleys, may fairly challenge comparison with the mountains of the Oberland; and neither forests nor verdant pastures, sparkling cascades nor placid lakes are wanting to produce a picture of great beauty. The prospect from the culminating points of the Bernina are all the more highly spoken of as only expert climbers are able to enjoy them. Standing upon the Roseg or the Morte-

Fig. 290.—THE GLACIERS OF TSCHIERVA AND MORTERATSCH.
According to Ziegler. Scale 1 : 100,000.



ratsch, the eye embraces at a glance fields of snow and ice extending for 20 miles from east to west, and we are able to trace the crystal streams to which the glaciers give birth. But the view afforded by the isolated summits which face the glaciers to the north of the deep valley of Pontresina is far superior. Stationed on the summit of the Piz Languard ("Long Regard"), we see spread out before us not only the entire group of the Bernina, the mountains of the Grisons, of the Tyrol, and of Northern Switzerland, but far beyond the St. Gotthard we

perceive Monte Rosa and the hazy outline of the French Alps. A panorama of almost equal extent may be enjoyed from the Piz Linard, which rises to the north on the other side of the Inn, and on the confines of the Austrian Vorarlberg. This mountain belongs to the group of the Selvretta, which is geologically interesting on account of the great variety of its rocks, which embrace nearly all formations, from gneiss and crystalline slates to sedimentary deposits of eocene age. We even meet there with springs of carbonic acid gas—near Tarasp, in the valley of the Inn—the only springs of that kind hitherto discovered in such a locality, for they do not rise from a bed of lava, but from decomposed schists, and communicate probably with the acidulous springs which rise lower down in the valley. The bodies of numerous small animals are found near the poisonous springs. Earthquakes frequently occur in the Engadin, but not as often as in the other two earthquake districts of Switzerland, viz. in the valley of the Visp, at the foot of Monte Rosa, and in the environs of Eglisau, between Schaffhausen and the mouth of the Aar.*

The Central Alps attain their greatest height and most considerable width in the Grisons and in the neighbouring Tyrol. They neither form a mountain-chain there nor a number of detached masses lying in the same axis, but form a veritable plateau, from which rise separate groups and numerous ranges ramifying in the most puzzling manner. All that portion of Switzerland which lies to the east of the Rhine rises from a platform no less than 3,200 feet in height, even in the valleys, and the mountain ranges extend thence into Germany and Italy. The contrast between Eastern and Western Switzerland is indeed most striking, for the latter does not lie within the region of the Alps at all, and is bounded, not by an entangled mass of mountains like that of the Grisons, but by a succession of parallel ridges separated from each other by longitudinal valleys.

* Heights of the mountains in the Grisons:—Piz Valrin (Adula group), 11,139 feet; Bernina, 13,294 feet; Roseg, 12,557 feet; Morteratsch, 12,317 feet; Languard, 10,717 feet; Piz Linard, 11,210 feet.





CHAPTER II.

THE JURA.*



THE parallel ranges of the Jura form but a secondary mountain system in comparison with the snow-clad Alps. Nevertheless they are an important feature in the general geography of Europe, and by their influence upon the climate, the flow of rivers, and the distribution of the population, they have played a prominent part in history.

In Switzerland the contrast between these two mountain systems, the Alps and the Jura, is most striking. Standing upon the plain which separates them, we look, on the one hand, upon the serrated chain of the Bernese Oberland, upon verdant slopes extending up to the snow-fields and glaciers, and, in spite of the great distance, are able to distinguish the varied hues presented by barren rocks, snow, meadows, and forests. The foot-hills present the greatest variety in their slope and height; and wide cultivated valleys, penetrating far into the mountain recesses, and dotted over with towns and villages, still further enliven the picture. Turning round towards the Jura, we find ourselves face to face with a steep and uniform slope. Towns and villages form a thin white streak along its foot; fields and vineyards occupy the lower slopes; and sombre pine woods cover all above up to the bluish pasture-grounds in the far-off distance. A few rocky *crêts* here and there rise above the long-stretched backs of the mountains, but they do not break the monotonous appearance of the chain. Some of these ranges, seen from a distance, appear to be of uniform height for miles; but if we penetrate through one of the gorges scooped out by torrents, and scarcely visible from the plain, we are surprised to find ourselves in delightful valleys.

It is only towards Switzerland that the Jura presents itself as an apparently unbroken rampart. On the French side the mountains are not only lower, but they are also far more irregular in their outline. True the culminating points of the chain rise to the south, entirely within the French territory, but the Swiss summits are little inferior to them in height, and the general elevation of the

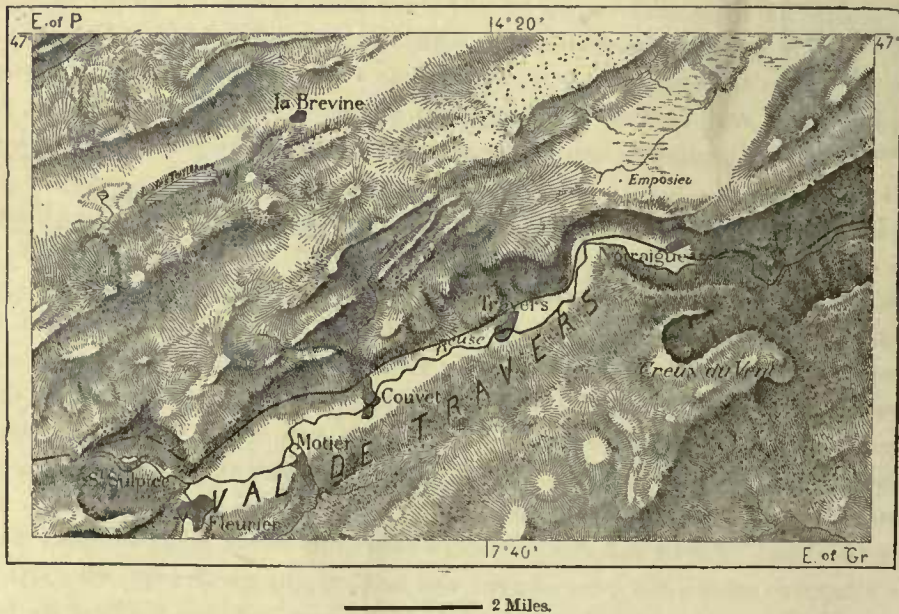
* Jacard, "Description du Jura Neuchâtelois et Vaudois;" A. Vézian, "Études Géologiques sur le Jura."

mountains is more considerable. Between Besançon and Neuchâtel the parallel ridges of the Jura increase in height as we proceed from west to east, and the highest amongst them forms a rampart bounding the plain of Switzerland. But to the north of Solothurn the ridges gradually grow lower, until their height hardly exceeds 2,000 feet. To the east of the Aar the Jura is represented by the small ridge of the Lägern, whilst beyond the Rhine, near Schaffhausen, it rises once more in the Randen group, and then gradually merges into the plateau of the Rauhe Alp.*

The Swiss Jura presents all those features which we have already noticed in connection with the French Jura—elongated valleys separated by parallel ridges, “combs,” and gorges connecting one valley with the other. These features in

Fig. 291.—THE VALLEY OF TRAVERS.

Scale 1 : 170,000.



combination produce picturesque scenery of astonishing variety. All the depressions are old lake basins, which were still covered with water during miocene ages. The valley of Travers, now drained by the Reuse, or Areuse, a tributary of the Lake of Neuchâtel, is an instance in point. It receives the torrents descending the terraced slopes of the “comb,” or amphitheatre, of St Sulpice at its upper end, and appears to terminate at the foot of a cliff which shuts it in on the east. But the slow erosive action of the water has overcome this obstacle. The river is now able to escape through a narrow gorge, its waters rushing headlong far beneath the railway suspended upon the flank of the mountains. All at once we perceive on our right a vast crater-shaped amphitheatre, known as the Creux-du-

* Altitudes of the Jura (in English feet) :—Mont Tendre, 5,512 ; Mont Dôle, 5,506 ; Chasseron, 5,286 ; Chasseral, 5,280 ; Weissenstein, 4,80 ; Lägern, 2,827.

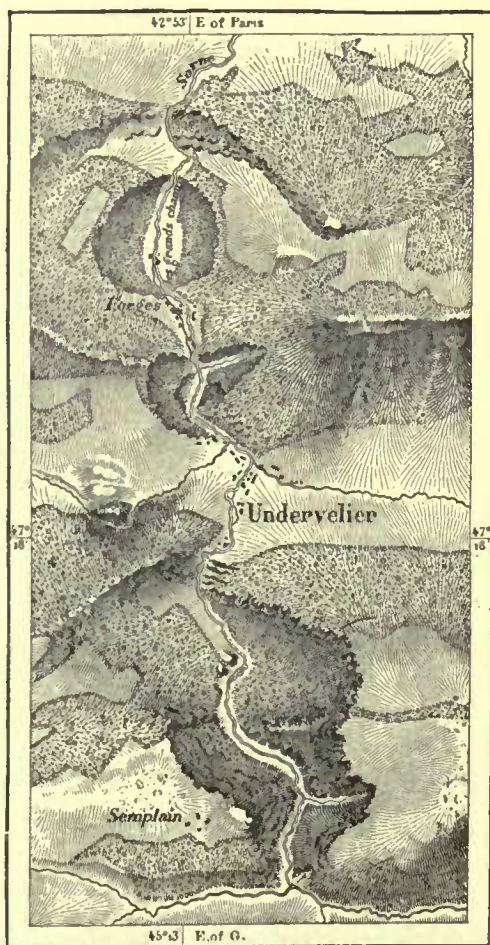
Vent, or "Windy Pit." A geological examination of the ground shows that this is a fallen-in cavity, or comb, such as are frequently met with in all limestone districts, which now communicates with the gorge of the Reuse. Widely different is the aspect of a valley to the north of that of Travers. No running water enlivens it now, its bottom being occupied by a swamp and bog. Thus, in a district of circumscribed area, we are able to study a valley still vivified by running waters, a "dead" valley, a fallen-in comb, and the tortuous defile of a "cluse."

In many other parts of the Swiss Jura the parallel mountain ramparts are pierced by cluses, bounded either by steep escarpments or by vast amphitheatres, and which permit the waters of the upper valleys to escape. Gorges of this kind connect Biel (Bienne) with the valley of St. Imier, the valley of Court with that of Undervelier, and, above all, the grand cluse of the Doubs, through which that river turns back upon itself, and finds its way into the Saône and the Mediterranean, instead of maintaining its original direction and flowing to the Rhine. There are even some cluses in an incomplete state, to which man has put the finishing hand. One of these is the gorge of Pierre-Pertuis. Nature had nearly accomplished her work there when the Romans overcame the remaining obstacles by means of a tunnel, which is still used by travellers.

Except in winter or early spring the Jura does not present us with those contrasts between snow and verdure which form so attractive a feature of the Alps. There are, however, magnificent forests of fir trees, which are said to have given the mountains their name, the meaning of which is supposed to be "forbidden woods." There is likewise an abundance of fine pasturage, reaching down to the margins of the small lakes which occupy some of the valley bottoms. These lakes, for the most part very shallow, are in many instances being invaded

Fig. 292.—THE CLUSE OF UNDERVELIER.

Scale 1 : 45,000.



Forest

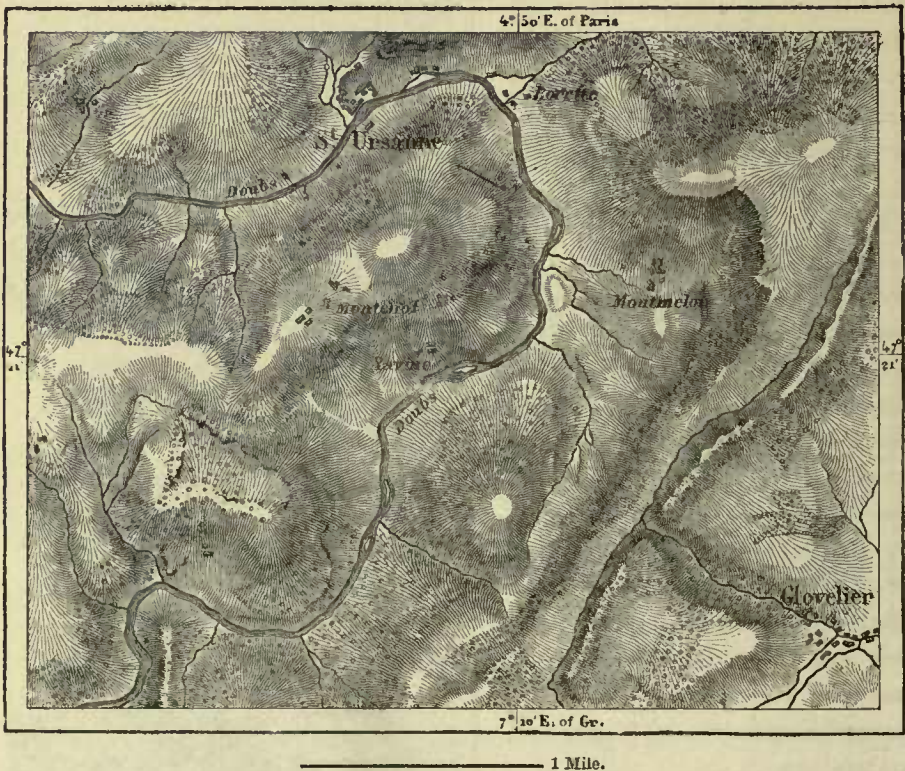

1 Mile.

by bogs, and several have disappeared entirely, their water having been sucked up, as it were, by the moss and other thirsty plants which grow along their banks.

The rain which falls upon the Jura not only fills the lakes and surface torrents, but a considerable portion of it finds its way through *creux* (pits) and *emposieur* into underground channels and caverns, and reappears again at the foot of the mountains. The most remarkable of these subterranean rivers is the Orbe, the most important tributary of the Rhine, having its sources in the Jura. The Orbe rises in France, in the small Lake of Rousses; lower down it traverses two

Fig. 293.—MEANDERINGS OF THE DOUBS AT ST. URSAINE.

Scale 1 : 50,000.



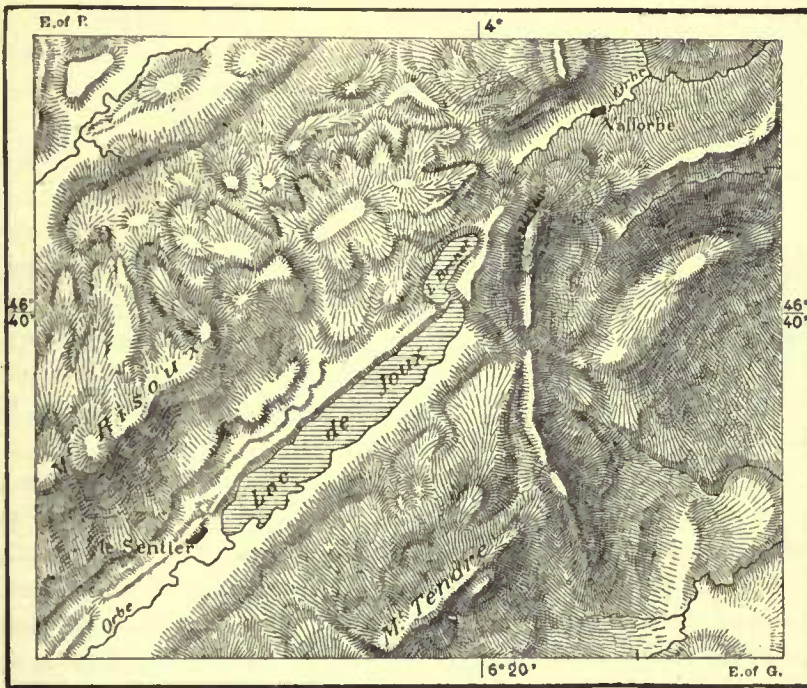
other lakes on Swiss territory, those of Joux and Brenet; and then, at the base of high cliffs, it rushes into a cavern, only to appear again 2 miles farther to the north-east, and 735 feet below the point where it disappeared. Its volume then is sufficient to turn all the mills of the manufacturing village of Vallorbe.

The whole of the surface drainage of the plateau of Ponts, to the north of the Reuse, is swallowed up by sinks, and reappears, 900 feet below, in the springs known as Noiraigue. Elsewhere springs no sooner mount to the surface than they disappear again, and the rivulets to which they give rise alternately flow on the surface and through underground channels. Of this kind are the rivulets which

converge upon the sink known as Creux-Genat, in the environs of Porrentruy. Many of these subterranean channels feed the Lakes of Neuchâtel and Biènné through springs rising from the bottom of these lakes. The localities where these lacustrine springs make their appearance are well known to huntsmen and fisher-

Fig. 294.—THE LAKE OF JOUX.

Scale 1 : 400,000.



men, for in winter, when the remainder of the lake is covered with ice, the water immediately above them continues open. Fish and wild fowl abound there, and hence they are known as *entner*, or duck pools. If the level of the lakes were to fall, these springs would give rise to rivulets.





CHAPTER III.

GLACIAL PERIOD.*



THE Jura, which affords so many opportunities for studying geological and hydrographical problems, furnishes likewise the most decisive proof of the vast extension of the glaciers in a former age. When exploring these mountains scientific men obtained the first glimpse of an age in which a great portion of Europe was covered with a cap of ice.

The Jura itself had its valley glaciers, which carried down blocks of rock to a lower level; but in addition to these rocks, which are clearly derived from the Jura itself, we meet with others on its eastern slope which are as certainly of a different origin. Formerly geologists were perplexed when asked to account for the presence of these prodigious masses of rock. Were they ruins of mountains no longer in existence? or had they been carried thither from the Alps, in spite of their being at a distance of 120 miles? We now know that the latter hypothesis was the correct one. These enormous erratic blocks have really been carried down the Alps, and we are even able, in many instances, to point out the locality whence they have been derived and the route which they followed. This mass of granite, we are able to say, came hither from the Monte Rosa; that block of mica schist tumbled down the sides of the St. Gotthard. Formerly the whole of the northern slope of the Alps was bounded by a vast sheet of ice, formed by the confluence of five glaciers, which filled up the valleys now drained by the Rhône, the Aar, the Reuss, the Linth, and the Rhine. The blocks of rock which tumbled down from the mountain-tops slowly travelled with these glaciers down the valley. They were carried over the plains and the cavities now converted into lakes, and would have been carried beyond the frontiers of Switzerland had not the transversal chain of the Jura interposed a barrier. It was upon its slopes they dropped when the glaciers melted away, and there we find them still, after hundreds and perhaps thousands of centuries. Some of the blocks carried by the Rhône glaciers

* Oswald Heer, "Le Monde Primitif de la Suisse;" Arnold Guyot, in *Bull. de la Société des Sciences Naturelles de Neuchâtel*; Viollet-le-Duc, "Le Massif du Mont Blanc;" J. Tyndall, "The Glaciers of the Alps;" Studer, "Ueber Schnee und Eis."

have been deposited upon the flanks of Mont Chasseron, at a height of 4,600 feet above the sea. It was there, right opposite to Martigny and Villeneuve, at the entrance to the Rhône valley, that the central stream of the Rhône glacier struck the Jura; and on either side of the Chasseron, whether we proceed north or south, the height at which erratic blocks are met with gradually decreases. Some of these blocks have a volume of 176,000 cubic feet, and are quarried as building stones.

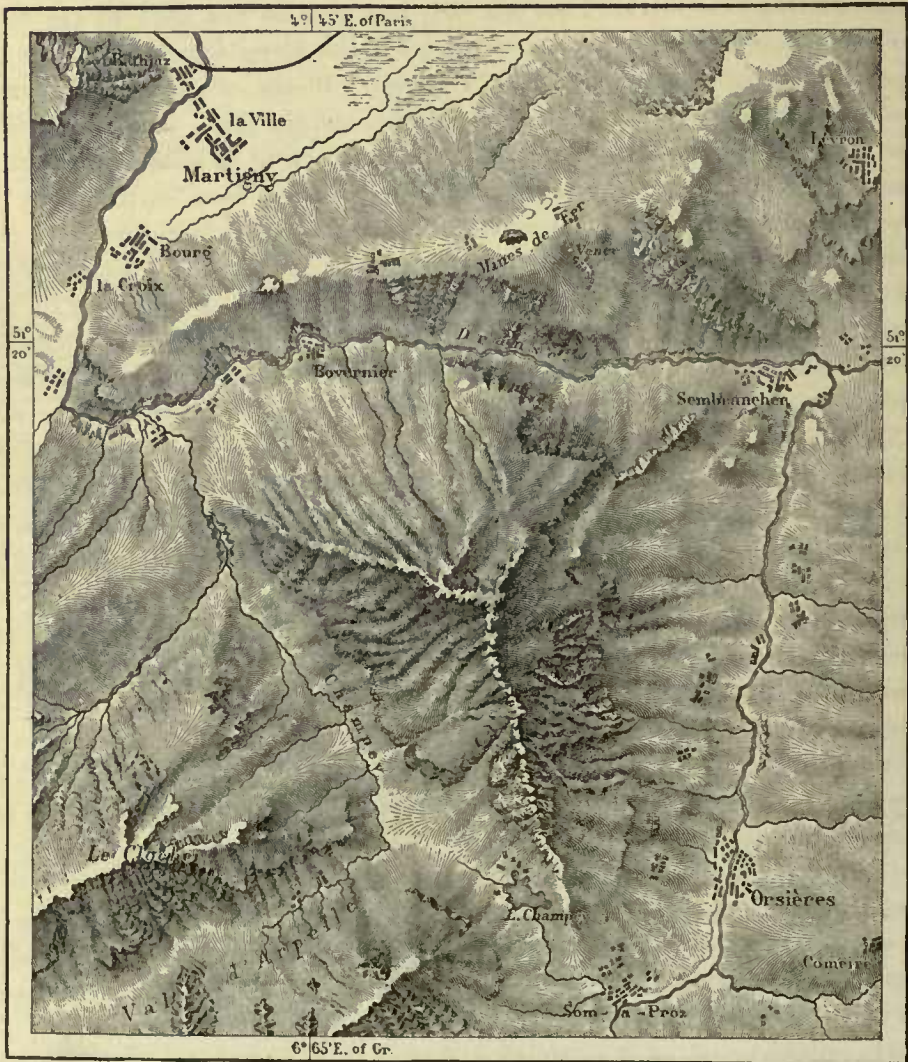
Erratic blocks of this kind are not only met with on the slope of the Jura, upon which the ancient glaciers impinged, but also along the slopes of all the Alpine valleys down which they formerly crept. Blocks of enormous size may be seen in the valleys of the Limmat, the Reuss, and the Aar. The Luegiboden, near Interlaken, is nothing but a huge erratic block of granite, having still a volume of 460,000 cubic feet, although much of it has been carried away by quarrymen, including a block forwarded to America to serve as the pedestal of a monument to Washington. The erratic rock, known as *bloc monstre*, on the hill of Montel, near Bex, above the valley of the Rhône, has a volume of no less than 530,000 cubic feet. Many of these glacier-borne rocks have been deposited on the banks of the Lake of Geneva, and close to that town there is one of huge size known as the Pierre à Niton. The Romans probably consecrated that rock to Neptune, and in our own days it has been converted into a gauge for registering the oscillations of the lake. But what is the volume of these huge blocks in comparison with that of the pebbles, the sand, and the mud carried down the hills by these ancient glaciers, and further distributed by the floods when they melted away? Most of the rocks and the soil removed whilst the existing valleys were being scooped out by the glaciers have been deposited upon the wide plains below them. Sometimes the glaciers melted so rapidly as to carry away the soil in streams of mud, similar in all respects to those which descend from some of the volcanoes of the Andes whenever a subterranean lake bursts its bonds. Pieces of ice were in every instance carried along with the mud, and the cavities which they filled have been discovered in the hardened conglomerate into which age has changed the mud. These rivers of mud sometimes filled up whole valleys to the brim. Below Sembrancher, in the valley of the Dranse, the mud rose to a height of 1,400 feet, as proved by the traces of it still existing upon the sides of the valley. But this enormous liquid mass at length burst the rocky barrier, stretching across the valley from the superb pyramid of Catogne to the mountain of Vence, and, when liberated, it inundated the lower portion of the valley.

The ancient moraines of valley glaciers, though in reality far less important witnesses to glacial action than the horizontal strata to which they gave birth, nevertheless more frequently attract attention on account of their uneven surface and the prominent part they play in the scenery of the country. The valley of the Limmat is traversed by no less than six ancient terminal moraines, one of which crosses the Lake of Zürich opposite Rapperswyl, and has been made use of in the construction of a bridge 5,250 feet in length. Zürich itself is built upon an ancient moraine, and so are several other towns at the lower end of lakes, and

even some in the plain, including a portion of Bern, the capital of Switzerland. The interesting district to the north-west of Luzern, which a flood would convert into parallel islands, and where are the Lakes of Sempach, Boldegg, and Hallwyl, and the swampy grounds crossed by the Reuss, exhibit many traces of an inva-

Fig. 295.—THE CATOGNE.

Scale 1 : 80,000.

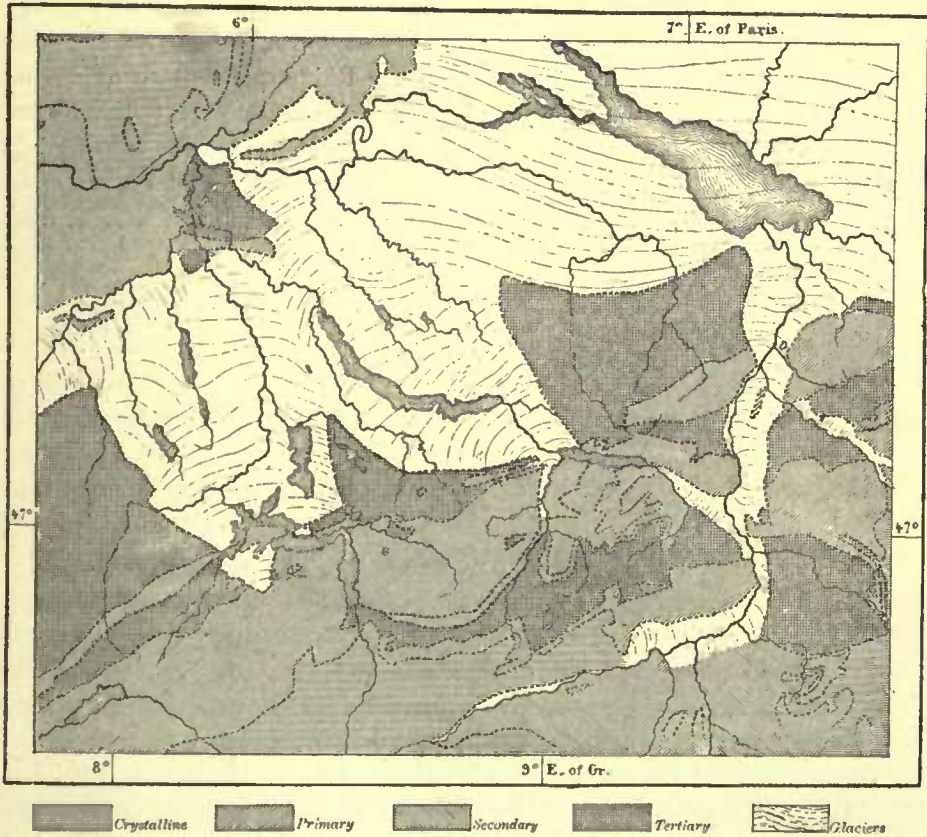


sion of glacial mud. The scenery and aspect of a considerable portion of the rugged plain which separates the Alps from the Jura are due to ancient moraines. There these accumulations of stones no longer present the chaotic appearance of former days. Their surface now is covered with soil, and they nearly all are clothed with woods, forming a most charming contrast with the lakes which sepa-

rate them, with the rivulets winding along their foot, and with the cultivated fields surrounding the villages. The charming scenery at the lower ends of the Lakes of Thun, Zürich, and Bienné (Biel) is the outcome of the diversities of contour resulting from the passage of ancient glaciers.

The flora of this region of moraines proves that a remarkable change took place in the climate when the ice invaded the country. The ocean still covered the plain between the Alps and the Jura during the miocene age. The sandstones and pebbly conglomerates deposited at that time are rich in species of plants and

Fig. 296.—THE ANCIENT GLACIERS OF EASTERN SWITZERLAND.



animals, whose presence proves to us that the mean temperature must then have varied between 64° and 68° Fahr. To this climate of Louisiana or Florida succeeded one analogous to that of Greenland. The Alpine plants, which are the same as those of Lapland, descended from the mountain summits into the valleys, and from the latter into the plain, and they are found now throughout Switzerland as far as erratic blocks are met with, their limit coinciding in a most remarkable manner with a flora of arctic aspect. M. Martins, who has more especially studied the vegetation of the Arctic regions and of the Alps, tells us that the aspect of the valley of Ponts, in the Jura of Neuchâtel, and at an elevation of 3,300 feet

above the sea, recalls certain portions of Lapland. But then the Alpine flora of that valley grows upon glacial mud carried hither from the Alps.

These vestiges of the past—erratic blocks, glacial mud, and Alpine plants—have enabled geologists to draw a map indicating the ancient glaciers. The most important among them was that of the Rhône. It filled up the basin of the Lake of Geneva, covered the plain of Switzerland to a depth of more than 3,000 feet, and extended north as far as what is now known as the Aargau, where it was joined by the glacier of the Aar. But it did not penetrate the Alps of Fribourg, which had their own system of glaciers. The erratic blocks deposited within this wide area have mostly been traced to that portion of the Alpine chain which extends from the St. Bernard to the Simplon. The glaciers of the Reuss and of the Linth likewise extended to the barrier of the Jura, but only at its eastern extremity, whilst the glacier of the valley of the Rhine spread itself over a considerable portion of Southern Germany. Glaciers of vast extent likewise crept down the Italian slope of the Alps, filling up, wholly or in part, the existing lakes. The Lake of Lugano, like that of Zürich, is divided into two portions by an ancient terminal moraine, which the retiring glacier left behind, and which is used now as a road.





CHAPTER IV.

RIVERS AND LAKES.*

IN comparison with the glaciers of a former age, the geological reconstruction of which has led the way to other discoveries connected with the history of our earth, the glaciers of the present day are of small account. They hardly cover more than 5 per cent. of the total area of the country, and their average thickness is certainly small compared with that of the ancient glaciers which made Switzerland another Greenland. Still, if there were to occur a sudden cessation of rain, and if these glaciers, which now hang like huge reservoirs above the rest of Europe, were to be melted to keep up the present volume of the rivers rising in Switzerland, the supply would suffice only for five years, even though we estimated them to have an average thickness of 300 feet.†

But it is well known that the difference in bulk which a glacier exhibits in summer and winter is relatively small, and that rivers and lakes are in the main dependent upon rain and melting snows for their supply of water, which they obtain either indirectly through springs, or directly through avalanches and surface drainage. The most important river of Switzerland, as respects the area of its catchment basin, is the Ticino, or Tessin, which is to a less extent fed by glaciers than any other river of the country. Though its principal valley is called Bedrette, which is synonymous with "glacier valley," the streams of ice which descend into it melt away before the mid-day sun. After heavy rains the volume of the Ticino, measured above where it enters the Lago Maggiore, has reached 150,000 and even 200,000 cubic feet a second (the average throughout the year being only 3,700 cubic feet), and it is then a river twice as powerful as the Rhône at the forks of Arches. The Verzasca is likewise a large river. After leaving

* Rüttimeyer, "Thal- u. Seebildung;" Studer, "Geschichte der Physischen Geographie der Schweiz."

† A Government Commission (in 1871) computed the area covered by glaciers at 809.1 square miles, viz. 390.3 square miles in the basin of the Rhône, 289.6 square miles in the basin of the Rhine, 70.6 square miles in the basin of the Inn, and 48.6 square miles in the basin of the Po.

An official statement published in 1878 gives lower figures, viz. 710 square miles for the whole of Switzerland, 375 for the canton of Valais (Valais), 138 for the canton of the Grisons, 103 for that of Bern, 44 for Uri, &c.

its wild gorge it spreads over a bed of gravel, which it pushes far into the lake, in front of the mouth of the Ticino. The Maggia, on the other side of the lake, is ordinarily a river like the Adour, but when in flood it may well bear comparison with the mighty Rhône.* The alluvium brought down by these three rivers is rapidly silting up the upper end of the lake. A comparison of ancient documents with our most recent maps would appear to show that this silting up, aided, no doubt, by the devastation of the forests which formerly clad the mountain slopes, is proceeding at an increasing rate. Seven hundred years ago the village of Gordola was the principal port on the upper part of the lake; it is at present hardly a mile from its shore; whilst the new port of Magadino has to be shifted every ten years, the shore of the lake flying it almost visibly. The port of Locarno, close to the delta formed by the Maggia, has to be perpetually dredged, at a

Fig. 297.—THE UPPER END OF THE LAGO MAGGIORE.

Scale 1 : 100,000.



considerable expense, for the sand is for ever invading it. If we assume that the matter held in suspension by the three rivers, the Ticino, the Verzasca, and the Maggia, and annually deposited in the lake, amounts to the one-thousandth part of their entire volume, the Bay of Locarno, in spite of its depth of 160 feet, will be silted up in the course of three hundred and fifty years, and the three rivers, then united into one, will be able to invade the lower portion of the lake. The alluvium deposited by these rivers remains injurious to health as long as it has not been turned over by the hoe or the plough. In summer the swampy plain of the Lower Ticino exhales deadly miasmata, and the inhabitants of several villages are at that time obliged to fly to the cabins they have in the mountain valleys.

* Average volume:—Ticino (Tessin), 3,700 cubic feet; Verzasca, 353 cubic feet; Maggia, 2,200 cubic feet.

Far more salubrious are the shores of the Cerisio, or Lake of Lugano, a double basin, within which the two ancient glaciers of the Ticino and the Adda formerly united into a single river. When the glaciers retired the basin of the Cerisio was left with but a few inconsiderable affluents. The alluvium brought down by them from the mountains is only of trifling quantity, and the lake shrinks consequently very slowly. This lake, not being subjected to sudden floods, might easily

Fig. 298.—THE LAKES OF LUGANO AND COMO.

Scale 1 : 250,000.



be transformed into a huge reservoir, whence the neighbouring fields of Lombardy might be irrigated. Signor Villoresi, an Italian engineer, has proposed to connect it by means of a tunnel, only 2 miles in length, with the Lake of Como, and to convert the latter into a basin of distribution, whence the water would be conveyed to the sterile lands of the Somma. The water available for such a purpose has been estimated at between 560 and 1,120 cubic feet, according to the season.

If the Ticino is fed only in a small measure by melting ice, such is not the case with respect to the Rhône, which has more extensive glaciers in its upper valley than any other river of Europe. The glaciers occupy nearly one-half the total area of those of all Switzerland, and the ice river of the Aletsch, as well as the ice streams ereeping down the slopes of Monte Rosa, is without a rival. The Rhône glacier, properly so called, is not only of considerable extent, but it is also much admired for its natural beauties, more especially on account of its terminal face, furrowed by huge crevasses. Formerly it was bounded only by naked rocks and

Fig. 299.—THE ALETSCH GLACIER.
Scale 1 : 100,000.



turf, but M. Gosset has planted its banks with Scandinavian trees, and a forest may be seen in close proximity to the ice. From this frozen river issues a small torrent, which is usually regarded as the head of the Rhône. The mountaineers, however, do not look upon the glacier as the veritable source of the Rhône; they derive that river from a small tepid spring which rises at the foot of a neighbouring rock. In addition to the Rhône glacier there are two hundred and sixty others which regulate the flow of the river, for it is precisely in summer, when the rainfall is least and the evaporation greatest, that the ice melts most rapidly. Some-

times, however, these glaciers themselves give rise to floods. Some of the upper side valleys are closed in by natural dams, formed of moraines and fragments of ice. The water accumulated behind these barriers, when it bursts them, rushes down the valley, carrying fragments of stone, houses, and trees before it, and denuding the fields of their arable soil. In order to prevent the recurrence of such floods it has been found necessary to pierce these dams, so that the water may escape. The small Lake of Moeril, or Merjelen, on the eastern side of the Aletsch glacier, from which it is separated by a lateral moraine, has been treated in this manner, and it has since remained permanently at the same level.

The Dranse, which joins the Rhône where it abruptly changes its direction before entering the gorge of St. Maurice, was blocked up by the glacier of Grétroz in 1818. Its upper valley was converted into a lake, and, when the pent-up waters at length liberated themselves, they produced one of the most disastrous floods known in connection with the Rhône valley. Immediately on issuing from the rock-bound gorge referred to, the Rhône enters upon an alluvial plain, formerly covered by the Lake of Geneva. This plain has an area of 34 square miles; and the depth of the alluvium which covers it, and all of which has been deposited there by the Rhône, is unknown. A few ancient moraines rise above it. The village of Port-Valais, which formerly stood upon the banks of the lake, is now at a distance of over a mile away from it, the whole of the intervening land having been deposited in the course of three centuries. It is also asserted that the delta of the Rhône has so rapidly grown during a single generation that the inhabitants of Villeneuve are no longer able to see Le Bouveret, which faces them on the southern shore, it being now hidden from view by a peninsula covered with poplars, willows, and houses. The heavier fragments brought down by the river form flats and sand-banks close to its mouth, whilst the triturated sand is carried a considerable distance into the lake. It has been ascertained, by soundings, that the bottom of the eastern extremity of the lake is slightly convex in front of the mouths of the river, a phenomenon satisfactorily explained by the deposition of alluvial matter.

Though much smaller now than in former ages, the Lake of Geneva, or Lemane, is the largest lake of Western Europe. It is also one of the deepest, its bottom extending down almost to the level of the sea.* To drain it by a river equal in volume to the Rhône would require no less than ten years, supposing, of course, that its tributaries ceased to flow. Like the ocean, it has its storms, its waves, its surge; but the most careful observations have not hitherto established the existence of tidal currents. The *seiches* are a phenomenon of quite a different kind, and are produced by sudden changes in the pressure of the atmosphere, which result in a swelling up of a portion of the lake, sometimes to the extent of 6 feet. These *seiches* occur at regular intervals, and the laws which govern them are now thoroughly understood.†

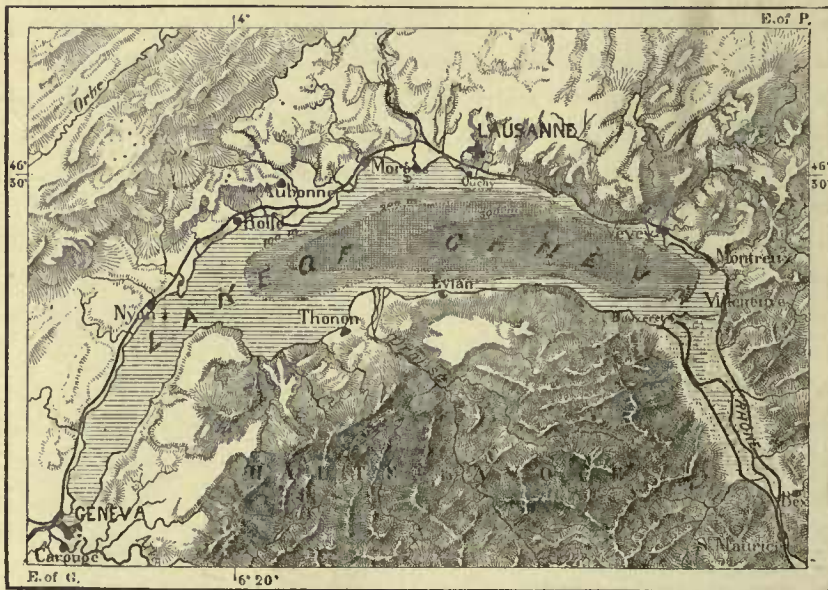
* Lake of Geneva:—Average height above sea, 1,217 feet; average area, 223 square miles; greatest depth, 1,099 feet; average depth, 492 feet; approximate contents, 85,193 million tons of water.

† See Forel in *Bull. de la Soc. Vaud. des Sciences Naturelles*.

The Lake of Geneva belongs both to the Switzerland of the Alps and that of the Jura. Crescent-shaped, it consists in reality of two separate basins—that in the east overlooked by the buttresses of the Alps, that in the west bounded by the gentler slopes of the Jura. These two basins indicate by their direction the system of mountains to which they belong. The eastern sheet of water stretches north-west, like all other Alpine lakes, whilst the parallel banks of the western sheet of water stretch towards the south-west; that is, in the same direction as the Lake of Neuchâtel and the other lakes of the Jura. The two basins differ likewise as to their configuration. The western lake is shallow, and gradually narrows towards the debouchure of the Rhône, the blue waters of which rush from the lake to mingle soon after with

Fig. 300.—THE LAKE OF GENEVA.

Scale 1 : 650,000.

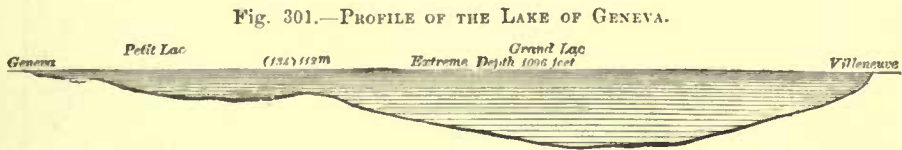


the turbid ones of the Arve. It is to be regretted that no dam has hitherto been built across the Rhône at Geneva, which would enable us not only to regulate its level, but also to supply motive power to the numerous factories along the river, and last, not least, to mitigate the floods which now so frequently carry havoc into the fertile fields of France. Careful observations made at Lyons during forty floods show distinctly that if such a dam had been in existence at the outlet of the Lake of Geneva, the rise of the flood would have been less to the extent of from 15 to 24 inches. By completely stopping the discharge of the lake during a week its level would rise only to the extent of 20 inches. By diverting the Arve into the lake we might certainly mitigate the floods on the Lower Rhône; but this would entail a very considerable expenditure, whilst it would prove a

possible nuisance to the city of Geneva, whose port might become silted up by the vast mass of alluvial matter brought down that river.*.

Formerly the level of the lake was much higher, and ancient lake beaches, dating back to the termination of the glacial period, may still be traced at an elevation of 100 and more feet above its present level. It is equally certain that during the pliocene age, which preceded the two glacial periods, the Jura Mountains extended into Savoy. At that time the lake was shut in, on the west, by a huge mountain barrier, and its waters spread far north to the height of land at Entre-Roches, which separated it from the basin of Neuchâtel. On that height of land, the elevation of which is the same as that of the ancient lake beaches discovered above the Rhône valley, near the Fort of L'Écluse, we find accumulations of pebbles, partly derived from the Valais, partly from the Bernese Oberland. We do not know in what direction the lake discharged its surplus waters during these remote ages. No trace of an ancient outlet has hitherto been discovered.

Amongst the lakes lying wholly upon Swiss territory that of Neuchâtel is the largest. Like its neighbour of Geneva, it was far more extensive in a former age,



Horizontal Scale 1 : 650,000 (same as Map). Vertical Scale 1 : 320,000.

for it included not only the two neighbouring Lakes of Biel (Bienne) and Morat, but the whole of the plains to the south, as far as the height of land at Entre-Roches, and the swampy plains which stretch eastward to the valley of the Aar. Even during the present century it has happened sometimes, when the rainfall was exceptionally heavy, that the three lakes became once more united into one.† The damp land which separates the three lakes, and in the midst of which rise a few wooded hills—ancient islands or promontories—is known as the “See-land,” or “Lake-land,” and its cultivation has only been rendered possible by a carefully devised system of drainage. The banks of these lakes are low, and they are shallow. Whilst most of the Swiss lakes occupy deep cavities, with precipitous sides and a flat bottom, the three lakes of the plain are in many parts fringed by “white bottoms” (*blancs fonds*), covered only by a few feet of water, which, however, does not conceal the white-coloured mud beneath. Reeds grow in many places, and much of the shore is alternately a swamp or covered by the water

* Fall of the Rhône between the lake and the mouth of the Arve (average), 10·53 feet; horse-power available, 7,000; actually utilised, 400.

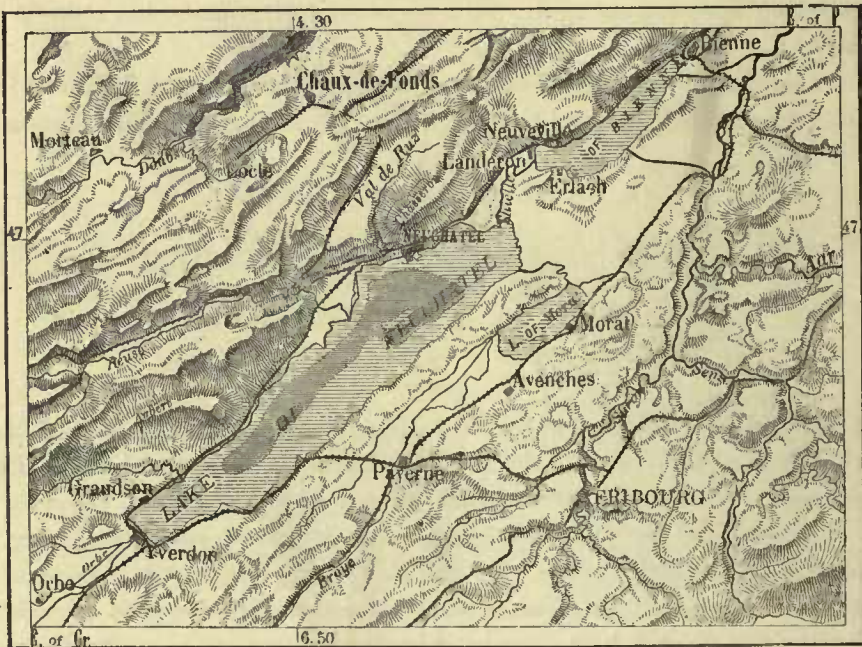
	Height above	Area.	Depth in		Con'ts.
	Sea.		Feet.	Feet.	
	Feet.	Sq. m.	Max.	Mean.	Million Tons
† Lake of Neuchâtel	1,427	92·7	472	246	18,000
Lake of Biel (Bienne)	1,424	16·2	253	130	1,680
Lake of Morat	1,427	10·4	157	98	81

of the lake, according to the season. As to the bed of the Lake of Neuchâtel, far from being a uniform level, it consists of a succession of ridges, running in the same direction as the neighbouring chains of the Jura, and extending north-east into the Lake of Biemme, where one of them rises above the water, forming the island of St. Pierre. A similar ridge occupies the basin of the Lake of Morat.

These three lakes of the Jura have grown much smaller during the historic period, the alluvium carried into them by torrents and the formation of bogs along their banks tending to the same result. Near the bridge over the Thièle, between the Lakes of Neuchâtel and Biemme, and about 14,000 feet from the actual shore of the latter, piles have been discovered, which were evidently placed there when the

Fig. 302.—THE LAKES OF NEUCHATEL, BIENNE, AND MORAT.

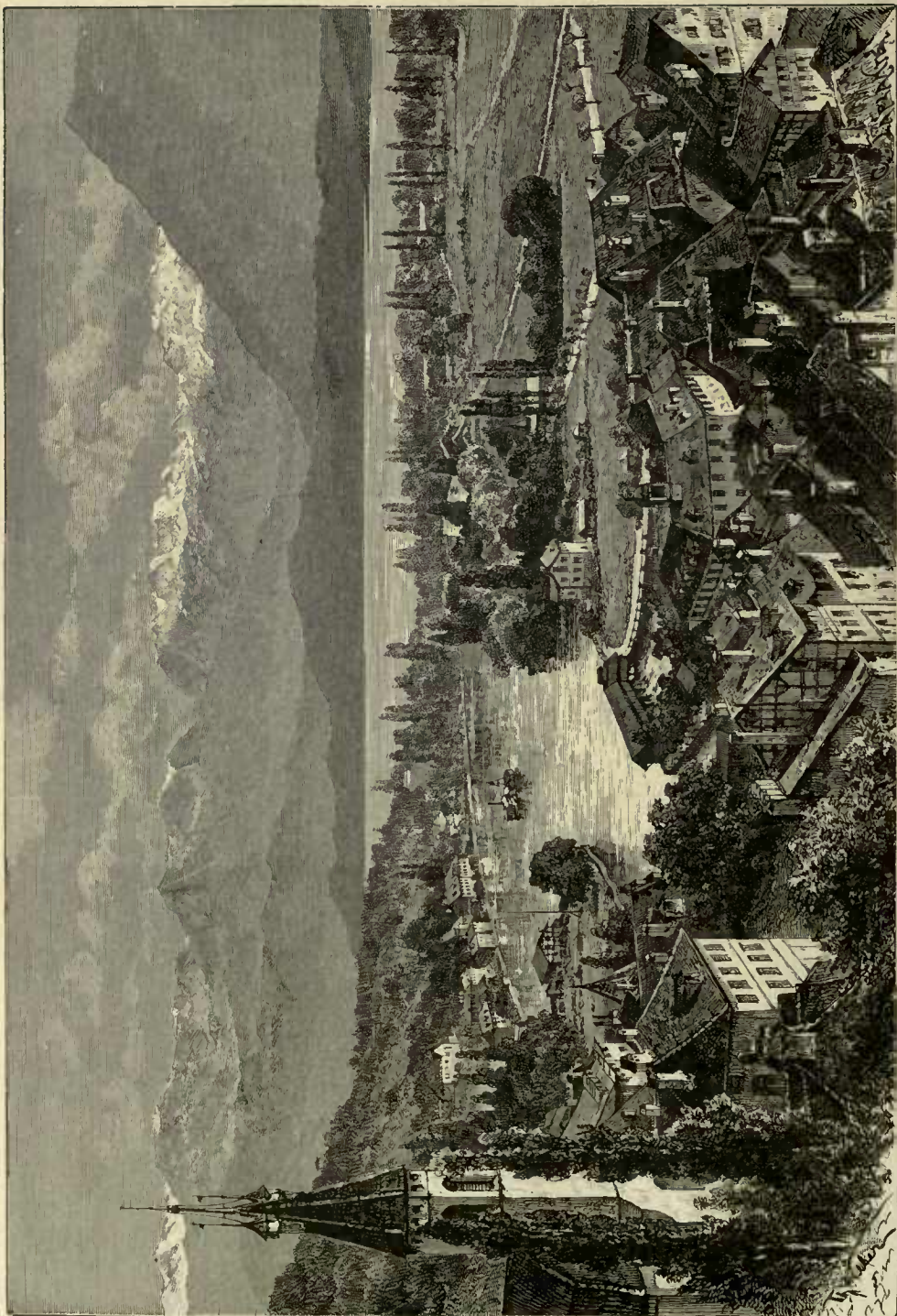
Scale 1 : 625,000.



10 Miles.

The darker shade indicates a depth of over 325 feet.

surrounding country was still under water. An abbey, built in 1100 close upon the shore of the lake, is now at a distance of 1,230 feet from it. Quite recently a shrinking of the Lake of Neuchâtel has led to the discovery of pile dwellings, and of numerous prehistoric remains. This natural shrinking of the lakes is accelerated by the "correction" of their emissaries. A fall of 10 feet in their level would result in the recovery of a considerable tract of land capable of being cultivated, whilst the drainage of the marshes which surround them would much improve the salubrity of the country. The bogs near the Lake of Morat, which formerly were frequently inundated by the Broye, have now been drained, and are being cultivated: the village of Witzwyl and several farmsteads now occupy what

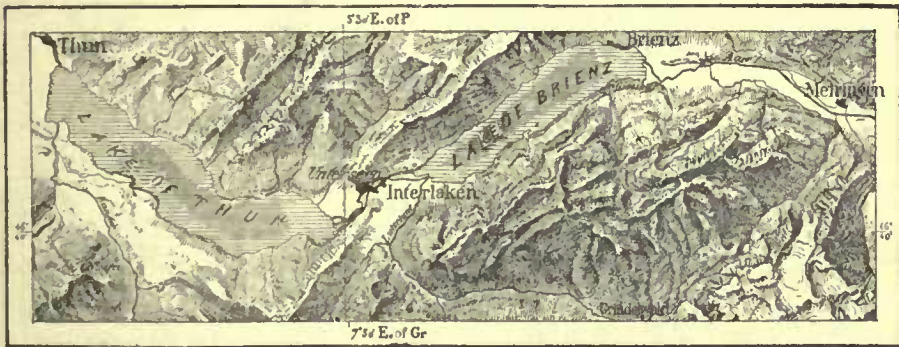


THE LAKE OF THUN.

was not many years ago an unproductive waste. The Upper Thièle, which flows into the Lake of Neuchâtel, and the Broye, a tributary of the Lake of Morat, frequently overflow their banks, and if it were not for the lake reservoirs into which they discharge themselves, their floods would carry destruction far down the valley. When these two rivers are in flood the Lake of Neuchâtel receives 21,200 cubic feet of water every second, its discharge during the same time not exceeding 3,500 cubic feet. It is thus that lakes act as regulators of the flow of rivers. But the Aar, a powerful river, likewise traverses the plain of the lakes, or "Seeboden," and there is no lake to regulate its floods or to receive the alluvium carried along by it. Engineers are about to provide it with such a reservoir. A canal, connecting the Aar at Aarberg with the Lake of Biemme, is designed to convey its flood waters into the latter; whilst the Lower Thièle, converted into a

Fig. 303.—THE LAKES OF BRIENZ AND THUN.

Scale 1 : 400,000.



The dark shading expresses a depth of over 660 feet.

navigable canal, will regulate the discharge of the lake. In making the excavations for this canal a Roman tunnel, 2,800 feet in length, was discovered near the village of Hageneck, at a depth of 300 feet below the level of the dividing ridge.

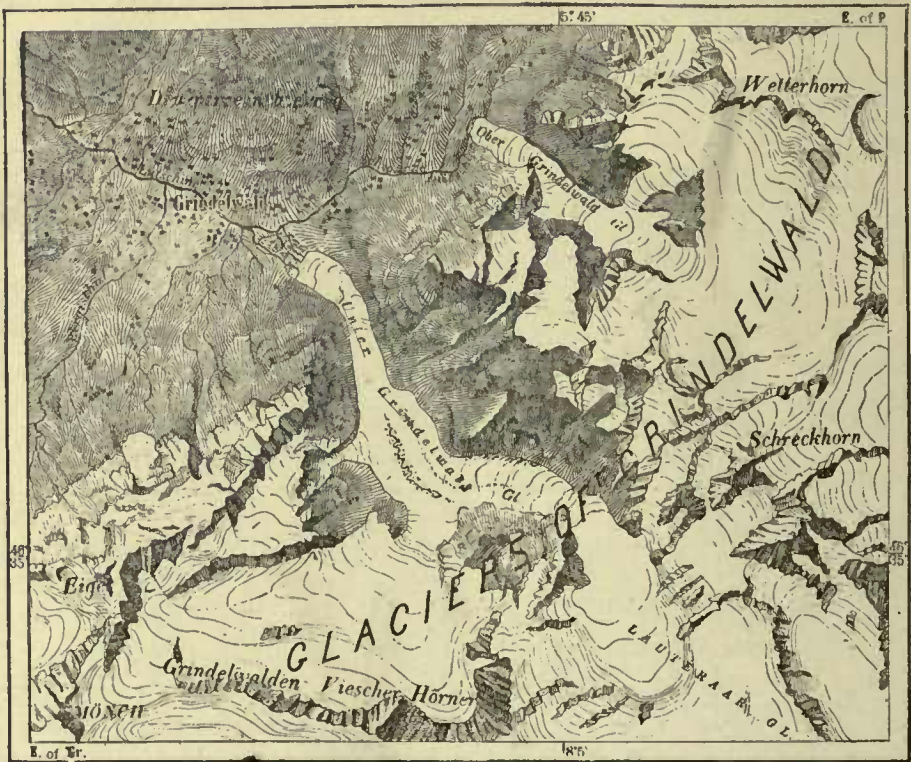
The redoubtable Aar is "regulated" in its upper course by the twin Lakes of Brienz and Thun. Formerly these two lakes formed one sheet of water, but during the glacial period immense quantities of mud and stones, the waste of the mountain masses of the Oberland, were carried down the valley of the Lutschine, and deposited in the very centre of the elongated lake, which was thus separated into two basins.* Denudation and deposition still proceed, though at a very slow rate, and both lakes are gradually being silted up. The Upper Aar, which enters the upper end of the Lake of Brienz, collects the débris throughout its basin, which includes the glacier of Unteraar, and, rushing over the Handeck Falls,

	Lake of Brienz.	Lake of Thun.
• Height above the sea, in feet	1,853	1,837
Average area, in square miles	11.6	18.5
Depth, greatest, in feet	856	702
Depth, mean, in feet	660	500
Contents, in million tons of water	6,000	7,940

deposits it in the lake. Lower down, the Lake of Brienz is joined by the Lutschine, which is fed by the vast glaciers of the Oberland, including that of Grindelwald. Formerly this furious mountain torrent frequently devastated the country around Interlaken; but about the middle of the thirteenth century it was confined within an artificial channel, and diverted by a direct course into the lake. Amongst the rivers which join the Lake of Thun the Kander is the most important. It brings down immense quantities of pebbles and mud. As recently as the beginning of last century it joined the Aar, about a mile below the town of Thun, but the sudden

Fig. 304.—THE GRINDELWALD GLACIER.

Scale 1 : 100,000.



inundations which it caused were of so disastrous a nature that the patricians of Bern caused it to be diverted into the lake. The roof of the tunnel which they constructed for that purpose has since fallen in, but the river continues to flow in the desired direction. The alluvium deposited by it covered an area of 142 acres in 1870, and, as the depth of the lake there cannot have been less than 200 feet, its mass may be estimated at 42,000,000 cubic yards.

The ancient lakes which formerly extended along the foot of the Jura, below the confluence of the Aar and the Thièle, exist no longer. The alluvium carried down by torrents, the growth of peat mosses, and the labour of man have converted

them into pasture-lands. All the small lakes of Northern Switzerland, as those of Sempach, Baldegg, Hallwyl, Greiffen, and Pfäffikon, as well as the three large ones of Luzern, Zug, and Zürich, belong to the hydrographical domain of the Alps, or of their foot-hills. The junction between the river systems of the Alps and the Jura takes place at the triple confluence of the Aar, the Reuss, and the Limmat. At a former geological epoch these three rivers flowed along the foot of the Jurassic ridge of the Lägern, towards the Lake of Constanz; but in the end the united force of these rivers broke through the barrier of the Jura. Geographically the passage which they opened for themselves forms the Gate of Switzerland to a traveller coming from the direction of Germany.

The centre one of the rivers, the Reuss, is the effluent of the Lake of the Four Cantons, which of all the lakes of Switzerland most resembles a Norwegian fiord. Between Luzern and Brunnen, or between Küssnacht and Stad, the lake appears to consist of a single sheet of water, but in reality it is formed of several separate basins, some joined to each other by narrow straits, others intersecting each other at right angles. At a former geological epoch, when the Lakes of Zug, Lowerz, Sarnen, and Lungern still formed part of the system of the Four Cantons, the labyrinth of these water-ways was even more intricate. Abrupt turnings, bold promontories, wide bays bordered by villages, glistening villas and sombre forests, cultivated fields and distant views of the Alps, are productive of the most picturesque effects, and many there are in whose opinion this is the most beautiful lake in all Switzerland. Historical associations increase the interest with which we contemplate its beauties. Formerly the lake was popularly considered to be almost unfathomable, and fishermen seriously talked about abyssal depths of 5,000 feet. They believed that the steep precipices which bound it continued at the same gradient until they met beneath its waters. They do extend beneath the surface of the lake, but only as far as its flat bottom, which in the basin of Uri lies at a depth of 612 feet. The depth of the large basin is 853 feet, that of the Lake of Zug 644 feet.*

The lakes drained by the Limmat have a geological history similar to that of the twin Lakes of Brienz and Thun. They, too, were cut in two by alluvial masses carried down by the glaciers. The Lake of Wallenstadt, or Wallen, most resembles an abyss. Bounded by the steep walls of the Churfürsten, this narrow and sombre lake resembles a gorge which has been invaded by a river. And such has actually been the case. The Rhine, which now flows to the east of the mountain masses of Appenzell and enters the Lake of Constanz, formerly flowed through the narrow mountain defile which opens to the south of the Churfürsten, and, taking the direction of the river Linth, the Lake of Zürich, and the present bed of the Limmat, it joined the Aar. A strip of alluvial land, about 43 miles in length, and only 16 feet high in the centre, now separates the Rhine from

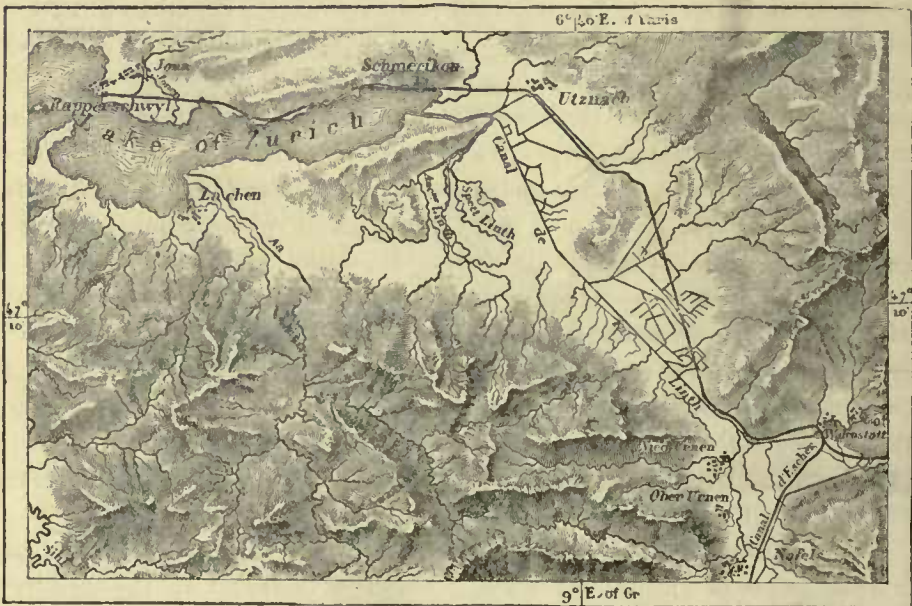
	Lake of Luzern.	Lake of Zug.
* Height above the sea, in feet	1,434	1,367
Average area, in square miles	43.7	14.7
Depth, greatest, in feet	853	644
Depth, average, in feet	490 ?	390 ?
Contents, in million tons of water	16,950	4,560

its ancient bed. A flood of unusual height might some day enable it to overcome this obstacle, as very nearly happened in 1817; and, if once it resumed its ancient course, it might not again return to its present bed. The people of Zürich fear such an event, and for this reason they offer the most powerful opposition to the construction of a canal which is to join the Linth to the Rhine, and the railway engineers were prevented from carrying their line through a cutting.

Below the Lake of Wallenstadt commences the valley of the Linth, formerly a swamp, converted into dry land by the detritus washed down from the Alps of Glarus. The torrent which performed the greater portion of this geological work was formerly much dreaded on account of its sudden floods, which laid waste the fields, and decimated the population by breeding miasmatic fevers. The famous

Fig. 305.—THE SWAMPS OF THE LINTH.

Scale 1 : 220,000.



Swiss geologist, Escher, surnamed of the Linth, diverted the course of this river into the Lake of Wallenstadt, and canalised the sluggish Mag, which formerly meandered amongst swamps. The Limmat (Linth-Mag), which drains the Lake of Zürich, is joined in the suburbs of that town by the Sihl, a river which frequently overflows its banks, but which might easily be diverted into the lake.

The Aar, having been reinforced by the Reuss and the Limmat, is a larger river than the Rhine* at the confluence of the two rivers, but its course being more sinuous, and its valley of less importance than that of the smaller river, the name of the latter has been bestowed upon the united streams. In its general

* Average volume of the Rhine at the confluence with the Aar, 15,010 cubic feet a second: of the Aar, 18,080 cubic feet.

features the Rhine bears a striking resemblance to the Rhône. Both rivers rise near the St. Gotthard, in a great transversal valley of the Central Alps; both purify their waters in a large lake; and, in their passage through the same Jurassic range of mountains, they both form cataracts and waterfalls, though separated by that time by an interval of 180 miles. The elbow at Basel has its analogue in the elbow at Lyons. Both rivers then flow straight towards the sea, the one to the Mediterranean, the other to the German Ocean, and the volume of water they discharge is about the same.

The principal head-stream of the Rhine is not the Vorder-Rhein, which rises in the neighbourhood of Andermatt, but the Hinter-Rhein, or Further Rhine, which has its source on the Adula. It is not "born amongst reeds," but rises from an icy cave, amidst a chaotic mass of rocks, rejoicing in the epithet of "Hell." Lower

Fig. 306.—THE SOURCES OF THE RHINE.

Scale 1 : 925,000.



10 Miles.

down it traverses many another "hell," the most famous amongst which is the fearful gorge of the Via Mala, bounded by precipitous rocks rising to a height of 1,500 feet. Immediately below that famous cleft in the mountains, within which the river is confined to a bed hardly 30 feet wide, the Rhine is joined by two mountain torrents. One of these is the Una, the waters of which are sometimes black as ink, owing to the triturated slate they hold in suspension; the other is the Albula, or "white river," which is a more formidable stream than the Rhine itself. It issues from the gorge of Schyn, or Mal Pass, hardly less wild than that of the Via Mala, and exceedingly interesting on account of its geological formation. Formerly, before the Albula had opened itself a passage through this gorge, it flowed north, in the direction of Chur.

The Rhine, now an imposing river, flows past the piled-up rock masses of the

Calanda, and is joined by several valleys, amongst which that of the Tamina is best known on account of its overhanging rocks, at whose foot rise the thermal springs of Pfäfers. The Rhine then flows through a wide alluvial plain, and below Sargans, where its old bed branches off to the left, in the direction of the Lake of Wallenstadt (see p. 429), it enters the ancient lake basin, now to a great part filled up by its alluvium. This filled-up basin is more extensive than that of the Rhône above the Lake of Geneva, its area amounting to no less than 116 square miles, and it is continually encroaching upon the Lake of Constanz. A few isolated hills, not yet destroyed by erosive action, rise in the midst of this vast alluvial plain. The river, which here forms the boundary between Switzerland and Austria, frequently overflows its banks, and the maintenance of embankments* and the drainage of the land require unremitting attention, in spite of which the Rhine has repeatedly broken through the barriers which confine it, and excavated itself a new bed. In many parts of the valley the average level of the river is from 6 feet to 10 feet higher than the adjoining plain. When building a bridge near Buchs, an old stone embankment was discovered at a depth of 16 feet below the actual level of the valley.

The Lake of Constanz is the remnant of a vast sheet of water which formerly stretched from the Swabian Jura to the mountains of the Tyrol. It is a German lake rather than a Swiss one, and its German name, Bodensee, is derived from a small village at its north-western extremity. In its general features it resembles the Lake of Geneva, but it is smaller and more shallow. Its waters present the phenomenon of seiches, locally known as *Ruhssen*. Its elevation above the sea being greater than that of the Lake of Geneva, and its position more northerly and less sheltered against cold easterly winds, ice forms along its banks nearly every winter, and five times in the course of the last four centuries the lake was frozen over entirely.

The Lake of Geneva formerly discharged its waters into the Rhine, whilst the Lake of Constanz was tributary to the Danube. Subsequently, after the latter lake had become a member of the basin of the Rhine, its waters discharged themselves, towards the north-west, through the arm now known as the Lake of Ueberlingen. At the present time the lake overflows through a canal $2\frac{1}{2}$ miles in length into the Untersee, or Lower Lake, which may almost be looked upon as a distinct lake, as it lies about 3 feet below the Bodensee. It is much shallower. Formerly its waters escaped through a valley now occupied by the rivers Aach and Biber, but they now issue from the south-western corner of the lake at Stein. In its passage through the Jurassic hills below that town the current of the river is strong. At Schaffhausen a forsaken bed of the river, now known as the Klettgau, branches off on the right. A short distance below that town, close to the old castle of Laufen, the Rhine plunges over a ledge of rock and forms a waterfall 66 feet in height. In the midst of the foaming waters rise two jagged rocks, the one pierced by a natural tunnel, through which the waters rush when the river is in

* Lake of Constanz (or Bodensee):—Height above the sea, 1,306 feet; area (average), 208 square miles; depth, greatest, 906 feet; depth, average, 490 feet; contents, in tons of water, 80,850 millions.

flood, and both covered with shrubs, whose leaves are ever moistened by the mist which perpetually hangs over the falls and is drifted about by the wind. The Falls of Laufen, frequently called after the neighbouring town of Schaffhausen, are the most considerable of Europe, no less than 330 tons of water, on an average, roaring over them every second. They set in motion the wheels of numerous factories. Above its junction with the Aar the Rhine is joined by the Thur, an impetuous river, which frequently overflows its banks.

Below the Aar the Rhine has still to surmount several obstacles before it reaches the plain. It forms a few small rapids, known as the *Kleine Laufen*. They present no obstacle to vessels descending the river, but the Great Rapids, or *Grosse Laufen*, near Laufenberg, interrupt navigation. The Rhine by this time has traversed the whole width of the Jura. It flows over a bed of granite connected with the Black Forest, and enters a natural region very different from Switzerland. Soon after, at Basel, the river turns abruptly towards the north, and intersects the wide plain of Alsatia and Baden, bounded on the one side by the Vosges, on the other by the Black Forest. Two-thirds of the surface drainage of Switzerland pass beneath the arches of the bridge of Basel. The volume of the Rhine, not including the water conveyed into it by tributaries not fed from Swiss sources, is double that of all the other rivers of Switzerland (Rhône, Ticino, Maggia, and Inn) at the spots where they leave Swiss territory.*

* Average volume of the rivers of Switzerland at the Swiss frontiers, as determined by a Federal Commission in 1871 (cubic feet per second):—Rhine, 28,854; Rhône, 9,535; Ticino (Tessin), 3,708; Maggia, 2,190; Verzasca, 353; Inn, 1,765; minor rivers, 424; total, 46,829.

The volume of the Rhine at Basel, including the water conveyed into it by its German tributaries, is 35,300 cubic feet a second.





CHAPTER V.

CLIMATE, FAUNA, AND FLORA.*



THE variety in the vertical configuration of the country materially affects its climate, and nearly every valley and every mountain side has a climate of its own. Speaking in a general way, we may observe that the climate in the Jura and on the northern slope of the Alps is far more inclement than would be expected from the latitude, whilst the towns on the southern slopes, being protected against northerly winds, enjoy a milder climate than other places equally distant from the equator, but situated on an open plain. Thus, whilst the mean annual temperature at Locarno, on the bank of the Lago Maggiore, amounts to 55° Fahr., that of the Swiss plain, between the Lakes of Geneva and Constanz, does not exceed 49° Fahr. In fact, every place in Switzerland has its distinct climate.† On ascending a mountain the mean annual temperature decreases 1° Fahr. for every 349 feet we ascend. This is the average, the extremes being 300 and 419 feet, according to the locality. The mean annual temperature on the passes of the St. Gotthard and Simplon is not much below freezing point; that on the St. Bernard is considerably less. The mean temperature of the Monte Rosa and of the highest peaks of the Oberland has been estimated at 5° Fahr., which is the climate of Greenland or the Arctic regions. The average height of the snow-line is 9,180 feet, but in exceptionally warm summers the

* H. C. Lombard, "Les Climats des Montagnes;" Dufour, "Recherches sur le Föhn du 23 Sept., 1866, en Suisse;" Tschudi, "Des Thierleben der Alpenwelt."

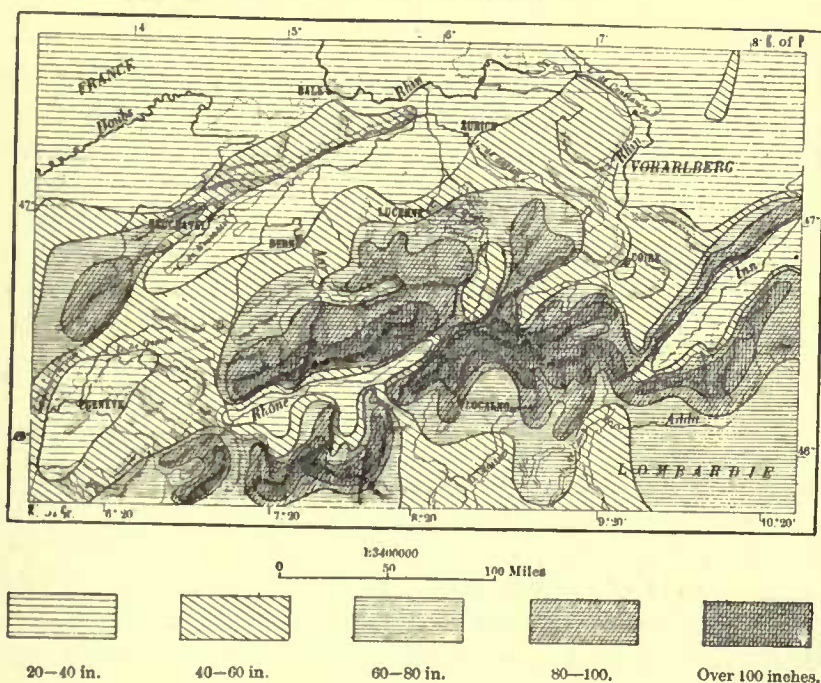
METEOROLOGICAL TABLE.

	Lat. N.	Height. Feet.	Mean Temperature (Degrees Fahr.)			Precipitation. Inches.
			January.	July.	Year.	
† Basel,	$47^{\circ} 34'$	804	31°	66°	48°	25
St. Gallen,	$47^{\circ} 26'$	1,810	29°	65°	49°	—
Zürich,	$47^{\circ} 23'$	1,420	29°	66°	48°	33
Bern,	$46^{\circ} 57'$	1,910	27°	63°	46°	46
Chur,	$46^{\circ} 50'$	2,000	29°	66°	49°	—
Neuchâtel,	$46^{\circ} 49'$	1,440	33°	64°	47°	—
Lausanne,	$46^{\circ} 31'$	1,440	30°	64°	49°	40
Geneva,	$46^{\circ} 12'$	1,330	$31^{\circ} 5'$	64°	48°	32
St. Gotthard,	$46^{\circ} 32'$	7,090	18°	46°	30°	—
St. Bernard,	$45^{\circ} 50'$	8,170	15°	43°	28°	61

snows completely melt away on summits having an altitude of over 11,000 feet; and even the jagged rocks of the Mischabel, which rise to a height of 14,000 feet, may then occasionally be seen without a patch of snow.

The mountains of Switzerland intercept winds and clouds, and the amount of precipitation is consequently more considerable than in the neighbouring countries. Dense fogs frequently drift over the swampy plains, the lakes, or shut-in valleys, but, as a rule, the sky is rather less clear half-way up the mountains than either in the lowlands or upon the mountain summits. The clouds are generally intercepted by the mountains at an elevation of 5,000 feet, and then descend in rains. Higher up, precipitation, in the form of snow, is less abundant. The annual rainfall varies in the plain of Switzerland between 25

Fig. 307.—RAIN MAP OF SWITZERLAND.



and 46 inches. This is far more than falls in France, but very much less than falls on the upper mountain slopes. On the Pass of St. Bernard the annual amount of precipitation, including rain and snow, exceeds 5 feet. Agassiz saw more than 56 feet of snow fall upon the passes in a single winter. On the southern slope of the Alps, in the valley of the Ticino, the rainfall resulting from the contact of warm winds with the cold mountain slopes is more considerable still, and sometimes exceeds 9 feet in the course of a single year.

Proportionately to its area, Switzerland receives a greater quantity of rain than any other country in Europe; and the quantity of water which flows down its rivers to the sea is very considerable. The combined volume of these rivers, which flow to the north, west, and south—into Germany, France, and Italy—is four times greater than that of the rivers of France, always bearing in mind

the difference between the areas of the two countries. In addition to these rivers, which carry fertility to distant countries, Switzerland possesses in its lakes and glaciers vast reservoirs of water.

North-easterly and south-westerly winds prevail, as in France and Germany, and the conflict between the polar and equatorial currents is going on perpetually and with varying success. Mountains and valleys, however, by intercepting or turning aside the atmospheric currents, produce the most extraordinary irregularities. Sometimes a violent wind blows on a pass, whilst in the valley below the air is calm, or moving gently in an inverse direction. It is by no means rare for a northerly wind to penetrate some valley from the south, or for a westerly wind to do so from the east. Moreover, in all the valleys which are bounded by high mountains, the wind must either blow up or down. In the canton of Valais, for instance, the winds either blow from the west or from the east; whilst in the valley of the Rhine, between Chur and the Lake of Constanz, only northerly and southerly winds are known, and the same is the case in the valley of the Ticino, between the St. Gotthard and the Lago Maggiore.

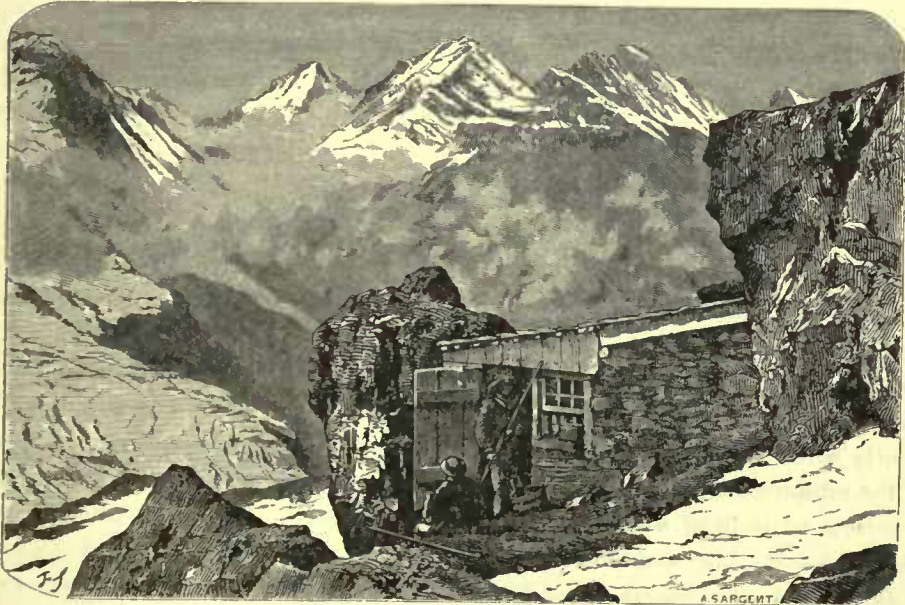
The general law in accordance with which the winds blow down the hills during the night and in the morning, and up the hills during the heat of the day, has been observed to prevail throughout Switzerland, and more especially on the lakes, where fishermen are obliged to pay special attention to this phenomenon. Except when interfered with by general atmospheric currents, a breeze begins to blow every afternoon from the bottom of the lake towards the mountains, the air above which has become rarefied through the heat of the sun. After sunset the mountains cool suddenly, and during the night the wind blows down the lake. Local circumstances, such as temperature and configuration of the mountains, cause the hour of change to vary for each lake basin. Thus in the canton of Ticino, where the steep slopes are exposed to the full heat of the sun, the *brevia*, or uphill breeze, begins to blow at eleven in the forenoon, whilst the contrary current sets in early in the evening. On the Lakes of Zürich and Constanz, which occupy valleys open towards the west, and are surrounded by mountains of less height, and less exposed to the rays of the sun, the breezes set in several hours later.

The *föhn*, known to the Romans as *favonius*, brings about the most sudden changes of temperature, and disturbs more than any other wind the general equilibrium of the atmosphere. This wind, so much dreaded and yet so beneficent, has been a subject of frequent discussion amongst meteorologists. Dove, Mühry, and others look upon the *föhn* as a tropical counter current of the trade winds. Others, including Escher of the Linth and Desor, believe that it originates in the Sahara, and flows in towards the area of low atmospheric pressure in Western Europe. M. L. Dufour, who most carefully investigated the *föhn* of the 23rd of September, 1866, found that the meteorological conditions of Algeria coincided on that day in the most striking manner with those of Switzerland, both countries having been visited by the same tempest. The *föhn* usually blows in winter or in early spring, and differs much according to season or

locality. As a rule it is hot, dry, and enervating. During its passage over the high Alps it cools, and causes heavy rains to fall upon the Monte Rosa and other summits of Ticino; but, as it plunges down again into the valleys, it regains its heat by condensation, and blows warm. It is the föhn which melts most of the snow in spring, sometimes in the course of a few hours laying bare extensive mountain slopes. "Without the föhn," say the peasants of the Grisons, "neither God nor the golden sun would prevail over the snow." But this wind, so beneficent on many occasions, is terrible in its fury. Woe to the vessel that ventures upon a lake exposed to its full blast. It lashes the surface of the water into mighty waves, and converts the lake into a caldron of seething water.

As we rise from one climatic zone to the other, all that has life in it—plants,

Fig. 308.—A CABIN OF THE ALPINE CLUB, WITH A VIEW OF THE ALTELS AND GSPALTENHORN.



animals, and human beings—diminishes. Nearly the whole of the population of Switzerland has settled down in the plains, in the hilly regions, and in the valleys which extend into the Alps. A contour-line drawn at a definite height along the mountain slopes would mark, in many parts, the upper limit of human habitations. There is only one town, viz. Chaux-de-Fonds, in the Jura of Neuchâtel which has been built at an elevation of more than 3,200 feet, and that almost in despite of the climate. Many villages in the Alpine valleys have an elevation of between 4,000 and 5,000 feet, and in the dreary valley of Avers, which is tributary to the Vorder-Rhein, where the year is made up of "nine months of winter and three of cold," we meet with the hamlet of Juf, inhabited by descendants of German settlers. Juf, at an elevation of 6,700 feet above the sea-level, is the highest village in Europe permanently inhabited.

The hospice of the Great St. Bernard, at a still higher elevation (8,108 feet), is open throughout the year for the reception of travellers crossing the pass. A few huts have been built even beyond the limits of perennial snow as places of shelter for mountain climbers. The most elevated amongst these is the one on the Matterhorn, which stands at a height of 12,790 feet.

It is well known that the climate exercises a most potent influence upon the inhabitants of the upper valleys. The mountaineers, as a rule, are stouter and heavier-limbed than the dwellers in the plain. Owing to the light air they breathe, they are less subject to maladies; and consumption, which carries off so many victims in Western Europe, is hardly known amongst them. Experience has clearly established this fact, and thousands of consumptive patients now pass the winter in the midst of snow and ice, in the villages of the valley of Davos and in the Grisons, which have an elevation of 5,080 feet.* On the other hand, the deaths from lung diseases and pleurisy increase with the altitude. These diseases are contagious amongst the mountaineers, and are much dreaded. In German Switzerland they are known as *Alpenstich*, or "stroke of the Alps." Asthma, scrofula, and rheumatism are more frequent in the Alpine valleys than in the plains. In damp places deficient in sunshine, and more especially where the water runs over magnesian rocks, many of the inhabitants are afflicted with wens or suffer from cretinism. Cleanliness, however, and an improved diet, cause these diseases to diminish from year to year.

Bodily and mental afflictions are more frequent in Switzerland than in the neighbouring countries, and only the number of blind is less.† But Switzerland possesses, in its diversified climate, varying with the elevation above the sea, the most powerful means of combating these maladies. By a change of residence we may obtain lighter air, more warmth, or less moisture. Jean Jacques Rousseau clearly perceived these advantages when he expressed his surprise that "bathing in the salubrious and beneficial mountain air had not yet become one of the great resources of medical science or of moral education." The wish of the great philosopher has been amply fulfilled, and thousands of our townsfolk now annually visit Switzerland in search of bodily, if not of moral strength; and they crowd the great hotels on the mountains and in the valleys, on the Rigi, the Seelisberg, the Muverau, the Bellalp, and many others, where a prospect may be enjoyed of the Monte Rosa or of the snow-clad peaks of the Bernese Oberland. The watering-places of the country, such as Schinznach, Baden, Pfäfers, Leuk (Louèche), or St. Moritz, are quite as much indebted to the pure mountain air for their success as to the character of their water. As to the mountaineers themselves, they are always having "changes of air," though by no means for the sake of their health.

* Deaths from consumption amongst a thousand inhabitants:—All Switzerland, 77; Basel (836 feet), 106; Geneva (1,230 feet), 101; Valais (1,640 feet), 49; Fribourg (2,060 feet), 37; Zug (1,570 feet), 17. In England the proportion is 124 per mille.

† Insane, in the canton of Bern, according to Dr Fetscherin (1871), 1,292, or 1 in 391; idiots, 1,512, or 1 in 335; idiots in Switzerland (census of 1870), 7,764, or 1 in 344; deaf and dumb, 6,544, or 1 in 408; blind, 2,032, or 1 in 1,313.

In France the number of deaf and dumb is only one-fifth of the above, but the blind are slightly more numerous.

They ascend the mountains to mow the grass; return to the lowlands to attend to their vineyards; and grow their oats and potatoes at some intermediate point. In the Valais we meet with numerous parish communities alternately inhabiting three distinct villages, according to the season.

It would not by any means be easy to trace the upper limits of various zones of vegetation, for local conditions, exposure to the sun, and human industry or interference bring about numerous exceptions. Even at Juf, far above the region of forests, the perseverance of the inhabitants compels the soil to yield a few vegetables. On the southern slope of the Alps, and in the valleys of the Valais (Wallis), which are sheltered against northerly winds, the vegetation ascends to a greater height than in German Switzerland. The vine, for instance, flourishes on the slope of Monte Rosa up to a height of 2,950 feet, whilst in the canton of St. Gall it cannot be grown beyond 1,700 feet. In Northern Switzerland cereals can be grown up to 3,600 feet, whilst rye succeeds up to 5,900 feet in the Grisons, and up to 6,500 feet on the slopes of Monte Rosa. Irrespective of exceptional cases, we may say that cultivation in Switzerland ceases at 3,940 feet. About one-half of the country lies thus above the region of agriculture, and much of the lower land is either unfit for cultivation or covered with lakes or forests. Fields, properly so called, only occupy the seventh part of it, and they diminish almost every year, as meadows prove more remunerative. Next to Norway, Switzerland, of all European countries, derives least support from its agricultural resources, and nearly half the bread eaten by the inhabitants is imported from abroad.

The great wealth of the country consists of its forests, its meadows, and its mountain pastures; for trees cover one-sixth of the total area, and pastures nearly one-third. In the Valais, in the Grisons, and in the Ticino we find many barren slopes, but, as a rule, the mountains of Switzerland are distinguished for their verdure. The lower slopes are covered with forests, their upper ones with aromatic herbs and grasses; and their freshness and beauty impress us all the more if we call up in our mind the tottering precipices of the Alps of the Dauphiné, the scorched rocks of the Apennines clad with meagre shrubs, or the dreary sierras of Spain, ashy-coloured or of a glaring red. The oak is comparatively rare in Switzerland, but nearly all the other forest trees of the lowlands of Europe ornament its valleys and the lower spurs of the Alps. The walnut-tree grows to an enormous size; beeches and chestnut-trees cover the slopes a little higher up; and to these succeed black woods of firs and pines, the most characteristic trees of Switzerland. Higher still we meet with larches, the wood of which is highly valued, until at last the creeping pine alone is capable of successfully struggling against the wind and the cold. Its roots are longer than its branches, and these latter repose flat upon the ground amongst a carpet of rhododendrons, and are thus protected against the violence of the storms. Formerly the forests extended higher up the hillsides, either owing to the refrigeration of the climate, as some meteorologists assert, or, what is more probable, because of the wanton destruction of forests by man, for a single tree soon perishes

where an entire forest would survive. The trunks of trees discovered in peat mosses prove conclusively that the slopes of Val Piora and of the Lukmanier were formerly covered with forests up to a height of 7,200 feet, where only pastures are found now. The upper limit of the forests has retired no less than 1,300 feet.

As we ascend the mountains the minor flora likewise changes its character. Down in the valleys carefully manured meadows yield abundant crops of hay, but higher up our grasses disappear, and species of arctic plants take their place. In spring the herds of cows leave the stables in which they pass the long winter, and, headed by a "leader" crowned with flowers and furnished with melodious bells, they depart for the Alps. They stay for some time on the lower pastures, but when the snow melts away from the upper slopes they mount higher and higher in search of the aromatic herbs which impart so delicious a flavour to the milk they give. Every patch of pasture is made use of; and if cattle cannot reach it, sheep or goats are taken thither, the herdsman frequently carrying the animals upon his back. On the approach of winter the herds once more return to the valleys, and the Alps are given up to solitude.

Far below the upper limit of mosses and other arctic plants animal life has ceased to exist in the mountains of Switzerland. Only about thirty species of insects and arachnidæ venture into the regions of persistent snows, which extend from 9,100 feet upwards. Between 9,800 and 10,800 feet we meet only with a few spiders. A field rat (*Arvicola nivalis*) has been seen at an elevation of 13,000 feet above the sea, but it has not yet been determined whether this little animal, which burrows its holes beneath ice and snow, lives permanently at such a height, or only visits such altitudes occasionally during summer. Not only quadrupeds and other land animals diminish with the height, but also fishes. The small lakes above 6,900 feet, which are frozen during a great part of the year, are very poor in them.

Many plants have disappeared during the historical epoch, more especially species peculiar to heaths, swamps, and lakes, and the huntsmen have exterminated several beasts which formerly inhabited the forests and the mountain sides. The bison, or auroch, and the beaver, still numerous during the Middle Ages, exist no longer. No deer has been seen in Switzerland for more than a century; the roe and wild bear have become exceedingly scarce, if they have not disappeared altogether; and it is very doubtful whether a tortoise was seen a short time ago, as asserted. There still remain a few wild goats and wild cats. Wolves are more numerous, and frequently invade the sheepfolds. The last bear was killed in Appenzell in 1673; and as those in the Grisons, in Ticino, and in the Upper Valais are sure of early extermination, the city of Bern will have to send to Asia or Africa for its symbolical animals. The chamois, or gemsbuck, is being pursued to extermination—eight hundred and twenty of these animals were killed in 1876—and the time is not very distant when the Swiss mountains will be inhabited only by herds of domesticated animals.

Birds of prey, and more especially the lammergeier, or bearded vulture, which sometimes attacks even children, are diminishing too, but there is no reason to

suppose that even a single species has been exterminated. The species of birds are three times more numerous than the species of all other vertebrate animals together, but three-fourths of these are merely birds of passage or occasional visitors, which make their home in Switzerland during winter or summer. Looking to the geographical position of Switzerland, in the very centre of the temperate zone, and to its bold mountain ranges, it is easily understood why so large a variety of birds of passage should temporarily stay in its valleys. These birds, when crossing from one slope of the Alps to the other, will naturally seek out the lowest depressions; and the Pass of St. Gotthard, with the valley of the Reuss leading up to it from the north, and that of the Ticino from the south, forms one of the great high-roads most frequented by those winged migrants. The high valleys at Urseren and Andermatt afford convenient resting-places, and it is there that Swiss ornithologists have captured some of their most valued specimens. These birds, indeed, pointed out to man, long before Alpine roads were thought of, the easiest passages across the mountains.





CHAPTER VI.*

THE PEOPLE.

THE plains of Switzerland were inhabited centuries before the time to which our most ancient historical documents go back. Even the ages which intervened between the two glacial periods saw man encamped in the valleys of the Alps. At Vizzicone, on the Italian slope, the beds formed by moraines belonging to these two periods are separated by a layer of lignite, within which has been found a mat made of rush. Branches cut off from firs have been discovered in a sedimentary deposit dating back to the interglacial period, at the eastern extremity of the Lake of Zürich; and Herr Rüttmeyer feels convinced that these branches were to be used for making baskets or a hedge, and prove the existence of man at that remote age. When the Romans took possession of the country several epochs of civilisation had already successively passed over it without a line to record what had happened, and it is only in our own days that evidence of these past ages has been discovered in caverns, in the lakes, and in the peat bogs. The first remains of human beings, together with their primæval implements, were discovered in caverns. At Veyrier, near Mont Salève, Messrs. Gosse and Thioly discovered human bones and implements made of the horns of reindeer, which afford us a glimpse into the life led by these troglodytæ. Other caverns at Thayngen, near Schaffhausen, which were inhabited during the reindeer period, have yielded veritable treasures, including a bone upon which an artist of that bygone age has rudely engraved the figure of a reindeer. Of the mammals which then inhabited Switzerland there now remain only three, viz. the stag, the wild cat, and the wolf. The southern slopes of the Alps appear to have been inhabited by men of a different race, perhaps by Etruscans, and of these, too, prehistoric remains have been discovered. One of the tributary valleys of the Maggia, the Val Lavizzara, or "potters' valley," is thus named on account of a soft stone, which was formerly made into pots. It is very probable that this name refers to an epoch of primitive

* Rüttmeyer, "Archiv. für Anthropologie," VIII.; "Veränderungen der Thierwelt der Schweiz;" Razoumovsky, "Histoire Naturelle du Jura;" F. Keller, "Die Keltischen Pfahlbauten in der Schweiz;" Troyon, "Habitations Lacustres;" Oswald Heer, "Die Pflanzen der Pfahlbauten;" A. Heim, "Fund aus der Renntierzeit."

civilisation, when man, not yet acquainted with the potter's wheel and the burning of clay, made his vessels of stone.

When the reindeer had disappeared, the glaciers had retired up the valleys, and the mosses of Lapland had been superseded by forests and grasses, the country was inhabited by a different race, known to us as the Lake dwellers. Swiss fishermen had long been acquainted with the fact that there existed rows of piles in the shallow bays of some of the lakes, but they had no notion of their origin, and the archæologists of the neighbourhood merely looked upon them as the remains of Roman embankments. Razoumovsky, towards the close of the last century, correctly guessed their origin, but his explanation passed into oblivion until an unexpected discovery enabled the learned to arrive at the truth. During the winter of 1853-54 the level of the Lake of Zürich fell much more than is ordinarily the case. The inhabitants of Obermeilen availed themselves of this opportunity, and, by throwing up embankments in advance of the old coast, they managed to secure a considerable tract of land. On this land, beneath a layer of mud, were discovered pieces of charcoal, stones blackened in the fire, cut bones, and utensils of every description, which clearly showed that a village had anciently existed there. Herr Ferdinand Keller carefully examined these remains, and soon after made known the result of his examination in a work on "Celtic Pile Dwellings in the Swiss Lakes." This was the starting-point in a subject of inquiry which has largely contributed towards laying the foundations of the new science of prehistoric anthropology.

It was no difficult task to reconstruct the pile dwellings of these distant ages.

The carbonised beams discovered amongst the piles clearly belonged to a platform constructed a few feet above the water. Interlaced branches and fragments of clay hardened in the fire formed the circular walls of the huts, whose conical roof was constructed of reeds, straw, or bark. The stones of the hearth have fallen beneath the place which they formerly occupied. Vessels of clay, heaps of leaves and moss, which served as beds, arms, trophies of the chase, such as the antlers of stags or the heads of bisons, which ornamented the walls—they all have been discovered embedded in the mud. In the peat bogs which formerly were

Fig. 309.—THE LAKE OF PFÄFFIKON.

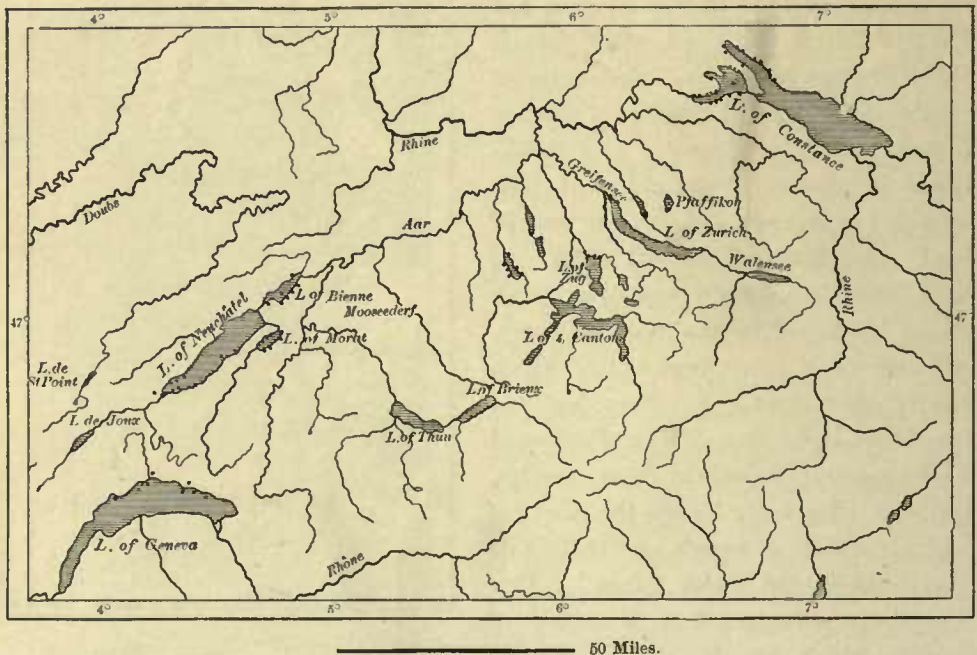
Scale 1 : 65,000.



covered by the Lake of Pfäffikon, even stuffs made of flax and hemp, and pieces of carbonised wheaten bread, have been discovered. By the side of the piles we are still able to identify dug-out trunks of trees which were used as boats, whilst rows of piles indicate the position of a bridge which connected the pile village with the mainland. In a few instances an estimate of the number of houses and of their inhabitants could be made. Up to the present time no less than two hundred of these villages have been discovered in the Swiss lakes, some of them having as many as five hundred houses. The population of these villages, which need not, however, have existed simultaneously, may be estimated at 100,000 souls. This much is certain, that these lake dwellers of Central Europe were perpetually at

Fig. 310.—THE PILE DWELLINGS OF SWITZERLAND.

Scale 1 : 2,200,000.



war with each other, and that, like the Papuans and Dayaks of our own day, they built their houses in the midst of the waters in order to be secure against sudden attacks.

The only lakes of Switzerland in which no remains of pile dwellings have hitherto been discovered are those which are very deep throughout, as the Lake of Lugano, or which are in the cold zone, as those of Thun and Brienz. Lake dwellings, some on piles, others placed on heaps of stone, bordered nearly the whole of the shore of the Lakes of Neuchâtel, Biel (Bielle), and Morat (Murten). Nearly one-half of all those known to exist in Switzerland were discovered there. But they are not the oldest, it appears, for it is principally on the banks of the Lakes of Zürich and Constance that pile dwellings belonging to the stone age are

met with. M. Troyon has calculated, from the rate at which alluvial mud is being deposited between the old pile village near Chamblon and the actual southern extremity of the Lake of Neuchâtel, that that village must have been built 3,300 years ago. The climate and flora of Switzerland were at that time pretty much what they are now, except that water-chestnuts and water-lilies grew abundantly in the lake, where they are no longer met with. All the cultivated plants belonged to species which still exist in the country, but they were less productive. Cereals and vegetables have been much improved since that time, and the grains of the former are now larger and heavier. The animals were the same as now, with the addition of the aurochs and the marsh pig, which have disappeared, and the bison, the elk, and the beaver, which have retired to other parts of Europe. Domestic fowls had not yet been introduced from the East. Curiously enough, no bones of hares have been discovered near the pile villages. Perhaps the lake dwellers looked upon this animal as impure, as do the Laplanders of our own day, and rejected it as an article of food. The cave dwellers of Thayngen had no such scruples, for the bones of hares abound there.

The progress from the stone age to the ages of bronze and iron took place either gradually through the influence of commerce, or it was brought about abruptly by foreign invaders. Coarse earthenware, dating back to the time of the Romans, proves that the lake dwellings were still inhabited at the beginning of the Christian era. Many of them exist virtually to the present day, for towns have arisen in their places. Zürich occupies the site of a lake village dating back to the stone age, whilst during the age of bronze there existed pile dwellings on the site now occupied by Geneva.

To what race of man belonged the first inhabitants of the Swiss lakes? We do not know. MM. Rüttimeyer, Keller, and other savants competent to form an opinion, look upon the dwellers in these villages as the ancestors of the modern Swiss. Others believe that these autochthons were Fins, or perhaps Iberians. According to them the Celts arrived subsequently, either during the bronze age, or during that of iron, and they exterminated the aboriginal inhabitants. These invaders, the Helvetians, whose name (*Elvii* or *Elvetii*) probably means herdsmen, conferred the name of *Helvetia* upon the region of the Central Alps, a name which survives to the present day. The Celtic names of their villages, the shape of their weapons, the crescents which they wore as amulets, and their custom of burning the dead—all this proves their Gallic origin. The cultivated plants and the domesticated animals, of which remains have been discovered in their pile dwellings, prove conclusively that they carried on commercial intercourse with Mediterranean countries.

The Celtic tribes—viz. the Helvetians of the plains and the Rauracians of the Jura—occupied, however, only Western Switzerland, the more mountainous regions in the east being held by men of a different race. Many names of villages prove to us that the country to the east of a sinuous line drawn from the St. Gotthard and the Bernese Alps to the mountains of St. Gall and Appenzell was occupied by

Rhætians, or Retes, who were either a Celtic tribe or the ancestors of the Etruscans. When the great migration of peoples took place, the German invaders proved sufficiently numerous to force their language and customs upon the Celts who had preceded them. The territories invaded by Alemanni and Franks form the German Switzerland of the present day, whilst that portion of ancient Helvetia which is now known as French Switzerland was conquered by the Burgundians, who soon became merged in the Latinised population of the country. The Aar forms approximately a natural frontier between the Alemanni and the Burgundians.

M. His, who has examined a large number of skulls found in old sepulchres, distinguishes four types, viz. those of Sitten (Sion), Hohberg, Disentis, and Belair. These types still exist amongst the present inhabitants of Switzerland. The skull of Sitten is Celtic: it is long and wide, with a rounded top. The skull of Hohberg is long and narrow, and resembles the skulls discovered in Roman tombs. The skull of Belair is of middling length, and is Burgundian; the square skulls of Disentis are Alemannic. This latter type prevails throughout Switzerland as well as in the whole of Southern Germany.

No notable changes have taken place in the population of Switzerland since the great migration, except that there has been an expansion in the direction of the mountain valleys, which were not formerly cultivated. The descendants of the ancient Rhætians, who formerly inhabited the lower plains, appear to have been gradually driven into the hills by conquering Franks and Alemanni. It is said that the valley of the Reuss, in the canton of Uri, was occupied by German settlers only in the eighth century. Several of the plateaux of the Jura remained even longer in a state of nature, for the serfs belonging to the monasteries only settled in these sombre forests towards the close of the tenth century. Subsequently, in the thirteenth and fourteenth centuries, *francs habergeants*, for the most part natives of Geneva, settled in the Jura, and, in consideration of their bringing the land under cultivation, the seigneurs exempted them from the principal taxes as well as from corporal punishment.

According to mediæval legends, another ethnical element is said to have become merged in those which form the bulk of the inhabitants of Switzerland. In many parts of the Valais there are buildings said to have been erected by Saracens, and it is asserted that these invaders have left visible traces of their presence amongst the inhabitants of some of the more remote valleys. This much is certain, that the Mussulmans made frequent incursions into Switzerland during the tenth century, say between 936 and 960. They penetrated as far as St. Gall and the Lake of Constanz; they occupied the Great St. Bernard and other passes leading from Italy into Switzerland, and levied blackmail upon travellers; they even took themselves wives in the country, and some amongst them no doubt settled there; but their numbers were certainly not large enough to exercise an appreciable influence upon the character of the inhabitants. The supposed Arabic names of some of the mountains of the Monte Rosa group—such as Almagel, Allalin, Mischabel—are more easily explained from Italian patois.

of places prove to us that "Romanche" or "Ladin" dialects were then in use, not only in the whole of the Grisons, but also on the Walen Lake (*i.e.* Welsh Lake), in the mountains of Appenzell, and in the Austrian provinces of the Vorarlberg and the Tyrol. Gradually encroached upon by German, these dialects of Latin, with which are mixed a few old Rhaetian words, and which have had a printed literature since the sixteenth century, survive only by force of habit or, in a few villages of the Grisons, by local patriotism. Nearly all the inhabitants now speak German or Italian in addition to one of the local patois used in the two upper valleys of the Rhine and in the Engadine. A few villages purely German are surrounded by Romanche territory. They were founded by Frederick Barbarossa to protect the passes of the Alps. German, moreover, is spoken on the southern slopes of the Bernese Alps, in the eastern Valais, and even on the Italian slope of the Alps, to the south of the Monte Rosa and the St. Gotthard. The small village of Bosco, in Ticino, is German, and so are the villages in the Italian valley of Pommat. Italian, on the other hand, is spoken in the two villages of Stalla and Marmels, to the north of the Julier Pass, on a tributary of the Rhine.

The limit of French does not coincide, like that of Italian, with a range of mountains. On the contrary, French has almost everywhere crossed the Jura, which one might suppose would form its natural boundary. In the canton of Neuchâtel and in the Bernese Jura the dialect of Franche-Comté is spoken, whilst farther south we hear a Provençal patois. In the Valais a French dialect, very like that of Auvergne, is spoken as far as the transversal range which bounds the valley of Herens, or Erin, on the east. In the canton of Fribourg French extends beyond the river Sarine to the foot of the Alps. In the Bernese Jura it is spoken as far as the banks of the Lake of Bienna (Biel), excepting only in a narrow slip extending along the foot of the Jura to the north of Chavannes. The number of French-speaking Swiss has slightly increased, as compared with those talking German.*

Fribourg, which was founded by a Count of Zähringen on French soil, was originally a German town, but French prevails there now, German being only spoken in the lower town. It is said that in families where the children speak both languages perfectly, French, in course of time, supersedes the German, no doubt because French is easier and clearer. Nor must we lose sight of the fact that French patois are only spoken in the villages, whilst the inhabitants of the town speak literary French with more or less purity. In German Switzerland, on the other hand, most of the patois have a literature of their own, and are spoken side by side with High German even in the towns. French thus enjoys the advantages which result from greater uniformity and cohesion, which enable it to resist effectually the centralizing tendencies emanating from Bern.

* Languages spoken in Switzerland:—

	Families. 1870.	Per Cent.	1880. Per Cent.
German	384,538	69·16	69·50
French	133,575	23·98	23·37
Italian	30,079	5·69	5·03
Romanche	8,779	1·17	1·69

Differences of race and language have influenced but slightly the religious tenets held by the people, in spite of what certain authors may assert. Feudal influences, rivalries between towns, conflicting interests, and the continual wars between the cantons are quite sufficient to account for the religious divisions which grew up at the time of the Reformation and exist to the present day. The French cantons of Vaud and Neuchâtel are almost exclusively inhabited by

Fig. 312.—COSTUMES IN URI.



Protestants; Geneva is pretty equally divided between the rival confessions; Fribourg and Valais are Catholic. It was Geneva, a town in French Switzerland, which merited during many years the epithet of "Protestant Rome;" whilst another French town, Fribourg, sheltered the Jesuits, and still remains, with Luzern, a German town, the stronghold of Roman Catholicism. On the other hand, the German cantons of Bern, Basel, Zürich, and several others are Protestant.

Fig. 313.—COSTUMES IN FRIBOURO.



St. Gallen, which has been formed out of a large number of miniature states, has a mixed population, whilst the four ancient Forest Cantons are wholly Catholic.

It is said that in the canton of Appenzell there exist striking physical differences between the Protestant inhabitants of Outer Rhoden and the Catholics of Inner Rhoden. These latter are less tall than other Germans of Switzerland; they are of slighter build, have brighter eyes, and a freer gait. As to the Romanches of the Grisons, their villages are partly Protestant, partly Catholic. The Italians of Ticino are Catholics, but those of the valley of Bregaglia belong to the Reformed Church. Upon the whole, the Protestants are in the majority, three-fifths of the total population, and the three most important cantons, Bern, Zürich, and Vaud, being of that confession. Of the few thousand Jews nearly a third live in the canton of Aargau.*

In spite of difference of race, language, religion, local customs and institutions, the Swiss of the various cantons possess many features in common which distinguish them from other natives of Europe. As compared with their neighbours, and more especially with those on the southern slopes of the Alps, they are certainly not distinguished by beauty of face or noble bearing. They do not shine by brilliant qualities or seductive manners, but they are powerful. The best-known type of a Swiss is a man with largely sculptured features, broad chest, of a rather heavy gait, with bright eyes and strong fists. The Swiss is slow, but tenacious. He does not allow sudden fancies to turn him aside from anything he has undertaken to carry out, but in case of need he knows perfectly how to utilise the ideas of others. In all he undertakes he looks to practical results, and he has certainly succeeded in winning for himself a greater amount of substantial liberty than most other Europeans. Amongst all nations the Swiss has most nearly realised the ideal of democratic institutions.

* Religious confessions of Switzerland (1870):—Protestants, 1,566,347, or 59 per cent.; Roman Catholics, 1,084,369, or 40·6 per cent.; Dissenters, 11,435, or 0·4 per cent.; Jews, 6,996, or 0·26 per cent.





CHAPTER VII.*

TOPOGRAPHY.



THE Swiss are largely indebted to nature for their political institutions and national independence. Mountains, lakes, and tortuous valleys have done as much as stout hearts and strong arms to place them in the front rank of free nations. During the Middle Ages nearly every community whose territory was enclosed by swamps, forests, or mountains managed to govern itself, but nowhere except in Switzerland did these natural defences prove strong enough to enable the population to maintain their independence.

Legendary history fixes upon the central region of the Alps as the birthplace of the Helvetic Confederation. Within this natural fortress, which was bounded on three sides by snow-clad mountains, at that time not crossed by roads, and protected on the fourth by a tempestuous lake, passed all those events which are related in the legend of William Tell. There, on the meadow of Rütli, three Switzers, the fathers of the fatherland, swore to be independent. The men of Uri, Schwitz, and Unterwalden not only enjoyed the advantage of inhabiting a country which could be easily defended, but they were also morally fit for the task that devolved upon them. The sons of colonists who had brought those wide valleys under cultivation, they were animated by a spirit of liberty, and possessed that audacity which appears to animate the pioneers of all countries who are the builders of their own fortunes, and issue triumphantly from a struggle with nature. The name of Schwitz, which was subsequently adopted for the whole country, signifies, according to Gatschet, "clearing the ground by fire," and this recalls the forcible manner in which these colonists took possession of the land which subsequently they held against all comers.

Victorious in "three or four small battles of everlasting memory," it was an easy thing for these Alpine mountaineers to find allies amongst the towns and nobles who held the hills and the plains, whilst on the southern slopes of the Alps they increased their territories by conquest. The Swiss cantons originally constituted themselves so as to form a geographical region, defended in the south and

* All statements of population refer to the year 1870, except when otherwise expressed.

east by the Alps, and in the west by the parallel ridges of the Jura. The Rhine, in the north, formed a boundary which it was easy to cross, but the Black Forest and the plateau of Swabia restricted intending invaders to a few roads, besides which the intestine dissensions of Germany proved at all times the surest safeguard of the Swiss cantons. The fact that the Swiss held the upper courses of rivers descending into Italy, France, and Germany enabled them to render services to their neighbours, if so inclined, or to play them off against each other.

The mountains have insured the independence of Switzerland, but the bulk of the population nevertheless lives in the plain. The region extending from the Lake of Geneva to the Lake of Constanz, and from the foot of the Alps to the foot of the Jura, forms only the fourth part of Switzerland, as far as area is concerned ; but nearly its whole population, wealth, and industry are concentrated there.*

The principal towns rise in this plain, and the most important highways of commerce intersect it. Differences of race and customs disappear more rapidly there than in the Alpine valleys, but still they exist. Of all countries of Europe Switzerland presents the greatest diversity in the aspect of its towns, every one of which possesses some feature of originality, and differs from all others.

The towns on the southern slope of the Alps, with their campaniles and coloured houses, are quite Italian in their aspect. *Bellinzona* (2,501 inhabitants), on the Ticino, which was formerly held in subjection by the people of Uri, Schwitz, and Unterwalden, is the least gay amongst the three alternate capitals of the canton of Ticino. *Locarno* (2,667 inhabitants), which occupies a picturesque position at the upper end of the Lago Maggiore and at the mouth of the Maggia valley, is the lowest town of Switzerland (653 feet), and the air we breathe there is of the balmiest. *Lugano* (6,024 inhabitants), 230 feet higher, but more favourably situated for commerce, is in the midst of the rich fields of the Sotto-Cenero, and has become the most populous town of the canton. It is one of those towns of Europe which attract most strangers, and they meet there with beautiful scenery, the blue waters of a lake, luxuriant vegetation, and picturesque villages perched upon the hillsides.†

	Area (exclusive of Lakes and Olaciers). Sq. M.	Population (1870).	Density. (In. to a Sq. Mile).
* Alps	8,985	809,531	90
Plain	4,082	1,406,856	345
Jura	1,669	438,014	262

† *Ticino* (in German and French *Tessin*).—Area, 1,088 square miles ; population (1870), 119,620 (1876) 121,768, almost without exception Roman Catholics. German is spoken in the village of Bosco ; Italian, more or less pure, throughout the rest of the canton. Ticino includes the valleys of the Ticino, Verzasca, and Maggia, which flow into the Lago Maggiore, as well as a portion of the fertile basin of the Lake of Lugano, which is separated from the rest of the canton by the Pass of Monte Cenero (3,775 feet). The principal passes leading into Northern Switzerland are those of the St. Gotthard and the Lukmanier. At the foot of the former is the village of Airole. The northern portion of the canton is Alpine, the southern Italian, in its character. Exports :—Cattle, silk, straw mats, cheese, timber, chestnuts, snails, and pot-stone. Thousands of the inhabitants annually leave their homes and make a living as chestnut-roasters, chocolate-makers, masons, or bricklayers in Lombardy and elsewhere. Most of the Italian ice and coffee shop-keepers in London are Ticinese. The principal towns are Lugano, Locarno, and Bellinzona.

In the upper valleys of the Rhône, on the French slope of Switzerland, we only meet with small villages. *Brieg* (Brigue, 1,076 inhabitants), at the foot of the Simplon, is a bustling place, and, owing to its many old towers with sparkling roofs, has something Russian in its aspect. *Visp* (Viège, 723 inhabitants) is a favourite resort of tourists (see p. 399). *Leuk* (Louèche, 1,220 inhabitants) is famous on account of its saline waters. *Sion* (Sitten, 4,895 inhabitants), on the Rhône, the capital of the ancient Seduni and the principal town in the canton of Valais,* is an old Gallo-Roman city, commanded by two ruined castles, one of them, though only dating back to the Middle Ages, being known by the Roman name of Valeria. *Martigny* (Martinach, 1,490 inhabitants), at the foot of the Great St. Bernard, is a place of considerable strategical importance. *St. Maurice* (1,666 inhabitants), known up to the thirteenth century as Agaunum, is no less so, for it defends the gorge through which the Rhône enters the alluvial plain extending to the Lake of Geneva.

Not far from St. Maurice, within the canton of Vaud,† is the wealthy village of *Bex* (3,804 inhabitants), with productive salt works, and one of the favourite resorts of foreigners, who take the baths or breathe the invigorating forest air. Foreign visitors have likewise contributed towards the prosperity of towns or villages like *Montreux*, *Clarens*, and *Vevey* (7,887 inhabitants), which stand on the northern side of the Lake of Geneva. The beauty of this lake, within whose placid waters are mirrored the surrounding mountains, and the mild climate, have naturally attracted many foreigners to this favoured corner of Switzerland, and towns like *Vevey* are quite cosmopolitan in their character.

Lausanne (26,520 inhabitants), the capital of the canton, occupying a hill about the centre of the lake, commands as fine a prospect as the towns higher up, and, like them, it annually attracts swarms of visitors. But, in addition to this, it is a

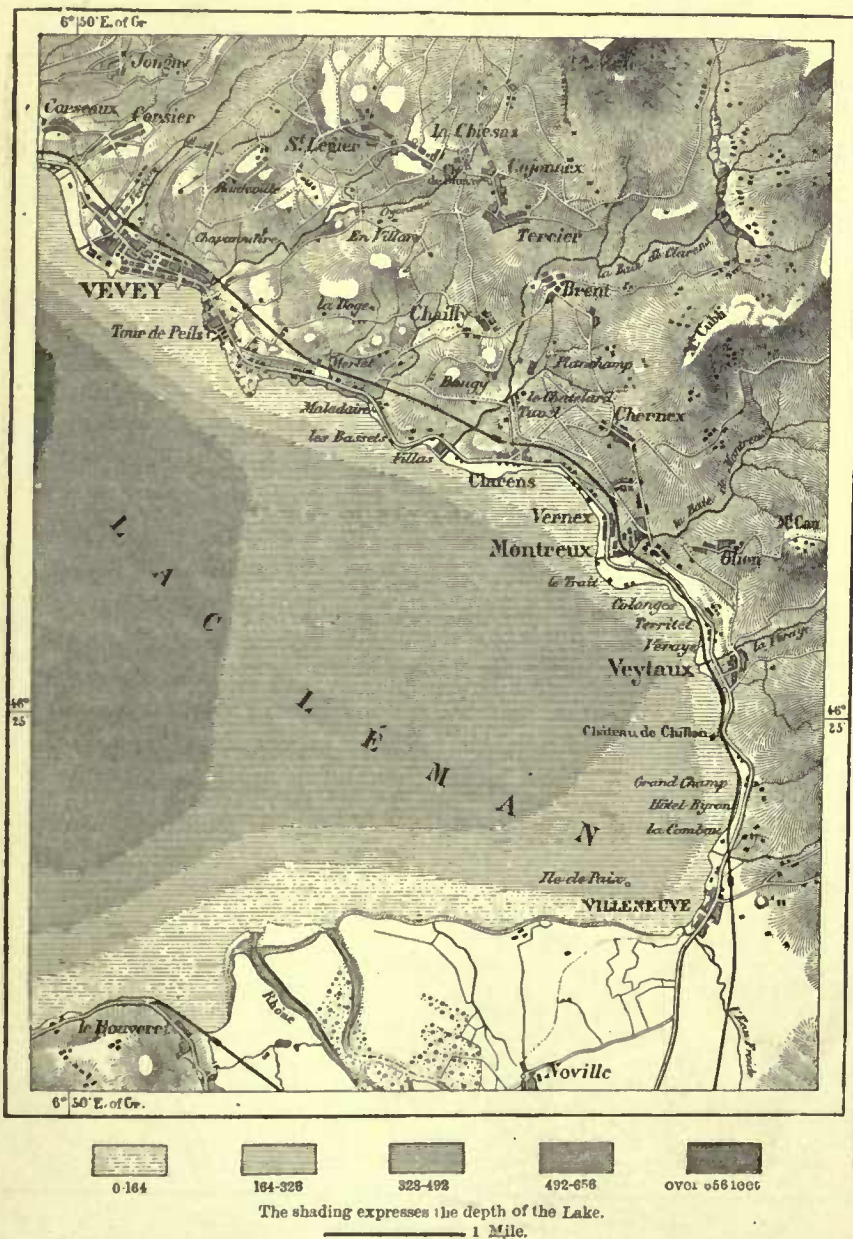
* *Valais* (in German *Wallis*).—Area, 2,026 square miles; population (1870), 96,887, (1876) 100,490, nearly all Roman Catholics. The canton includes the valley of the Rhône, from its source down to the Lake of Geneva. It is bounded in the north by the Bernese Alps, in the south by Alpine ranges, culminating in the Monte Rosa. The Furka Pass leads from the head of the Rhône into the valley of the Reuss, and to the northern foot of the St. Gotthard. The Grimsel and Gemmi Passes, the latter above Leuk, and certainly one of the finest in Switzerland, connect the Valais with Northern Switzerland, and the Nufenen, Simplon, and Great St. Bernard with Italy. The products are wine, walnuts, cherries, cattle, sheep, goats, cheese, iron, argentiferous lead, sulphur, anthracite, and a little gold in the sand of the rivers. About two-thirds of the inhabitants speak French, one-third German, and a few Romanche. The Valais joined the Confederation in 1597. The principal towns are Brieg, Leuk (Louèche), Sion, Martigny, and St. Maurice.

† *Vaud* (in German *Waadt*).—Area, 1,244 square miles; population (1870), 231,700, (1876) 242,439. In 1870 there were 211,686 Protestants, 17,592 Catholics, and 610 Jews. French is spoken almost throughout. The canton extends along the northern shore of the Lake of Geneva as far as the Lake of Neuchâtel, and beyond the Jura to the French frontier. The greater part of the country is hilly and of exceeding fertility. It produces corn, tobacco, fruit, chestnuts, walnuts, wine. The breeding of cattle and dairy farming are important. The mineral kingdom furnishes coal and salt. There are iron works, where ores from the Bernese Jura are smelted, and watchmaking is carried on in the Jura, but other branches of industry are hardly known. Much has been done for popular education within the last forty years. Up to 1803 Vaud belonged to the canton of Bern; since then it has been an independent member of the Confederation. The principal towns are Bex and Aigle, in the Rhône valley; Vevey, Lausanne, Morges, and Nyon, on the Lake of Geneva; and Yverdon, on the Lake of Neuchâtel.

busy commercial place, upon which several lines of railway converge, and the seat of the principal Court of Appeal of the Confederation. It grows rapidly, and at

Fig. 314.—THE EASTERN EXTREMITY OF THE LAKE OF GENEVA.

Scale 1 : 80,000.



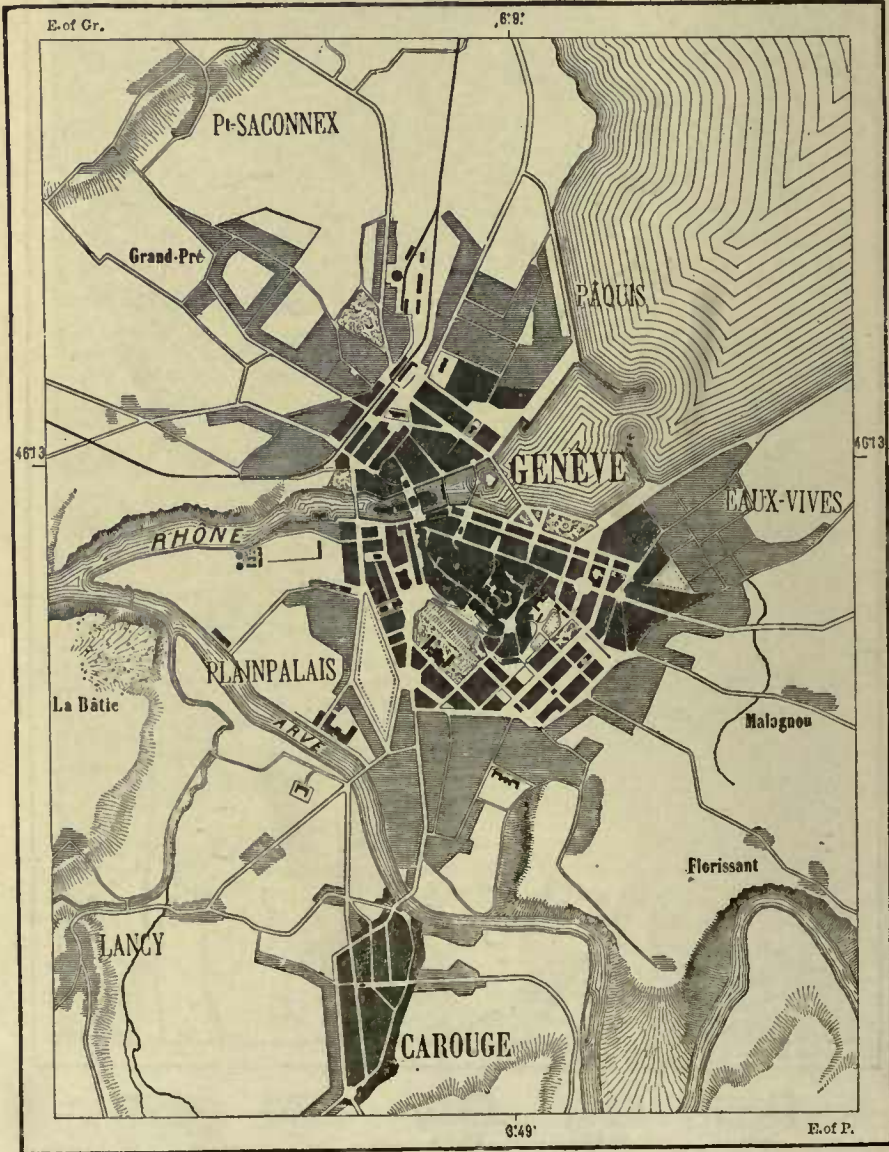
no distant time will form one town with its port of *Ouchy*, with which a railway, having a very steep gradient, connects it.

Geneva (*Genève* in French, *Genf* in German, 67,357 inhabitants, including the

suburbs) occupies an excellent geographical position at the lower extremity of the Lake of Geneva,* where the Rhône issues from it, and is joined by the Arve. Upon it converge all the roads which connect Central Germany with Southern

Fig. 315.—GENEVA.

Scale 1 : 35,000.



France, for it is there that the gap between the Alps and the Jura permits of an

* Geneva :—Area, 108 square miles; population (1870), 93,195, (1876) 99,352. In 1870 there were 47,868 Catholics, 43,638 Protestants, and 961 Jews. The canton includes the town and the surrounding country. The soil is not fertile, but by perseverance it has been converted into a flourishing garden. Nearly one-half of the cultivated area is planted with vines.



GENEVA (MONT BLANC IN THE DISTANCE).

easy passage. Geneva is the natural mediator between Lyons, lower down on the Rhône, and Central Europe. It is almost matter for surprise that this city, which has so frequently been chosen for international meetings, should to this day remain the "greatest amongst the small towns" of Europe. But the rigorous winters, the cold northerly winds, or *bises*, the fogs which frequently hang over the country, and the small area capable of cultivation, sufficiently account for the slow growth of the population. At present only a single line of railway passes the town, namely, that which connects Lyons with Bern and Basel. No branch lines have yet been constructed to Annecy, to the foot of Mont Blanc, or to the Jura, and for the present there is little prospect of their being built.

Geneva, which became the capital of a *civitas* in the fourth century, has occupied for ages a position quite exceptional. Restricted to its narrow territory and overshadowed by a mountain which it could not even call its own, the city remained for a long time a republic of exiles. Calvin disciplined its citizens in his repellent fashion, and strangers differing from them met with no friendly reception. The men who governed it were for the most part descendants of French or Italian refugees, whom religious differences had driven from their homes, and they sought above all things to keep up the energy and the spirit which had dictated the doings of their forefathers. But this small body of men, so remarkable on account of its exclusiveness, was equally so for its love of study and intellectual vigour. Geneva, during the last three centuries, has produced more men of eminence in science and literature than any other town of equal size. It was the birthplace of Jean Jacques Rousseau, of Horace de Saussure, of Necker, Sismondi, Töpffer, and Pradier, and some of its families have almost become scientific dynasties. Many amongst the famous children of Geneva may perhaps be claimed also by the Parisians, amongst whom they found a second home; but, for all that, the Swiss city has at all times been distinguished for its patronage of education and science. Its schools are among the best of the country; its newly founded university occupies an honourable position; there are valuable natural-history collections and many learned societies, including a geographical one. The "city of Calvin," which is just now erecting a sumptuous monument in honour of a Duke of Brunswick, might certainly be called upon to place an expiatory memorial upon the spot where Michael Servetus, the illustrious Spaniard, was burnt at the stake.

Geneva is no longer the "Rome of Protestantism." Its old walls have fallen; its ramparts have been converted into walks or sumptuous streets; new roads, lined by country houses, extend in all directions, and join the former villages of Plainpalais and Carouge to the city. The time when the whole of the alluvial peninsula between the Arve and the Rhône will be covered with houses is fast approaching. The "old Genevese" now constitute only a minority in their own town, which has become one of the most cosmopolitan cities of Europe, within which reside about one-fourth of the foreigners who remain during the winter in

Switzerland.* Geneva, though its population is now double what it was some years ago, has unfortunately lost the two great branches of industry which carried its fame into all parts of the world, viz. the manufacture of jewellery and watches. France and the United States, which formerly obtained these articles from the workshops of Geneva, are now able to supply their own wants by home manufacture, and many of the Genevese masters have been ruined.† The Arve and the Rhône are capable of supplying motive power to an almost unlimited number of factories, but have not yet been utilised (see p. 424). As a place of commerce and money market Geneva possesses considerable resources.

Geneva owes its importance to the vicinity of France; but, as long as Italy remained the centre of civilised nations, the most populous town of Switzerland naturally existed in a different part of the country. Aventicum, a Celtic town, having as patroness a deity named Aventia, became the capital, and its geographical position justifies the selection made. It stood on the shore of the Lake of Morat, or Murten, which was more extensive then, in a depression of the undulating plain which separates the Alps from the Jura. It was nearer to the Lake of Geneva than to the northern frontier of Helvetia, and the Romans were able to reach it from Agaunum (St. Maurice, in the Rhône valley) in two or three days' march. At it they established the central custom-house for the whole of the eastern frontier of Gaul. The Alemanni destroyed the town, and there now only remain a few walls covered with shrubs, two towers, pavements, statuettes, mosaics, and inscriptions. The surrounding country, which was amongst the best cultivated in Helvetia, became one of the most barren, and in the Middle Ages was known as *Uchtland*; that is, "fallow land." Since then a new town, *Avenches*, has been built upon the hills overlooking the site of ancient Aventicum, and numerous villages have sprung up in the environs. To the north-east of it, on the shores of the lake, is *Morat* (Murten, 2,328 inhabitants), still enclosed by a turreted wall, and famous on account of the defeat inflicted upon Charles the Bold of Burgundy in 1476. To the south-east is *Fribourg* (Freiburg, 10,904 inhabitants), the capital of the canton of the same name, and, like Murten, near the linguistic boundary. Its Gothic cathedral and gabled towers command the deep valley of the Sarine (Saane), here spanned by a suspension bridge nearly 1,000 feet in length, and

* Population of Geneva, according to M. P. L. Dunant:—

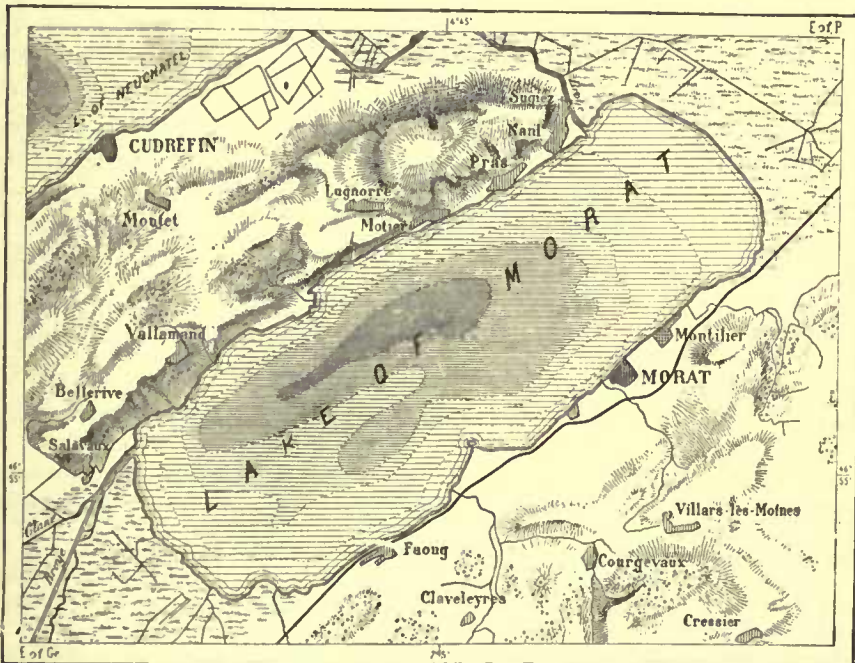
	1843.	1870.
Natives of the canton	58 per cent.	38·4 per cent.
" other Swiss cantons	20 "	22 6 "
Foreigners	21 "	39 0 "
Foreigners residing in Geneva:—		
	1860.	1870.
French and Savoyards	11,579	14,251
Germans	1,509	2,038
Italians	600	763
Others	500	1,127
	<u>14,188</u>	<u>18,179</u>
	1865.	1875.
† Master jewellers and watchmakers	225	205
Workmen employed by them	1,586	1,028

passing high above the river, the houses, and fields. Another bridge crosses the neighbouring gorge of the Gotterin at a height of 318 feet.*

From *Yverdun* (5,889 inhabitants), near the southern extremity of the Lake of Neuchâtel, diverge all the roads which lead to the Lake of Geneva. It is the modern representative of the Gallic city of Ebrodunum, and fourteen centuries ago the lake, from which it is now separated by a swampy plain, still washed its walls. The castle of Granson, three miles to the north, defended the road

Fig 316.—MORAT (MURTEN) AND ITS LAKES.

Scale 1 : 100,000.



1 Mile.

which passed between the Jura and the western shore of the lake, and near it Charles the Bold suffered a terrible defeat in 1476.

Neuchâtel,† the capital of a canton, occupies a commanding position near the

* *Fribourg* (Freiburg).—Area, 664 square miles; population (1870), 110,832, (1876) 113,952. In 1870 there were 93,051 Catholics and 16,819 Protestants. About 74 per cent. of the inhabitants speak French. The canton is drained by the Saane, or Sarine. The south-eastern portion is mountainous, but none of the summits reach the snow-line. The greater portion is hilly, with rich meadows and pasture-lands, and Gruyère cheeses are known throughout the world. The cereals grown generally cover the requirements of the population. Amongst the products are timber, wine, fruit, peat, and coal. Straw-plaiting is carried on extensively, and there are tan-yards, saw-mills, a glass factory, and a beet-sugar factory. Watches are manufactured at Murten. In educational matters the canton is very backward, except in the district of Murten, which is inhabited by German Protestants. The principal towns are Fribourg, Murten, and Bulle.

† *Neuchâtel* (Neuenburg).—Area, 312 square miles; population (1870), 97,284, (1878) 99,729. In 1870 there were 84,334 Protestants and 11,345 Catholics. Eighty-seven per cent. of the inhabitants speak French. The canton lies between the eastern shore of the Lake of Neuchâtel and the French frontier. It is intersected by four parallel ridges of the Jura, covered with forests or poor herbage. Wine is grown along

point of junction of the roads and railways which skirt the shores of the lake and run through the valley of Travers into France. It is a fine town, the houses in its modern quarter being for the most part built of a light-coloured limestone. The wealthy landowners and nobles of the canton form a sort of aristocracy, but Neuchâtel is justly proud of its schools, its museum, and its library. *Chaux-de-Fonds* (19,930 inhabitants), in a valley of the Upper Jura, close to the French frontier, and about 3,300 feet above the sea, is the great industrial centre of the canton, and its most populous town. In the sterile mountains, where the soil refused to yield subsistence to the men who dwelt upon it, it became necessary to look to industrial occupations as a means of subsistence. The first watch was made at Chaux-de-Fonds in 1680, and since then that branch of industry has grown immensely, and is carried on also at *Le Locle* (10,334 inhabitants), and in many villages in the vicinity. The district remains to the present day the chief centre of watchmaking in the world, and although the number of workmen has recently decreased, the number of watches turned out is larger than ever.* Ironically the natives compare the "village" of Chaux-de-Fonds with the "city" of Neuchâtel.

A portion of the manufacturing district of the Jura lies within the canton of Bern, which extends from the highest summits of the Alps to the frontiers of France.† The capital of this canton and of the entire Confederation (3,600 inhabitants) occupies an advantageous site half-way between the Rhône and the Rhine, and on the Aar, which affords the easiest access to the Oberland. During the

foot of the Jura. Cheese forms an article of export, but two-thirds of the corn required have to be imported. The manufacturing industry is of importance. Cotton stuffs, lace, and watches are the chief articles produced. The principal towns are Neuchâtel, Chaux-de-Fonds, and Le Locle. The principality of Neuchâtel originally belonged to Burgundy. Rudolf of Habsburg ceded it in 1288 to John of Chalon. In 1707, the reigning prince having died without heirs, the Estates acknowledged the claims of Frederick of Prussia, and Neuchâtel remained a Prussian dependency until 1857. As such it became a member of the Swiss Confederation in 1815.

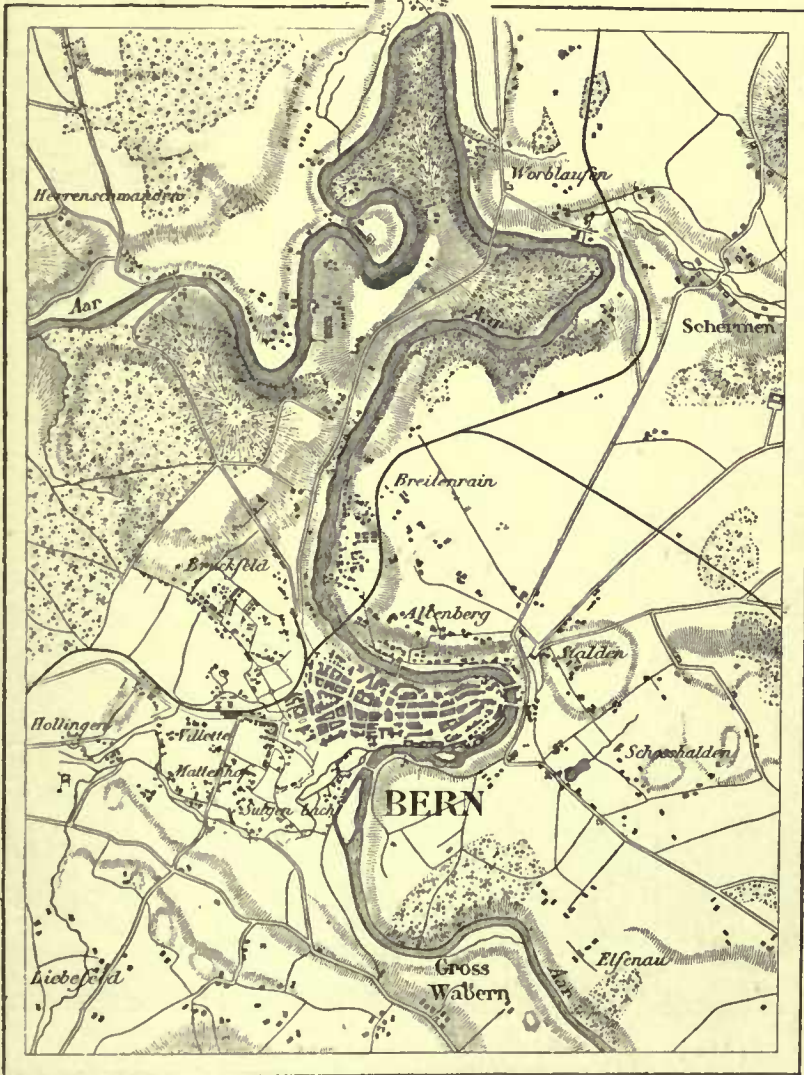
* In 1870 there were 4,505 watchmakers at Chaux-de-Fonds; in 1877 only 4,172. About 1,450,000 watches are annually manufactured in the Swiss Jura, their estimated value being £1,200,000, or 16s. each.

† *Bern*.—Area, 2,660 square miles; population (1870), 506,455, (1876) 528,670. In 1870 there were 436,307 Protestants, 66,015 Roman Catholics, and 1,400 Jews. About one-seventh of the inhabitants speak French. Geographically this canton, next to that of the Grisons, the largest of Switzerland, consists of several well-defined regions. The *Bernese Oberland*, with its glaciers and lakes (including those of Brienz and Thun), has been fully described elsewhere. Cattle-breeding and dairy-farming are the principal occupations of the inhabitants. The valleys of Simmen and Saanen—the one tributary to the Lake of Thun, the other to the river Aar—are famous for their fine breeds. Wood-carving employs many of the inhabitants during winter. The principal towns or villages of the Oberland are Thun, Interlaken, Brienz, Meiringen, and Saanen. The *Mittelland*, or hilly region, is intersected by the rivers Aar and Emmen, and is for the most part a fertile region. It extends north into the Upper Aargau, the most productive district of the canton. The Emmen Thal is famous for its cheese, its wooden houses, its wrestlers, and its floods. The principal towns in this section of the canton are Bern, the capital, on the Aar; Langnau and Burgdorf, on the Emmen; and Wangen, in the Upper Aargau. The *Seeland* (see page 425) is drained by the rivers Aar and Zihl, the latter being the affluent of the Lake of Biel, or Bienne. Lastly, there is the Bernese Jura, comparatively sterile, but a busy seat of industry. Its leading towns are Moutiers and Porentruy. The canton of Bern is wealthy, no doubt, but in no other part of Switzerland are the contrasts between rich and poor so marked. Cattle-breeding, dairy-farming, and in the plain the cultivation of corn and potatoes, employ the bulk of the inhabitants. About 150,000 tons of iron are produced annually in the Jura, and the manufacture of linens and other textile fabrics, lace, watches, carved woodenware, leather, &c., is of some importance. The national costume of the Bernese is amongst the most picturesque to be met with in Switzerland.

wars of the Middle Ages this position entailed great strategical advantages, more especially as the town stands upon a peninsula bounded on three sides by the steep banks of the river. A wall built across the neck of this peninsula thus sufficed to protect the inhabitants in case of attack. Bern, unfortunately, is not favoured by

Fig. 317.—BERN.

Scale 1 : 50,000.



the climate, and the extremes of temperature are greater here than in any other town of Switzerland.* It is much exposed to the winds, and the death rate is very high, especially in the poorer quarters. The damp tortuous street following the

* Extremes of temperature at Bern, 97.2 and -22° Fahr. Difference, 119.2° Fahr. Mean annual temperature, 46° Fahr.

windings of the Aar is one of the most insalubrious places in Europe, and maladies reign there permanently as in a hospital. The wretched streets of this quarter contrast painfully with the palatial buildings which rise among the gardens to the west of the city, and whence may be enjoyed the fine panorama presented by the meandering Aar and the snow-clad Alps rising in the distance above verdure-clad hills.*

Amongst the most remarkable buildings of the town are the Federal Palace,

Fig. 318.—VIEW OF BERN.



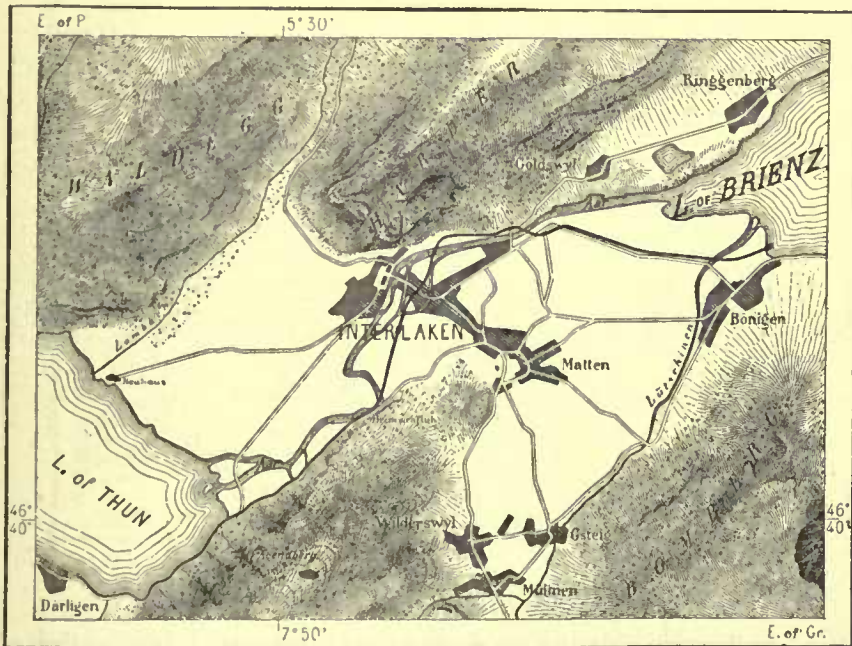
erected in 1852—57, the Gothic Minster, the Hospital, the Post Office, and the bold Nydeck Bridge which leads to the famous Bear Pit. Bern is the seat of a university, possesses several libraries and museums, but cannot compare with Zürich as regards scientific associations. Amongst its famous children more warriors are met with than men of learning: of the latter A. von Haller (died 1777), the poet and physician, is perhaps the most widely known.

* Death rate of Bern (1855—67), 35·2 per 1,000 inhabitants; in the upper quarters of the town, 12·6 per 1,000; in the Aarberger-Gasse, 74·8 per 1,000.

Bern, which according to some etymologists is a corruption of the Celtic name of Verona, whilst others derive it from *Bären* ("bears"), still preserves a mediæval physiognomy in its interior quarters. The pomp and strength of feudal Switzerland are called up before our mind when we look at the solid walls of the houses, at the buttresses which support them, at the "rows" similar to those of Chester, at steep-peaked roofs, and fountains ornamented with quaintly sculptured figures. We can almost fancy these streets being filled with men-at-arms flushed with victory or returning from the pillage of a village, waving their banners and blowing their horns. Bern has a few factories on the banks of the Aar, industrial suburbs beyond the public walks, and extensive quarries near the neighbouring

Fig. 319.—INTERLAKEN.

Scale 1 : 70,000.



1 Mile.

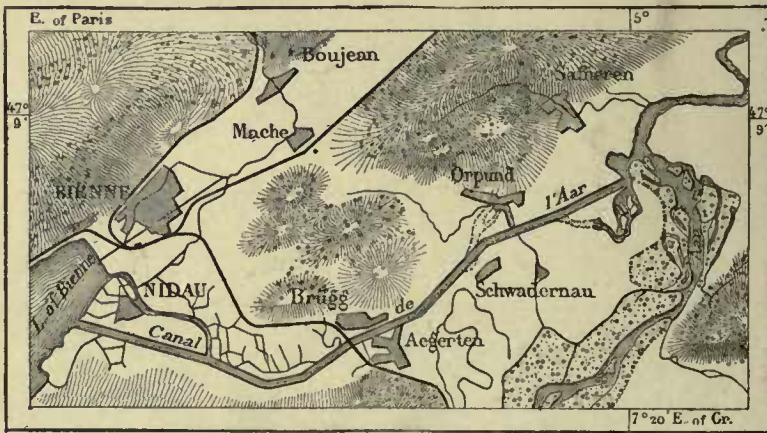
village of Ostermündingen, but the great industries of the country, the manufacture of cheese, linens, and cloth, and straw-plaiting, are principally carried on in the wealthy communes of the Emmenthal, at *Langnau* (6,214 inhabitants), *Sumiswald*, and *Burgdorf* (Berthoud, 5,078 inhabitants), each of which towns has its agencies throughout Switzerland and in many foreign countries. In the old castle of Burgdorf Pestalozzi established his educational institute (1798—1804). At *Thun* (Thoune, 4,623 inhabitants), where the Aar escapes from the lower lake of the Oberland, there are likewise a few factories, but that town is important rather because so many travellers annually pass through it on their road to Interlaken, within easy reach of the delightful scenery of the Oberland. It is the military capital of Switzerland, the seat of the Military College of the Confederation, and

of an arsenal. It is a quaint city, with "rows," overlooked by an old castle, now converted into a prison, and the parish church built upon the summit of a commanding hill. In the vicinity of Bern and in the Alpine valleys of the canton there are many wealthy and populous villages, some of them remarkable on account of their huge wooden houses ornamented with sculptures.

Interlaken, on the alluvial plain of the Bödéli, which separates the Lakes of Thun and Brienz, is one of the favourite haunts of tourists. It is named after a convent ("inter lacus"), suppressed in 1484 in consequence of the immoral life led by the nuns, and now occupied as a school. The climate is mild, and the environs abound in delightful walks. The valley of the Lauterbrunnen, in the south, leads up to the famous falls of the Staubbach and Schmadribach. The icy summits of the Jungfrau tower majestically beyond it. The glacier of Grindelwald is within easy reach, and a steamer rapidly conveys the traveller to *Brienz*,

Fig. 320.—BIEL (BIENNE) AND THE NEW BED OF THE AAR.

Scale 1 : 100,000.



C. Perron

1 Mile.

with its pretty boating girls, to the *Giessbach*, and the charming Hasli valley, whose chief village, *Meiringen*, fell a victim to a fearful conflagration in February, 1879.

Biel (in French *Bienna*, 8,113 inhabitants), favourably situated at the northern end of the lake named after it, opposite to the mouth of the valley of Suze, which leads into the Jura, and close to the Aar navigation, has become a great place of commerce, and its inhabitants speak of it as a *Zukunftstadt*; that is, a town having a future in store for it. Quite the reverse might be said of *Solothurn* (Soleure, 7,054 inhabitants),* lower down on the Aar, which reflects its turrets and crenellated walls, and almost deserves to be called a "town of the past;" whilst *Otten*

* *Solothurn*.—Area, 303 square miles; population (1870), 74,713, (1876) 77,803. In 1870 there were 62,072 Catholics and 12,448 Protestants. German is spoken throughout. The canton includes a portion of the fertile valley of the Aar, which abounds in orchards, and produces corn for exportation, whilst the Jura, in the west, is sterile. There are valuable quarries of marble, limestone (at *Olten*), and millstones, as well as iron mines. Silk-weaving is carried on on the northern slope of the Jura, in the so-called "Black Boys' Land." The only towns of note are Solothurn and *Olten*.



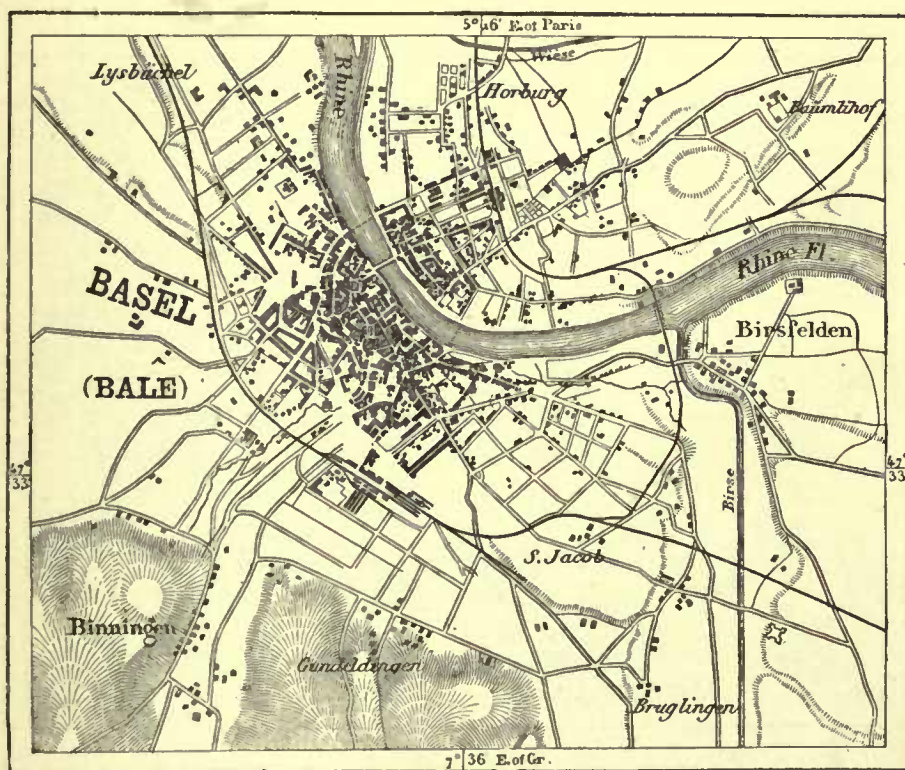
THE WELFHORN AND THE ROSENLAUI GLACIER.

(2,998 inhabitants), still lower down in the valley, has become an important railway centre, and increases annually in commerce and industry. Hosiery, glass, and parquetry are manufactured, and there are huge railway workshops for the construction of locomotives and rolling stock. The railway which pierces the Jura in the tunnel of Hauenstein, and runs past *Liestal* (3,873 inhabitants) to Basel, places Olten in communication with the railway systems of France and Germany.

*Basel** (44,834 inhabitants), by its commerce, history, and general influence upon the economical condition of Switzerland, has much in common with Geneva.

Fig. 321.—BASEL (BÂLE).

Scale 1 : 50,000.



Admirably situated upon a terrace at the great elbow of the Rhine, where that river enters upon the plain of Alsatia, it occupies commercially the same position towards Germany and Northern France as that held by Geneva with reference to Southern France. Nay, its market is even more extensive, and two-thirds of the

* *Basel* (in French *Bâle*) forms two cantons, viz. *Basel Town* (14 square miles, 51,515 inhabitants in 1876) and *Basel Country* (163 square miles, 55,548 inhabitants). The capital of the latter is *Liestal*. The country is hilly and fertile. Agriculture, dairy-farming, and horticulture are carried on with success. The silk industry is very important, and there are also cotton, paper, and woollen mills, and tobacco manufactories. *Basel Country*, tired of the pressure exercised by the wealthy town, severed its connection with it in 1833, and now forms an independent canton. It was the first canton to adopt a purely democratic constitution, but *Basel Town*, in spite of its patricians, has since done the same.

imports of Switzerland pass through its custom-house. Its manufactures of silk, of ribbons, and of chemical products give rise to a very important trade with foreign countries.* Rich and powerful long before Geneva, Basel, like its southern rival, became a place of refuge at the time of the Reformation, and one of the great centres of scientific research. Erasmus and Ecolampadius taught in its schools, and Holbein resided there for many years. Euler, Bernoulli, and other natives of the town rank amongst the most famous men of Switzerland, and some of its old families rival the Genevese "dynasties" in the number of men of merit belonging to them. Old customs have been more strictly preserved at Basel than at Geneva. Strangers have not yet succeeded in altering

Fig. 322.—PORRENTUUY.

Scale 1 : 60,000.



the aspect of the town; and the natives, who are strict Protestants, form the vast majority of its inhabitants. Amongst the numerous missionary institutions, that of Chrishona, in a neighbouring village, is the most considerable. Basel is reputed to be one of the most important money marts of the world,† but it may also boast of its university, its scientific collections, its picture gallery, with many paintings by Hans Holbein, and its library, rich in precious manuscripts. The Gothic cathedral, built of the beautiful red sandstone abounding in the Vosges, rises boldly above the Rhine, which flows beneath it. Near it is the famous

* The silk industry employs 40,000 operatives and 6,500 power-looms, and the value of the silk manufactured annually is estimated at £1,600,000.

† In 1875 82 families paid property tax on a capital averaging £80,000 each.

chamber in which met the Council of Basel, and which is scrupulously preserved in the condition it was in in the fifteenth century. A sloping bridge will soon connect Basel Proper with Little Basel, on the opposite bank of the Rhine.

Basel is the natural market of the Bernese Jura, the principal town in which is *Porrentruy* (Pruntrut, 5,341 inhabitants), the former residence of the Bishops of Basel. Near it is the village of *Bonfol*, known on account of the pottery manufactured there.

Ascending the Rhine, we pass the salt works of Schweizerhall, Augst, Rhein-

Fig. 323.—THE CONFLUENCE OF THE RHINE, THE AAR, THE REUSS, AND THE LIMMAT.
Scale 1 : 300,000.



felden, and Ryburg. *Augst* occupies the site of *Augusta Rauracorum*, a town founded by *Lucius Munatius Glaucus*, which formerly experienced the same amount of commercial prosperity as that enjoyed in our own days by *Basel*, its fortunate successor.

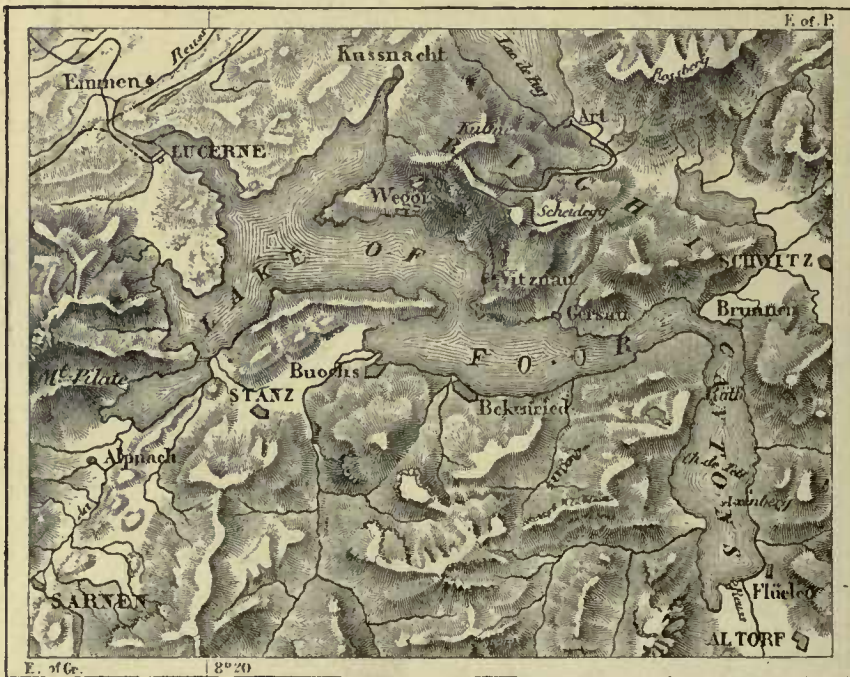
One-half of the village of *Augst* lies within the canton of *Aargau*, the capital of which is situated in the valley watered by the *Aar*.* *Aargau* (5,449 inha-

* *Aargau* (in French *Argovie*).—Area, 543 square miles; population (1870), 198,875, (1876) 201,567. In 1870 there were 107,703 Protestants, 89,180 Catholics, and 1,541 Jews. The canton includes the lower valley of the *Aar*, which is joined within its boundaries by the *Reuss* and the *Limmat*, and extends north to the *Rhine*. It is for the most part hilly and fertile. The products include wine and salt (300,000 cwts.). There are cotton-mills (265,000 spindles), dye and print works. Straw-plaiting occupies about 30,000 operatives during winter. Much has been done for education. The principal towns are *Aargau*, *Zofingen*, *Baden*, and *Reinach*.

bitants) is not a large town, but its inhabitants are distinguished for their culture, and many industries requiring skill, intelligence, and even a scientific training, such as the manufacture of instruments, are carried on. Eighteen centuries ago, Vindonissa, at the triple confluence of the Aar, the Limmat, and the Reuss, was the great strategical centre of the country. It was upon this town that the Roman roads converged which crossed the Alps from Italy, and the legions stationed there were favourably placed for supporting those which held the frontiers of the Rhine and of the Danube. But its very importance led to the destruction of this stronghold. Several times captured towards the close of the Empire, there now remain but a few insignificant ruins, and only its name survives in that of the

Fig. 324.—THE LAKE OF THE FOUR CANTONS (VIERWALDSTÄTTER SEE).

Scale 1 : 800,000



village of Windisch. The wars of the Middle Ages prevented the reconstruction of this ancient city, but several towns have sprung up in its vicinity, such as *Brugg*, at the mouth of the Boetzberg tunnel; *Schinnach*, famous on account of its sulphurous waters; and *Baden*, the hot springs of which were highly appreciated by the Romans. It is certainly curious that no large town should have arisen in so favourable a locality. On a hill which rises to the south are the ruins of the feudal castle of Habsburg, the ancestral home of the imperial family of Austria.

If we trace the Reuss to the point where it issues from the Lake of the Four Cantons, we reach *Luzern* (14,524 inhabitants), the political and commercial

metropolis of primitive Switzerland, and the capital of a large canton.* Its position, at the lower end of the lake and upon its effluent, is analogous to that of Geneva, Zürich, and Constanz. Another river, the Little Emme, joins the Reuss about a mile below Luzern. Turreted walls surrounding the town, an old lighthouse, or *lucerna*, the blue and swift waters of the Reuss, the lake, and the view of the mountains which enclose it, render Luzern one of the most attractive cities of Switzerland. The number of strangers who pass through it every summer is very great. Luzern, the most Catholic city, was the capital of the Swiss "Sonderbund," or "Separatist League," which fought between 1845 and 1847 in favour of the pretensions of the Jesuits. Its most remarkable monument is a lion carved out of the solid rock, from a design by Thorwaldsen, and recalls the time when the Switzers sold themselves as soldiers to the sovereigns of Europe. Though favourably situated, Luzern has little commerce or industry, but, like Zürich, it expects great things from the completion of the tunnel through the St. Gotthard.

Sempach, the village rendered famous through the battle fought there on the 9th July, 1386, lies to the north-west of Luzern, on a small lake. *Küssnacht* and *Wäggis* are villages on the Lake of the Four Cantons, and at the foot of the Rigi.

In the three other Forest Cantons † the towns are few in number, and even the capitals are hardly more than villages. *Altorf*, or *Altdorf* (2,724 inhabitants), is still the simple village as in the legendary age of William Tell; *Stanz* (2,070

* *Luzern* (in French *Lucerne*).—Area, 579 square miles; population (1870), 132,338, (1876) 133,316. In 1870 there were 128,338 Catholics and 3,823 Protestants. The canton includes three distinct regions, viz. the *Gau*, in the north, the centre of which is occupied by the Lake of Sempach; the country adjoining the Lake of the Four Cantons, together with the valley of the Reuss; and the mountain valleys drained by the Little Emme and its tributaries. The most important of these valleys is known as *Entlebuch*. Its inhabitants depend almost wholly upon dairy-farming for their subsistence, and, like their neighbours in the valley of the Great Emme, they are expert wrestlers. The mountains bounding these valleys rise to a height of 7,140 feet, and are covered with turf and aromatic herbs. There are no glaciers in the canton. Agriculture and dairy-farming are the principal occupations. The soil, almost throughout, is fertile. There are extensive forests.

† The Forest Cantons, or Vierwaldstätter, are Luzern, Schwyz, Uri, and Unterwalden. Luzern has been noticed above.

Schwyz (Schwitz, hence Switzer and Switzerland).—Area, 351 square miles; population (1876), 4⁰,216, nearly all Catholics. The canton extends from the Lake of the Four Cantons to that of Zürich, and may be described as a platform 2,700 feet in height, above which rise the naked rocks of the Mythen and other mountain summits. The Rigi lies almost wholly within the limits of the cantons, a plain and the small Lake of Lowerr separating it from the rest of the canton. The valleys are fertile, the most important amongst them being those of the Muota, which flows into the Lake of the Four Cantons, and of the Sihl, a tributary of the Lake of Zürich. Cattle-breeding and dairy-farming are the principal occupations. Silk and cotton mills have been established by Zürich manufacturers. The only places of importance are Schwyz and Gersau.

Uri.—Area, 415 square miles; population (1876), 16,900, all Catholics. The canton extends from the southern bay of the Lake of the Four Cantons up to the St. Gotthard and Furka Passes, and thus includes the valley of the Reuss, known at its head as Urseren Thal, and all its tributary valleys, with the famous Mayenthal. Cattle-breeding and dairy-farming support the majority of the inhabitants. Corn is grown on about 14,000 acres; forests cover about 42, and glaciers 44 square miles. Altdorf and Andermatt are the principal villages. The Great St. Gotthard railway will traverse this canton throughout its length.

Unterwalden extends from the southern shore of the Lake of the Four Cantons, and includes the valleys of the Sarner Aa and of the Engelberg Aa, the one extending up to the Brünig Pass, the other to the foot of the snow-clad Titlis. Since 1100 Unterwalden has formed two cantons, one "nid" ("below"), the other "ob dem Wald" ("above the forest"), whose combined area is 296 square miles, with a population (1876) of 27,002 inhabitants, nearly all of whom are Roman Catholics. The country is distinguished for its picturesque scenery. Its meadows and pastures are luxuriant, and cheese (20,000 cwt. annually), fruit, walnuts, spirits, and cider are exported. The principal villages are Stanz and Sarnen.

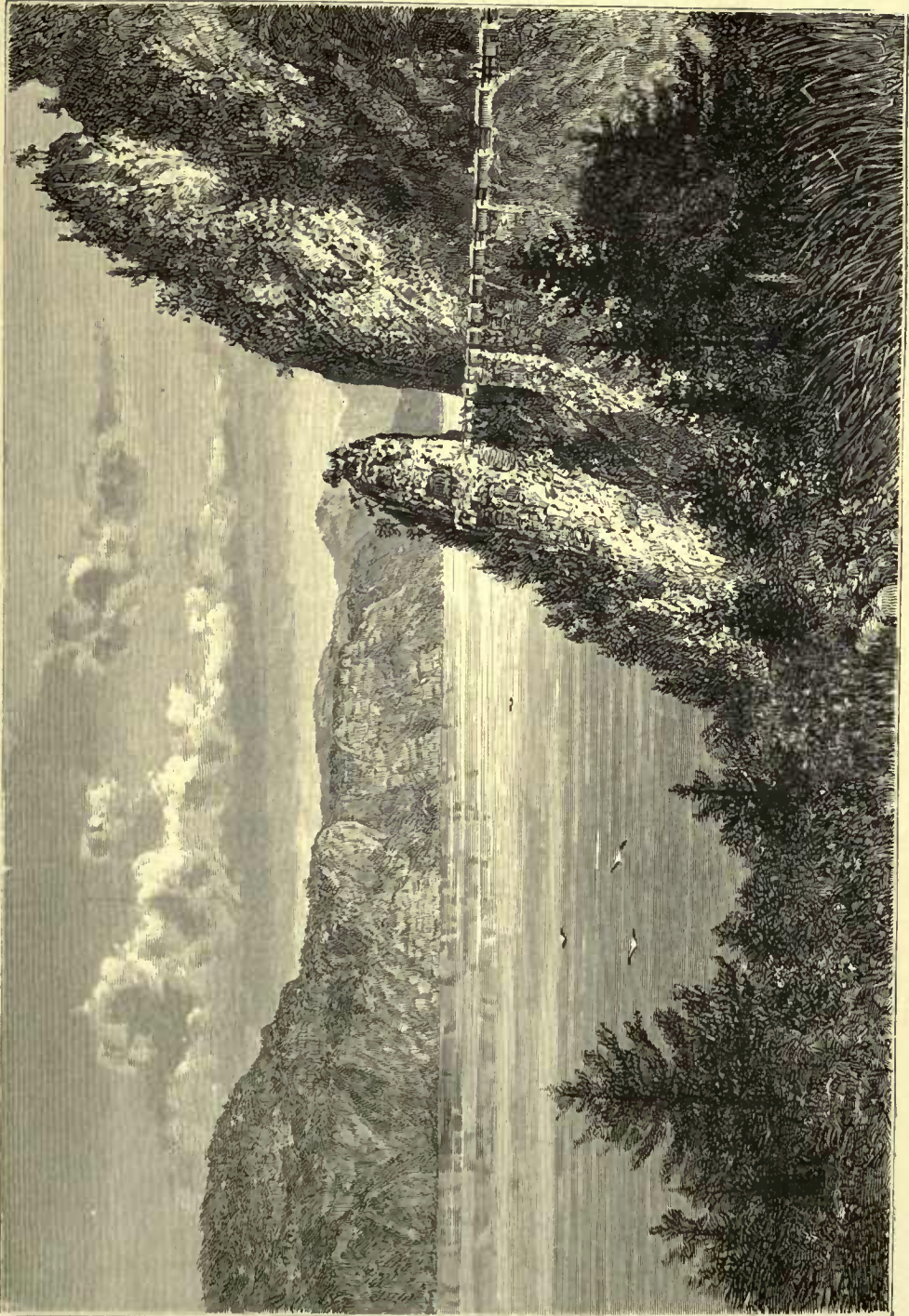
inhabitants) and *Sarnen* (3,720 inhabitants), the capitals of the two half-cantons of Unterwalden, are merely villages. *Brunnen*, on the lake and the Axenstrasse, is one of the most-frequented places on the St. Gotthard road, with large storehouses. *Gersau* (2,274 inhabitants), formerly the capital of an independent republic, is visited now by a few foreign valetudinarians in search of a sheltered abode. *Schwyz* (6,154 inhabitants), at the foot of the Mythen, is a larger place than either of the above, but the number of inhabitants assigned to it in the census includes those of several of the villages in the vicinity. It lies close to the Lake of Lowerrz, beyond which is *Goldau*, built on the débris resulting from the great landslip which took place in 1806, and buried four villages. *Einsiedlen*, the native place of Paracelsus, consists of a few detached hamlets, the most considerable amongst which has for its centre a famous old abbey, annually visited by 150,000 pilgrims and tourists. The printing-office there, which limits itself to the production of religious books, is one of the largest establishments of that kind in Europe. The great boast of the monks at the abbey is to have collected, in the ninth century, the most ancient copies then existing of the monumental inscriptions of Rome and Pavia. The gorge of Morgarten, to the south-west of Einsiedlen, recalls the decisive victory achieved by the Confederated Swiss in 1315 over the iron-clad knights of Austria—a victory which inspired them with confidence in themselves.

Zug (4,277 inhabitants), on a lake named after the town, is the capital of a small canton of great antiquity, but not otherwise remarkable. *Cham*, a village on the same lake, has a paper-mill, a cotton-mill, and the extensive establishment of the Anglo-Swiss Condensed Milk Company.*

Zürich † (56,695 inhabitants), the principal town of north-eastern Switzerland,

* *Zug*.—Area, 92 square miles; population (1876), 21,775, nearly all Roman Catholics. The canton includes the country to the west, north, and east of the Lake of Zug, together with the valley of the Lorze, the affluent of the Aegei Lake. Its surface is hilly and fertile. Agriculture and dairy-farming are the principal occupations, but there are also cotton-mills. Zug is the capital. The canton joined the Confederation in 1352.

† *Zürich*.—Area, 666 square miles; population (1870), 284,786, (1876) 294,994. In 1870 there were 263,710 Protestants, 17,972 Catholics, and 504 Jews. The canton includes the greater portion of the Lake of Zürich, together with the land on both sides of it, and extends to the Rhine in the north. The principal valleys are those of the Limmat, of the Glatt, of the Töss, and of the Thur, all of them tributary to the Rhine. In addition to the Lake of Zürich there are the Greifensee and the Lake of Phällikon, both in the valley of the Glatt. The Schnebelhorn (4,248 feet), on the frontier of St. Gallen, is the highest summit within the boundaries of the canton, the whole northern half of which is undulating, with fertile fields, rich meadow lands, and wooded hills. Agriculture is carried on with great care, and the use of agricultural machines general. The land is much subdivided. About 125,000 acres are under the plough; 116,000 acres consist of meadows; 13,000 acres are planted with vines; and 128,000 acres are covered with forests. Market gardening is carried on with greater success than elsewhere in Switzerland. The breeding of cattle and dairy-farming are of great importance. The mineral kingdom supplies coal, peat, gypsum, marl, and building stones. Manufacturing industries flourish. The cotton manufacture employed, in 1871, 660,136 spindles, 6,265 power-looms, and 9,536 operatives. The manufacture of silk gives occupation to 18,000 operatives, most of whom work at home. About £2,000,000 worth of silk stuffs are exported annually, yielding a profit of no less than £720,000. The woollen and linen industries were of greater importance than they are now. The machine shops and foundries (3,563 operatives) are the most important in Switzerland. There are likewise potteries, paper-mills, chemical works, saw, oil, and gypsum mills. Straw-plaiting is principally carried on in the Rafzerfeld. Much has been done to promote the education of the people, perhaps more than in any other canton of Switzerland. The principal towns are Zürich, Winterthur, Wädenswil, Uster, and Horgen. The canton joined the Confederation in 1351, fifteen years after its Patrician Government had been overthrown by the people.



THE LAKE OF THE FOUR CANTONS.

at the foot of the Uetliberg, and at the lower end of its lake, where the rivers Limmat and Sihl effect their junction, is far more accessible than Luzern, and commands some of the most important natural high-roads. Hence its strategical importance. It was at Zürich, on the 3rd Vendémiaire of the year VIII., that Massena saved France by annihilating the Russian army marching upon Basel. The city of Zwingli is but little inferior to that of Calvin, as regards the number of its inhabitants, but it is far superior to it in the facilities which are offered by its numerous educational institutions, its Polytechnicum, its university, its museums and libraries. Zürich makes great efforts to deserve the epithet of "Athens of Switzerland," which its citizens have bestowed upon it. Scheuchzer, the first man who studied the physical geography of the Alps in a scientific spirit, was a native of Zürich, as was also Lavater, the famous physiognomist. It is a manufacturing town, too, with silk and cotton mills, foundries, and machine shops. Steam-engines constructed at Zürich have been exported even to England and to America. More than half the corn trade of Switzerland is conducted by Zürich houses, its leather fairs are well attended, and the visits of commercial travellers are more frequent than in any other town of Switzerland. Zwingli preached in the old parish church, a basilica of the twelfth century. The silk and cotton industry enriches also many of the neighbouring towns and villages as far as the canton of Zug. *Wald* (5,055 inhabitants) and *Uster* (5,808 inhabitants), to the east of Zürich, on the river Aa, which connects the Pfäffikon with the Greifen Lake, are busy manufacturing centres. The river Aa, which supplies motive power to the numerous mills of these towns, is popularly known as the "river of millions." *Winterthur* (9,404 inhabitants), next to Zürich the most important town of the canton, is the modern representative of the Roman station of Vitodurum. It is ambitiously termed the Liverpool of Switzerland, because it imports so much cotton. There are, however, few towns of equal size which can boast of more varied industries, or of a larger number of educational and other public institutions. Its foundries and machine shops are more especially noteworthy.

*Glarus** (in French *Glaris*, 5,516 inhabitants) is the capital of a canton and a busy manufacturing and commercial centre, but in the mountain country of the Grisons,† which lies beyond it, there are no manufactures, and *Chur* (in French

* *Glarus*.—Area, 267 square miles; population (1876), 36,129. In 1870 there were 28,238 Protestants and 6,888 Catholics. The canton includes the valley of the Linth, as far as the Walen Lake, and is quite Alpine in its character, glaciers covering 5 per cent. of its surface. Formerly a land of herdsmen, it has become a manufacturing country, cotton and woollen mills and hosiery manufacture employing more hands now than dairy-farming or agriculture. The battles of Naefels (152 and 1388) resulted in the liberation of the canton from the yoke of Austria.

† *Graubünden* (Grisons).—Area, 2,774 square miles; population (1870), 91,782, (1876) 92,906. In 1870 there were 51,887 Protestants and 39,843 Roman Catholics. The canton is the largest in Switzerland, but very thinly inhabited. It includes the valley of the Upper Rhine; the valley of the Upper Inn, or Engadin, separated from the former by the Albula Alps; and the valleys of Calanca and Misocco, on the southern slope of the Alps, and tributary to the Ticino. Only about 5 per cent. of the area is cultivated (barley is grown up to 5,810 feet, wheat up to 4,740 feet). Wine is grown around Chur and on the Italian slopes. Sericulture and the breeding of snails (for exportation to Italy) are likewise of some importance. The mines supply lead, copper, silver, and iron, and there are quarries of marble, alabaster, and pot-stones. Amongst the fifty mineral springs are Tarasp and St. Moritz.

In the tenth century the Grisons were annexed to the German Empire, and numerous ecclesiastical

Coire, in Italian *Coira*, in Romanic *Quoira*, 7,552 inhabitants) is the only town deserving the name. It is, above all, a place of traffic, for the roads which run over the Alpine passes of the Splügen and the Bernardino into Italy, and those which cross the Julier, Albula, and Fluela Passes into the Engadin, diverge from it. The cathedral is a remarkable building, said to date back to the eighth century, and there are also the remains of a Roman tower (*Mars in Oculis*). Other places of interest are *Ilanz*, the capital of the Grey League, and *Disentis*, with one of the oldest abbeys in Christendom, founded in the seventh century by Sigisbert, the Scotch apostle, but burnt, together with its invaluable library, in 1799, by the French, both on the Rhine, and Samaden, St. Moritz, and Tarasp, in the Engadin. The latter two are famous watering-places. *St. Moritz*, in the Upper Engadin, 609 feet above the sea, has acidulous and ferruginous springs, whilst *Tarasp* (4,912 feet), in the Lower Engadin, and its neighbourhood, abound in springs of nearly every kind, including mofettas, or gas springs. At both places huge hotels have been constructed for the accommodation of visitors. The villages in the Engadin are generally wealthy, many of the inhabitants having made their fortunes abroad as pastrycooks or coffee-house keepers.

Descending the Rhine, we pass from the Grisons into the canton of St. Gallen.* On our left we perceive *Ragatz*, a famous bathing town, supplied from the springs of Pfäfers, higher up in the Tamina valley, which here debouches upon the plain of the Rhine. The only Swiss town in that plain is *Altstätten* (7,575 inhabitants). But long before we reach it a road and railway branch off towards the west at Sargans, and, passing to the south of the Walen Lake, conduct to the curious old city of Rapperswyl, on the Lake of Zürich, here crossed by a wooden bridge. *St. Gallen* (16,675 inhabitants), the venerable capital of the canton, lies to the west, beyond the Alps of Appenzell, in a valley tributary to the Lake of Constanz. One thousand years ago, in the age of the Carolingians, the abbey of St. Gall was the most famous school of learning in the world. A monk there

and secular lords ruined the wealth of the country by their continual quarrels. The people at various times rose against them, and destroyed the 183 castles which they had built. In 1393 the inhabitants of the Lower Rhine valley, of the Albula valley, and of the Engadin, formed the League of God's House (*Lia Ca Dè*), at the head of which was the Church of Chur. In 1424 the inhabitants dwelling along the two head-streams of the Rhine and on the Italian slope formed the Grey League (*Lia Grischa*, in German *Graubünden*, in French *Grisons*), thus named on account of the grey dress usually worn. In 1428—36 the small villages to the east of Chur, in the Prætigau (Landquart valley), the Schanfigger valley (*Seana vicus*), and the Davos valley formed the League of the Ten Courts (*Lia dellas desch dretturas*). In 1473 these three leagues combined and joined the Swiss Confederation. Of the inhabitants 30 per cent. speak German, 14 per cent. Italian, and 56 per cent. Romanic dialects. These latter, however, in addition to their patois, speak in most instances either German or Italian.

* *St. Gallen* (St. Gall).—Area, 780 square miles; population (1876), 196,834. In 1870 there were 116,060 Roman Catholics and 74,573 Protestants. The canton includes the valley of the Rhine down to the Lake of Constanz, the flourishing old county of Toggenburg, drained by the river Thur, to the north of the depression through which the Rhine formerly took its course, and which extends from Sargans, in the east, to the Lake of Zürich in the west. Within it lie Lake Walen and the vale known as Gaster. The southernmost portion of the canton is exceedingly rugged, and partly covered with glaciers. Dairy-farming and agriculture are of importance; and there are productive coal and iron mines, slate and other quarries. The manufacturing industry is mostly confined to the old county of Toggenburg. It supplies cottons, lace, embroidery, linen, and silk. The principal towns are St. Gallen, Altstätten, Wattwyl, Rorschach, Wallenstadt, and Rapperswyl.

compiled the famous chronicle which recounts the achievements of Charlemagne; and German became a fixed language there long before Luther translated the Bible. This famous old abbey was suppressed in 1806, but its library, with its 1,506 precious codices and 21,000 volumes, has been carefully preserved. In addition to it there exists a town library of 28,000 volumes. The founder of the abbey, St. Gall, an Irishman, lies buried in the abbey church. The town, in spite of its great elevation above the sea (2,265 feet), has grown into a manufacturing centre since the thirteenth century. Formerly the linen manufacture predominated, but now embroidered muslins form the staple produce, and the vast meadows surrounding the town and its suburbs have been converted into bleaching grounds. The manufacturers of St. Gall are a pushing race, and maintain agents in all parts of the world. The valley of Toggenburg, which is drained by the Thur, and has *Wattwil* (5,494 inhabitants) for its capital, lies to the west of that town, and forms one continuous street of factories, and one-eighth of all the cotton stuffs manufactured in Switzerland are produced there. *Herisau* (9,727 inhabitants), the largest town of the canton of Appenzell, belongs to the manufacturing district of St. Gall. As to *Appenzell* itself (3,686 inhabitants), it is remarkable rather on account of its past than for the work accomplished in its workshops. As an evidence of olden times, the iron chain and collar of the pillory still remain attached to the walls of its town-hall.*

Thurgau† is to far less an extent a manufacturing country than the valleys of St. Gall, Zürich, or Lower Appenzell. *Frauenfeld* (5,138 inhabitants) and its other towns and villages are distinguished rather for the orchards and gardens by which they are surrounded. *Romanshorn* (3,141 inhabitants), on the Lake of Constanz, and the neighbouring port of *Rorschach* (3,493 inhabitants), in the canton of St. Gallen, are imported grain marts. The shipping trade between the Swiss and German shores of the Bodensee is far more active than on the Lake of Geneva. On the latter the steamers are obliged to compete with railways running along the northern shore, for the southern is bounded for the most part by steep and almost deserted mountains. On the Bodensee, on the other hand, the vessels cross the lake transversely, thus connecting the terminal stations of the German and Swiss railways.

The Bodensee (Lake of Constanz) forms with the Rhine a natural frontier on

* *Appenzell*, since 1597, has been divided into the Catholic half-canton of Inner Rhoden and the Protestant one of Outer Rhoden. The former includes the upper valley of the Sittern, with Appenzell for its capital. The inhabitants depend mainly upon dairy-farming. In Outer Rhoden many of the inhabitants are engaged in muslin-weaving, embroidery, and other industries. The Appenzellers are noted for their gaiety and intelligence. They are excellent wrestlers and marksmen. They were formerly the subjects of the Abbots of St. Gall, but, being cruelly oppressed by them, they formed themselves into Rhoden (Retten, i.e. bands), and recovered their independence.

† *Thurgau* (in French *Thurgovie*).—Area, 332 square miles; population (1876), 95,075. In 1870 there were 69,231 Catholics and 23,454 Protestants. The canton extends along the Lake of Constanz and the Rhine to within the neighbourhood of Schaffhausen. The Thur and the Murg are the principal rivers. The surface is undulating, and of great fertility. The Thurgau is the granary of Switzerland, and its orchards are very extensive. Wine, cider, potato brandy, fruit, corn, fish, and cotton stuffs are exported. Frauenfeld is the capital.

the north of Switzerland, but a small canton, that of *Schaffhausen*, lies beyond that river. Its capital (10,303 inhabitants) is one of the most curious cities of the Confederation, for by the side of old towers and walls rise the modern factories. The water of the Rhine has been conveyed into nearly every house, where it supplies a cheap and efficacious motive power. The Byzantine minster, built between 1104 and 1453, possesses a bell of 1486, inscribed "Vivos voco, mortuos plango, fulgura trango!" The Gothic church of St. John's is said to be the largest in Switzerland. The neighbourhood of this original town abounds in delightful sites. No doubt grander scenery may be seen in other parts of Switzerland, but none more charming.*

* *Schaffhausen*.—Area, 114 square miles; population (1876), 38,925. In 1870 there were 34,466 Protestants and 3,051 Catholics. The limestone of the Randen, a miniature of the Swabian Jura, approaches close to the Rhine. Agriculture and cattle-breeding are the principal occupations. Corn, potatoes, wine, and cattle are exported. Cast-steel files, railway carriages, and crucibles are manufactured. The canton joined the Confederation in 1501.





CHAPTER VIII.

AGRICULTURE, INDUSTRY, AND COMMERCE.*



ALTHOUGH far less than one-half of the area is capable of being cultivated, and much of the remainder lies at so great an elevation above the sea as to be incapable of being utilised except as forests or pasture, the population of Switzerland increases annually to the extent of 12,000 or 15,000 persons. In spite of its extensive glaciers and snow-fields, the population is as dense in Switzerland as it is in France.

The agricultural produce is not sufficient for the support of the inhabitants.† About one-third of the corn required has to be imported from Germany, Hungary, and the Danubian Principalities, and has to be paid for out of the profits derived from manufacturing industries. The vine is cultivated with care, and the sunny slopes on the Lakes of Geneva and Neuchâtel and of the Lower Valais form one continuous vineyard, from which the dreaded phylloxera has hitherto been successfully excluded. But the wine produced does not meet the demand, which is very large in some of the cantons, and France is called upon to make up the deficiency.‡ Similar deficiencies take place in all other kinds of agricultural produce: only fruit is grown in quantities sufficient for home consumption, more especially in the northern cantons of Aargau, Zürich, Schaffhausen, and Thurgau.

The nature of their country precludes the Swiss from contending with neighbouring countries as to ordinary agricultural productions, but their unrivalled meadow and pastures largely compensate them in this respect. Formerly, too,

* According to occupations the population of Switzerland is distributed as follows:—

Agriculture and cattle-breeding	44·4 per cent.
Industry	34·6 ”
Commerce	5·2 ”
Conveyance and traffic	1·8 ”
Officials, professional men, and artists	3·9 ”
Servants (rendering personal services)	6·3 ”
Persons of independent means	3·9 ”

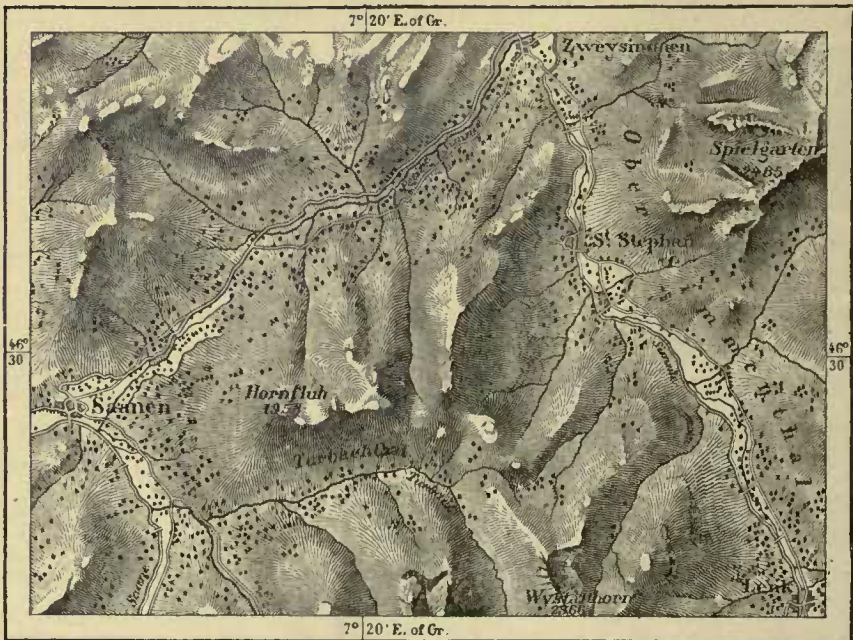
† Luzern, Solothurn, Fribourg, and Schaffhausen export corn; Valais and Aargau grow nearly sufficient for home consumption. All other cantons are compelled to import largely.

‡ The annual production of wine is estimated at 2,541,000 gallons. It is most considerable in Vaud, Valais, Zürich, and Thurgau.

their forests yielded a supply of timber and fuel amply sufficient for home consumption; * but since the beginning of this century the forests have decreased considerably. In some of the cantons, and more especially in the Valais and Ticino, the trees have been cut down without the least thought of the future; and the disastrous consequences of such wanton destruction have not failed to appear in a deterioration of the climate and an increase in the destructive action of mountain torrents. The Forest Cantons no longer deserve that name. The Kern-Wald, which anciently separated the two portions of the canton of Unterwalden, has almost disappeared. Strict laws have been promulgated for the protection of national and communal forests; but much of the forest land appears to have

Fig. 325.—THE "SENNHUTTEN," OR HERDSMEN'S CABINS, OF THE SIMMENTHAL.

Scale 1 : 145,000.



2 Miles.

definitely become private property, in spite of the stipulation that it should be restored to the communes after a lapse of eight or nine years, and is not affected by these laws. Thus, year after year, we are compelled to witness a diminution in the forests of Switzerland, and a proportionate increase in the cost of timber and fuel. The Swiss now import large quantities of timber and of fuel, in spite of the

* Distribution of the area of Switzerland (1878) :—

	Area. Acres.	Per Cent.		Area. Acres.	Per Cent.
Arable land	1,500,180	14.7	Glaciers	454,390	4.4
Vineyards	75,370	0.7	Lakes	353,530	3.5
Meadows	1,600,000	15.6	Houses	39,980	0.3
Pastures	2,242,000	21.9	Roads, rivers, waste land	2,067,110	20.3
Forests	1,906,290	18.7	Total, unproductive	2,915,010	28.5
Total, productive	7,323,840	71.5			

fact that they possess almost inexhaustible stores of the latter in their vast peat bogs and their beds of lignite and anthracite.

Fortunately the mountaineers are not able to destroy the meadows and Alpine pastures, which constitute the principal source of wealth of the country. They only suffer occasionally from floods, which cover them with rubbish. The mountain pastures are either *Allmende*—that is, commons belonging to the parishes (35·5 per cent.)—or they are the property of corporations (9 per cent.) or of private owners.

The Alpine pastures are divided into nearly 300,000 *Stösse*, each capable of supporting a cow, and varying in size from 1 to 10 acres, according to their fertility. They are valued at £3,200,000, and yield annually a profit of over £400,000. Every citizen is entitled to pasture a certain number of cows or other animals upon the common pastures. The village usually appoints a Senn, or herdsman, and sometimes also a “cheesemaster,” who divides the cheese, butter, &c., amongst the persons interested. The private pastures are usually farmed, and the manufacture of cheese and butter is frequently carried on by associations, as in the French Jura. The day on which the herds leave the villages for the mountain pastures is a universal holiday. The herds gradually proceed from *Staffel* to *Staffel*, and in August, or earlier if the weather prove unfavourable, they return as slowly to the villages. The Senn, or herdsman, lives in a hut constructed of rough timber, and furnished with the necessary apparatus for making cheese. Another hut serves as a storehouse. In the morning, when the Senn steps outside his hut, he blows his Alpine horn, made of the bark of the birch, or *yodels*, and the animals intrusted to his care obey the accustomed call and collect around him to be milked. It is a hard life the Senn leads on his Alp, and very little of romance is attached to it.

The manufacture of cheese and butter is generally carried on by associations, as in the French Jura. Swiss cheese is highly esteemed on the continent. The best sorts are made at Gruyère, in the canton of Fribourg, and in the Emmenthal.* The making of butter suffers in consequence of the high prices paid for cheese, but condensed milk forms an important article of export. The cattle of Switzerland, noted for their strength and the quantity of milk they yield, belong in the main to two races. The finest representatives of the brown race are met with in Schwyz, whilst the brindled race is principally seen in the Alps of Bern and Fribourg. The latter is said to resemble the cattle of Jutland and the Baltic, and is supposed to have been introduced by the Burgundians.† Swiss sheep and

* In 1875 398,000 cwts. of cheese, valued at £1,400,000, were exported.

	1906.	1876.
† Horses	100,324	100,935
Asses and Mules	£,475	3,145
Milch cows	553,205	592,460
Other cattle	440,086	443,470
Sheep	447,001	367,550
Goats	375,482	396,155
Pigs	304,428	334,215
Beehives	—	177,825

The import of cattle and butter regularly exceeds the export.

horses generally belong to inferior breeds, but something has recently been done by the Federal authorities to improve the former. The goats are actually mischievous, for they destroy the forests.

Silkworms are bred in Ticino, and snails, for exportation to Italy, in the Grisons.

In former times, when only a small area had been brought under cultivation, the forests and pasture-lands did not suffice for the maintenance of the population of the country. If a mountaineer desired to acquire wealth he was compelled to expatriate himself for years, and to go in search of it to the towns of neighbouring countries. Even now the "Fathers" of many wealthy Alpine parishes take every needful precaution in order that the population intrusted to their care shall not outgrow the resources afforded by the land. Bound to support those of its members who become indigent, they do not readily authorise marriages; and if a family should grow too rapidly they provide its younger members with a *viaticum*, and advise them to go in search of fortune in the wide world. In former times these expatriated sons of the country, provided they enjoyed good health, found ready employment as mercenaries. More than twenty-one centuries ago, we are told by Polybius, the Celts came down from the Alps and from the Upper Rhône valley, and sold themselves to the Romans, in order that they might fight other Celts living in the plains of the Po. War became the favourite occupation of the mountaineers, elated by their great victories over Austrians and Burgundians. Some of the cantons actually made money by trading in their poorer citizens. They concluded conventions with France, Austria, the Pope, and several Italian states, by which they bound themselves to furnish regiments of soldiers, either for parade or for actual fighting. For,

"If heroes you would have, the pay must be high." *

As recently as 1855 one of the Swiss cantons entered into a so-called "capitulation" with Rome and Naples. But neither Luzern nor any of the little cantons would dare now to sell the flesh of their sons. The young men whom they expatriate now must seek to make a living by some other means than soldiering.

Nearly every mountain village cultivates a special trade, which those amongst the young men who emigrate practise in the towns in which they establish themselves. The emigrants from one village are all of them chimney-sweeps; those from another glaziers or masons. There are others which only send forth knife-grinders, cloth-dealers, florists, or colliers. The men from the valley of Blegno, in the canton of Ticino, are chestnut-roasters, although the chestnut-tree does not grow in their mountain valley. The Engadin and other parts of the Grisons supply Europe with pastrycooks; whilst the southern valleys of Ticino annually provide Italy with builders, designers, and painters. These emigrants are, as a rule, quite as careful with their savings as the parish authorities are with their parochial treasure chest. They spend little, pocket halfpence or sovereigns as may chance, and, having realised a competency, they return to their native valley,

* *Le Régiment du Baron Madruce.*

where they build themselves a house, and live as "gentlemen" amidst their fellow-countrymen. In visiting the remote Alpine valley a stranger feels sometimes surprised that he should be accosted in his own language. One-fourth of the natives of Ticino speak French, and many German; hundreds are able to speak a few words of Spanish, Arabic, Greek, or Bulgarian. On returning to their homes, many of these emigrants keep up their connection with the countries in which they realised their fortunes. The Swiss of Glarus, St. Gall, and Toggenburg have established agencies in all the principal towns of Europe, as far as Scandinavia and Russia, and in the East. China, Brazil, and the United States are amongst the best customers of the handicraftsmen dwelling in the valleys of the Alps and of the Jura.*

Industry is, in fact, the great source of wealth, which enables the Swiss to live in spite of the small agricultural and mineral resources of the country. Mining is carried on to some extent, but the mineral resources of the country are not very great, and the working of many mines has been discontinued, owing to the cost of fuel. Iron ores are found in the Jura, in St. Gallen, Solothurn, and Valais. About 632,000 cwts. of ore are raised annually. The Alps are supposed to be rich in iron ore, but, owing to the want of fuel, it would not pay to work them. There are copper, zinc, lead, cobalt, and bismuth mines, but their produce is very scanty. Gold in small quantities is found in the sand of some rivers, and silver in the argentiferous lead of Valais, Bern, and the Grisons. The salt works of Bex, in the Valais and to the west of Basel, are more productive. They yield about 660,000 cwts. annually, in spite of which considerable quantities of salt have to be imported from abroad. From 10,000 to 15,000 tons of asphalt are obtained annually in the Val de Travers, in the Jura. Coal is found in the Valais, in Bern, and in Fribourg; lignite in some of the other cantons; but the quantity raised (about 20,000 tons a year) is insignificant. Peat is found in most of the cantons. Marble, roofing slates, millstones, and building stones are quarried extensively.

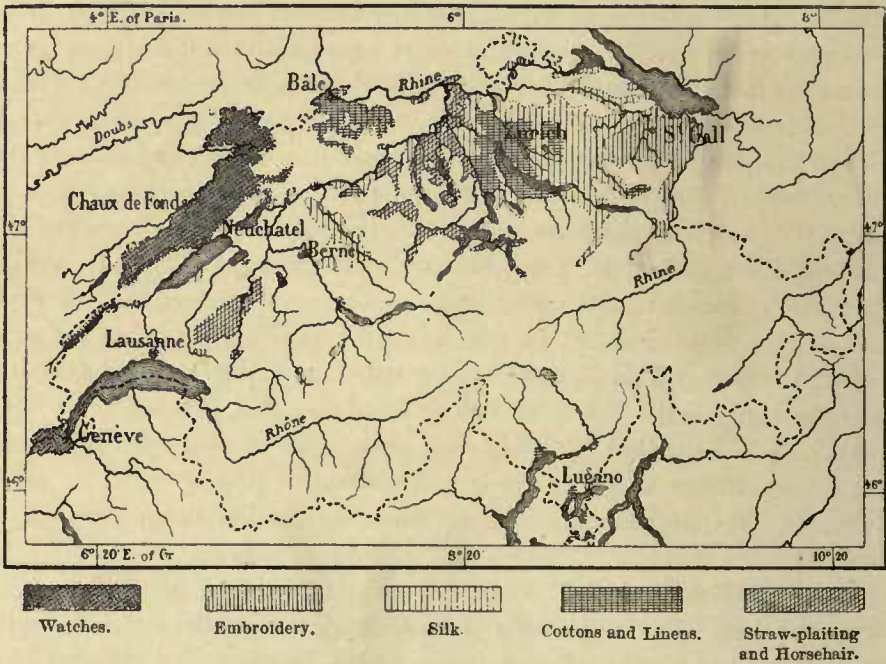
Necessity, which compelled so many to emigrate, induced those who remained at home to employ the long winter in manufacturing articles in wool or coarse linens, which they sold at ridiculously low prices. Such was the modest beginning of Swiss industry, which now holds so respectable a place. Though obliged to import most of the raw produce, Swiss manufacturers were able to undersell their foreign competitors, for they paid lower wages, especially in the mountain districts, and the many rivers and rivulets furnished them gratuitously with a motive power for their machinery. On the other hand, Switzerland labours under the disadvantage of being cut off from the sea, which places it at the mercy of its neighbours, who could annihilate its commerce by the erection of customs barriers. Most of its industries, moreover, have no connection at all with the district in which they are carried on, such as exists between the factories of many foreign countries and the coal or iron mines in the vicinity of which they grew up.

* In 1870 the number of Swiss residing abroad was estimated at 72,500. Their real number, however, is supposed to be 250,000.

Watches, for instance, can be manufactured equally well in other countries, and Swiss watches actually find no longer a market in France or the United States.*

But, in spite of this, Geneva and the Jura are the most important centres of watchmaking in the world.† This branch of industry is carried on exclusively in French Switzerland. The Jura supplies principally plain watches; Geneva, watches in highly ornamental cases; and Le Locle, pocket chronometers. To regulate these latter an observatory has been established at Neuchâtel. The export of watches to the United States, which formerly yielded £520,000, hardly reaches now £200,000—a most serious blow to so important a branch of Swiss industry. The German cantons in the plains and hilly district—Glarus, Zürich,

Fig. 326.—INDUSTRIAL MAP OF SWITZERLAND.



St. Gallen, and Appenzell—engage in cotton-spinning, employing 2,000,000 spindles and 16,000 power-looms. Silks are manufactured in Zürich and Basel,

* Statistics of the leading industries of Switzerland (1875) :—

	Operatives.		Total of their Wages.	Average Wages per Day.
	Males.	Females.		
Textile industries	75,000	75,000	£4,320,000	1s. 10d.
Watchmaking	57,000	13,000	2,520,000	2s. 5d.
Silks and ribbons	33,000	27,000	2,016,000	2s. 3d.
Machine shops	20,000	—	804,000	2s. 7d.
Total	185,000	115,000	£9,660,000	2s. 5d.

The average working day is 12 hours 24 minutes.

† Watchmaking in 1875 :—

Switzerland	1,600,000 watches, value £3,520,000
France	400,000 „ „ 1,000,000
England	200,000 „ „ 640,000
United States	200,000 „ „ 600,000

which are formidable rivals of Lyons. This branch of industry is very old, but it only attained larger proportions through the immigration of Italian and French Protestants during the sixteenth and seventeenth centuries. The abolition of the silk duties in England gave an immense development to it, whilst the protective policy of the United States threatens it with destruction. Silk goods valued at £1,600,000 were exported to America in 1872. In 1876 the exports had fallen to little more than a million! The mechanical embroidery of textile fabrics, chiefly carried on in St. Gallen, Appenzell and Thurgau, has likewise grown into an important branch of industry.* The manufacture of linen, straw-plaiting, the distillation of liqueurs, and wood-carving, which gives so much pleasure to the visitors of the Bernese Oberland, are amongst the minor industries. Nor must we omit to notice the machine builders of Zürich and Olten, and the many

Fig. 327.—AN AVALANCHE ON THE EBENE FLUH.



handicraftsmen who devote their attention to the production of a great variety of fancy articles, amongst which the jewellery of Geneva occupies a most respectable place. The iron works only produce 160,000 cwts. of pig-iron a year.

M. de Laveleye has pointed out that the Swiss workmen, as compared with those of other countries, enjoy a great advantage by sharing largely in the property in the land. It is quite true that at Zürich, Glarus, and elsewhere many of the native workmen own a patch of meadow land, a potato-field, or a couple of cows, looked after by the wife or the children. But in Switzerland, as in all manufacturing countries, the workmen are for the most part solely dependent upon their wages. In proof of this we may cite the canton of Glarus,

* In 1876 there were 10,237 embroidering machines, and including the workshops they were valued at £1,800,000. About 25,000 operatives were employed in that branch of industry.

where the general wealth has more than quadrupled since 1850, but where, notwithstanding, only one-third of the population consists of landowners, whilst half the canton is the property of no more than thirty individuals.

Thanks to its manufacturing industry, Switzerland is able to carry on a very considerable commerce.* The imports from France include woollen stuffs and silks, wine, flour, jewellery, and hardware. Italy supplies almost exclusively raw silk. Germany furnishes corn, flour, and all kinds of manufactured goods. The exports include silks, cotton goods, lace, watches, jewellery, straw-plaiting, cattle and cheese, wine, liqueurs, musical boxes, wood-carvings, machinery, asphalt, &c. Free trade has been adopted in principle. The customs duties are principally

Fig. 328.—THE PASSES OVER THE ALPS.

Scale 1 : 2,400,000.



levied upon luxuries and alcoholic drinks, and the transit dues were abolished in 1867.

Nature has opposed great obstacles to the development of commerce. In a country of mountains, torrents, avalanches, and landslips, the construction of carriage roads entailed a considerable amount of labour, and their maintenance is costly. It is well known that travellers only venture timidly into certain mountain gorges, and speak with a subdued voice for fear that the vibration of the air might cause an avalanche to rush down the mountain slope and involve them in destruction. In spite of these difficulties, the network of excellent carriage roads which now embraces the plain and the hilly regions leaves but little to be desired.

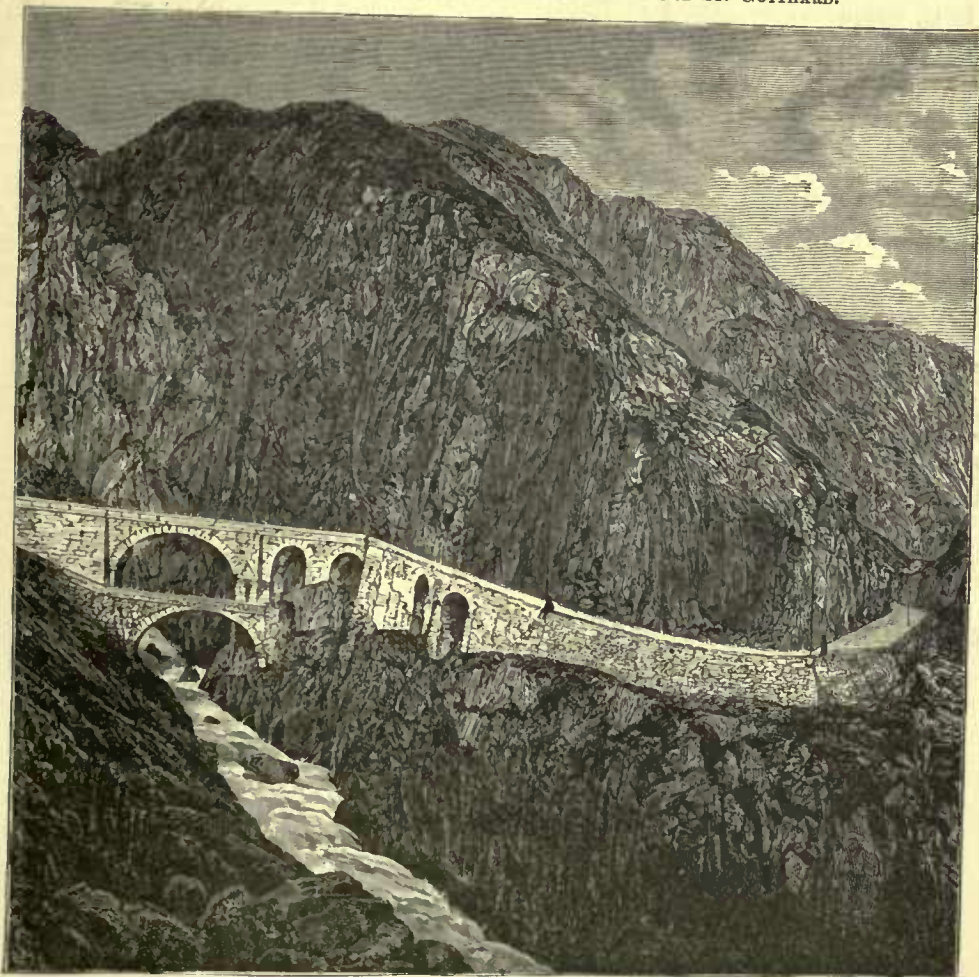
* In 1874 the imports and exports were roughly estimated at £43,200,000, or £16 5s. per head.

In 1876 the imports included 289,394 head of live stock; £107,613 worth of merchandise taxed *ad valorem*, and 43,322,071 cwts. of other goods.

The exports included 105,782 head of live stock; £246,330 worth of wood and coal; and 4 453,979 cwts. of other goods (401,915 cwts. of cheese, 225,491 cwts. of cotton stuffs, 107,747 cwts. of cotton yarn and twist, 24,216 cwts. of raw silk, 58,341 cwts. of silk stuffs and ribbons, &c.).

More than twenty carriage roads connect the two slopes of the Jura. Every one of the lakes is skirted by roads, some of them, like the Axenstrasse, being hewn out of the solid rock. Excellent roads likewise cross the principal passes of the secondary ranges of the Alps, and some amongst these, such as that of the Brünig, which connects Interlaken with the Lake of the Four Cantons, is frequented annually by thousands of travellers. As to the Central Alps, many of the paths which lead across these have not yet been made practicable for carriages.

Fig. 329.—THE DEVIL'S BRIDGE AND THE ROAD OF THE ST. GOTTHARD.



The famous old pass which the Romans dedicated to Jupiter Pœninus, in whose honour they erected a temple upon its summits, now replaced by the monastery of St. Bernard, is practicable only for mules. The Lukmanier, which, next to the Maloggia in the Engadin, is the lowest pass over the Central Alps, still waits for its carriage road. The Septimer was much frequented by the Romans, and the road which led over it joined that over the Bernardiuo on the northern slope at Curia (Chur), on the southern at Clavenna (Chiavenna), but merely a footpath leads across it now. On the other hand, passages which were not frequented for-

E. of Paris

6° 10'

46° 40'



Granite & Trachyte
 Gneiss
 Marble & Limestone
 Lias & Dolomite

Scale



6° 20'

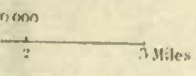


6° 40'

6° 30'

8° 40'

E. of Gr

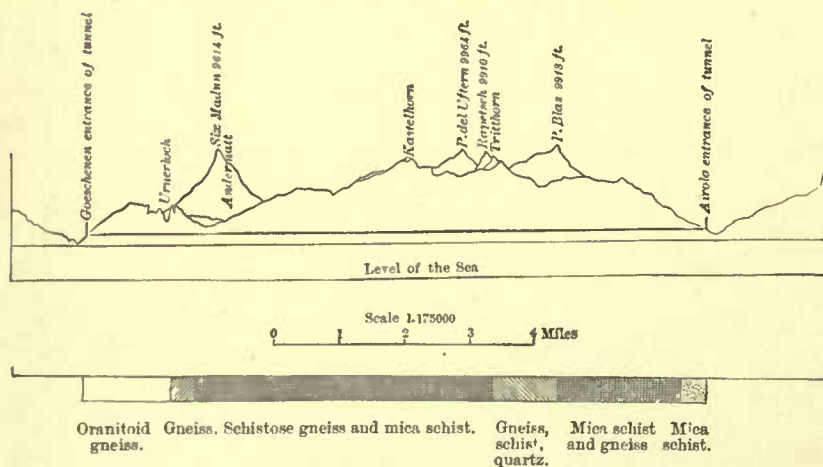


Digitized by Microscop
 Schists Gypsram & Rauch Alluvium
 Wache

in all Europe, leads over the Matterjoch (*Passage de St. Théodule*, 10,920 feet). According to the number of travellers which cross them annually they rank in the following order:—Simplon, Splügen, Bernardino, and La Maloggia.*

But high-roads, however carefully constructed, no longer suffice for the requirements of commerce: railways, placing the country into connection with the railway systems of other countries, have become indispensable. The first railway, that from Zürich to Baden, was opened in 1847, but at present the plain of Switzerland has more railways in proportion to its area than any other country of Europe; perhaps too many, if we judge them by the profit their constructors derive from them.† They may possibly become more profitable after they have been placed in direct communication with the Italian railways, and this great work has been seriously taken in hand. Germany and Italy, which are most interested in the realisation of this plan, have combined with Switzerland to construct for that purpose a tunnel beneath the Pass of St. Gotthard. Amongst all the great works

Fig. 331.—THE TUNNEL OF THE ST. GOTTHARD.



recently accomplished, this piercing of the St. Gotthard will be one of the greatest and one of the most necessary. Switzerland would, in course of time, become a kind of blind alley, unless a road were opened through it available for the transit trade. Goods and passengers are now obliged to travel by way of France or Austria, but, as soon as the tunnel of the St. Gotthard shall have been opened for traffic, commerce will avail itself of the advantage it offers, and some of its stations, high up in the mountains, will become great *entrepôts* of European importance. Results such as these cannot, however, be attained without exercising a potent

* In 1875 the four principal Alpine passes were crossed by the following number of travellers:—St. Gotthard, 65,500; Simplon, 27,700; Splügen, 24,150; Bernardino, 24,000.

Altogether the Alpine routes were made use of by 225,000 travellers in carriages, and by at least as many pedestrians.

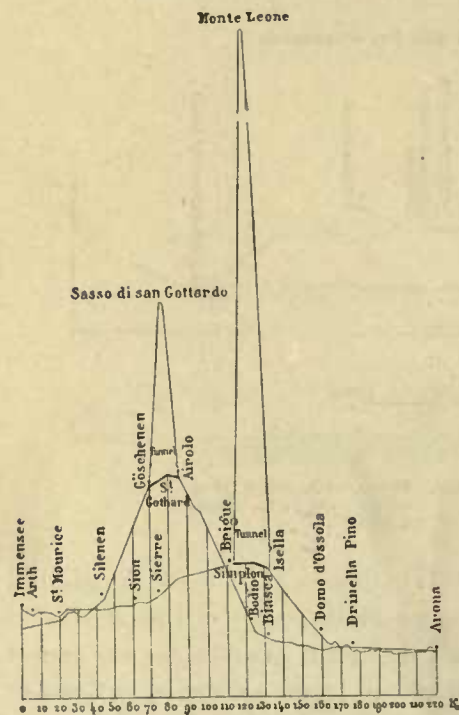
† In 1877 there were 1,500 miles of railway constructed at an expense of £34,000,000. In 1876 the revenue derived from them was £2,433,620, or £1,502 a mile.

The Post Office (1876) forwarded 65,035,290 letters, 20,389,833 parcels, and 45,650,000 newspapers. The telegraph lines have a length of over 4,000 miles, and 2,918,858 messages were sent in 1876.

influence upon political geography. The high chain of the Alps, which hitherto formed an almost impassable barrier between nations, will exist no longer. Manners and customs which survive only in remote districts will be swept away. The difficulties presented by this vast enterprise have been great; financial miscalculations have led to embarrassment; but the work is nevertheless progressing satisfactorily, and the year 1880 will no doubt see its accomplishment. The lines of railway which give access to it from the Forest Cantons and Ticino can be opened soon after.*

But this is not all. If German Switzerland pierces the Alps which separate it from Italy, French Switzerland likewise desires to obtain a direct outlet towards

Fig. 332.—DIAGRAM OF THE TUNNELS OF THE SIMPLON AND THE ST. GOTTHARD.
Horizontal Scale 1 : 4,000,000.
Vertical Scale 1 : 40,000.



the south, and its interests are identical with those of Northern France. In fact, a straight line drawn from Paris to Milan—that is to say, in the direction of Brindisi, Egypt, and India—passes through the canton of the Valais. Engineers, anxious to find the most favourable locality where they might pierce the Alps, have fixed upon the Simplon. This is the veritable gateway into Italy, but the gate requires opening. As compared with other Alpine railways, that proposed to run through the tunnel of the Simplon will possess the inestimable advantage of having very gentle gradients. Its construction will be less costly, and its traffic can be carried with far greater facility. It is, therefore, much to be desired that its construction should be taken in hand at an early date.†

Another gap, the Pass of Maloggia, at the other extremity of Switzerland, at the head of the Inn, appears to offer many advantages for the construction of a railway traversing the Alps obliquely, and connecting the valley of the Danube with the Gulf of Genoa. But this railway, very different from the proposed line over the Simplon, would for a considerable distance be at an elevation of 5,900 feet above the sea, and on reaching the edge of the pass, very appropriately called

* The total length of the tunnel, between Göschenen on the north and Airolo on the south, is 48,947 feet, or 9.3 miles.

† Comparison of Alpine tunnels:—

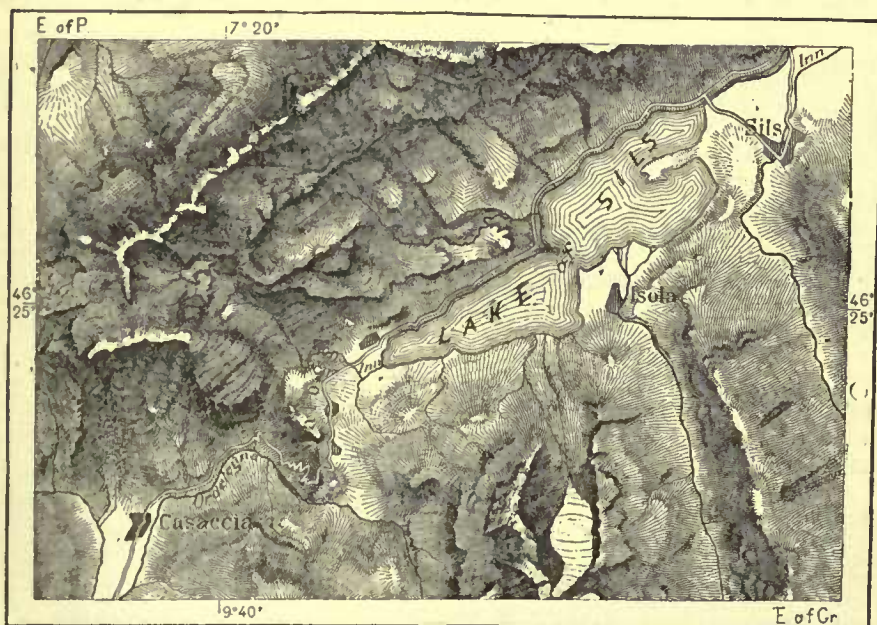
	Mt. Cenis (completed).	St. Gotthard (constructing).	Simplon (proposed).
Length in feet	40,133	48,947	61,493
Altitude "	4,100	3,785	2,360

that of the "bad quarters, or lodgings," it would be necessary to construct very costly embankments in order to reach the valley of Bregaglia, lying far below.

Although years may pass before the lines through the St. Gotthard and the Simplon are opened for traffic, the number of travellers is ever on the increase, and Switzerland has almost become one huge hotel. During the summer season they arrive in thousands, and all the languages of Europe may then be heard.* Many of these visitors, attracted by the salubrity of the climate or the advantages of living in a free country, permanently settle there, and even during winter the resident foreign population is very considerable.† Manufacturing

Fig. 333.—THE PASS OF MALOGGIA.

Scale 1 : 95,000.



towns like Geneva, Basel, Zürich, or St. Gallen attract many German or French workmen, whilst Italian may be heard wherever railway embankments are being thrown up or houses built.

The natives of Switzerland whom a traveller encounters whilst passing rapidly from hotel to hotel do not give a fair idea of the bulk of the population. Indeed, the "exploitation of foreigners" is not the least profitable industry of the country.‡ Hotel-keepers, carriers, guides, horn-blowers, openers of gates, guardians of waterfalls, and a host of mendicants, who make their living out of foreign visitors, never

* In 1869 Interlaken was visited by 175,000 strangers, who stayed there from a night to several weeks.

† Number of foreigners domiciled in Switzerland (1870), 150,900, of whom 63,117 were Germans, 62,228 French, 18,073 Italians, 2,297 English, 1,599 Russians, 1,404 Americans.

‡ The foreigners who annually visit the Oberland are said to leave £1,200,000 behind them.

hesitate when a chance of making something out of him presents itself. Everything is sold, down to a glass of water, or even a gesture indicating the route a traveller is to follow. Fine sites are taken possession of and enclosed with barriers, in order that strangers desirous of enjoying the prospect can be made to pay for it. Waterfalls and cascades are concealed behind hideous palisades, in order that the travellers not willing or able to pay may be shut out from their enjoyment. It is only natural that this avidity should disgust foreign visitors, but in a world where the love of lucre is being perpetually called forth it is difficult to form an opinion of the true moral standard of the persons with whom we come temporarily into contact.

If we would study the Swiss as he is, we must step beyond this world of hotels,

Fig. 334.—THE MÖNCH, WITH THE JUNGFRAU, THE SILBERHORN, THE SCHNEEHORN, THE ALTELS, AND BLÜMLISALP, IN THE DISTANCE.



the only one with which most foreign visitors become acquainted. In forming our opinion of the moral character of the people we must be guided not only by our own personal experience, but also by the statistics published by the different cantons and by public societies. Much has certainly been done for elementary education; but although Switzerland ranks high in that respect, many of its cantons lag far behind, and the diffusion of knowledge is much less general than in Germany. In many cantons every child receives an elementary education, and some of the adults attend superior schools, but there are others which leave much to be desired in that respect. The school-house is the finest building in many villages, and in some of the towns veritable palaces have been constructed to serve the purposes of education. In the north-eastern cantons, where the vast majority of inhabitants are Protestant, the proportion of children attending school to the

whole population is as 1 to 5, while in the half-Protestant cantons it is as 1 to 7, and in the Roman Catholic cantons as 1 to 9. Parents are by law compelled to send their children to school, or to have them privately taught, from the age of six to that of twelve years; and neglect may be punished by fine, and in some cases by imprisonment. The law has not hitherto been enforced in the Roman Catholic cantons, but it is rigidly carried out in those where the Protestants form the majority of the inhabitants. In every parish there are elementary schools, where the rudiments of education, with geography and history, are taught, and the number of secondary schools is very considerable. Industrial schools, in which girls are taught needlework, exist in connection with many of the elementary schools. Superior schools exist in fifteen of the principal towns. There are colleges at Geneva and Lausanne, and universities at Basel (founded in 1460), Bern, Zürich, and Geneva. These latter are organized on the German system. No less than 280 professors and teachers are attached to them, and they are attended by 1,200 pupils. A Polytechnic school was established at Zürich in 1855, and is maintained by the Federal Government. There are in addition five agricultural schools, sixteen training schools for elementary teachers, a military academy at Thun, and six seminaries for the education of Roman Catholic priests.* Teachers and professors are in many instances better paid than in the neighbouring countries, and they enjoy the respect of their fellow-citizens.†

The number of public libraries is large, and there exist numerous societies for the promotion of art and science, all of which exercise a most beneficial influence upon the education of the people. Amongst societies embracing the whole of Switzerland, and counting their members by thousands, may be mentioned the Art Union, the Natural History Society, the Historical and Antiquarian Societies, the Unions of Choral and Gymnastic Societies, the Unions of Swiss Physicians and Lawyers, and a Society for the Promotion of Art Industry.‡

* Educational statistics:—5,500 elementary schools are attended by 420,000 pupils. They are maintained at an annual expenditure of £268,000. Education is most widely diffused in the cantons of Basel Town, Zürich, and Vaud, where only 4 out of every 1,000 inhabitants are illiterate. In the cantons of Unterwalden (nid dem Wald), Fribourg, Valais, Schwyz, and Appenzell (Outer Rhoden) the number of illiterates varies between 113 and 315 per 1,000.

Out of every 1,000 recruits no less than 9 are unable to read!

† In the canton of Zürich, which takes the lead in all matters relating to education, the elementary teachers are paid £92 to £140 annually in the town, and £48 as a minimum in the country districts, in addition to which the country schoolmasters are provided with lodgings.

‡ In 1876 there existed 25 large public libraries in Switzerland, with 920,500 volumes; 1,629 school and people's libraries, with 687,950 volumes.

There existed likewise 5,552 societies or clubs, with 230,000 members.

About 412 periodicals are being published; 266 in German, 118 in French, 16 in Italian, 5 in Romain, and 1 in English.



CHAPTER IX.

GOVERNMENT AND ADMINISTRATION.



SWITZERLAND, with its diverse races and languages, is not governed, like most other states, by a monarch or by a political party. In spite of the centralizing tendencies which have been at work more or less actively since the commencement of the nineteenth century, each canton consists in reality of a confederation of communes, or parishes, every one of which attends to its local affairs, whilst the Republic itself includes a number of cantons enjoying a large amount of autonomy. In former times Switzerland was cut up into several hundred independent states, every one of which was governed on different principles, and which hung only loosely together in case of emergency. The valley formed the natural unit of these states—the Republican cellule of the entire organism as it were. The Grisons present a striking instance of this kind. The communes there are separated by barriers of mountains, rocks, and snow-fields, and were thus able to maintain their independence. They combined into three leagues for the purpose of administering the interests they had in common, and these three leagues again formed themselves into a federation for the defence of the country against foreign aggression (see p. 491).

The Swiss Republic, taken as a whole, did not at that time realise our ideal of what such a body politic should have been. Feudal practices, and military expeditions undertaken for the sake of conquest, formed a strange and curious contrast to the practice of local liberty. Serfdom existed, and in Solothurn was abolished only in 1782. The inhabitants of the plain and of the hills, whom nature had not protected against the incursions of armed bands, became the "cattle" of feudal lords and princely abbots. The laws differed throughout the country, and the privileges accorded to members of the Confederation varied according to the accidents of conquest or of alliances. Some of the towns enjoyed the title of "allies," without being sovereign; others were admitted as "protected towns;" others, again, were treated as victims of conquest, and had to obey the behests of individual cantons, or of the Swiss "people" met in "Tagsatzung," or Parliament. It required the terrible shock of the French Revolution to change this state of

affairs, and to turn Switzerland into paths more conformable with our modern ideas of civilisation and civil liberty. The curious distribution of Protestants and Catholics in Switzerland clearly proves the tyrannical manner in which each of these little states was formerly governed. Religion, festivals, and, in fact, everything, was enforced by laws and customs. It merely depended upon the issue of a battle whether the inhabitants of a certain district should conform, at least outwardly, to the ceremonies of one of the two contending confessions. Hence this strange intermingling of Catholics and Protestants, independently of differences of language or of natural geographical boundaries. But toleration has recently become the rule, and religious strife is less violent than it used to be. Still even recently a new religious sect has been established, that of the Old Catholics, whose principal stronghold is in the cantons of Solothurn, Bern, and Aargau.* They constituted themselves a separate Church in June, 1876, elected a bishop, and now number 80 congregations, with 75,000 members. The cantonal authorities at the same time took measures to repress the opposition which some of the Catholic clergy offered to the laws of the state, and more especially to the election of priests by the parishioners, as being contrary to the laws of the Church. In the Jura and in Geneva military force was employed to maintain the authority of the state, and quite recently the priests appear to have submitted. Peace, however, has not been restored, and the suppression of monasteries and convents is not calculated to allay the discontent of the clergy and of a considerable body amongst the laity. There now remain 32 monasteries and 53 convents in Switzerland, the former with 438, the latter with 2,132 inmates. Amongst the former the Benedictine abbeys of Einsiedlen, Engelberg, and Disentis, and the monasteries of the St. Bernard and the St. Gotthard, are the most famous.

Some of the smaller cantons (Glarus, Uri, Appenzell, and Unterwalden) have retained their old popular assemblies, or *landsgemeinden*, at which all citizens of the canton deliberate in common. The *landsgemeinden* of Schwyz and Zug have been abolished—the former in 1798, the latter after the religious war waged against the Sonderbund. The meetings in the two Forest Cantons of Uri and Unterwalden are attended by a considerable amount of display, and are very curious

* The Swiss Confederation (*Eidgenossenschaft*) was founded in 1315 by the cantons of Uri, Schwyz, and Unterwalden; Luzern acceded in 1332, and thus arose the federation of the four Forest Cantons (*Waldstätte*). Zürich joined in 1351, Zug and Glarus in 1352, Bern in 1353. The Federation then assumed the title of "*Eidgenossenschaft of the Eight Towns*." This union imparted strength to the Confederation, and it became aggressive, and the great victories at Granson and Murten (1470 and 1476) established its fame. By the treaty of Basel (1499) the independence of the Swiss Confederation had been virtually acknowledged, although it remained nominally a member of the Empire until the treaty of Westphalia (1648). Solothurn and Fribourg joined the Federation in 1481, Basel and Schaffhausen in 1501, and Appenzell in 1513. The thirteen cantons named formed the Federation up to the outbreak of the French Revolution. In addition to them there were "associates," such as the Abbots of St. Gall and the town of Biel, who sent representatives to the Parliament; confederates or allies, including the Grisons, the Valais, Neuchâtel, Geneva, and a portion of the bishopric of Basel, and Mulhausen, in Alsatia; and "subjects" (the Thurgau, Vaul, and other territories). French armies overthrew the old Federation, and established in its place an Helvetic Republic (1798), which a few years afterwards became virtually a dependency of France. The Valais and Geneva became French departments. The Congress of Vienna (1813) established Switzerland within its actual limits and guaranteed its neutrality.

spectacles, recalling a bygone age. In reality, however, the virtual power reposes in the hands of a few leading families. Far more influential is the *landsgemeinde*, which meets at Trogen, in the canton of Appenzell, for it is frequently attended by more than 10,000 citizens. The assembly of Glarus, however, has succeeded most in maintaining its ancient prerogatives. This meeting, in accordance with ancient custom, is attended also by the children. Seated beneath the hustings, they listen to the speeches made by their fathers, and are thus initiated into the politics of the canton. In the larger cantons a body chosen by universal suffrage exercises all the functions of the *landsgemeinden*.

Five cantons (Geneva, Neuchâtel, Valais, and Ticino) retain the representative institutions which up to 1863 were in force in the majority of the cantons. A Common Council—Grosser Rath, or Grand Conseil—is elected by universal suffrage every two, three, or four years. The Executive (Staatsrath, or Conseil d'État) is elected by the Common Council, as are also the judges of the superior court, who usually serve for nine years, and the prefects, or Amtmänner, of the districts. The Common Council is a legislative body, and only bills affecting the constitution of the canton must be submitted to a popular vote before they become law.

All other cantons—and they are the majority—have recently given themselves purely democratic constitutions. In all of these the Common or Cantonal Council is elected by universal suffrage, and in some of them also the executive, the judges, and principal officers. Bills and estimates are prepared by the representatives of the people, but they have no final force until the body of citizens has had an opportunity to express an opinion with respect to them. This “Referendum” is either obligatory or facultative. In the former case all bills must be submitted to a popular vote; in the latter they are submitted only on the requisition of a certain number of citizens, or in the case of money bills, if the sum voted exceed a certain amount. In addition to this, a certain number of citizens may compel the Council to take into consideration any bill that may be deemed of public interest. Moreover, in some of the cantons the Common Council may be called upon to retire before the expiration of the usual term of office. Self-government is rigidly carried out in all these democratic commonwealths, most of the officers being elected. The members of the representative bodies throughout Switzerland, as well as most of the magistrates, are either honorary servants of their fellow-citizens or receive a merely nominal salary.

The local laws differ in many particulars. The penalty of death and corporal punishment have been abolished throughout; the gambling hell at Saxon will soon be closed; but vestiges of mediæval processes still remain. Other cantons have proved themselves more accessible to modern ideas. In Ticino the principle that criminals should be punished only with a view to their moral regeneration is universally accepted, and the punishment is frequently remitted. The numerous ancient laws still in force in many cantons lead to an immense amount of litigation; but there can be no doubt that the pressure exercised by the Federal

High Court of Justice at Lausanne will finally lead to the acceptance of a code which shall have force throughout the Federation.

The greatest difference between the members of the Federation results from their inequality in area and population. The area of the canton of the Grisons is nearly two hundred times more extensive than that of the half-canton of Basel Town, whilst the canton of Bern has forty-six times more inhabitants than that of Unterwalden nid dem Wald. But, in spite of these great differences of area and population, the nineteen cantons and six half-cantons enjoy the same rights and privileges in their local government, the only disability of the half-cantons being this, that they are represented in the State Council only by one member instead of two.* Of all the Federal republics Switzerland approaches nearest to our ideal of a Government carried on by the people. In accordance with the constitution, the sovereignty of the people is acknowledged, and the powers of the State are wielded by functionaries elected by them, or appointed with the consent of

	* Total Area. Sq. M.	Glaciers. sq. M.	Lakes. Sq. M.	Inhabitants.		Inhab. to a Sq. M.	Prevailing Nationality.
				Dec. 31, 1870 (Census).	July 1, 1876 (Estimated).		
Zürich	656.9	—	29.2	284,786	294,994	443	German
† Bern (Berno)	2659.9	111.4	47.4	506,455	528,670	236	Germ., French
† Luzern (Lucerne)	579.5	—	25.2	132,338	133,316	230	German
† Uri	415.4	44.3	7.8	16,107	16,900	41	"
† Schwyz (Schwitz)	350.8	0.5	21.0	47,705	49,216	141	"
† Unterwalden ob } dem Wald	183.2	3.9	4.4	14,415	15,009	82	"
Unterwalden nid } dem Wald	112.2	1.4	12.4	11,701	11,993	107	"
Glarus (Glaris)	266.9	13.9	2.7	35,151	36,179	134	"
† Zug	92.3	—	13.1	20,993	21,775	236	"
† Fribourg (Freiburg)	644.4	—	45.1	110,832	113,952	177	French, Germ.
† Solothurn (Soleure)	302.6	—	0.1	74,713	77,803	259	German
Basel (Bâle) Town	13.8	—	—	47,760	51,515	3,680	"
„ Country	162.8	—	—	54,127	55,548	280	"
Schaffhausen	113.6	—	—	37,721	38,925	344	"
Appenzell, Outer } Rhoden	100.6	0.04	0.04	48,726	48,879	488	"
† Appenzell, Inner } Rhoden	61.4	0.4	0.2	11,909	11,907	195	"
‡ St. Gallen (St. Gall)	779.6	2.9	29.6	191,015	196,834	252	"
‡ Graubünden, Gri- } sons	2774.1	138.7	5.8	91,782	92,905	34	{ Germ., Romaine, Italian
† Aargau (Argovie)	542.1	—	3.3	198,875	201,567	373	German
‡ Thurgau (Thur- } govie)	381.5	—	50.4	93,360	95,074	250	German
† Ticino (Tessin)	1088.2	13.1	25.6	119,620	121,768	111	Italian
Vaud (Waadt)	1244.3	4.3	156.6	231,700	212,439	195	French
† Valais (Wallis)	2026.0	375.2	6.7	96,887	100,490	50	{ French, Germ. Italian
Neuchâtel } (Neuenburg)	311.9	—	36.9	97,284	102,843	331	French
‡ Genève (Genf, } Geneva)	107.9	—	11.6	93,195	99,352	920	French
Total	<u>15981.0</u>	<u>710.0</u>	<u>535.1</u>	<u>2,569,095</u>	<u>2,759,854</u>	<u>173</u>	

† Catholic cantons.

‡ Mixed Catholics and Protestants.

their representatives. The legislative powers are vested in the people and their representatives, and measures of paramount importance must be referred to the voters, without whose approbation they cannot pass into laws. Every citizen may propose a law, and if he can obtain the support of one-thirteenth of the electors of his canton he may take the opinion of the cantonal authorities upon it. In this manner the whole of Switzerland has been converted into a huge parliament, of which every Swiss citizen is a member.

The central authority, up to 1848, was exercised by the *Tagsatzung*, or Diet, which alternately sat at Zürich, Luzern, and Bern. Each canton or half-canton was represented by a Delegate, compelled to vote in accordance with the instructions furnished by his constituency. The large and wealthy cantons had no more to say than the small ones, and the half-cantons had virtually but a consultative vote, for by a legal fiction two half-votes were not considered to count as a full vote, and a bill was not considered to have been carried if $11\frac{1}{2}$ votes had been recorded in its favour. The small cantons actually governed the country. These evils were put a stop to by the Constitution adopted on the 12th September, 1848, on the conclusion of the Separatist war, which converted a loose federation of sovereign cantons into a Federal state.

In virtue of this Federal pact, amended in a spirit of centralization in 1874, no canton is permitted to form political alliances with other cantons or with foreign states. All sovereign powers have been delegated to the National Assembly. It alone can conclude treaties or declare war; the military forces, towards which each canton contributes a contingent, only obey its orders; it coins money and superintends weights and measures; it carries on the postal and telegraph services, and levies the customs duties. The Federation likewise watches over the rights and privileges of the citizens, and interferes whenever a canton attempts to violate the law.

Religious liberty is guaranteed, and elementary education throughout Switzerland is to be compulsory, secular, and gratuitous. If 30,000 citizens or eight cantons require it, each bill carried by the National Assembly must be submitted to a popular vote. This is called a Referendum.

Bern has been chosen capital of the country, and is the seat of the National Assembly, or Bundes-Versammlung, which consists of two chambers. The State Council (Ständerath) is composed of forty-four members, chosen by the cantons and half-cantons, the former being represented by two, the latter by one member. The National Council (Nationalrath) consists of 135 representatives of the people, chosen in direct election at the rate of one deputy for every 20,000 souls. A general election of representatives takes place every three years. Every citizen of the Republic who has attained the age of twenty years is entitled to a vote; and any voter, not being a clergyman, may be elected a deputy. The chief executive authority is deputed to a Bundesrath, or Federal Council, consisting of seven members, elected for three years by the Federal Assembly. The President and Vice-President of the Federal Council are the first magistrates of the Republic. Both

are elected by the Federal Assembly for the term of one year, and are not re-eligible till after the expiration of another year. The seven members of the Federal Council—each of whom has a salary of £480 per annum, while the President has £540—act as ministers or chiefs of the seven administrative departments of the Republic.

The eleven members of the Federal Tribunal are elected for six years by the Federal Assembly. It decides on all matters in dispute between the cantons, or between cantons and the central Government, and acts in general as a High Court of Appeal. Its seat is Lausanne. The constitution of 1874 abolished corporal punishment and the penalty of death, and transferred all legislation on commercial matters and copyright to the National Assembly.

There is no standing army, but all citizens are called upon to render military service between the ages of twenty and forty-four, or to pay an exemption-tax should they be physically unfit. The *Bundes-Auszug* (field force, absurdly called *élite* the French cantons) consists of all men up to thirty-two, and each canton is required to furnish a force equal to at least 3 per cent. of its population, and in addition a reserve of half that strength. The *Landwehr* (militia) includes all men who have passed through the *Auszug*. Most of the expenses connected with the army are borne by the Federation.*

The cantons levy the recruits, appoint the officers, and carry on the administration of their contingents. The Federal authorities furnish the instructors, and exercise a general control. All legislation on military matters emanates from them.

The army, though not a standing one, nevertheless weighs heavily upon the Federal and cantonal budgets, and a deficit has become almost chronic since the middle of the present century. The first Federal loan was contracted in 1867, and fresh loans will have to be contracted in future every year unless the cantons are called upon to cover the deficiency in the public revenue. This, however, would be a dangerous experiment, for most of the cantons raise their revenues by direct taxes, and would resent any increase of the heavy burden they are obliged to bear even now. The Federal revenue is derived chiefly from customs, for the Post and Telegraph Offices yield but a small surplus. A portion of the revenue is

* Federal army (December, 1876):—

AUSZUG.		LANDWEHR.	
Staff	620	Staff	110
Infantry, 107 battalions	98,188	107 battalions	81,617
Cavalry, 24 squadrons and 12 troops	2,646	24 squadrons and 12 troops	2,279
Artillery, 60 batteries and train	15,530	23 batteries and train	7,421
Engineers, 8 battalions	2,285	8 battalions	1,484
Hospital Corps	887		—
Administrations	292		604
Permanent Instructors	187		—
	<u>120,635</u>		<u>93,515</u>

Each man undergoes six to eight weeks' setting-up drill, and as long as he remains in the *Auszug* he annually attends a week's or a fortnight's training, according to the branch of the army to which he belongs.

paid over to the cantons. These latter derive their chief revenue from a property tax of one and a half per mille.*

* Revenue and expenditure of the Confederation :—

	Revenue.	Expenditure.
1874	£1,873,792	£991,295
1875	1,580,640	1,370,640
1876	1,659,496	1,704,880
1878	1,642,600	1,684,920

The military expenditure amounted to £586,239 in 1876, as compared with £127,439 in 1872.

The public debt of the Republic amounts to £1,170,000. As a set-off against the debt there exists a so-called "Federal fortune," including landed property and invested capital. It is valued at £1,271,332, but only yielded £11,736 in 1876.

The cantonal debts probably amount to £400,000.

Taxation, inclusive of what is levied by the cantons, is sufficiently onerous to excuse a great amount of grumbling.





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